Assessing The Extent Of IT Integration Across The Business Curriculum

Ronald R. Tidd, (Email: Ron@rrtidd.com), Central Washington University

ABSTRACT

This paper describes a methodology for assessing the extent to which computer technologies have been integrated across the business/management curriculum so as to enhance learning process and outcomes. The assessment was motivated by the need to: Inform interested individuals such as current and potential students, prospective employers, administrative/budget personnel, and accrediting bodies about the extent to which these technologies are being taught and used; and Increase the learning efficiency of the integration effort by ensuring that computer-based learning tasks are properly sequenced across the curriculum, so that students develop the necessary computing skills and knowledge in a timely manner. Data will be collected using a web-based survey instrument that feeds responses into a database for analysis. The survey's design is the focus of this presentation.

INTRODUCTION

Business professionals and professors operate in an environment that is increasingly dependent on networked computer technologies (Martin 1999; Tapscott 1996). Various software applications facilitate the collection and analysis of data while intranets, extranets and the Internet facilitate the dissemination of information and collaboration with colleagues who may be scattered around the globe.

Clearly, there is pressure for business school graduates and educators to develop a different and evolving set of skills and knowledge (Albrecht and Sack 2000; Hanna 2000; AICPA 1999; AICPA 1998; AECC 1990). Both must be able to use computer technologies as strategically significant resources, and employ them to help manage organizational resources and fulfill organizational mission. They must also be able to use the technologies to enhance career performance (IFA 1998; AICPA 1997). Whether used to prepare professional communications and analyses or participate in just-in-time learning, computers will be in integral part of career success.

This situation increases pressure on business educators to devote more resources to technology-specific course content (Farrington 1999: Heterick et al 1998; CAUSE 1993; Penrod and Dolance 1992) and technology-enhanced learning processes. Unfortunately, the demand for computer resources exceeds the supply as budget constrained programs try to respond to a student body that will grow in size until around 2010. In addition, and as always, there is insufficient time within the traditional four-year degree program to impart all of the desired skills and knowledge. Clearly there is a need to become more efficient to increase effectiveness. This requires, in part, that the theoretical foundations established in learning psychology must guide the integration of computer technologies into the business curriculum (Glaser 1990).

This paper reports on the initial stage of a research agenda designed to assess the extent to which computer technologies have been integrated across the business curriculum. The current focus is on the design of a survey instrument to be administered to faculty to collect information about the use of computers in the learning and teaching processes. The next section of the paper describes the factors that guide the instrument's design, including the theoretical foundations established in learning psychology. The third section describes the proposed instrument. The paper closes with a description of the future stages of the research agenda.

FOUNDATIONS

Business educators must prepare students for the evolving networked business environment, and will find themselves subject to the same influences as business. Schools are under pressure to use technology for the following reasons:

- To support administrative needs and
- As a tool for or the topic of learning.

The latter is a resource intensive activity that requires extensive planning and coordination. It must be guided by theoretical foundations to increase the likelihood of enhanced learning outcomes (Schmidt and Olcott 2000).

Gagné et al (1992) developed the conditions of learning theory to guide the development of theory-based programs of learning. It is one of several alternative theories developed in learning and cognitive psychology[1] (Kearsley 1999) that share a common theme: The most effective and efficient learning involves a sequential process that is individualized for each learner. That basic idea provides a useful foundation for developing a framework for sequencing learning tasks that exploit the power of common software.

The conditions of learning theory identifies a sequence of learning outcomes/objectives (Table 1). Each capability provides necessary enabling skills for those that follow, so learners must master each capability before moving to the next. Frustrations and failure occur for those who do follow the theory's prescribed path.

Table 1
Learning Outcomes/Objectives

Capability	Description
1. Motor Skill	Ability to complete purposeful actions that require skeletal muscle
2. Attitude	Predisposition towards certain behaviors, such as studying a particular topic
3. Verbal Information	Acquisition of facts and organized knowledge about the topic
4. Intellectual skills	Ability to perform symbolically controlled procedures
5. Cognitive Strategy	Ability to monitor and manage cognitive processes

To master each capability, learners must progress through the conditions of learning[2] (Table 2) for each capability. For example, to master the verbal information related to buy-versus-lease decisions, learners must engage in a properly sequenced learning process:

- Identify the learning objectives (learn new terms and knowledge).
- Establish links to relevant previous studies (net present value and depreciation calculations, decision making rules, tax deductions, etc.).
- Examine and encode material covering the new terms and knowledge.
- Elaborate on the new material (complete exercises and problems)
- Assess the success in fulfilling the learning objective (test).

This process can only be attempted for the verbal information capability only after it is completed for the motor skill and attitude capabilities; It must be repeated for the intellectual skills and cognitive strategy capabilities

[1] Also see Bloom (1956), Bonner (1999), and Decker and Cheski (2000).
[2] The conditions of learning are actually different for each learning outcome. The presentation identifies the essential elements of the conditions, without damaging the theory's structure and application.

Table 2
Conditions of Learning

Conditions of Learning	Description
1) Identify	Identify learning objective
2) Link	Establish link to previous material
3) Examine	Examine and encode new material
4) Elaborate	Elaborate on new material
5) Assess	Assess learning outcome

The obvious application of the theory to the use of computers as either a tool for or topic of learning exercises is that learners need to develop first the physical skills (e.g., typing and "mousing") then the knowledge. In particular, application-specific knowledge must be sequential starting with the basic features and progressing through increasingly complex features that enable mastery of the most complex features. Consider Microsoft Excel, for example, one of the more ubiquitous business tools. A learner must master basic data entry and formatting skills before moving on to the use of formulas, and master the use of formulas before attempting to learn how to use the Solver add-in for constrained optimization.

INSTRUMENT

The survey instrument must capture data that will identify the extent to which computer technology is integrated across the business curriculum and implements the concepts of the conditions of learning theory. Thus, each faculty member must respond for each course that he/she teaches to survey questions organized by the following main questions:

- Which technologies are you using in the course?
- What is your primary reason for using these technologies?
- What is the teaching environment in which you are using those technologies?
- How do you make the materials available for your students?
- Who developed the materials that you use?

Thus the survey results will help identify whether essential computing skills are used and taught at the appropriate time in the curriculum. The current version of the survey is accessible on the author's web site at www.rrtidd.com /ITintegrate.htm.

FUTURE EFFORTS

The real work in this project will occur after the survey instrument is finalized and administered. At that time it will be necessary to assess whether the curriculum has a sufficient degree of integration to ensure that students should have the necessary skills upon graduation. To the extent that there is insufficient or inappropriate integration, then it will be necessary to consider revising the curriculum at appropriate points.[3] It will also be necessary to develop an "exit exam" to test graduating students on their mastery of the more significant computing skills.

REFERENCES

1. Accounting Education Change Commission (AECC). 1990. Objectives of education for accountants: Position statement number one. *Issues in Accounting Education* (Fall): 307-312.
2. Albrecht, W. S., and R. J. Sack. (2000). *Accounting Education: Charting the Course through a Perilous Future, Accounting Education Series, No. 16*, Sarasota, FL, American Accounting Association.
3. American Institute of Certified Public Accountants (AICPA). 1999. Core competency framework for entry into the accounting profession, http://www.aicpa.org/edu/corecomp.htm. (Accessed January 31, 2005.)

[3] The Department of Accounting is already engaged in this process in its core courses for accounting majors.

4. American Institute of Certified Public Accountants (AICPA). 1998. AEEC integration of technology into the learning experience, http://www.aicpa.org/edu/taskfrpt.htm (Accessed January 31, 2005.)
5. Bloom, B.S. 1956. *Taxonomy of Educational Objective.* New York: David McKay Company.
6. Bonner, S. 1999. Choosing teaching methods based on learning objectives: An integrative framework. *Issues in Accounting Education* (Spring): 11-39.
7. CAUSE. 1993. *Reengineering Teaching and Learning in Higher Education: Sheltered Groves, Camelot, Windmills, and Malls*, *Professional Paper Series # 10,* edited by R. Heterick, Jr. Boulder CO: CAUSE.
8. Decker, K., and M. Cheski. 2000. Web-based instruction: It's not just a web page. *Business, Education, and Technology Journal*, (Spring): 26-31.
9. Farrington, G. 1999. The new technologies and the future of residential undergraduate education. In *Dancing with the Devil*, edited by Richard Katz and Associates. San Francisco, CA: Jossey Bass Inc.
10. Gagné, R., L. Briggs, and W. Wager. 1992. *Principles of Instructional Design.* Fort Worth: Harcourt Brace Jovanovich College Publishers.
11. Glaser, R. 1990. The reemergence of learning theory within instructional research, *American Psychologist* (January): 29-39.
12. Hanna, D. 2000a.Emerging approaches to learning in collegiate classrooms. In *Higher Education in an Era of Digital Competition*, edited by Donald E. Hanna & Associates. Madison, WI: Atwood Publishing.
13. Hanna, D. 2000b.Higher education in an era of digital competition: Global consequences. In *Higher Education in an Era of Digital Competition*, edited by Donald E. Hanna & Associates. Madison, WI: Atwood Publishing.
14. Heterick, R., J. Mingle, and C. Twigg. 1998. The public policy implications of a global learning infrastructure, http://www.educause.edu/ir/library/html/nli0005.html. (Accessed February 7, 2005.)
15. International Federation of Accountants (IFA). 1998. *Information technology in the accounting curriculum, International Education Guideline No. 11*, New York, NY, International Federation of Accountants.
16. Kearsley, G. 1999. Explorations in learning & instruction: The theory into practice database, http://www.gwu.edu/~tip/. (Accessed January 31, 2005.)
17. Martin, C. 1999. *Net Future*. New York, NY: McGraw-Hill.
18. Penrod, J. and M. Dolence. 1992. Reengineering: A Process for Transforming Higher Education. Boulder, CO: CAUSE.
19. Schmidt, K., and D. Olcott. 2000. Integrated technology systems design: A model for aligning pedagogical quality with learning technology. In *Higher Education in an Era of Digital Competition*, edited by Donald E. Hanna & Associates. Madison, WI: Atwood Publishing.
20. Tapscott, D. 1996. *The Digital Economy*. New York, NY: McGraw-Hill.

NOTES