AN ABSTRACT OF THE DISSERTATION OF

Paul A. Fisher for the degree of Doctor of Philosophy in Education presented on March 6, 2013.
Title: Changing Student Learning Approaches in Fundamental Accounting Education Through the use of Graphic Organizers

Abstract approved: _____
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The field of accounting has experienced dramatic changes in the past 20 years. Advances in technology and workplace requirements have changed the responsibilities in the accounting position of a historical recorder to a functioning manager within the organization. The curriculum used by accounting instructors has not changed or kept pace with redefinition of accounting competency. This study was designed to measure the effectiveness of graphical organizers in teaching accounting. Assessment was based on a deep versus surface approach checklist which was altered to reflect accounting terminology. Means testing was the primary comparison protocol. Two classes were selected in an Oregon community college which were instructed by the same instructor. One class used graphic organizers as a communication tool, and the other class did not. Results did not indicate or favor one method over the other. Other learning factors contributed to the lack of significance in this study.

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Changing Student Learning Approaches in Fundamental Accounting Education Through the Use of Graphic Organizers

by

Paul A. Fisher

A DISSERTATION

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Doctor of Philosophy

Presented March 6, 2013

Commencement June 2013

Doctor of Philosophy dissertation of Paul A. Fisher presented on March 6, 2013.

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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

Paul A. Fisher, Author

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Chapter 1: Introduction

According to the *New York Times*, 100,000 U.S. tax returns, both federal and state, will be prepared by Indian citizens in Bombay and Bangalore this year. The number is four times larger than last year and many more times greater than the several thousand of just two years ago (AccountWEB.com, 2004).

Foreign nationals are increasingly preparing tax returns for United States citizens at a fraction of the U.S. cost. This phenomenon reflects the state of accounting in the 21st century. Tasks and procedures that traditionally were reserved for the professional accountant are now being performed by lower-paid individuals with less training. Industry drives to cut operating costs has finally expanded beyond manufacturing and customer service to the accounting field. These changes are the result of globalization, technology, and economic concentration (Albrecht & Sack, 2000, Chapter 2), and it is even more important to recognize how the interrelationships among these three elemental pressures are driving changes that affect the future of accounting and therefore the instruction of future accountants.

Traditional Accounting Instruction

Traditional accounting is a rule-based discipline (Carlson, Forkner, & Prickett, 1947). Accountants have spent a great deal of their time as company historians categorizing economic events into standardized reports and statements that record the economic events of the business and compute the financial health of the organization. To be successful in the traditional accounting setting, an individual needed to exercise

great discipline in using terminology and in ensuring the preciseness of hand-written worksheets and schedules. The need for neatness and the standardized nature of the handwritten worksheets led to a number of manual techniques that became integral to learning the profession of bookkeeping and accounting (Diller-Haas, 2004). Students learning accounting were required to master the standardized formats and the protocol of recording data as an integral part of their knowledge base (Albrecht & Sack, 2000, Chapter 5). Examples of this protocol are found in the posting procedure, journalizing rules, standardized accounting worksheets and schedules, and the closing routine (Weygandt, Kelso, & Kimmel, 2002). These practices are not without academic foundation.

B. F. Skinner's operant learning theory proposed that education is a series of small steps that leads the learner to understanding (Schunk, 2000). Accounting has traditionally been instructed as series of steps with the result assumed to be an understanding of the discipline. While these traditional accounting concepts were not overly complex, the manual recording routines were. Elaborate protocols and conventions were created to standardize the industry. Many students who understood the principles and concepts of accounting had difficulty with the protocol aspects of the accounting discipline. In traditional accounting education rote memorization has been the dominant instructional paradigm. Mastery of detailed recording routines served as both the object of an accounting education and the main reason for employment in the workplace (Diller-Hass, 2004).

Current authors such as Albrecht (Albrecht & Sack, 2000, Chapter 8), Ainsworth (2000), Glass and Oakley (2003), and Jennings (2001) do not think rote memorization is a successful pedagogy for accounting and are searching for greater organizational understanding from students (Merritt, 2002). The approach method a student uses to learning is important because accountants are going to be required to be much more flexible in the future, and student study decisions will impact their future (Booth, Luckett, & Mladenovic, 1999).

One alternative pedagogical approach is the use of graphic organizers in accounting education. By exploring the use of graphic organizers and documenting the value of their use in the new pedagogy, this research identifies the need, suggests a process, and delineates some outcomes from using graphic organizers in accounting education. In this research, changes in students' approach to study are used as a measuring device to indicate the value of using graphic organizers in the classroom.

The Graphic Organizer

A graphic organizer is a visual representation of the relationships of different concepts. Kaplan and Norton (2000) defined graphical organizers as "a visual representation of a company's critical objectives and the crucial relationships among them that drive the organizational performance" (p.168). Gowin and Novak (2002) stated that concept maps are "intended to represent meaningful relationships between concepts" (p. 15).

The graphic organizer, often called a "concept map" or a "mind map" (Katayama & Robinson, 2000), has been used for many years as a tool to assist

learning. More recent authors have called the graphic organizer a “learning map” (Krasnic, 2011). A range of disciplines routinely use graphic organizers as a student activity to provide a broader understanding of the subject matter. These disciplines include the sciences, such as biology and physics, as well as writing and mathematics (Austin & Shore 1995; Nicoll, Francisco, & Nakhleh, 2001b; Rye & Rubba, 2002). While the use of graphic organizers in accounting education is not commonplace, it can be argued the graphic organizer may prove to be a useful learning tool in accounting education. This is particularly relevant in the current changing workplace environment.

Roberts (1999) demonstrated the value of using the graphic organizer in the study of statistics by identifying three complementary objectives of concept maps. The purposes identified by Roberts were (a) a method of learning, (b) a method of enabling feedback, and (c) a method for assessment. Since these same three purposes or intentions exist in accounting instruction, perhaps the graphic organizer can be used as a learning tool for accounting students as well.

Classroom Application

Graphic organizers could help create a plan for learning, provide an efficient method for giving feedback to students, and serve as an avenue for assessment. The value of the graphic organizer lies not in the final product but in the process of developing and producing it (Katayama & Robinson, 2000). The challenge for an instructor is to create an environment for the communication of broad issues and to have a means for understanding what the student masters and what pieces of

curriculum need reinforcement. Consider these two examples from an introductory accounting course (for full-page replications see Appendixes A and B):

Example A Example B

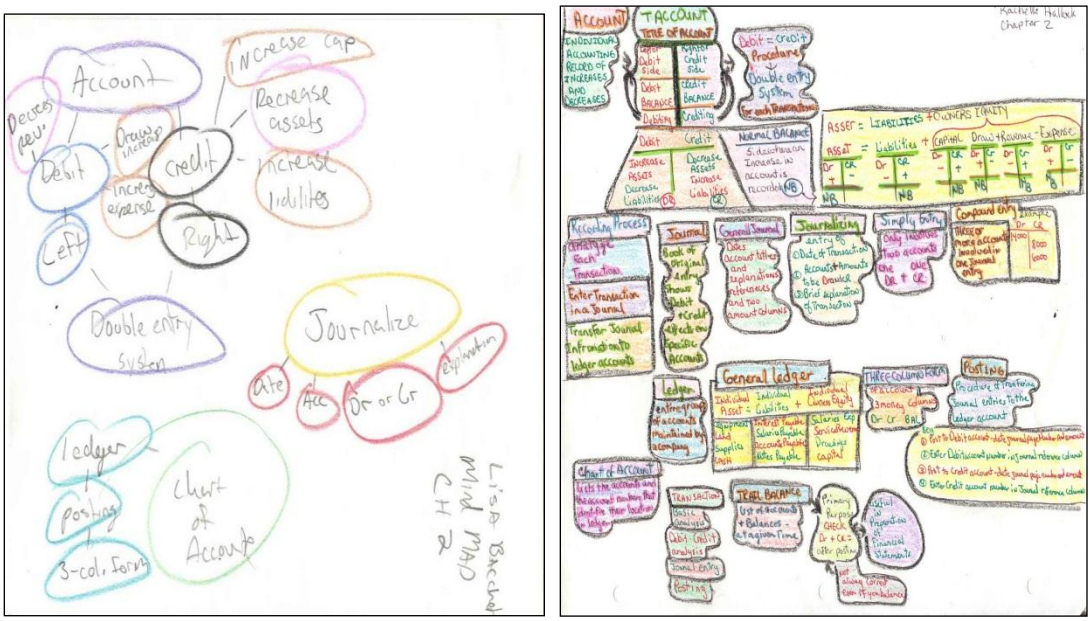

Figure1.1 *Examples of Student Generated Concept Maps*

Reproduced with the permission of the students.

Example A demonstrates to the instructor that the student is having some difficulty in visualizing both how accounting principles fit together (how concepts are related) and what differentiates the concepts from one another. Student A is also demonstrating disconnected procedures. Student A is aware of the pieces of accounting, but not the relationships between the concepts and how the processes cork together. Example B demonstrates the student is much more aware of the different aspects of accounting and how they are related. This is demonstrated by the location of the “T accounts”

under the proper category and how increases and decreases are documented. Example B also shows how the student understands the process of accounting and the important sequential operations. It is clear through this map the second student has a higher level of understanding and is able to visualize the categorical relationships. This is meaningful learning (Gowin & Novak, 2002).

The challenge of this research was to explore learning strategies. It was hoped that through a better understanding of learning strategies student learning will be improved. Workplace requirements have changed in the last 20 years, but accounting education has not kept pace. Changing student learning approaches in order to help bring the student from the level of understanding reflected by Example A to the level indicated in Example B is the central theme of this research.

Study Focus

The purpose of this study was to examine the use of graphic organizers in fundamental accounting education and to demonstrate that graphic organizers are valuable tools for helping accounting students to develop deeper learning approaches. Deeper learning approaches may promote greater success in accounting courses and enhance lifelong learning behaviors. Evaluating graphic organizers may increase the chances of furthering communication between instructor and student to help in improving student understanding. In particular, the study documented the experience of two fundamental accounting classes. The research instructor taught two concurrent sections of the same accounting course. One section per instructor used graphic organizers as a communication tool, and the other did not. A student questionnaire

administered at the beginning and the end of each course to determine if changes in the students' study approach can be empirically measured.

Need for Change

Understanding why accounting education curriculum needs to change requires an examination of the student, the instructor, and the workplace environment. Traditionally, the primary responsibility of bookkeepers has been to act as record repositories; determining how specific transactions would be recorded; maintaining the records; computing similar transactions with historical consistently; and then reporting the significance of the records to members of the organization. The assigned task was to record economic events properly using good judgment in accordance with the prescribed rules. After the events were recorded and reported in financial reports, accountants then deciphered the meaning of the records and statements for the benefit of others in the organization (Weygandt, Kieso, & Kimmel, 2002). Simply put, bookkeepers recorded events, and accountants managed action.

In today's workplace, the accountant's professional demands have dramatically changed. Workplace surveys have indicated that skills such as analytical/critical thinking skills, computer skills, communication skills, and interpersonal skills are more important than the technical skills of knowing Financial Accounting Standards Board (FASB) and Generally Accepted Accounting Principles (GAAP) rulings (Ainsworth, 2001). The causes for this change are numerous, including advances in technology, shifts toward globalization, and the increased concentration of power among fewer financial players. It is the computer; however,

that has had by far the most dramatic effect on the activity of accounting (Albrecht 2002). The meteoric rise of the computer over the past 30 years has had a profound impact on the accounting industry. Rule-based computers are very well adapted to performing the repetitive actions or calculations that are the mainstay of traditional bookkeeping. Systems have been developed that standardize the format and make fewer computational errors. Computers are far more efficient in producing the financial statements for companies and can produce graphs and comparative reports virtually at the press of a button (Albrecht, 2002). Access and availability have reduced the cost of providing immediate and current information to almost zero. Enterprises are no longer willing to pay for the manual system of accounting when they can acquire timelier, computerized information in a better format for less cost.

As a result, the accounting profession is no longer the "mystery-laden" discipline for which jargon and protocol have acted as a barrier to employment entry. Many accounting software companies advertise programs that are easy to use and understand. Not only has the monopoly over how to meet the demand of immediacy from organizations been broken, the "historical perspective" accountants have long depended on for employment has evaporated (Albrecht, 2002). In order to keep accounting education current, the techniques for both its teaching and learning need to change (Russell & Smith, 2003).

Workplace Requirements

The changing business environment has also pressured the accounting profession. Clients are demanding outcomes from accounting education, and those

organizations are demanding it faster and faster. Traditional bookkeeping techniques are not flexible enough to serve these new demands (Ainsworth 2001; Geary & Sims, 1994). Traditional accounting education is further challenged by globalization and by the different business models that are prevalent in the modern environment. By extension, traditional accounting education does not sufficiently prepare students for the world they will face when job hunting. Some analysts have placed the output of the traditional bookkeeper at one-tenth the value of a "consultant or decision maker" (Albrecht, 2002). For today's students to have a future market for their skills and talents, they must learn a different way to apply new skills (Albrecht & Sack, 2000). "Accounting education is perceived as having a number of problems, including:

- Course content and curricula
- Pedagogy
- Skill development
- Technology
- Faculty development and reward systems
- Strategic direction" (Albrecht & Sack, 2000, p. 44)

These results were verified by Burnett (2003). Today, accountants need to be able to communicate organized information and to identify and solve problems in unfamiliar and changing environments. Procedural accounting education does not prepare students for this environment. Catanach, Croll, and Grinaker (1998) stated, "The traditional approach (to accounting education) is too sterile and overly reliant on highly structured problems and rule memorization" (p. 4). Albrecht and Sack (2000)

posited this criticism: “Our pedagogy often lacks creativity … and does not develop the students’ ability to learn” (p. 43). Glass and Oakley (2003) phrased the concern even more strongly: “Accounting education is failing to meet the needs of the profession by focusing curricula on memorization or accounting rules rather than the development of conceptual and analytical skills necessary for today’s accounting environment” (p. 679). Changing the pedagogy is a requirement for student success in the future, and teaching students how to learn is more important than ever (Walker, 2000). This research focused on changing one pedagogical practice to accounting education in order to encourage students to develop a study approach that can serve as a lifelong learning model.

Research Questions

The research examined these questions:

- To what extent does the use of graphic organizers change the study approach students use to learn accounting?
- What are some advantages and disadvantages of using graphic organizers in first-term accounting education?
- What are the major issues that need to be considered when using graphic organizers in the instruction of fundamental accounting courses?

Summary

Accounting is a very traditional discipline which is being challenged by some significant technological changes. While the context of the accounting profession has

changed, the manner in which accounting is instructed has not changed significantly. Accounting instructors continue to use traditional techniques to deliver education to accounting students. These techniques include repetitive computations and detailed recording of economic events. Fundamental accounting students are comprised of two groups; those continuing into the profession of accounting and those that are not. There is some disagreement concerning how students should be instructed. While some in the teaching field cling to traditional procedural methods of instructing, researchers are beginning to explore the application of informational techniques in teaching accounting students.

Graphic organizers are currently being used with success in other of disciplines to assist students in learning. This study Examine the use of graphic organizers in teaching accounting. It is an attempt to statistically demonstrate that graphic organizers have an effect on student learning strategies and give credence to the practice of using graphic organizers as a class activity.

The literature review will describe traditional accounting pedagogy and suggest why a change in accounting education is necessary and desired. Documenting the current needs of accounting education will lead this research to determine what kinds of pedagogical trends are being attempted and to discuss some of the successes in terms of instructional best practices. In addition, a brief history of graphic organizers will be presented to provide a background for this paper. Finally, the literature review will direct the reader to further areas of study.

Chapter 2: Literature Review

The literature review for this study is divided into three sections. The first section briefly describes accounting education in general and outlines some fundamental differences in the educational approaches to accounting. The second section focuses on different approaches to learning and how these learning approaches can affect teaching techniques. The third section is dedicated to the use of graphic organizers in the classroom and to the different methods used to evaluate students' work.

Overview

With the two exceptions of the Starch and Elliott (1912 & 1913), studies relating to the correlation of grades and proficiency and some early work that examines some historical aspects of learning approaches, the literature selected is intended to include the latest works on the subjects. In general, the literature has been limited to texts written in English and appearing from 1990 to the present, although there are some exceptions.

The focus for this study was to find literature that related to students taking courses in fundamental accounting within the United States. The resources selected for this literature review were identified using the following databases: ERIC, Academic Search Premier, and Business Source Premier. The terms used in the literature search consisted of the following: *accounting*, *accounting education*,

learning approaches, study approaches, graphic organizers, concept maps, mind maps, and *student evaluation.*

Accounting education in general. The first portion of the review shows how the accounting industry has incorporated organizational theory into its business structure. This is important because traditional accounting has driven organizational characteristics. This is evidenced by the traditional corporate departments like accounts payable/purchasing, accounts receivable or billing, asset managers, and advertising for managers with "profit & loss responsibilities." The departmentalization and isolation of traditional accounting functions represent major challenges for current accounting professionals. A major theme for Albrecht and Sack (2000) was to break departmental isolation.

Actions taken in the modernization of accounting has led to a theoretical split among accounting instructors, with those applying the different approaches commonly referred to as "preparers" and "users" (Diller-Haas, 2004). The first group, preparers, thinks it best to maintain the conventional methods and procedures that have been used over time. Strict definitions and a specific protocol guide the preparers' activities. The other group sees procedural accounting education as archaic and not responding to the demands of industry. This group, the users, prefers education designed for those that rely on, or "use" the reporting of accounting information. Decision making and communication are more important to users than are the protocols or procedures that preparers prefer.

The preponderance of research evidence has supported the need for a change in accounting education (Ainsworth, 2001; Albrecht, 2002; Glass & Oakley, 2003). Current, peer-reviewed, published authors that support the rote-memorization method of teaching accounting were not found; however, because this method is in such broad-based use, it has become part of the pervasive culture of teaching, and widespread anecdotal evidence can be found.

Learning approaches. The second section of the review outlines how various types of learning can lead to the learning outcomes suggested by the Accounting Education Change Commission (AECC). This research used the *Approach to Learning*, which is a dominant paradigm for student learning (Booth, Luckett, & Mladenovic, 1999). This learning theory identified three types of student learning approaches. These were surface, deep, and achieving. *Surface* and *deep* learning define how a student engages in learning, and *achieving* indicates how a student organizes his or her work for effectiveness. In effect, the Biggs's achieving component explains how well a student implements the selected approach to learning, and not which method they choose. (Biggs, 1978; Biggs, 1989)

Rote-memorization, or surface learning (Novak, 1998), is a basic type of learning. This learning strategy is effective for passing the tests that have been used as an entry barrier to the profession of accounting. A common example of the use of a successful rote-memorization technique is how people study to pass the comprehensive portion of the driver's license test. Applicants learn how many feet before a corner to signal and the legal distances between cars. They are able to pull

figures from memory without internalizing or visualizing safe distances. There is little contextual application to the information. While they may know the rules, they are not necessarily safe drivers. The current system of licensing recognizes this deficiency by requiring two parts to the licensing test. In addition to knowing what the rules are (written test), applicants are required to demonstrate competency in actual driving. The intended outcome is safe driving over the years, and not simply completing a test bank of questions successfully.

A *deep learning approach* requires the student to have a better understanding of the foundations of the subject rather than simply a familiarity with the rules or procedures of the subject (Lucas, 2001). Written communication, analytical and critical thinking, oral communication, and decision making are the skills that accountants use on a daily basis, therefore our education should model this behavior (Booth, Luckett, & Mladenovic, 1999).

The *achieving approach* encompasses how a student organizes and goes about completing his or her work. Biggs (1987) described the characteristics of an achieving study strategy as the "model student." Biggs (1989) further defined the achieving approach as an extrinsic motivational form and included examples such as organization in time and work space as indicators of the achieving approach. Students can organize information with varying degrees of efficiency regardless of the choice of approach (Biggs, 1987; Biggs, 1994).

Novak (1998) recalled David Ausubel's learning theory of "thinking (cognition), feeling (affecting), and acting (psychomotor)" (p. 59). The classroom

should encourage these learning approaches throughout the curriculum. For accounting education, by tilting pedagogical activities toward the deep learning encouraged by the AECC (Ainsworth, 2001), the fundamental accounting class will become more valuable to the student (Booth, Luckett & Mladenovic, 1999).

Graphic organizers in accounting. The third and final section of the literature review discussed the uses of graphic organizers in education and the ways they might be used in teaching fundamental accounting courses. The purpose of this section was to develop an understanding of methods that aid in student learning; that allow feedback between the instructor and the student; and that can be used as a tool to assess student comprehension. This discussion builds on the work of Sirias (2002). As a starting point, the rubric used integration, differentiation, and accuracy as the major indicators of student understanding. Other features like timeliness and chapter learning objectives were being incorporated to assist in the assessment of a student's understanding by providing additional empirical information. The objective of the scoring rubric was to provide a tool that could be used effectively and efficiently by both instructor and student to improve communication. The initial rubric is described in greater detail in Chapter 3, Design and Methods.

Accounting Education in General

Frederick Taylor was a proponent of "scientific management" (Hope & Fraser, 2003, p. 105). Taylor's influence has been widespread, and he remains today one of the founding thinkers in the art of organizational management. Taylor's basic precept was that honing and polishing individual activities makes the entire

organization more efficient, which in turn increases the overall financial performance of the organization. One result of the specialization encouraged by Taylor was seen in the departmentalization of organizations. This was particularly true in the accounting field. Accounts receivable and sales generally belonged to a different department than purchasing and accounts payable. Both groups of workers were very good at their tasks, but they perform the tasks separately and in virtual isolation from the rest of the institution. Very precise and mechanistic routines and algorithms were developed in order to allow accountants to assure accuracy and efficiency in their job performance. Debit and credit rules, 10-columnar worksheets, and accounts receivable aging schedules are examples of these precise sequential routines.

The language of business. The traditional educational approach was also mechanistic and functionally based. Testing for subject proficiency was based on a series of isolated problems, in accordance with the underlying Taylor assumption that if a student mastered the parts and details, he or she would have mastered the entire subject area (Hope & Fraser, 2003). The image of a silo operation is helpful in understanding this recording process. Once one silo is completed (or "full"), the student proceeds to learning the next silo of information. There is little relationship between the different silos, and there is an assumption that the student will put incorporate the facts into their knowledge base (Rahman & Velayutham, 1998).

One example of this preparer method is found in the problem set of a procedurally based text. The problem reads:

The challenge problem in this chapter is designed to test your knowledge of relationships among the parts of the manufacturing cost calculation.

Directions: Fill in the missing amounts in each column. Each column[1] is independent of the others.

	Work in Pro. Beg.	Raw Mat. Beg.	Raw Mat. Purch.	Raw Mat. Avail.	Raw Mat. End	Cost Raw Mat. Used
(a)	$25,000	$50,000	$110,000	?	$45,000	?
(b)	$40,000	$45,000	?	$205,000	?	$140,000
(c)	?	?	$210,000	?	$29,600	?
(d)	?	?	$306,500	$337,500	&29,600	?

And then on the following page:

	Labor and Overhead	Total Mfq. Costs	Total goods in Production	Work in Pro.End	Cost of goods Mfq.
(a)	$200,000	?	?	$ 20,000	?
(b)	?	$310,000	?	?	$320,000
(c)	?	$510,000	?	$ 55,000	$550,000
(d)	$125,000	?	$455,000	$ 37,200	?

Figure 1.2 *Sample Procedural Question*
(Dansby, Kaliski, & Lawrence 2010, p. 1119) Reprinted with permission of Paradigm Publishing, Inc., St. Paul, MN.

The correct answer requires converting the format to a workable schedule, and then performing the computations. The blueprint for this problem is a Statement of Cost of Manufacturing however the authors do not give direct information for the student to solve. The underlying assumption is that given the parts, the student will be able to develop the proper relationships. (The completed answer is in Appendix B.) While being computationally correct, what this problem does not help the student to understand is how business decisions affect the financial reports. In other words, how do decisions made in one area of operation affect the outcomes of the organization?

[1] This should actually be row. It is believed this is a typographical error. While this does increase student confusion, it does not invalidate the example.

From this procedural learning paradigm, it is assumed that if the student can master the details, they have command of the subject (Davidson, 1995). If the student can perform the computational gymnastics, the conclusion is that the student has mastered the subject. Metaphorically speaking, this is similar to assuming that a person completing crossword puzzles can write.

Contrary to the silo metaphor, the workplace does not operate in independent arenas that have little contact with others (Kaplan & Norton, 1992). The workplace consists of highly integrated and interdependent organizations, each of which may require a different understanding of how work is accomplished (Albrecht & Sack, 2000). To better serve this new workplace, AECC has encouraged accounting education to change and to move toward a different educational model (Ainsworth, 2001). The model should include the following changes: less emphasis on computational and skill development and more emphasis on concept development communication; less emphasis on statement preparation and more on analysis, planning, interpretation, and decision making; a change in focus from rule-based learning to conceptual understanding; less instruction in bookkeeping and more focus on understanding organizational behavior; a breakdown of the silo structure; more instruction that positions accounting as an integral part of business and of the marketplace; more emphasis on the role of accounting and information in the management of a global enterprise; and the inclusion of "best practices" into the classroom (Albrecht & Sack, 2000). Observe the differences in the following user based text by Edmonds, Edmonds, McNair, Olds, Tsay, and Milam (2007):

Babb enterprises loaned $25,000 to Sneathen Co. on September 2, 2008 for one year at 6% interest.

Required: Show the effects of the following transactions in a horizontal statements model like the one shown below:

	*	Cash	*	Notes Receivable	*	Receivable	*	Accounts Payable	*	Retained Earnings	*	Revenue	*	Expenses	
(1)	-	25,000	+	25,000											
(2)					+	500					+	500			
Bal.		(25,000)		25,000		500						500			
(3)	+	26,500	-	25,000	-	500					+	1,000			
Bal.		1,500		0		0						1,500			

Figure 1.3 *Sample User Question*

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The solution of this problem requires the student to have a broader understanding of the information. The student needs to understand the implications of an economic event across the financial statements. As the income is increased, there are different effects on the balance sheet. Rote memorization and an over dependence on the mechanical debits and credits does not provide the student the conceptual relationships. Seeing, calculating, and communicating how those changes are recorded allows the student to understand that the accounting function is far different than the bookkeeping function. The computational levels are similar (adding, subtracting, and multiplication), but demanding the student analyze and interpret effects on the entire system is different.

Accounting has long been called the language of business (Weygandt, Kieso, & Kimmel, 2002). The preciseness of that language often causes confusion outside of the profession. Accounting definitions and protocols sometimes are viewed as jargon and can create comprehension barriers for the non-professional. Terms like “debits”

and “credits” are valuable tools for the accountant, but to the untrained they may seem intimidating and misleading. The protocols and routines built up over many years of manual accounting are both restrictive and, many times, counter-intuitive to the untrained eye. For example, a “non-qualified” audit opinion is better than a “qualified” opinion (GAAP). Another example is the new car returned to the dealer for less than the purchase price. This is commonly known as depreciation, but in accounting it is simply the loss of market value. Dansby, Kaliski, and Lawrence (2010) wrote “the purpose of depreciation accounting is to spread the cost of an asset over its useful life rather than treating the asset’s cost as an expense in the year it was purchased (p. 138)”. These technical differences tend to separate accounting from common place understanding and create a gap in our learning.

User/Preparer based accounting. One of the debates favoring a change in accounting education is centered in the difference between the “user-based” curriculum and the “preparer-based” curriculum (Albrecht & Sack, 2000). The preparer-based curriculum is designed to maintain the high levels of protocol that apply in performing the manual bookkeeping function (Albrecht, 2002). One of the goals of this type of curriculum is to produce a high level of replication, or consistency, in accounting techniques. All accountants should be calculating and presenting information in the same manner and using the same format (Weygandt, Kieso, & Kimmel, 2002). These manual protocols became important, because they allowed for more efficient auditing and improved communication between bookkeepers. However there is disagreement among current professionals about many

of the reporting formats and uses of accounting information. Current practice indicates less continuity than many text authors assume.

User-based accounting is different because it is developed to assist the user or consumer of accounting information *in making* decisions. There is less reliance on protocol and routines and more concern about the global knowledge an individual has. Using this global knowledge and accounting information to make and communicate quality decisions is what the workplace now demands. The survey of literature affirms that such authors as Albrecht and Sack (2000), Geary and Rooney (1993), Glass and Oakley (2003), and Rahman and Velayutham (1998) encouraged the holistic approach. Few articles supported the continuation of the preparers' method of instruction, but Umapathy (1984) did find some selected applications for a procedurally based education. Nevertheless, Umapathy expressed concern that even though a student may understand the different computational processes, it is also important that the student have a broader understanding of the implications of accounting in organizational decision-making.

In accounting education specifically, Beattie, Collins, and McInnes (1997) posited four general issues to be addressed in accounting education. They were:

1. It is widely believed that accounting attracts a relatively high proportion of reproducing and achieving students. Does, therefore the inherent approach to learning of accounting undergraduates differ from that of the general undergraduate population?

2. Since deep understanding involves the appropriate use of both comprehension learning and operation learning, to what extent can the direct teaching of study strategies and specific study skills assist students to become more aware of their own style, to recognize its strengths and weaknesses and to be able to consciously use alternative approaches?

3. Given the inherent mix of procedural and conceptual knowledge in accounting, which teaching methods promote a deep approach to learning? In addition, to what extent is deep learning increased as a result of strategies which integrate the teaching of accounting techniques with the teaching of economics, finance, etc., rather that teaching separate functional areas in these subjects?

4. Which forms of assessment (for example, case studies and essays) reward critical thinking and thus encourage a deep approach to learning? (p. 10)

Addressing all of these issues will make accounting education more viable in the workplace. The *context* of teaching accounting recognizes the need to include the type of learner the discipline attracts. The *learner* needs to be able to address both the computational and the conceptual requirements of accounting. The *curriculum* design needs to develop different teaching methods to encourage deep learning activities that are theory and research based. Finally, *evaluations* should require the components of critical thinking and be designed to inventory conceptual problems.

While the preparer method may have been valuable at one time, its value has decreased due to the increased popularity of and dependence on the computer. It is very difficult, however, to change from a preparer-based instructional mode to a user-based mode. Thus, while research indicates the need to shift to the user-based curriculum, there is a high resistance to this change among instructors (Lux, 2000).

Learning Approaches

Understanding the complex student approaches of deep and surface learning is a prerequisite to understanding the interrelationship of learning components within the teaching-learning environment. The four major issues identified by Beattie, Collins, and McInnes (1997), attempted to develop a clearer understanding of

learning approaches to accounting education. This work distinguished two types of student learning as deep and surface learning concluding "A fundamental common feature of these documents is the belief that there is a need to move away from procedural learning towards a more conceptual form of learning" (p. 2). In order to achieve this, the authors argued that it is necessary to assist students to achieve "deep learning" rather than "surface learning" (Beattie, Collins, & McInnes, 1997).

Surface learning characteristics. Another name for surface learning is procedural learning – having procedure guide students' thoughts and understanding. The characteristics of a surface learner, first described by Entwhistle and Ramsden in 1983, were refined by Beattie, Collins, and McInnes (1997) as:

1. "Memorizing ideas and accepting ideas without question;
2. Concentrating on memorization without distinguishing underlying principles or patterns;
3. Being influenced by assessment requirements". (p. 3)

Novak (1998) identified different but congruent characteristics. In Novak's view learners task themselves with gaining information through rote-memorization. Some other characteristics identified by Novak include:

1. Failure is regarded as a lack of effort;
2. Learners are "empty vessels" needing to be filled;
3. Rewards and punishment are the principle motivators in learning. (Novak, 1998).

The surface learning approach has been an important skill in helping many accountants pass portions of the Certified Public Accountants (CPA) test. The authors' distinctions between surface and deep learning were not intended to discount the value of surface learning but were intended to begin to allow a different form of instruction to emerge (Beattie, Collins, & McInnes, 1997). Therefore the curriculum for accounting education should be broader than simple rote memorization. These definitions are given further clarification in a comparison of the traditional and constructivist learning (Appendix C).

Deep learning characteristics. Deep learning is a different type of learning. Rather than relying on a procedural or skill base, learning is concept oriented. The characteristics of deep learning were listed as:

1. Understanding issues and interacting with the contents of particular teaching materials;
2. Relating the ideas to previous knowledge and experience;
3. Examining the logic of arguments and relating the evidence presented to the conclusions (Beattie, Collins, & McInnes, 1997, p. 3).

Novak (1998) defined the deep learner as interested in meaningful (relational) learning and understanding that learning is the responsibility of the learner. Human potential and feelings are important . Although these lists are not complete, they do provide a picture of the differences in learners that educators need to recognize.

Sound accounting education requires a mix of both conceptual (deep) learning and operational (surface) learning. However, since procedural education has been

used for so many years, the evolution to multi-level learning has seemed radical to some (Albrecht, 2002; Gow Kember, & Cooper, 1994). It is clear, however, that the educational outcomes have changed. For example, while both surface and deep learning have contextual value, the AECC is encouraging more dependence on deep learning to help educate accountants (Ainsworth, 2001). This requires a pedagogical shift that changes classroom activities (Geary & Rooney, 1993).

While surface and deep describe the manner in which students learn, a third area has also been identified. Biggs (1987) called this an "achieving" approach. Student approaches to both deep and surface learning are enhanced by a higher level, or awareness, of achievement. According to this theory, the intention that a student applies to his or her study is directly related to the success of the eventual performance. Biggs' work shows that the most important learning takes place with a deep manner, with the student understanding and using methods of organizing their learning .

Meta-cognition. In another learning paradigm Schunk (2000) identified meta-cognition which he defined as the ability for the learner to have self-control over the learning activity. This meta-cognitive learning model is similar to model that AECC would like to use for future accountants (Albrecht & Sack, 2000). There are, in fact, different instructional techniques that can be used to shift student approaches to this higher level of achieving, since changes in curriculum can shift learning approaches (Gow, Kember, & Cooper, 1994). Accounting education should be using

some of these instructional techniques to assist the shift toward the deep-achieving approaches to learning (Hall, 2002).

Novak (2010) paraphrased Ausubel's promotion of the idea that learners individually form and organize information, including curriculum presented in courses. He identified three distinct principles to better learning. The first is recognition of the role of prior knowledge or what the student brings to the classroom. The ability of the student to identify and relate information to prior knowledge profoundly impacts the level learning. The second principle is that knowledge is constructed by the student, not transmitted by the instructor. New information is organized in structures created by the student. Teachers do not provide learning, but only supplement what the learner creates through organizing their information. The last Ausubel principle is that information is subsumed. The structure of new information is created in a manner that it will accept more information. The older information becomes embedded in our knowledge scaffolding and provides building blocks for our newer knowledge (Novak, 2010).

Using grades to measure learning. Originally, it was anticipated using grades as an indicator of student learning for this study. However as literature review developed, the use of grades became less attractive. As early as 1912, studies were being done regarding the relationship between grading, scoring, and subject knowledge. One study examining writing indicated a low correlation between subject knowledge and the grades a student earned (Starch & Elliot, 1912). Some argued that since this particular survey was conducted on writers and writing samples, the results

might be too subjective for validity. Starch and Elliot (1913) repeated their experiment, this time in the field of mathematics, and found the results to be consistent with the 1912 study. More recently, Conley (2000) discussed the lack of correlation that exists between grades and proficiency.

Furthermore, instructors grading the same material are highly variable and do not necessarily reflect consistent judgment in assessing students' subject learning and knowledge. This issue is further complicated, because performance assessments sometimes do not measure what they intend to measure (Davidson, 2001). Validity, reliability, and internal consistency are not assured by developing common tasks, standards, and scoring (Marzano, 2012). However, it does seem to be self-evident that grades do have an influence on students' ability to enroll in subsequent courses, gain admission to educational institutions, and obtain entry-level jobs.

More recently Booth, Luckett, and Mladenovic (1999) reported that students demonstrated a negative correlation between grade and surface learning approach for art, science and GPA for art, science, rural science and economic students. Concurrently there was a positive correlation between art students and deep learning. It was thought that the use of grades as a measure of learning was misleading to measuring work performance. Booth et al concluded that the learning environment has a significant impact on the learning approach student use and eventual workplace success. The current nature of accounting pedagogy and teaching materials fortifies surface learning approaches and therefore creates complexity in the analyses (Booth, Luckett, & Mladenovic, 1999).

Recognizing the problematical nature of correlating grades to proficiency and learning, this study presumes that improved communication between students and teachers is better than poorer communication. Therefore, in place of the goal of improved grades, increased communication between the student and the instructor is the object of this research, which in turn should shift the learning approach from surface to deep**.**

Using surveys to measure learning. In order to measure the amount of change in the approach a student takes to learning and to avoid the previously mentioned problems that arise when using grades as a measure, the researcher gave consideration to how to approach measurement and the type of measurement that is appropriate. Two basic forms of research can be pursued, qualitative and quantitative (Farmer & Rojewski, 2001). These approaches will be discussed briefly, with additional detail provided in the *Methods* section.

Qualitative study is based on the emerging paradigms of constructivism, critical socialism, feminism, and postmodernism. This type of study helps us understand why techniques and practices are successful. Studies using the qualitative discipline can be useful in developing a set of good practices and techniques for using graphic organizers in the classroom (Farmer & Rojewski, 2001). Quantitative research attempts to answer questions in a more mathematical manner. The use of models and statistics gives the research a more "objective" nature. As a whole, it has been my experience that accounting instructors operate in a positivist paradigm.

Assuming accounting instructors are more positivist, it seems more appropriate to use quantitative techniques to complete this research (Farmer & Rojewski, 2001).

Creswell (2003) identified an additional approach to research design. The third approach is a mixed approach which combines both quantitative and qualitative. Creswell identified four alternative knowledge claim positions. They are post positivism, advocacy/participatory, pragmatism, and constructionism. These were not selected as Richardson (1994) advised researchers to exercise caution in designing studies. The first cautionary note was that, if the researcher is using a qualitative technique, it is important that the researcher be experienced in the qualitative process. My experience does not rise to this level and therefore this type of research is not a good option for this project. Regardless of the type of study, however, Richardson's second caution was to exercise "great care" in the use of the information derived from the studies. Richardson expressed concern that the surveys might have internal conflicts that degrade their value. A study with some verification documentation is better than one with no internal verification. Richardson also encouraged researchers to be aware of cultural issues, in particular the effect of language and culture on understanding. He cautioned researchers never to allow their research to interfere with a student's success.

Survey comparison. To determine which surveys might provide the best means of measurement for this study, three different surveys were evaluated using Richardson's two criteria, greatest internal consistency, and least apparent student impact. Three surveys seemed to fit the best. The three surveys were Entwhistle

Approaches to Study Inventory, Biggs' *Revised Study Process Questionnaire – Two Factor*, and Holschuh's *Strategies Checklist.*

Entwhistle (2000) and Biggs (1987), two major learning approach theorists, both have produced broad and well-developed bodies of research. Both have surveys designed to determine the approach to learning that students use. Entwhistle's Approaches to Study Inventory is roughly 64 questions, breaking down the student's learning approach into 16 subscales divided among four major categories: meaning orientation, reproducing orientation, achieving orientation, and styles and pathologies orientation (Richardson, 1994). The Entwhistle survey was not selected, however, because it seems likely that a 64-question survey taken twice within one term might be overly oppressive to students. Previous applications of the study do not include accounting students or accounting courses.

John Biggs' survey, the *Study Process Questionnaire* (SPQ), is widely used in Australia and China as a tool to measure student approaches to learning. The SPQ has been used for students in virtually all disciplines over a period of decades (Biggs, 1987). In 2000, Biggs changed his survey to a shorter and less complicated version called the *Revised Study Process Questionnaire – Two Factor* (R-SPQ-2F) (Biggs, Kemper, & Leung, 2004). The R-SPQ-2F reduced the number of questions to 20.The internal validity was examined and determined acceptable in 2001 (Fox, McManus, & Winder, 2001). Biggs' research (Biggs et al., 2001) indicated that the attributes for the achieving approach to study are contained in the deep approach and therefore is

redundant. The R-SPQ-2F is not discipline specific (Elias, 2005). Both the Entwhistle and Biggs surveys inventory what a student feels.

The third survey examined is called the *Strategies Checklist* by Holschuh (Elias, 2005). This is a 42-question survey that is designed so an instructor can administer it at the beginning of the course and at the end. It is somewhat long, but the questions are much more behaviorally based than those of either Biggs or Entwhistle. It seems likely that a student might identify more closely with questions that focus on what a particular action is rather than questions that ask what the student "feels" about the subject. Also, this is a United States survey, which should be more culturally accurate for research in the United States (Elias, 2005). Elias (2005) also suggested changing the word biology to accounting to give the checklist more specificity. For these reasons, the *Strategies Checklist* was selected as the measuring instrument for this research.

Graphic Organizers in Accounting

In 1990 the AECC identified four skills that accounting education should be assessing and improving:

> To become successful professionals, accounting graduates must possess communication skills, intellectual skills, interpersonal skills, and decision making. Communication skills include both receiving and transmitting information and concepts, including effective reading, listening, writing and speaking. Intellectual skills include the ability to locate, obtain and organize information and the ability to identify and solve unstructured problems in unfamiliar settings and to exercise judgment based on comprehension of unfocused set of facts. Interpersonal skills include the ability to work effectively in groups to provide leadership when appropriate. (AECC Position Statement Number One, 1990, p. 307-308)

In follow-up studies, these four professional skills have consistently surfaced. Written communication, analytical/critical thinking, oral communication, and decision making as professional skills are supported on a regional basis in both Texas (Burnett, 2003; Auditing Section Education Committee, 2001-2002) and Oregon (Iverson, 2002). These skills are best taught using education techniques that focus on concepts, which tend to emerge from the use of graphic organizers or concept maps.

Graphic organizers or concept maps have been used for decades in different academic disciplines (Novak 1998, 2010). Science, writing, and mathematics – and even business statistics – have used graphic organizers to assist students with their learning (Austin & Shore, 1995; Mergendoller & Sacks, 1994; Nicoll, Francisco & Nakhleh, 2001a; Rye & Rubba, 2002; Sirias, 2002). Kaplan and Norton (2000) advocated the use of mapping in the workplace, saying:

> In the industrial age, companies created value by transforming raw materials into finished products. The economy was primarily based on tangible assets – inventory, land, factories, and equipment – and an organization could describe and document its business strategy by using financial tools such as general ledgers, income statements, and balance sheets. In the information age, businesses must increasingly create and deploy intangible assets – for instance, customer relationships, employee skills and knowledge, information technologies, and a corporate culture that encourages innovation, problem solving, and general organizational improvements. (p. 168-169)

Kaplan and Norton (2000) further described "the balanced scorecard," a graphical organizer that has been used in "hundreds of businesses" (p. 169). Not only are graphic organizers useful in the learning environment, but they can be used effectively in the workplace. Using graphic organizers in teaching accounting classes

has a dual purpose. First, graphic organizers aid in giving the student a global perspective of the subject matter (Hofman, 1995). Second, it trains the student in the use of a tool that is used in the workplace (Kaplan & Norton, 2000). This study is important, because little research literature has explored the use of the graphic organizer as a communication tool in the learning environment of an accounting education.

Assessing Performance with Graphic Organizers

The value of graphic organizers is in their spatial nature and the extent to which we learn and remember in a spatial manner. Hofman (1995) discussed dictionary meaning (surface learning) and encyclopedia meaning (deep learning) and described how mapping increases the level of understanding for the student. According to Hofman one of the values of graphic organizers involved how the student developed and related ideas. Even though Hofman discussed many different schemes and techniques, he consistently reported that creating concept maps (graphic organizers) had a high value. Katayama & Robinson (2000) went as far as defining a hierarchy of value in the use of class notes. The least valuable are notes produced and distributed by the instructor. Students writing their own outlines (i.e. class notes) received a higher educational value which led to improved learning. Katayama & Robinson (2000) hypothesized a direct relationship between learning and student involvement. Finally, the most valuable note device is the student produced graphic organizer. What remains is for research on accounting instructors who include graphic organizers in their teaching methodology.

Creating graphic organizers. Buzan (2005), Nast (2006), and Krasnic (2011) were selected to assist in developing a procedure to create graphic organizers. One of the barriers to using mapping in the classroom is that students are unfamiliar with what and how to map. Most students have far more exposure to outlining and creating sequential connections in their academic careers. The newness of concept mapping or creating graphical organizers might create ambiguity and concern for the student. These three authors were selected because they all have experience in showing others how to create maps and all consider mapping a valuable and productive activity.

Below is an example of a mind map. Buzan (2005) simplified the process to seven steps. They are:

1. Start in the center of a blank page turned sideways.
2. Use an image or picture for the central idea.
3. Use colors throughout.
4. Connect the main branches
5. Make the branches curved rather than straight-lined.
6. Use one key work per line.
7. Use images throughout.

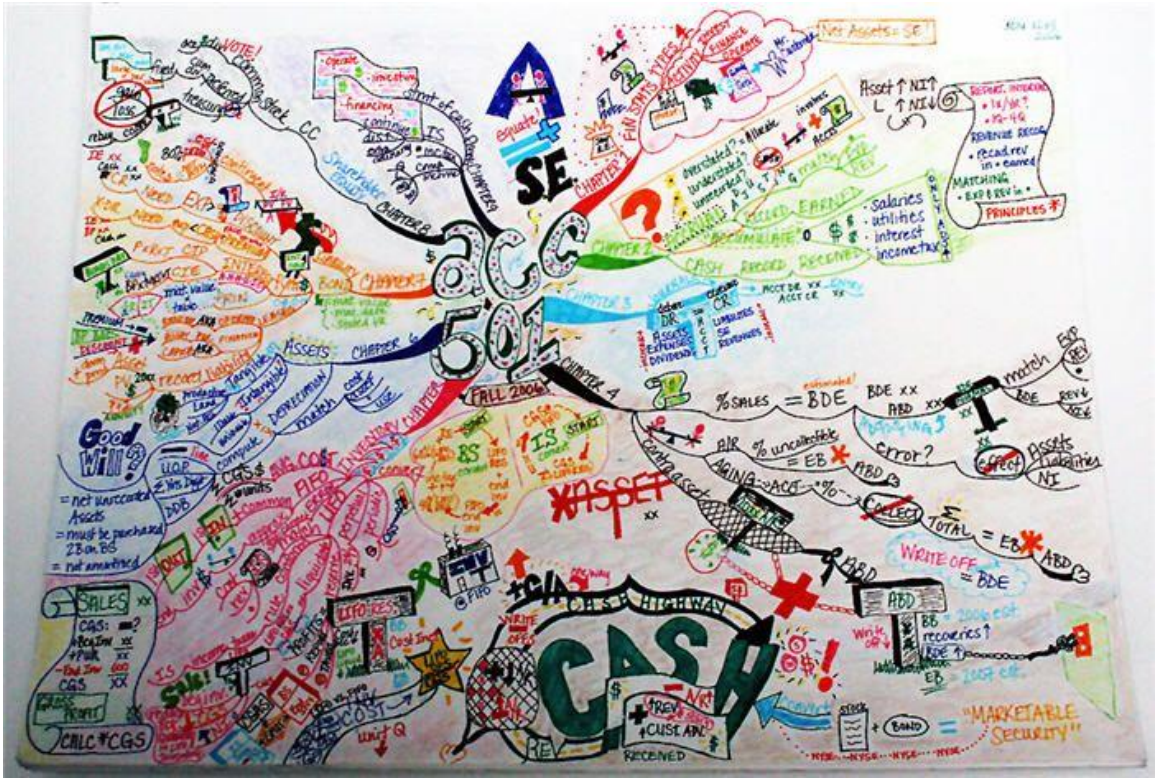

Figure 1.4 *Accounting Mindmap Example*

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Buzan indicated that if students work diligently they can attain results like this. These mind maps were based on the concept of radiant thinking. This is a synergistic term created by Buzan to describe non-sequential thinking and learning (Buzan, 2005).

Nast (2006) had a simpler model. The example provided here represents a decision-making process for the uses of a machine because no accounting samples were found. Nast agreed with Buzan concerning his thoughts about radiant thinking. She wrote, "When the purpose is to come with the most creative idea, most people

will try to think of the best idea to the exclusion of any other options. This is normal linear thinking and creates barriers to our creativity and thought processes" (2006, p. 26). Instead of being limited to a sequential or chronological path of thinking, Nast suggested that we open to associative thinking. This is reflective of Buzan's radiant thinking. Nast's six "laws" of mapping are:

1. Start with a landscaped blank paper with the central statement or image in the middle.
2. Create main branches of categories to investigate.
3. Use images and colors to group concepts. The thickness and color of lines indicate the importance of the category. Utilize "blooms" to give weight to the category.
4. Keep "silly" ideas. They often are the seeds of good thinking.
5. Establish a radiant hierarchy.
6. Unblock thinking by leaving empty lines and areas of the bloom. (Nast, 2006).

Krasnic (2011) had a more stringent protocol to mapping. Krasnic had developed a systematic and methodical way of learning. Emphasizing the relationships between meaningful organization of the material and critical thinking, Krasnic wanted students to make visual connections with the information. This visualization process leads to key questions and key concepts. These four steps are contained within phases of learning. The five phases of learning are preview, participate, process, practice, and produce. Each phase uses the four steps in a progression reflecting Bloom's taxonomy.

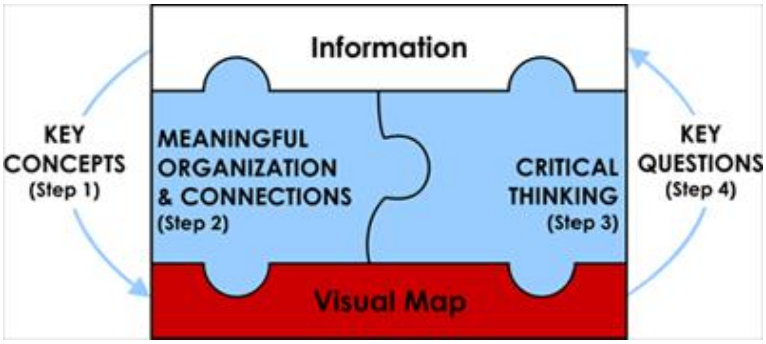

Figure 1.5 *Visual Learning Process*
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More importantly for the current study was Krasnic's identification a variation of Novak's concept maps (2010) and the distinctions between rote learning and meaningful learning. The steps to making a map for Krasnic are:

1. Select the concept;
2. Gather relevant information;
3. Keep the map simple;
4. Start in the center;
5. Add primary concepts;
6. Branch sub concepts off the primary concepts;
7. Continue to capture and map key concepts;
8. Add more information (the map is a living document!);
9. Add visual elements to increase map's effectiveness;
10. Go through the visual map checklist for final edits. (p. 34-40)

These three methods are representative of many other authors who have developed mapping protocol. The commonalities include starting in the center of the

page; using single words or pictures to convey ideas; creating “blooms” or sectionals for supportive items to the concepts. All three authors also want the learner to look at the diagram and begin filling in “blank spots”. This meta-cognitive process increases the longevity of the usefulness of the knowledge which is what Gowin and Novak attempt with their concept maps (Gowin & Novak, 2002).

Scoring graphic organizers. The evaluation of graphic organizers is problematic and a single protocol for evaluation has not been widely accepted. In fact, Nicoll, Francisco, and Nakhleh (2001a) stated that Shavelson, Lang, and Lewin (1994) documented no less than 128 different evaluation methods. Apparently, the difficulty was not in devising an evaluation method but rather in gaining agreement on which method was best. In this study, it was important to remember that the function of the graphic organizer is not primarily to assess student knowledge but to assist in instructor/student communication. Any evaluation method, therefore, must focus on measuring the extent to which the objective of better instructor/student communication has been achieved.

Graphic organizers aid learning among all students, particularly those who generate their own graphic organizers. Katayama and Robinson (2000) ranked the quality of graphic organizers in terms of how the student produces the graphic organizer. Instructor-generated notes resulted in the lowest value scores, primarily due to the fact that the student had little input into the process. The most successful approach involved graphic organizers that were designed entirely by the student (Katayama & Robinson, 2000). The continuum included publisher produced notes,

instructor produced notes, instructor produced concept maps, student produced notes, and student produced concept maps. This continuum indicates that the most successful learning strategy is to have learners work and produce the maps and not rely on publisher or instructor generated material.

Graphic organizers also fit the AECC call for fewer facts and more contextual education. "It appears [that] if the goal is factual learning, then the type of study notes and the amount of information do not matter. Most would agree that *application* is a more valued outcome for students than knowledge of facts" (Albrecht & Sack, 2000, p. 6). Therefore, the assessment tool (conversation rubric) should not only promote dialogue, but it should also reflect the skills highlighted by the AECC.

Roberts (1999) used two methods of scoring to evaluate graphic organizers as a measure of students' statistical understanding. The first method allocated points to branches and hierarchical levels (propositional links) in the graphic organizers and summed those points for a final "score." The second method was to rate student maps against some specific criteria. One advantage of this second method cited in this research was the ability to identify misconceptions in students' understanding. Understanding a student's misconception is valuable information for starting dialogues with students. If an instructor knows where the misconceptions lie, the instructor can reiterate the correct information and change those misconceptions. If the instructor does not recognize the misconceptions, corrections become much more haphazard and sometimes do not take place until after testing. Anecdotally after mapping a chapter, I have had students get up and point to a particular concept they

were having difficulty grasping. This ability to directly identify problematic areas helps the student to communicate with the instructor and helps in the learning process by providing clarity into the discussion.

Austin and Shore (1993) evaluated scoring methods developed by Novak (1979). The results were mixed and not always as precise as educators would have preferred. Novak employed a sophisticated system of counting and weighting links. This system gave higher weight to multi-level links and deducted points for mistakes. The issue raised by Austin and Shore (1993) was that, if an instructor wished to use the graphic organizer for a quantitative score, then some direction or parameters had to be given to the student. In contrast, Katayama and Robinson (2000) indicated that with more instructions, the tool was less valuable. Stated differently, as learners attempted to closely follow teacher instructions, the value of learner generated maps decreased. Therefore, the instructor needs to keep a balance between the value of graphic organizers in student learning as opposed to assessment. This bifurcation is better resolved in a qualitative assessment method.

Rye and Rubba (2002) studied the use of graphic organizers in terms of their reliability and validity in science education. They concluded that scoring criteria should focus more on conceptual adequacy than simply on the counting of linkages. Their work indicated that it was more important for students to understand the material than to create a map that had many nodes and links. In fact, one map studied actually "scored lower at 86 points, yet had a more robust explication of those problems" (Rye & Rubba, 2002, p. 4). The authors explained that it was possible for

an individual student to explicate a conception of only one of the key problems caused by (in this case) chlorofluorocarbons and achieve a higher score than a student with a more robust explication of those problems. The implications for this study were simply that care must be taken in any type of scoring or grading of the maps created for other disciplines including accounting. Reverting to the sequential manner of teaching or scoring the maps can discount the global value of mapping.

In 2003, Gerchak, Besterfield-Sacre, Shuman, and Wolfe investigated the use of concept maps or graphic organizers to evaluate students' conceptualization of the engineering field. In order to do so, a *holistic metric* was devised, and eight significant qualities were identified. The qualities were comprehensiveness, structure, correctness, naiveté, focus, approach, organization, and sophistication. The authors concluded that graphic organizers represented an important new method for assessing student learning. This study demonstrated how mapping can be used to create conversations and make changes in different learning situations.

All of these methods of evaluation require considerable amounts of time and effort in explaining the process and the reasons for the evaluation. It is difficult and could be seen as unfair to develop and evaluate students on systems with which they have little experience or knowledge. It is also recognized that the more the student conforms to predetermined ideas laid out by the instructor, the less valuable the mapping becomes. The difficult balance is between maintaining the value of the map while making it something a student will both engage in (because it is a graded

assignment) and use correctly (because it remains important that some information is correct and some is not).

Meaningful learning and graphic organizers. Gowin and Novak (2002) recognized the importance of previous learning to each student when they stated, "Our principle objective in an interview is to ascertain what the learner knows about a given body of knowledge. Prior to instruction, the interview will help in the selection and organization of concepts and examples" (p. 122). Identifying pre-knowledge is a meta-cognitive practice. Gowin and Novak claimed that moving from a theory of rote or behavioral learning to a comprehensive, performance-based learning theory was best accomplished by using an interview or conversation to pinpoint the student's understanding and by subsequently constructing the learning environment around pre-existing knowledge.

Gowin and Novak (2002) identified five components of successful meaningful learning. These are the learner, the teacher, the student, the curriculum, the environment, and the evaluation. These components interact allowing for meaningful learning. For example if a student enthusiastic about a subject is paired with an instructor with passion for the discipline, in an positive environment with clear evaluative goals, meaningful learning is more likely to take place. Conversely if one or more of the components is compromised, meaningful learning will likely be hindered. The interaction or communication between student and teacher is often difficult to accomplish. Time constraints, individual priorities, and other barriers seem difficult to overcome. Graphic organizers could be a method to streamline these

dialogues. Graphic organizers can be used to identify student understanding, and the instructor can then gear instruction to the learner needs.

Hegarty-Hazel and Prosser (1991) and Hegarty-Hazel (1991) reported on the relationship between conceptual knowledge and different study strategies in Australian biology and physics students. The importance of the Hegarty-Hazel and Prosser work to the present research is that these study strategies involved the same deep and surface learning that the AECC has advocated. The researchers used Biggs' three study strategies (i.e. surface study, deep study, and achieving study) and developed indicators for each strategy. These indicators – integration, differentiation, hierarchy, and accuracy – correspond to Gowin and Novak's (2002) conclusions about the components of evaluation. A description of these indicators follows.

Integration was defined as the ability to capture how ideas and concepts are interrelated (Gowin & Novak, 2002). Compared to a traditional education based on the Taylor model that views learning as a silo operation, this represented a bold change to accounting education. Learning techniques like rote memorization were no longer considered successful learning strategies for accounting. The level of integration needed to be raised. Leveson (2005) isolated six distinct levels of understanding accounting as shown in Table 2.1. The lowest level (named "A") involved the simple calculation, "quantifying tangible economic events" (p. 9). The highest level, "F," was a "culturally determined system of principles" (p. 9). Realistically, most accounting instructors will not attempt to get every student to a level of "F," but it is quite conceivable for students to attain levels "C" and "D."

These levels include making decisions, supporting management, and controlling resources. Leveson suggested that this level of integration was also desired by the AECC.

Table 2-1

Levels of Understanding Accounting Proposed by Leveson (2004):

F	A culturally-determined system of principles and rules which operationalize the moral principles of the right-to-know in society.
E	Learning in accounting as a personal change and development through student-directed engagement with course material and requirements.
D	Learning in accounting as developing a relational understanding of the discipline
C	Learning in accounting as developing concepts.
B	Learning in accounting as acquiring concepts from sources external to the student.
A	Learning in accounting as accumulating facts from sources external to the student.

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Therefore the goal of accounting instruction should be to assist the student in internalizing and developing a relational understanding rather than simply creating computational competence.

Differentiation described how concepts emerge and change as the student learns (Gowin & Novak, 2002). For example, if a student is learning about accounts receivable management, the first level of understanding should be to understand the different methodologies used in calculating accounts receivable. In addition, the

student needs to know how these different methods fit into the operation of the business (integration). After demonstrating knowledge of interrelatedness, the student needs to show how different calculations can impact the total organization (differentiation). Procedural education is limited to learning how to calculate the number without also understanding from the company-wide perspective how the procedure eventually affects different parts of the business organization.

Hierarchy recognized the ability to understand which concepts are more inclusive and which are subordinate (Gowin & Novak, 2002). Inverse hierarchical mapping could be very creative, or more commonly it could indicate fundamental misunderstandings that might hinder the student's success. My personal experience has demonstrated that actually seeing how the student ranks different concepts illuminates their thought processes helps in teaching. This process allows the instructor the ability to see and react to what the student understands is beneficial for both the student and the instructor creating an environment of meaningful learning (Gowin & Novak, 2002).

Accuracy referred to the ability to correctly document the principles. On a level of integration and differentiation, the relationships and procedures learned by the student must be aligned with GAAP. Thus, in the previous accounts receivable example, not only would the student need to demonstrate how different decisions will affect the organization, but the effect of those decisions would have to be computed using standardized methods. In other words, the standardized procedures of

accounting cannot be ignored or thrown away. Consistent methodology is still a valuable skill to have. Creativity in accounting is not a generally accepted practice.

Graphic organizers give the instructor a window through which to view the students' understanding of a subject (Hofman, 1995). Knowledge acquisition is a series of corrections for the student. The actual drawing of a map helps students grasp the concepts. It brings attention to detail which is a critical step in learning (Church, Ritchhart, & Morrison, 2011). Mapping techniques allow the instructor to view the students' misconceptions in order to redirect attention and improve accuracy (Sirias, 2002). While longer-term studies would be valuable in assessing the value of graphic organizers in accounting education, in this study the graphic organizer is used essentially as a conversation base for the student and teacher. It is a concrete method that allows the instructor to view what the student knows, and it serves as a medium the student can use to demonstrate the integration, differentiation, hierarchy, and accuracy of accounting concepts.

Assessment and graphic organizers. A good deal of research has been done on student assessment and on the advantages and disadvantages of using graphic organizers as an assessment tool. Throughout this discussion, one theme emerged. Students respond to what instructor's measure. Students will respond to the degree that instructors choose to measure procedural elements, and they will respond to what instructors choose to emphasize (Conley, 2000; Rye & Rubba, 2002). If instructors choose to focus student attention on communicating information, identifying key ideas, formalizing concepts, and summarizing information, then concept mapping is a

useful technique (Nicoll, 2001a). If instructors choose to be procedurally based, graphic organizers will be less useful but, arguably, may still prove useful due to the nature of learning. The educational components advocated by the AECC appear to be supported by concept mapping and graphic organizers. However the difficulty is to develop these educational components while not losing the value of procedural education.

Students can find learning easier if learning tools are available and if the students know how to use them. One such tool is the list of chapter objectives that is common in textbooks (Weygandt, Kieso, & Kimmel, 2002). These help orient students to what the chapter covers and what the students' learning responsibilities are. The mapping rubric includes a numerical objective requirement that it is hoped will direct a student's attention to the issues illuminated by the text and will guide the student in developing the concept map. Again, if students know that some measurement will be based on the chapter objectives, then they will respond by reading the objectives (Roberts, 1999). Over the past 30 years, many authors have developed empirical designs to measure and assess graphic organizers. Quinn, Mintzes, and Laws (2003) described very intricate systems of counting and valuating nodes (concepts), arcs (integration), and associations called clusters. This system of evaluation was not chosen for use in the proposed study for two reasons. First, it requires significant learning by the instructor. Instructors who already feel overworked are not as likely to spend the time and effort required to perfect their application of this type of grading.

The second reason for not selecting the Quinn, Mintzes, and Laws (2003) model was that while there may be value in a quantitative view of student work, there is even greater value on the qualitative side. It is also important to remember that the graphic organizer creates a medium for discussion between the instructor and the student. The quantitative techniques advocated by Quinn et al are less valuable in measuring student success when the primary use of graphic organizers is to encourage and guide these teacher-student discussions.

The quantitative data for this study were therefore limited to identification of the chapter objectives, reduction of the chapter material to one page, and the timeliness of the activity. By answering qualitatively in a short essay format, the student described the most difficult parts of the chapter. The components of integration, differentiation, and accuracy were documented and qualitatively displayed on a center-based Liker-type scale. A section for comments was also provided where both the student and the instructor could write their reactions (see Appendix D).

Summary

In summary, a few issues rise to the surface. First, there is support for changing accounting education so that it focuses on the uses of accounting data rather than just the preparation of that data. Second, this change in accounting education needs to lead to deep learning and achieving rather than focus only on surface learning. Third, graphic organizers can function as an instructional tool that will lead to deep learning and can also offer a means of assessing that learning.

Traditional accounting education needs to be changed in a way that will give students a more global vision of a business or organization. This may require a different approach to the way accounting is taught. Part of the instructor's responsibility is to be proactive and seek better ways to communicate and interact with students. The influence of instructors, particularly in the fundamental courses, is very important to the decisions students make about continuing their education in accounting. Establishing a personalized and meaningful dialogue with the students is a path toward controlling and maximizing this influence. The practicalities of serving many students, however, require that the method be efficient and not burdensome to the instructor. Failure to obtain instructor support will not serve any curriculum.

Deep learning, rather than surface learning, is being advocated by the AECC. Accounting has traditionally been taught using surface-learning instructional techniques with the hope that a student will develop a deep approach to the subject. These *preparer* teaching methods no longer satisfy the needs of the workplace. A broader understanding of the uses of accounting information is needed in the workplace of the 21st century. The user of accounting information needs to develop the ability to understand issues and relate ideas to previous knowledge. These skills are best learned when the student has the ability to continue his or her education in a self-directed (meta-learning) manner. Today, the accountant also needs to be able to examine situations and to communicate conclusions. Surface learning techniques do not prepare the student for these types of activities and therefore should be de-emphasized in course curriculum.

Surface learning, or rote memorization, is the traditional method used in accounting education. Generally, surface learning is extrinsically motivated and is used to meet minimal requirements. A surface approach has traditionally allowed students to memorize answers in order to be successful in accounting courses. While this algorithmic instructional method may have been valuable a one time, changes in the business environment make it important for students to experience a different learning method today.

The deep learning approach is more compatible with the findings of the AECC. The AECC has encouraged a change in accounting education by advising a more global approach to the discipline of accounting. Deep learning is much more intrinsically driven and strives to understand the interrelationships among concepts. Deep learning should lead to a higher level of job competence. Many educational institutions promote "life-long learning" which is another advantage to approaching education through the use of deep learning methods. The use of graphic organizers helps establish an environment for this type of learning.

In addition, pursuing the strategy of achievement will make students more successful, regardless of the learning method or approach they choose to employ. This strategy can be driven by a desire to "be better" than others or by an understanding of what is required in a profession. Encouraging meta-learning will assist students in achieving both classroom success and success in their professional careers. Self-assessment or evaluation is important to the nature of this success. One self-assessment tool can be the graphic organizer.

A diagram that shows the relationships of concepts, as does a graphic organizer, is a simple, direct means of demonstrating information. This is one reason that graphic organizers are used in a variety of situations, including education. In education, the use of the organizer helps the instructor and the student communicate many disciplines, and could be helpful in first-year accounting courses. It seems self-evident that, in order to assist the student in understanding accounting principles, instructors need to know what concepts are causing confusion. Graphic organizers are a way to help instructors see what concepts and relationships have not been grasped. If an instructor can identify the areas that are causing confusion, the instructor can then reinforce those specific concepts. Doing this on a regular basis is important because the algorithmic nature of accounting requires a sequential student understanding. If a student misses the first concept, successfully continuing on becomes more difficult. Graphic organizers provide a snapshot of what a student knows at any one time. The instructor can then use this valuable knowledge to help a student learn the missing information, catch up, and stay on track. Knowledge assessment is an important component of any course of instruction. Many different methods of using graphic organizers for assessment are available for use. The difficulty is to determine what one single method should be used. Unlike algorithmic assessment, however, there is no single, correct answer. Graphic organizers allow students to express relationships and concepts in many different ways. Reducing these variations to a single assessment system can be time consuming for the teacher. The balance between giving the student enough guidance while maximizing the value of

the process is difficult to attain. In this study, the dimensions of differentiation, integration, and accuracy were chosen in order to promote deep learning techniques. In addition, chapter objectives should be used to orient students to the types of information they need to map.

For this research, a conversation rubric was developed with the goal of utilizing both efficiency and effectiveness (Appendix D). The standardized format will assist instructors and students in having a conversation about the knowledge set, which, in turn will assist the student in understanding the subject matter. By receiving timely feedback about students' progress and understanding, the instructor will be able adjust lectures and activities to highlight and accent different accounting concepts. This flexibility in the curriculum is important to student success.

The conversation rubric also was designed for both quick turnarounds (feedback) from the instructor and to provide some standardization. The primary outcomes of using this tool should be that instructors and students will have a higher level of communication, course objectives will be clearer to the student, and students' knowledge gaps will be more evident to the instructor. The net result is greater student satisfaction with regard to the education in fundamental accounting classes, which, over time could lead to increasing the number of students who major in accounting.

Chapter 3: Design and Methods

This chapter discusses the design and the methods used to study the effect of graphic organizers in introductory accounting courses. It begins with a statement of personal disclosure, followed by a discussion of the Strategies Checklist that has been chosen and the ways this questionnaire fits into the research. The hypothesis of this research was that by using graphic organizers in introductory accounting courses, instructors can influence how students study accounting. It was hoped that the research would confirm that the deep learning approach will be more beneficial to the student.

Personal Disclosure

I have over 20 years of experience in teaching fundamental accounting. I originally began teaching bookkeeping in an accidental way, but I found that guiding students through the jargon of accounting was both challenging and rewarding. From that experience I have learned that the relationship between the student and the instructor can be more important than the details of any one accounting technique or principle. Successful students have both an aptitude for numbers and reading, and some personal motivation (Glass & Oakley, 2003). However, non-successful students often display many of the same attributes. This dichotomy led me to examine the manner in which instructors and students communicate and, more precisely, whether there are some particular tools in use that will assist in instructor/student communication (Margulies, 2002).

In the late 1990's I began experimenting with the use of concept maps. Partly as a result of some reading of authors like Buzan but mostly as an outgrowth of conversations with others, I began to use concept maps or graphic organizers in class. Two conversations were instrumental. First was with a neighborhood university botany instructor. We had many conversations about how important to student learning that students learned how to draw plants. He stated that it significantly increased student learning and understanding. The ability to manipulate and closely inspect flower parts was instrumental in mastering the discipline. My second conversation was with my architect brother. He told me that he always sketched ideas with his clients. It was the best way to understand what clients wanted and how different design components interacted. My thought was that using this communication technique might be beneficial to students learning accounting.

The first mapping experiences were less than satisfactory. Many maps looked similar to Example A on page 5 of this document. The maps lacked definition and accuracy. Students were confused as to the use of these maps and how much their grades would be impacted with these maps. Initially my efforts went to describing maps and relating the steps to good mapping. At that time my most successful technique was to start with a group project at the beginning of each term. Selecting a focus question and allowing groups of students to converse around that question was a very productive way of starting the class mapping.

Focus questions included topics like:

- What do you want to be able to do at the end of this class?
- What did you learn in your last class that might help you with this class?

And for sequential courses, each group was assigned a chapter to map and present to the class.

These icebreaking activities were more effective when the class scored the maps using the conversation rubric. I also use maps when my lectures seem to be a narcotic. Having groups interact and discuss accounting keeps the kinetic learning system engaged.

I found that this technique improved the level of conversations with students and made our communication more efficient. Students could demonstrate their area of confusion easier, sometimes by going to map an pointing to the area of confusing. When they did not have the ability to formulate a question, they could direct me to the area of their difficulty. While I did have sporadic successes, I also had failures. This technique lacked an acceptable level of consistency.

Study Summary

This study was approached from a post-positivism orientation. Entwhistle (2000) divides epistemological level of students into two areas, dualism and relativism. The dualistic side of student learning includes knowledge being seen as an absolute. The ability to replicate and reproduce is a highly valued skill at this

epistemological level. These are the same skills that seem important to most accounting instructors. One must replicate the information in such a fashion that anyone possessing the same orientation can understand. Entwhistle drew a direct line from this dualistic approach to the lowest form of learning-information acquisition (Entwhistle, 2000), and we might view this as a distinction between pure positivism and post-positivism. Dewey (1958) argued that we should be looking further than simply acquiring knowledge. "The objection to dualism is not just that it is dualism, but that it forces upon us antithetical, non-controvertible principles and interpretations" (p. 241). In Dewey's mind there was a danger in memorization without processing. A catalog of bits of procedures does not equate to learning. Dewey thought good learning has an "inside" and "outside." For good education this means we cannot separate the learner from the learning and the learning from the learning environment.

Gowin and Novak (2002) expanded this notion into five large interconnected elements of learning. They are the learner (student), teacher, curriculum, context (environment), and assessment. Novak (2010) wrote that this was built largely on the work of Ausubel and his assimilation theory (p. 56-90). Ausubel differentiated between rote-learning and meaningful learning. He also distinguished between reception instruction and autonomous discovery instruction. Novak (2010) stated rote/reception instruction is popular in corporate and educational settings. However this popularity can be driven by economic considerations and not educational concerns. For example it is far less expensive to test with publisher produced tests

than to create new ones for each class. However it may not be a superior learning method. Meaningful learning uses different techniques than rote memorization. Novak proposed that different techniques will lead to better learning. In particular he wrote that concept mapping is a key to meaningful learning and the different forms of mapping allows for different instructional styles. For example the memorization of multiplication tables is a reception instructional activity. It is essentially a rote memorization and is not meaningfully learned. Novak encouraged instructors account for these different learning styles in the design of learning environments. The upper portion of the following diagram is where the most meaningful learning takes place. On an individual basis meaningful learning is accomplished by mapping; as an instructional design for either autonomous or guided instruction, mapping remains a valuable activity. A comparison of the traditional and constructivist elements is duplicated in Appendix C. The traditional methods emphasize the student "absorbing" information from controlled situations with success being measured by objective tests.

The tool that explored for this study was the graphic organizer which is similar to Novak's concept mapping (2010). Deeper learning is the objective of this constructionist theory. This research examines the relationship between deep-achieving learning and the use of graphic organizers in first-year accounting classes.

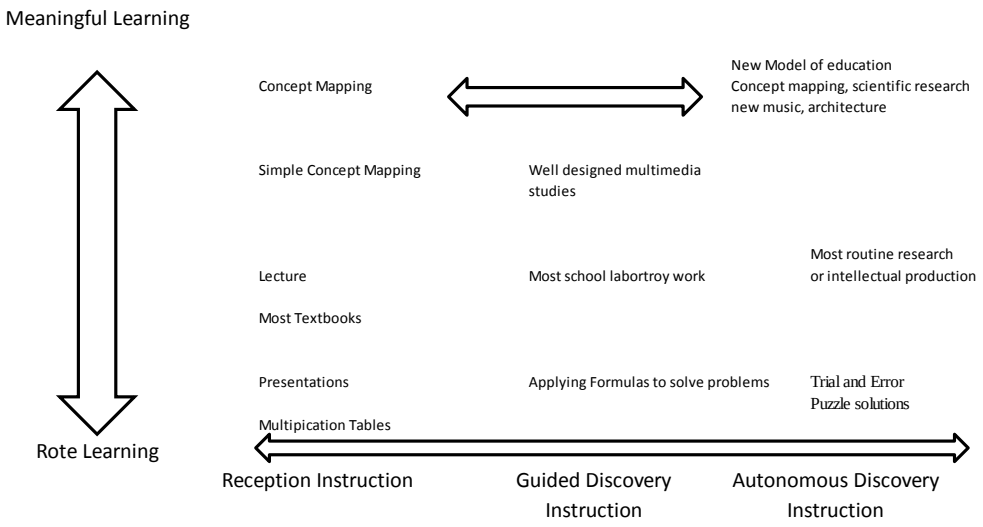

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Figure 3.1 Reception learning and discovery learning

In addition, a conversation/scoring rubric was developed as an aid to student/teacher communication. One assumption was that better teacher/learner communication will lead to better student performance.

For many years successful accounting students have been measured by their grades, their continued study, and the eventual passing of the Certified Public Accountant Examination (CPA Exam), which typically leads to professional success in the field when measured monetarily. For a variety of reasons, however, the value of this path has been questioned. As stated earlier, there is a significant amount of literature that challenges the grade as a measurement of knowledge or learning. In addition, the decreasing number of candidates taking the CPA Exam indicates erosion in the public's perception of the value of accounting professionals (Albrecht & Sack, 2000). The traditional view of the successful accounting student is changing, and instructors should re-evaluate and adapt to the new environment. Today, the

instructor needs to focus on accounting as a broader subject that is integrated with business management, ethics, and strategic planning (Albrecht & Sack, 2000). These changes are not always reflected in pedagogical change.

Study design. This study examined whether it is possible to measure a shift in the study approaches of first-year accounting students that is the result of the use of graphic organizers. In general, the study examined the experience of an accounting instructor, teaching two concurrent sections of introductory accounting. One section of the teacher's load was considered the treatment group (using graphic organizers), and the other section was considered the control group (not using graphic organizers). The Strategies Checklist (Appendix D and E) was the measuring tool; it was applied once at the beginning of the term and once at the end of the term. Statistical information derived from this survey was used to measure the change in the students' approach to study in order to indicate whether and to what extent there was been a shift in the study approach of students. In part this addressed the first research question; to what extent does the use of graphic organizers change the study approach students use to learn accounting?

Throughout the selected term the researcher maintained contact with the instructors. Contact maintenance was primarily to address problems as they arise and to develop a dialogue that will aid in answering the last two research questions.

- What are some advantages and disadvantages of using graphic organizers in first-term accounting education?

- What are the major issues that need to be considered when using graphic organizers in the instruction of fundamental accounting courses?

Discussing these questions helped define what areas need further study.

Participants

Student participants included all students attending the first-year accounting classes instructed by a community college instructor participating in this study. The study began and concluded within one academic term. Critical to the study was that the instructor taught two sections of the same first-year accounting course. It was important that the instructor's sections be interchangeable, such as two financial accounting sections or two managerial accounting sections, so that the same instructor can use graphic organizers in one section and avoid graphic organizers in the other. Having the same instructor helped to eliminate the effect of possible differences in instruction technique that might emerge between the two student groups in the paired classes. It was relatively unimportant which instructional method the instructor preferred (procedural versus user). Every instructor is on a continuum between procedural and user curriculum. Using graphic organizers should assist students to shift toward deep learning strategies. Identification of potential instructors to participate in the study was based on an examination of class assignments for the term, and instructor orientation was not considered.

While some biases like instructor presentation and class differentiation cannot be fully eliminated, the attempt was made to provide instructors with clear information regarding the study parameters and the importance of not blending

techniques for the term and making the one difference the use of graphic organizers as a communication tool. The assumption was that two courses offered during the same term and taught by the same instructor will be similar in content and the self-selection process of student enrollment would satisfy the randomness requirement.

The pool of potential instructors at Oregon community colleges was identified by a survey of class schedules from school websites. Instructors teaching two sections of fundamental accounting courses were contacted first using email addresses and phone numbers. After failing to attract enough participants, the search was widened to include Washington and California. The search was again widened, and two east coast instructors expressed interest. Both declined after a series of conversations.

On three occasions the study was ready to be launched. The first attempt was during the winter term of 2008. The researcher was scheduled to meet with three participating instructors during finals week of the fall of 2007, however a major snow storm prevented travel and the study was canceled. Attempts to revive it in the spring term were not successful because the instructors were not teaching two sections of the same accounting course. A third time the study was aborted because the participating instructor contracted cancer and was not able to complete his courses.

Eventually an instructor from an Oregon community college agreed to participate in the study and the study was completed. That instructor used graphic organizers with 28 students as part of the treated group, and that same instructor did not use graphic organizers with 25 students as part of the control group. Both groups

were taking Introductory Financial Accounting and apparently represented members of a typical community college class in that subject.

One other instructor from Oregon State University (OSU) also participated in the study. Checklists were not completed on the treated groups for the OSU students. The data obtained from OSU were not incorporated in within group statistical comparisons. It was felt that even though the study at OSU was not successful, the data gathered did have validity for background. The instructor comments concerning the difficulties with the graphic organizer system and preliminary student ranking of questions were incorporated in later narrative. The instructor and researcher did introduce the use of graphics to a winter 2010 class, but feedback from students was not documented.

Measures

The measuring instrument is the Preliminary Strategies Checklist and the Final Strategies Checklist (Holschuh, 1998) with some of the changes suggested by Elias (2005). The Strategies Checklist is a survey that yields scores that enable a comparison of two basic learning strategies. The checklist was administered the second week of the term and again during the last two weeks of the term. The timing was selected to minimize course intrusion and maximize the time between checklists. It was thought that the greater the time period between surveys, the larger the differences could be. Differences in the checklists are essentially grammatical and change the perspective from future tense to past tense (e.g. question 17 was changed from *"I will tend to cram for my accounting tests"* to *"I tended to cram for my*

accounting exams"). The basic checklist is 46 questions in four different topical areas. Respondents circled or otherwise marked the questions that described their intentions or their actions. This information was then transferred to a spreadsheet. One question was added (47) that asked what grade the student expected. At the time of the study it was thought that the expected grade might be an indicator, but the examination has since been put aside.

The four areas identified by the checklist are text, studying, lecture notes, and supports. These learner-centered questions fit with Gowin and Novak's (2002) five elements of meaningful learning. The *text* section corresponds to Gowin and Novak's element of curriculum; the *study approach* relates to the learner; *lecture notes* with how the instructor presents material; and *supports* relate to the learning environments. The remaining element, evaluation, is represented throughout the Checklist. Within these groups, the questions describe different behaviors which are indicative of deep or surface learning approaches. Each survey then generates two numbers by summing the number of deep responses and the number of surface responses. These summative numbers were then used to develop comparative statistics. The number questions indicating surface and deep learning approaches are different. In conversations with the author of the checklist, she stated that this inequality did not happen by design and no significance should be applied to the imbalance (Appendix D & E).

Text. The text portion of the checklist has 10 deep approach question and six surface approach questions. The term "text" includes publisher produced course ancillaries. The checklist intends to measure how the student will approach the course

work, and not how well the text is written. Checklist questions 1, 2, 8, 14, and 16 address deep learning approaches to learning in regards to the provided material (Appendix E & F). Looking at the chapter prior to reading gives the student some a framework about the how the information will be presented. This pre-reading overview activity and helps to give the learner a framework to attach new information or "scaffolding" (Novak, 2010). Reviewing the teaching materials from the text to understand how the materials "fit" together is also evidence of a meta-cognitive approach. If the learner has an understanding of how the information is being presented, they have an idea of what information they are getting and what information they are missing. Questions 6, 8, and 9 refer to the learner's ability to relate the ideas and concepts to the world or previous experience. Question 3, 13, and 15 examine the how the student will relate to the course. Does the material seem to follow an order or sequence that makes sense to the learner? These are deep learning attributes.

Checklist questions 4 and 10 are surface approach questions. If the learner tends to accept what the text states and does not compare the writing to life experiences, then the learner is exhibiting surface learning tendencies. Having confidence in the veracity of printed material is important, but the surface learner does not analyze the presented material against their own experience. The surface learner sometimes will highlight expansive portions of the text. This practice is a result of not being able to establish a hierarchy of the information. They cannot distinguish between important and non-important information. Questions 5, 11, and

12 relate to student's rote memorization of the text. The surface learner again concentrates on memorizing facts without association the facts with the underlying theory. Finally question 7 indicates the learner's willingness to focus on the testing of text material. Surface learners tend to be more concerned with testing than learning.

Studying. The studying section measures how the student approaches learning about the subject. The checklist has seven deep approach questions and three surface approach question. Questions 18, 19 and 24 relate to how the learner identifies changes (uses a variety of strategies) and utilizes planning in their studying. Questions 22, 23, and 25 concern how the learner relates the course material to the events outside of themselves i.e., what might be tested; what is already known? Question 26 refers to the learners intentionally examining the material for conceptual logic (in this instance the reference is to publisher produced diagrams). If the material makes conceptual logic, then as it is subsumed it remains retrievable (Novak, 2010).

Questions 17, 20, and 21 are surface learning questions. Testing is the major component all three of these questions. The surface learner's educational goal is to pass the assessment. Information on the test is the most important learning criteria and therefore it rises considerably in the minds of surface learners. The students do not intend to change their methods of memorization, but will simply try harder to accomplish their educational success. Question #20 is illuminating in that the student will change behavior <u>if</u> they are doing "poorly in accounting". Students should change study techniques when they realize that meaningful learning is not taking place, not simply because an outside measure has determined they are not being

successful. This misdirection indicates a lack of understanding about meaningful learning.

Lecture notes. Four questions (30, 32, 33, and 35) refer to deep learning approaches of the course lecture notes. Reviewing notes numerous times (daily) and reorganizing them to make more sense (fit our scaffolding) are deep learning approaches to coursework. The deep learner also prepares themselves for the class by pre-reading the chapter (question 33) before the lecture. This pre-framing is important to the deep learner, because it allows them to more easily assimilate the new information with current constructs. Self-testing is also a characteristic of the deep learner (question 35). This testing assists in making the lecture fit into a scheme which aids in understanding.

Six questions are related to surfacing learning in the lecture notes section of the checklist. Purchasing notes instead of creating notes (question 27) is considered safer by the learner, because they are concerned they will "miss" something, yet are not inclined to work the information into their own scaffold. Purchasing the notes limits the risk of missing information, but decreases the overall value of the note taking (Katayama & Robinson, 2000). Questions 28 and 34 are very similar. Neat, detailed notes and transcribing what an instructor is saying are surface learning activities reflecting more concern about the "how" information looks and less concern about "what" the information is. Questions 29 and 31 relate to the surface learners unwillingness to search out underlying principles or patterns. Question 36 is clearly

associated with the motivational aspects of the assessment. The only reason to review the notes is to be successful on the test.

Supports. The checklist has eight deep approach and two surface approach questions in the support section`. Questions 40, 41, 44, 45, and 46 are self-evaluation type questions. In other words, the learner recognizes that certain areas of material are not mastered and takes appropriate action by retaking practice tests or seeking outside help from a tutor or instructor. Question 46 refers to accessing a learning strategies session to help the process. Questions 39, 42, and 43 are indicators of other types of interaction with colleagues that help the learner focus on the concepts.

Question 37 relates to the surface learner's concern of the test or assessment. The main reason for using external supports is to pass an assessment and not to grasp the material. Question 38 again reiterates the habit of accepting prepared notes for the surface learner.

The purpose of this section was to review the checklist and demonstrate how the questions on the checklist relate to the Beattie, Collins, and McInnes' (1997) categories of surface and deep learning attributes. Every question on the checklist has a deep or surface learning relationship. The learner indicates what particular question they intend (preliminary checklist) or what they actually did (final checklist) in the course in each of the four sections. This allows researchers to create a profile. The aggregation of these profiles is the statistical portion of the research.

Checklist issues. Not every question on the checklist applies to every course in accounting and there are some questions that can have some ambiguity for the

student. Question 6 refers to studying diagrams to help understand the accounting process. A learner may have difficulty determining the definition of a diagram. A strict definition could mean only those graphics that have flow where another interpretation could include tables and charts. The learners could be answering different questions.

Some text ancillaries do not provide the learner with a study guide. Others are indistinguishable from the text in terms of format and size (Horngren, Harrison, & Oliver, 2012). The range of differences in these "text materials" could bring different level of understanding to the learner. Some of the terminology of the checklist might be misleading to the participant. The meaning of *idea* (question 8) has many variations. Question 16 asks the student to have a level of awareness about what they know and do not know. This meta-cognitive characteristic may not be adequately separated from those that *think* they do not know (or conversely, *think* they know when they do not). The source of "diagrams" in question 26 is not defined. If the diagram source is the instructor or textbook company, the learning value is discounted (Katayama & Robinson, 2000). This makes the diagram a surface learning tool. On the other hand if the diagram is generated by the student it would demonstrate a deeper level learning approach.

Overall the checklist attempts to minimize conflicting terms and is clear in the meaning and the reason each question was included. While different institutions may have different systems levels of student support for education, checklist captures the

spirit of what should be different characteristics of deep and surfacing learning activities.

Procedures

During the term, the instructor used graphic organizers in one class (treated) and not in another (control). Presently, many instructors use graphics as a teaching method to enhance the learning environment and to assist with explanations. Because this study examined graphic organizers as a technique to create the opportunity for conversations, the key to dividing and separating the two courses, therefore, was the element of conversation. The study was based on the concept that learning takes place during conversation or dialogue (Schunk, 2000). Therefore, the control class did not use graphic organizers to promote conversation, but it was acceptable for the instructor to use graphics to promote understanding. The main delineating characteristic was that in the treatment courses the student-generated graphic organizers was a graded activity, while in the control courses the communication activity was not graded. Requiring students to produce their own graphic organizers was very different from using organizers developed by the instructor or taken from other sources as aids to explanation.

The questionnaire was administered at the beginning and the end of the course. Students were not informed of the rationale or scope of the survey. After completing each survey, students placed the surveys into a large, pre-addressed envelope for mailing. The instructor forwarded the surveys to the researcher. Twice during the courses the researcher interviewed the instructor. These interviews

primarily provided a mechanism for preventing problems that might affect the students. While individual instructors may change the presentation of the graphic organizers to make the treated classes more efficient, in the control classes the instructor was asked not to present graphic organizers as a communication tool and was not required to grade student-generated graphic organizers.

At the conclusion of the term, a third and final interview with the instructor took place. The conversation with the instructor concerned if and how the use of graphic organizers was beneficial. Interview questions were open-ended and directed toward the subject of improving the teaching technique and directed toward defining deficient components. After the interviews, the survey packets were scored and the data analyzed.

Analysis The scores on the Strategies Checklist were used as the criteria for measuring change. Counts of answers were tracked to provide information on deep and surface learning intentions (preliminary) and as a history of actual performance (final). Significant shifts in the scores would indicate a change in students' approach to the study of accounting in these courses. ANOVA did not produce a significant difference in the groups, and therefore a more deliberate approach was taken. The first issue to determine was the differences between the Holschuh (2009) data and the research participants. In other words, can the two groups be compared for statistical association?

The initial hypothesis is: H_1 = There is a difference between Holschuh students and Fisher/Russ-Eft students. The specific classes were examined in terms of

differences between themselves and with data recorded by Holschuh (2009). In the preliminary checklist, no significant differences between the study classes and Holschuh should be observed. This establishes the comparability of data between the groups. In other words if the classes are to be considered the same, then we should fail to reject the differences that may be recorded.

The participating courses deep approach scores were examined to determine if at the start of the study there were significant differences. If differences are detected, there is a possibility of the classes are not comparable and have different student characteristics that might influence the conclusions of the study. Eight more hypothesizes were proposed to examine the results of the classes. They are:

H_2 = There is a difference in deep strategy responses on the preliminary checklist between the control and the treated classes.

H_3 = There is a difference in surface strategy responses on the preliminary checklist between the control and the treated classes.

H_4 = There is a difference in deep strategy responses on the final checklist between the control and the treated classes.

H_5 = There is a difference in surface strategy responses on the final checklist between the control and the treated classes.

H_6 = There is a difference in deep strategy responses from the preliminary checklist to the final checklist in the control class.

H_7 = There is a difference in surface strategy responses from the preliminary checklist to the final checklist in the control class.

H_8 = There is a difference in deep strategy responses from the preliminary checklist to the final checklist in the treated class.

H_9 = There is a difference in surface strategy responses from the preliminary checklist to the final checklist in the treated class.

Finally a comparison of the interaction between surface and deep approach indicators was made. A reasonable assumption might be that as the deep approach indicators increase, the surface indicators would decrease. In effect does an inverse relationship exist between deep and surface indicators?

H_{10} = is there an inverse relationship between the deep approach and surface approach indicators?

H_8 and H_9 are the foci of this study. While the others are necessary for completeness, the actual measurement of learner approach changes to a higher level of deep learning approaches and the effects of surface approaches are the components of interest. It would also seem that that an inverse relationship should accompany deep learning indicators as surface learning approaches would decrease as documented by H_8. However it is not part of this study to examine the uses and benefits of deep learning approaches.

The research experience with OSU was not entirely successful, but there is information that can be gleaned from the study. Some of the students participating in the study did not complete the preliminary and final checklists. Additionally the protocol of the study was not followed.

One premise for differences between preliminary and final surveys could be that students are energetic and somewhat naive about their ability to complete the course. Opening day thoughts are very much about how well the student will perform. At the conclusion of a term, it anecdotally seems to be a more sober evaluation of the learner's performance.

Protection of Human Participants

This study was conducted under the auspices of Oregon State University Institutional Review Board. The study was classified as "exempt" and neither the researcher nor the college received any funds for completing this study. All ethical and compliance training was completed by the researcher. This was a self-selecting survey and the medical and psychological parameters were not applicable. No ethical or conflict of interest occurrences were experienced.

Summary

The researcher has over 20 years of experience teaching accounting. This study was approached from a post-positivist perspective, because it is the researchers' understanding that most instructors in the accounting field are more comfortable in post-positivism. The study was designed to examine the relationship between the use of graphic organizers and achieving deep learning in fundamental accounting classes. New information about how learning accounting should be accomplished is coming forth. There is greater interest in student learning outcomes to be deeper learning based than the procedural based traditional methods (Albrecht & Sack, 2000). The

goal of the research was to determine if concept maps aid in shifting students to deeper learning approaches.

Students in accounting use a variety of methods for successful course completion. Using graphic organizers may or may not be a good teaching technique that will aid instructors in helping students improve their understandings of, in this case, accounting concepts and principles. The research also sought to clarify what types of advantages and disadvantages exist in the use of graphic organizers and also what are some of the major issues that need considering for using graphic organizers in accounting education.

The study required two classes of fundamental accounting students being instructed by the same instructor. This limited the differences between the classes. One class was the control, and the other was treated. The treatment was the use of graphic organizers as part of the curriculum of the courses. The instructor required graphic organizers of the treated class and periodic short quizzes for the untreated (control) class. This procedure gave some assurance both classes had similar experiences with instructor bias minimized. An instructor from an Oregon Community College was eventually selected to participate in the study.

The measuring instrument was a checklist developed by Holschuh with a few grammatical changes. The checklist was originally designed for biology (Holschuh, 1998) and more recently has been used for accounting (Elias, 2005). The checklist has four sections; text, studying, lecture notes, and supports. These four sections were examined to assure that each question aligned with definitions of deep and surface

learning approaches (Beattie et all, 1997). Some concerns about language and learner understanding of the checklist verbiage were noted, but the overall conclusion was the checklist is a good instrument to evaluate surface and deep learning approaches.

Ten hypotheses were developed to examine the research question. Of the 10, the most important H_8 was identified. The remaining tests are used to support the external and internal validity of this study, and to explore the relationship between deep and surface learning. H_{10} references an increase in surface approaches which should decrease as the as deep learning approaches' increase. However, examining this relationship in depth is outside the focus of this study.

Chapter 4: Results

The purpose of this study was to investigate the impact of using graphic organizers in learning fundamental accounting. The study was driven by recognition that, although times have changed, essential accounting education may have failed to keep pace. The use of graphic organizers was hypothesized as a technique for updating instructional techniques and by extension updating accounting education. A basic research assumption was that a student could gain a better understanding of accounting by using graphic organizers leading to a deep learning approach. The increase in learning would take place in two areas. The first is increased communication with the instructor. Increased interaction between instructor and student should provide a greater opportunity for meaningful learning. The second area is a student created document that helps establish meta-cognitive practices through self-identification of knowledge gaps. This practice should improve the likelihood of the student being a life-long learner.

Traditional accounting instructional techniques generally promote surface learning techniques. Accounting instructors tend to use pieces and parts in order to instruct accounting. The hope of using this technique is that students will at one point in the future integrate the accounting pieces into their other professional duties. The challenge is that this type of rote learning has a short shelf life; some say eight weeks (Gowin & Novak, 2002); and therefore there is concern about the value of this

approach (Lucas, 2001; Mantano, Anes, Hassall, & Joyce 2001). The thrust of this research was to explore a different instructional technique and assist students to gain a deeper approach to learning in fundamental accounting courses.

In general, the study examined how utilizing graphic organizers affects the student study approach for fundamental accounting students. Specifically the study was designed to address the following questions:

- To what extent does the use of graphic organizers change the study approach students use to learn accounting?
- What are some advantages and disadvantages of using graphic organizers in first-term accounting education?
- What are the major issues that need to be considered when using graphic organizers in the instruction of fundamental accounting courses?

To address these questions participating groups of students were requested to complete a questionnaire in an attempt to assess their approach to the study of accounting. Table 4-1 presents a listing of internal and external validity factors and an assessment of risk. By using one instructor teaching two classes (treated and control), it was hoped a number of variables would be sufficiently controlled so as to have a limited impact on the results. This study was attempted over a two and one-half year period. The researcher experienced difficulty in gaining agreement by instructors to participate in the study, eventually only one instructor was a qualified participant. This particular instructor was both the pilot study instructor and the study instructor.

As discussed later, the problems with gaining instructor agreement can be categorized in three different areas; content overload, inconsistent class scheduling, and perceived value of mapping as an educational tool.

Profile of Study College and Student Participants

One instructor at an Oregon community college agreed to participate in this study. This community college is a midsized community college in the Oregon Community College system of 17 colleges (College Profiles, 1995-2011). The College has experienced growth in the past few years and uses more than one campus or learning center for the delivery of educational services. The two accounting courses selected were not on the same campus, but were in close proximity (less than 20 miles). Post study conversations with the instructor indicated that the sections seemed to be normal and without significant differences to other terms and academic years. The instructor indicated that anecdotally there did not appear to be significant differences in the type or performance of the students. The researcher considers the class size (21-25) as somewhat above normal for community college and small university, but below normal for larger university.

Evidence of Internal and External Validity in the Study

This section describes the actions taken to maintain the internal and external validity of the study. Threats to internal validity include inadequate procedural control and problems with participant characteristics. Creswell (2003) suggested examining these external threats in terms of procedures, treatment, and experience. The results of this appear in Table 4-1. The measuring instrument (Holschuh Study

Checklist) did not change throughout the study; however the researcher has some concerns about the understanding students have of the checklist. It is unclear if students really understand the terminology and sections of the checklist. For example different students may draw different conclusions from the term "study guide" (question 7). The survey question is "I will read the study guide instead of my text because it will highlight everything I will need to know." Some study guides are produced by publishers, and others may be written by instructors. It is unclear if the term "study guide" needs to be clarified. Another example, question 19 refers to study *strategy*, and each student could have a different interpretation of what constitutes a study strategy.

Table 4-1

Internal Validity and Assessment of Threats

Variable	**Procedures**	**Treatment**	**Experience**
Change of instrument	Moderate risk *The validity of the approach checklist is still in question.*	Low risk	Low risk
Application of treatment	High risk *Instructor familiarity with mapping*	High risk *Student ability to connect the value of mapping to the incident situation.*	Moderate risk *Failure to maintain dialogue with instructor during the entire study period.*
Participant characteristics	Low risk	Low risk	Low risk

The question states "I will use a variety of strategies when I study accounting." The student's personal definition and competence could vary and might determine the

choices made on the checklist. For example some students may not know or recall many different study strategies, and therefore the choice of using different strategies might be one of simply changing time or location of studying. This is not what Holschuh intended as a "strategy."

External validity measures inferences to other persons and situations due to conclusions based on the statistics and the construct of the study (Creswell 2003). It indicates the extent to which the results can be generalized. The results of this examination appear in Table 4-2:

Table 4-2

External Threats and Assessment of Risks

Variable	**Inferences**	**Power**
Statistical conclusion	Low risk *The power of the study was low.*	High risk *The inability to study more than one course on different campuses.*
Variable	**Definition of terms**	**Measures of variables**
Construct validity	High risk *The terms used on the checklist hold different definitions for the participants.* *Different institutions do not have the same services to aid in student success*	Moderate risk

The checklist asked participants to respond positively to different activity descriptions. The activities are divided into two indicator groups; deep approach and surface approach. This means that each student would have a deep approach score and a surface approach score. The two checklists (preliminary and final) created four different data sets for each student. These included the positive responses for deep approaches before (D_1) and after (D_2) the course. The second set of data included positive responses for surface approaches before (S_1) and after the course (S_2).

Holschuh (1998) asserted that the checklist is a valid measure of study approaches. "Once again, they also indicated a stronger relationship between deep study strategy use and the factors on the Self-Regulated Learning Inventory" (p. 20) concluding that the checklist is a valid measure of strategy. The Holschuh study was based on a biology course, but the researcher assumes a close curricular association between the disciplines. Holschuh also reported a negative correlation between deep and surface study strategies which simply indicated the more students used deep study strategies the less they used surface study strategies. The implication was that student's study approaches are transitional and tend to be somewhat mutually exclusive. Holschuh's work was designed to examine the relationship between different dimensions of epistemological beliefs and how those beliefs impact study strategies. The researcher continues to believe the checklist is a reliable instrument to measure deep and surface strategy use. Likewise the data produced in this study should be comparable to Holschuh data. The data were examined using a 95% confidence level.

Statistical Analysis

Two ANOVA procedures were administered to the data. The first analyzed the changes in the number of the deep responses for both the control class and the treated class. The second procedure analyzed the change in the number of surface responses for both the control group and the treated group. The factors were control versus treated (classes) and preliminary versus final checklists. The two procedures resulted in similar conclusions.

For the total study population, the mean of the number of deep responses was 15.04 positive responses in the preliminary checklist which decreased to 10.47 positive responses in the final checklist (Table 4.5). ANOVA analysis of the deep

Table 4.3

ANOVA Analysis for Deep Responses

Source	**Sum Of Squares**	**df**	**MS**	**F**	**p-value**	**Critical F**	
Treatment	1128.0	3	376.0	13.62	0.0000	2.6928	
Error	2841.6	103	27.6				
Total	3969.5						
Summary						**95.0% CI Estimate**	
Groups	***Count***	***Sum***	***Average***	***Variance***	***Std Dev***	***LL***	***UL***
CD1	28	428	15.3	16.5	4.06	13.71	16.86
CD2	31	284	9.2	32.7	5.72	7.06	11.26
TD1	23	335	14.6	24.3	4.93	12.44	16.70
TD2	25	195	7.8	36.7	6.06	5.30	10.30

responses yielded a critical F of 2.628 and a computed F of 13.628 (p= 0.0000, df 3,103). It was expected that differences would be seen between the groups. However a review of the confidence intervals reveals that both the treated and control classes

had similar decreases in the number of responses. In other words there were less positive responses in the final checklist than the preliminary checklist. This was not anticipated (Table 4.3).

Table 4.4

ANOVA Analysis for Surface Responses

Source	***Sum Of Squares***	***df***	***MS***	***F***	***p-value***	***Critical F***
Treatment	85.1	3	28.4	4.827	0.0035	2.6928
Error	605.5	103	5.9			
Total	690.7					

Summary						**95.0% CI Estimate**	
Groups	***Count***	***Sum***	***Average***	***Variance***	***Std Dev***	***LL***	***UL***
CS1	28	146	5.2	6.0	2.44	4.27	6.16
CS2	31	105	3.4	5.8	2.42	2.50	4.27
TS1	23	119	5.2	5.4	2.33	4.17	6.18
TS2	25	86	3.44	6.3	2.50	2.41	4.47

For the total study population, the mean of the number of surface responses was 5.25 positive responses in the preliminary checklist which decreased to 4.21 in the final checklist (Table 4.5). ANOVA analysis of the surface produced similar results as the deep response analysis. While the size of the difference was not as great as with the deep responses, the pattern is repeated. The computed F was 4.827 (p= 0.0035; df 3,103) and again the confidence intervals indicated that the differences are paired differences. Both the treated and control classes experienced significant drops in the number of responses (Table 4.4).

The first hypothesis test (H_1 = There is a difference between Holschuh students and Fisher/Russ-Eft students) was intended to demonstrate the continuity between the Holschuh and Fisher/Russ-Eft student populations. In other words, are the two study groups essentially the same in terms of the survey? These comparisons demonstrate the level of external validity and allow some predictability in the other hypothesis. As shown in the comparative statistics of Table 4.5, the groups do not appear congruent. The preliminary deep and surface means showed significant statistical differences between three of the four groups. Deep strategy responses at the beginning of the term resulted in a rejection of the null hypothesis ($p < .0123$). This indicates a lack of continuity with the two groups responding to the deep questions. Similarly the comparison of the means of the surface strategy responses demonstrated a difference between the two groups ($p < .0100$). At the conclusion of the term the means of the deep strategy response was compared to the Holschuh data. This also indicated a lack of continuity ($p < .0012$). Interesting the comparison of surface strategy responses at the end of the term did indicate a similarity ($p < .3147$). This leads to the conclusion that there may be significant differences between the Holschuh and Fisher/Russ-Eft student populations. The source of this difference is undetermined. The differences students experience during the term as measured by the checklist is also a part of the first hypothesis. In this instance the difference between deep strategies responses for both student groups the treated and the control classes were compared. Table 4.6 shows that the Holschuh student population was different ($p < .0000$). The Fisher/Russ-Eft student responses were also significantly

different ($p < .0000$). The Holschuh students appeared to show a decrease in deep strategy response, while the Fisher/Russ-Eft student showed increases. The information for the surface strategy responses provided shown in Table 4-7 is similar to the deep strategy responses. For Holschuh there is a significant difference between the preliminary and final checklist means ($p < .0113$). The Fisher/Russ-Eft student population also demonstrated differences ($p < .0000$). In this case the Holschuh students showed increases in surface strategies while the Fisher/Russ-Eft students showed decreases. Examining the student populations should have established that both groups (Holschuh and Fisher/Russ-Eft) were similar. The results of this examination show that there may be significant differences between the two groups and that some conclusions made for one group may not be applicable to the other.

The deep strategy responses from the study groups were examined next. Table 4.8 compares the differences between the control and treated groups, and how the groups differed from the beginning of the term to the end. The preliminary checklist demonstrated a difference between the control and treated groups ($p < .0000$).

It is interesting to note that this difference no longer existed at the end of the term ($p < .6700$). The control or untreated student population did not demonstrate a difference from the beginning of the term to the end ($p < .8753$). The treated student population also did not demonstrate a difference in the deep strategy responses

Table 4.5

Overall Comparison of Holschuh and Fisher/Russ-Eft Students (H_1)

	Holschuh					Fisher/Russ-Eft					
	N	Min	Max	M	SD	N	Min	Max	M	SD	
Deep strategy on preliminary checklist (D_1)	518	2	29	16.65	4.91	53	4	24	15.04	4.41	Computed value: 2.50 Confidence Interval: (2.870, 0.350) p = .0123 **Reject H_O**
Surface strategy on preliminary checklist (S_1)	518	0	16	4.13	2.51	53	1	11	5.25	2.35	Computed value: -3.28 Confidence Interval: (-0.451,-1.789) p = .0010 **Reject H_O**
Deep strategy on final checklist (D_2)	517	0	27	12.77	4.63	47	0	22	10.47	4.67	Computed value: 3.24 Confidence Interval: (3.693, 0.907) p = .0012 **Reject H_O**
Surface strategy on deep checklist (S_2)	517	0	13	4.53	2.57	47	0	8	4.21	2.04	Computed value: 1.01 Confidence Interval: (9.44, -0.304) p = .3147 **FTR H_O**

Table 4.6

Comparison of Deep Strategy Preliminary and Final Checklists: Holschuh and Fisher/Russ-Eft Students (H_2)

	Holschuh					Russ-Eft/Fisher				
	N	Min	Max	M	SD	N	Min	Max	M	SD
Deep strategy on Preliminary checklist (D_1)	518	2	29	16.65	4.91	53	4	24	15.04	4.41
Deep strategy on Final checklist (D_2)	517	0	27	12.77	4.63	47	0	22	10.47	4.67
Computed value: 13.08 Confidence Interval: (4.461, 3.299) p = .0000 **Reject H_O**						Computed value: 5.01 Confidence Interval: (6.357, 2.783) p = .0000 **Reject H_O**				

($p < .9001$). It was hoped that the treated population would show a difference, but this was not the case.

Comparison of surface responses was also examined. As shown in Table 4-9, there was not a difference shown at the beginning of the term between the control and treated populations ($p < .9144$). This was expected. At the end of the term there was not a significant difference between the two classes ($p < .5058$). This was unexpected. Within the classes there were differences. The control class demonstrated a significant drop in the mean of surface responses ($p < .0000$) from the preliminary to the final checklist. The treated group also demonstrated a significant decrease in the number of surface responses ($p < .0000$).

There was a significant difference in the surface approach, but not as strong as the deep approach. The surface responses dropped an average of 13.4 over the term. Initially the mean of surface strategy responses was 45.56 and the mean descended to 32.19. The t-test indicates a difference in the two sets of data ($t = 2.60$; $df = 15$; and the $p < .0203$). Both the changes in the deep approach and the surface approach indicate some movement, but it is unclear as to why that movement takes place. The researcher presumes it is a natural transition from student intention to student performance. Perhaps students are optimistic about how they will perform in the preliminary survey, and do not always follow through on those intentions as shown in the final survey. The last area of examination was regression analysis to determine if there is a relationship between choosing a deep response and choosing a surface response and the grade that was anticipated by the student.

Table 4.7

Comparison of Surface Strategy Preliminary and Final Checklists: Holschuh and Fisher/Russ-Eft Students (H_3)

	Holschuh					Fisher/Russ-Eft				
	N	Min	Max	M	SD	N	Min	Max	M	SD
Surface strategy on Preliminary checklist (S_1)	518	0	16	4.13	2.51	53	1	11	5.25	2.35
Surface strategy on Final checklist (S_2)	517	0	13	4.53	2.57	47	0	8	4.21	2.04
Computed value: -2.53 Confidence Interval: (-0.090, -0.710) p = .0113 **Reject H_O**						Computed value: 2.37 Confidence Interval: (1.9, .0180) p = .0000 **Reject H_O**				

Table 4.8

Comparison of Deep Strategy Preliminary and Final checklists: Control and Treated Classes ($H_{4, 6, \& 8}$)

	Control					Treated					
	N	Min	Max	M	SD	N	Min	Max	M	SD	
Deep strategy on preliminary checklist (D_1)	25	4	23	14.76	4.84	28	7	24	15.29	4.06	Computed value:-4.18 Confidence Interval: (1.891, -2.951) p = 0.0000 **Reject H_O**
Deep strategy on Final checklist (D_2)	21	2	19	9.90	5.04	27	0	22	10.51	4.76	Computed value:-0.43 Confidence Interval: (2.195, -3.415) p = .6700 **FTR H_O**
Computed value: .8753 Confidence Interval: (-7.732, 1.988) p = 0.16 **FTR H_O**						Computed value: 0.13 Confidence Interval: (7.122, 2.438) p = .9001 **FTR H_O**					

Table 4.9

Comparison of Surface Strategy Preliminary and Final Checklists: Control and Treated ($H_{5, 6, \&8}$)

	Control					Treated					
	N	Min	Max	M	SD	N	Min	Max	M	SD	
Surface strategy on preliminary checklist (S_1)	28	2	11	5.21	2.44	25	1	9	5.28	2.30	Computed value: -0.11 Confidence Interval: (1.207, -1.347) p = .9144 **FTR H_O**
Surface strategy on Final checklist (S_2)	26	2	8	4.03	2.06	21	0	8	4.43	2.04	Computed value: -0.67 Confidence Interval: (0.778, -1.578) p = .5058 **FTR H_O**
Computed value = -5.63 Confidence Interval: = (2.382, -0.022) p = 0.0000 **Reject H_O**						Computed value = -5.91 Confidence Interval: = (2.105, -0.405) p =0 .0000 **Reject H_O**					

All four groups (preliminary and final; control and treated) were independently analyzed. There was no R in excess of .6000 indicating a lack of predictability with these models. It seems evident that these students chose different strategies and did not necessarily exclude one strategy in favor of another.

Comparing Preliminary Responses (D1 & S1) and Final Responses (D2 & S2) The two population means z-test comparison for the preliminary positive deep responses demonstrated a difference between Holschuh and Fisher/Russ-Eft ($p < .0123$) indicating a difference in the groups at a 95% confidence level. Likewise the data for the preliminary surface responses demonstrated a difference in the groups ($p < .00010$). The data derived from responses after the term also demonstrated a difference in the groups ($p < .0196$). The comparison for surface responses between both groups (Holschuh and Fisher/Russ-Eft) did not demonstrate and difference in the two groups ($p = .3147$). Comparing all of the groups together in an ANOVA protocol demonstrated further that the groups were different (f-critical 95.86, $p < .00000$).

Comparing treated and untreated groups using a t-test. This analysis initially examined the differences between deep and surface checklist scores using of the mean score of the number of questions affirmed in the preliminary and final surveys of the study groups. This test did not include Holschuh data, but focused on differences in the two community college study groups. The computation was based on the t-test. A discussion of the differences between the deep and surface responses will follow. Lastly a brief comparison of the four groups will conclude this section.

The comparison of treated/untreated deep learning approach indicators means appearing in Table 4-4 indicates means of 14.76 and 15.29 for deep responses. In other words the different classes had a beginning difference in the number of positive responses to deep learning strategy questions. However this difference was not significant at the 95% confidence level (p = .6679). Comparing the final deep learning strategies following the intervention for the treated group rendered a similar result. There is not a significant difference at the 95% confidence level

The remaining question concerns the interrelation of the deep and surface responses (H_{10}). In other words if a student chooses a deep response, are they less (or more) likely to choose a corresponding surface response? Table 4-10 shows the Pearson correlation coefficient (r) for each of the classes. There is little evidence to support the idea of mutual exclusivity for the current study.

Table 4-10

Pearson Correlation Coefficient (H_{10})

Variable	**Control**	**Treated**
D_1 vs. S_1	-.0363	0.3616
D_2 vs. S_2	.6242	0.6922

Summary

This study examined the use of graphic organizers in fundamental accounting courses. In particular, the study attempted to document the use of graphic organizers to increase communication between instructor and student. It was believed that increased communication is helpful to student success and produces a deeper study strategy in the student. The study demonstrated that there was not enough evidence to document differences between the Holschuh participants and the community college participants. The study also demonstrated that shifts in student study strategies do take place. In most cases there is lower strategy identification in both surface and deep activities. The study failed to discover sufficient evidence to conclude that graphic organizers have an effect on student study strategies. The checklist did document changes in the student learning approach to fundamental accounting, but these changes are not clear enough for the researcher to support the hypothesized conclusions or form other postulates. Some data could be used by the instructor to emphasize or develop different classroom activities that might be supportive of the deeper learning approach.

Conversations with the course instructor indicated a lack of knowledge about concept maps. He referenced maps as a “pictures” and did not grade many. Mapping was not used as a component of the final grade. While the hesitancy is understandable, the potential for students to not perform if they are not graded enhances the surface behavior. It was clear to the researcher that effort was put into the concept maps, but the value of mapping was not clear to both students and

instructor. Of those students participating fully in the graphic organizers, the instructor indicated they showed enthusiasm for the project. While some students resisted embraced the use of organizers, he stated that some students “really had fun with this.” While the main objective is not for student entertainment, it is good to know that it did not seem overbearing to some students. The study was inconclusive in part because the use of graphic organizers has not been adequately explained to instructors nor is it practiced among accounting instructors. I also discovered a degree of hesitancy to embrace some of the AECC’s recommendations. The numerical data did not support anticipated conclusions.

Chapter 5: Discussion

Concept mapping has been shown to be a successful learning tool used in a number of other disciplines most notably sciences like writing, biology, and chemistry (Gerchak, Besterfield-Sacre, Shuman, & Wolfe, 2003; Gowin & Novak, 2002; Hegarty-Hazel & Prosser, 1991; Rye & Rubba, 2002). It could be used more generically but our skills in both mapping and evaluating mapping are somewhat limited (Katayama & Robinson, 2000). Graphic organizers are diagrams of concepts and relationships as we see them. They can be an accelerated method of portraying our understanding. Many research writers document the uses and values of mapping for both the student and the instructor (Austin & Shore, 1995; Jonassen, Beisser, & Yacci, 1993; Katayama, & Robinson, 2000). Professionals use mapping techniques daily to demonstrate ideas and concepts. We know this by observing successful those professionals in fields like medicine, construction, engineering, and programming. It seems accounting instructors should be able to take advantage of some of these advantages.

Currently there has not been much research in using graphic organizers in fundamental accounting instruction. However there are examples of instructors and practitioners beginning to become aware of the power of mapping. This is demonstrated by the increased use of maps in support. (One example is at the Management and Accounting Web- http://maaw.info/LearningMapsLinks.htm) Traditional accounting instruction focuses on the mechanics of computation and not

the reasons for measuring accounting output. Many texts and computer aids concentrate on individual answers and expect the student to incorporate the individual computations into a fabric of understanding. Many authors are concerned about this procedural approach to learning (Ainsworth, 2001; Albrecht, 2002; Glass & Oakley, 2003; Rahman & Velayutham, 1998). The user approach is more concerned about the use of information and not so much as the genesis of information (Ainsworth, 2001). This dialogue has increased in pitch over the last decade (Lux, 2000). Some educators and practitioners cannot see the wisdom of the user approach. While an increasing number of studies document the effectiveness of the user approach, there is a paucity of evidence to support the procedural approach. The researcher spent time searching and inquiring positive experiences of procedural accounting from leaders in the field of accounting education.

This study examined the effects of the use of concept maps or graphic organizers to improve the delivery of accounting education primarily through increasing dialogue between the instructor and student. The study also attempted to statistically document the value of changing the student approach to learning. With the pressures of low contact time, many times it is very difficult for instructors to converse with students. This is increasingly difficult in large (over 30) classes. The temptation is to use computer generated testing and correcting systems to alleviate instructor workload. While this might be advantageous in the short-term to that end, by increasing our dependence on these procedural devices, instructors decrease the opportunity to interact with students. Finding instructional techniques that allow

students to understand and function in a very different world should be the instructional goal.

Increasing class size and decreasing instructional resources is a self-evident condition of current Oregon community colleges (http://www.oregon.gov/ccwd). Accounting instruction shares the same tensions between desirability and practicability. The tension has led to greater use of course management software. Currently all major publishers producing accounting texts offer course management material. The advantages of this course management software include asynchronous access to learning; the use of hyperlinks to find and use information; fast grading and feedback (some is instantaneous) for the student. Instructors and institutions can also increase class sizes without imposing unbearable increase workloads (Wamsley, 2012). These practical advantages are not entirely in line with current constructionist educational theory that emphasizes dialogue as the path to meaningful learning (Schunk, 2000).

Outcomes for Accounting Education

The AECC developed outcomes for accounting education. These outcomes can generally be aligned with deep study approach of accounting. The attributes of a deep study approach is beneficial to the student. It seems to make sense the more instructors can develop an understanding of deep study strategies, the more student outcomes will be in line with the AECC recommendations (Albrecht, 2000). This is not to say that procedural curriculum is valueless or harmful. Procedural curriculum is good for building a data base for student success. Much like a state driver's test that

has two parts, the accounting curriculum should have two parts. Graphic organizers can be a valuable tool to bridge the concepts with the practice for students. Concept maps are a way of developing communication between instructor and student that might otherwise be lost.

In the past 10 years discussions about using concept maps has increased. As the level of sophistication is increased, it is apparent that general usage will increase. Some would argue that concept maps are not the most effective way of determining learning. Karpicke and Blunt (2011) tell us that retrieval practice is a better way to produce learning than concept maps. Retrieval practice is attained by a series of short answer conceptual questions. The tests were taken over an extended time period and in science courses. As stated earlier, there does not appear to be significant difference in the learning of accounting and the learning of science. The results indicated that retrieval practice was a more effective learning tool. The Karpicke and Blunt study is important for two reasons. Primarily it demonstrates the status of mapping has become important enough to be seriously considered as a top echelon instructional tool. Currently we spend years conditioning students in retrieval practice. The United States K-12 system is based on documenting the retrieval process. It is understandable that students would perform at a higher level with familiar tools, but this does not necessarily identify retrieval practice as a superior learning tool.

The second important concept that Karpicke and Blunt (2011) point out is the need for more than one technique or process in education. So many times we rely on tests or formal papers to establish a dialogue with our student. These are essentially

one-way communication tools that do not allow for small corrections of instruction (Schunk, 2000). In learning theory, one-way communication is not as effective as a two-way dialogue (Gowin & Alvarez, 2005). The hope behind concept maps is the ability for one instructor to communicate with many learners with a reduced time commitment. Gowin and Novak (2002) define learning as shared meaning. For accounting instructors this can mean that while we must pass on the ability to converse in the "jargon" of accounting, we also need to be able to listen to the ways that students are constructing their knowledge.

Study Limitations

The limitations to this study are both pragmatic and theoretical. The invitation to participate did not generate a large enough group of interested instructors to be a statistically valid study. The reasons for this differed with each instructor, but generally this study was viewed as more work within an environment of over-work and a lack of value-added for the student. As stated earlier the study did not provide enough evidence to reject the H_0 and support the relationship between using graphics and deep learning strategies. Instructors had difficulty identifying the value of concept mapping.

Instructors did not feel comfortable with the concept of using graphic organizers as part of their assessment and grade determination plan. In conversations with instructors about why this project was not attractive to them, two recurring themes surfaced.

- Instructors did not place a high level of credence in the pedagogical foundation for the use of graphic organizers in the instruction of accounting.
- Many instructors felt the pressures of curriculum content on the limited amount of course time precluded the explanation and implementation time taken out of the course. Simply stated, they felt there was not enough time to do something "more" in the classes that they were not sure would give the students additional value.

The high level of resistance to exploring this concept surprised the researcher. While there are a few instructors investigating different modes of education, by far most are satisfied with more traditional approaches to instructing accounting. Throughout the state there is very limited inclusion of the global concepts the AECC advocates. It was both surprising and concerning that a majority of the accounting instructors contacted for this research did not know about the Commission and its work. Most instructors appear to be centering their course on the bottom left-hand side of the graphic (Figure 5-1). This chart is one that Simon (2007) adapted from Gowin and Novak's (2002) description of meaningful learning. This particular chart is focused on accounting education. Note that the lower tier is for rote learning. As discussed earlier, rote learning has the shortest retention time. The area adjacent to "rote-learning" is the current state most accounting education as defined by Leveson (2005). Time and effort is spent on learning debits and credits but not on how the

Meaningful learning	*Student constructed concept maps*	*Assigned case studies*	*Research projects and dissertations*
	Many instructor and textbook presentations	*Preparation of accounting statements*	*Essays, reports, and other coursework assignments*
Rote learning	*Debits and Credits*	*Applying formula to solve problems such as break-even and variances*	*Trial and error puzzle solution, such as calculation of internal rate of return and incomplete concept maps.*
	Receptive learning	**Guided discovery learning**	**Pure discovery learning**

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Figure 5.*1 Rote-meaning and reception discovery learning continuums adapted to accounting education context by Simon (2007)*

concepts relate both to other accounting concepts and to workplace decision-making. Students are assessed on a single correct answer but not on coordinating that answer with other departments within the organization. This method is not satisfactory because the students are not able to assimilate the information into larger cognitive structures. However rote-learning and rote assessments are the most efficient in terms of instructor time and effort. Instructor's time and energy is at a premium. As these constraints increase quality student contact decreases. (Wamsley, 2012)

One implication of the relationship of contact time and student learning is that teachers document (test) using short-term techniques and cannot be as concerned with

longer term meaningful learning documentation. This might in part explain the lack of enthusiasm for the accounting majors as explained by the AECC (Ainsworth, 2001). There are learning barriers between the course and the "real world". These barriers are amplified by curriculum, instructors and evaluation that are embedded in the current system.

Leveson (2004) divided accounting education into five different goal levels. She connected the levels to teacher-centered and student centered orientations for teaching. The student–centered/learning levels are related to encouraging students to find and develop their own accounting rules and developing higher conceptual levels that actually change the way a student thinks. Teacher–centered/content orientation involves the transmission of facts and developing procedural skills.

This is the traditional method for teaching accounting and is still the dominant model (Albrecht & Sack, 2002; Catanach, Croll, & Grinaker, 2000; Davidson & Jones, 1995; Simon, 2007). This is the instructional model that is currently supported by many publishers with ancilliary products. Booth, Luckett, and Mladenovic (1999) documented a number of different instructional methods that could potentially have learning value. These include case studies; group-based, intensive co-operative learning formats, and communication and critical thinking techniques.

In the past decade these techniques have not gained wide spread usage in fundamemtal accounting instruction. There is a reliance on publisher based systems to score student work. This leads to what Booth et al describe as "a mere accumilation

of unrelated bits of information for reproduction in (the) assessment process" (p. 279). Publisher anciliary systems are very efficient at giving feedback to students. In many cases it is immediate and that is beneficial. Publisher anciliaries do not appear to have group-based discussion, co-operative learning, or critical thinking as the central outcome oif the material. Rather the technology enhnced anciliaries it seem directed guiding the learner to a single "correct" answer. This one 'correct" answer computes the student scores. This practice contradicts the suggestions by Booth, Luckett and Mladenovic and Leveson.

Eisner (1991) investigated the differences in question type that teachers develop and present in class. He termed presentation differences as "recitation teaching" and "responsive teaching" (p. 139). Yes or no questions and correct computational sequence are examples of recitational questioning. Alternatively, asking open-ended questions that require students to reformulate information into new relationships is a responsive teaching technique. Interestingly Eisner found that both are successful to developing proximinal development. However recitation teaching does not build the learner structure for future learning because "teachers do not know where to go or what the next zone of proximityty is" (p. 140). This plays into the current status of instructional practices of accounting. Instructors may perceive themselves as successful because students answer questions correctly and perform computation adequately within the course. However the students are not prepared for future classes and the recitation instructor does not understand what student needs will assist in that transition and cannot assist.

One aspect that I found mystifying during this study was the hestitancy of accounting instructors to look at different forms of instruction and the lack of wilingness to experiment with alternative learning strategies. Multiple instructors told me they would not invest the time to discuss the use of mapping in their classes. They felt that the current course material was adequate and they were not particularly imterested in examining alternatives. For those instructors willing to have a conversation, there was an overwhelming sense of avoidance to curriculem changes. Even the instructor agreeing to this study was very cautious about what the ramifications were and how should the "pictures" be graded. This leads me to a pair of conclusions.

First accounting instructors exhibited as lack of learning theory. Either through institutional neglect or personal choice, many courses are not driven by a complete understanding of learning theory or a cohesive phiosophical basis. It seemed far more prevaelent that accounting instructors have confidence that publisher produced materials contain the appropiate theorectical basis and therefore the instructors are not required to have a working understaanding of learning theory. For many, there does not appear to be the need for change. In our conversations there was broad awareness about the differences between the user and preparer methods, but not about the AECC or other challenges to current practices that are fundametnal to the different methodology. This lack of understanding about the underpinnings of coursework was troubling to me.

The second conclusion that can be drawn from the study interviewing conversations is that many instructors may feel that fundamental accounting is a "right of passage" or "gateway" course. For students, sequential study in business programs cannot be continued unless that student passes the accounting courses. This might create a "gatekeeper" mentality that precludes flexibility for instructors. If a course is designed to filter poor student performance, then there is a set of very objective standards and the instructor is required to enforce that protocal. More emphasis is placed on what a student can do, and not on how the student thinks or what the student learns.

Areas for Further Research

The process of this research has brought to light some questions that might require further research. From the researcher's perspective a dialogue needs to be enhanced concerning what our students need and require. This learner-based dialogue should begin with a study on the types of students that now attend our college accounting courses. Current research indicates that the student learning approach is a valuable lens to focus course value. However it is not sufficient to look at only one area to change. Using the Gowin and Novak (2002) components of meaningful learning (learner, teacher, curriculum, environment, and assessment) is helpful to engage in a more complete analysis of accounting education.

The need for further study is evident. In particular with accounting instruction, there is an extreme lack of good research documenting the value of the procedural method. Publishers and the majority of instructors remain firmly in the procedural

method. The popularity of the procedural method may be due to comfort with the current status, inability to change due to number of students and other parameters, or simply because we do not know better. However the evidence through literature is compelling that accounting instructors need to change how accounting is taught or document the reasons for not changing the methods. It seems inconsistent to know that change needs to take place, yet avoid doing so. Not only is further study needed, but the development of better texts and more consistent pedagogical presentation of accounting reflecting the value of deep learning.

Learner. Students tend to have difficulty learning the subject of accounting. To a large part this is because there are quantitative features in the curriculum. Students want to be seen as correct (procedural) and feel more comfortable with an absence of ambiguity. Graphic organizers offer the potential of being both concrete enough for student involvement while reflecting how concepts interrelate. Additionally most organizations now use graphic organizers in day to day operations and using graphics to transmit information is a valuable skill. This is a skill that most schools do not teach. Using graphic organizers in classes is an opportunity for students to learn how to use organizers and make accounting information more structured. It is also clear that for some courses, deep learning is a better approach. Further studies are needed for developing standard methods of analyzing graphic organizers in the classroom and the effects on individuals in those classes. Currently the state of Oregon does not have an adequate student learning approach data set. It is difficult to determine where we are going without knowing where we are. Additional

research is required that specifically addresses the accounting student of Oregon. In addition to quantitative studies such as the present study, both observational and qualitative studies would contribute to understanding.

Teacher. It appears that most community college teachers do not actively incorporate constructionist learning theory in accounting classes. Most instructors use publisher produced materials and do not make substantive changes to that curriculum (Simon, 2009, Wamsley, 2012). Both Simon (2009) and Novak (2010) indicate that this is a surface instructional technique (Novak, 2010; Simon, 2009). Appendix C shows that dependence on publisher curriculum and test banks as indicators of surface instructional technique (Novak, 2010). Simon's adaptation of the Novak's learning continuum (Figure 3.1) visually represents where most accounting education is. The bottom left-hand section is the most used in accounting education. Instructors should be moving into the higher levels of the continuum for better learning (Simon 2009). Anecdotally accounting instructors report they could not teach accounting without teaching debits and credits. While the debit and credit terminology is an accounting important jargon, it is not an accounting principle. Accounting teachers need to more clearly resolve the differences between the mechanics of accounting and the overall concepts. Research needs to be undertaken to understand how the personal paradigms of accounting instructors affect the delivery of accounting knowledge. Developing strategies to help students learn how to learn; demonstrating the relationship between theory and practice; and creating interactions between learners to advance shared

meaning are all areas that need study. These constructivist activities would enhance the accounting students experience with the subject.

Implications for Practice

Three different initial or starting places in accounting education are discussed in this section. They are ratio analysis, cash flow, and trial balance blueprint. This approach attempts to capitalize on prior student knowledge and to create connections with accounting that allow learner scaffolding (Novak, 2010). This is different from current procedural instructional practice that emphasizes accounting as being different or new to the student. This traditional approach isolates accounting education from day to day experiences and makes it less relevant from the learner's perspective. Counter-balancing this by using more common starting points might make the total accounting educational experience more personal and therefore easier for students without losing the rigor of the discipline.

Curriculum. Current accounting curriculum is procedurally based. With the exception of a few isolated occurrences, accounting curriculum has failed to keep pace with the changes technology and globalization have forced upon us all. The curriculum has been essentially the same for decades (Simon, 2007; Weygandt, Kieso, & Kimmel, 2002). Accounting texts start with a form of tablature recording to demonstrate how transactions impact across the accounting categories. There is then a discussion about the application of debits and credits after which posting to journals and the production of financial statements. This cycle method is reflective of the manual accounting system and cycles it produces. Following cycles is good

accounting practice, but has challenges in learning theory. Traditional accounting instruction attempts to demonstrate how *different* accounting is from other personal activities. For example, one text has one paragraph regarding the transferability of information. This one paragraph is in a chapter of over 50 pages (Horngren, Harrison, & Oliver, 2012). The message is clear that accounting is separate from ordinary activities. This is diametrically opposed to constructivist learning theory that tells us meaningful learning is based on our prior knowledge. Generally students are at a disadvantage when they cannot relate information to prior knowledge. Pre-course anxiety over this class is heightened and the success of the student becomes more difficult. The difficulty of learning accounting becomes a self-fulfilling prophecy.

Ratio analysis as an initial concept. Describing current educational curriculum Bain (2004) reported

> Robert de Beauregrand said just recently: "Bulimic education' force feeds the learner with a feast of 'facts' which are memorized and used for narrowly defined task, each leading to a single 'right' answer already decided by the teacher or the textbook. After this use the facts are 'purged' to make room to make room for the next feeding." (p. 41)

He could not describe traditional accounting any better. Traditional textbooks spend four to five chapters on the accounting equation; how to document transactions and produce financial statements (Horngren, Harrison, & Oliver, 2012; Weygandt, Kieso, & Kimmel, 2002). The procedures of bank reconciliation (cash control), accounts receivable analysis, inventory valuation (LIFO/FIFO), plant assets (depreciation) are presented in the order. Each category has a procedure and a correct answer. These

different procedures are unrelated and, for the students, have a very short memory life. We teach techniques that students "learn" (mimic) and then the student soon forgets. At the end of the term we provide a publisher final test intended to document the student's knowledge not realizing that by the time the next term arrives, most of the this disaggregated knowledge has dissipated and not been subsumed (Novak, 2010).

One alternative is to start the course with ratio analysis giving the student a clearer understanding of the target and in turn providing a more cohesive presentation of the subject matter. The key to ratio analysis is predominantly using percentages. Calculating percentages and trends are skills that most students possess before entering the accounting course. Using vertical and horizontal analysis demonstrates the different category of each account and how that account fits into the bigger economic picture. "Tweaking" each account gives the student and idea how the different variables affect the account. This is a very different curriculum from telling students what they do not know and burdening them with a great deal of procedural detail to confirm their ignorance. Once the concepts of interrelatedness are embedded in the student's memory framework, other concepts become more understandable. For example learning the different methods of depreciation do not make sense until the students see changes in the financials that depreciation methods generates. The procedural students learn and lose the protocols of depreciation before they see the effects on the financial statements. The conceptual student knows that change can be made on the financials by using different depreciation methods and then can

investigate exactly how the changes could be made. This is a significant curricular difference.

Cash flow as an initial concept. Another alternative way of transmitting accounting information is to introduce accounting through the Cash Flow Statement (CFS). Most students intuitively understand the importance of cash. Spending the first section of a term on the CFS defining the major categories of accounts and how increasing and decreasing helps and hurts the cash flow. Cash flow statements are created by calculating the differences between the beginning account balances and the ending account balances. This difference can either "help" or "hurt" the cash flow. Students understand cash and how cash flow through their personal lives. It is natural scaffolding to next apply these transitions to accounting. (I suggest using the indirect method to cash-flows because it has a clearer association to the individual accounts.) After gaining some familiarity with cash-flows, the student can more clearly understand how the different line items impact the financials.

Trial balance blueprint as an initial concept. A third alternative is to begin the course with the Trial Balance. This alternative is mostly successful with bookkeeping instruction. Students become very familiar with a blue print for the trial balance. The blueprint is shown in Table 5.2.

The first weeks of the term are used assuring the student has memorized this blueprint. The blueprint is more meaningful than the accounting equation. Students readily recognize the patterns and begin to understand that one does not change without changing the others. This fixes a scaffold for the student to hang other

informational pieces on. They have a sense of where the different accounts "fit" together. Using the T/B blueprint to prepare learners before entering into the procedural areas of accounting helps the learner to have a sense and a vision of how each transaction affects the final statements.

Assets
Current assets
Long term assets
Liabilities
Current liabilities
Long term liabilities
Owner's Equity
Capital
Retained earnings
Revenue
Cash
Credit
Expense
Cost of Goods Sold
Operating expenses

Table 5.2 *Trial Balance Blueprint*

These are examples a more constructivist learning process than the traditional method. Rather than attempting to change what a student already knows, the trial balance, cash flow method, and the ratio method all build on current knowledge and gives depth to learner's experience. This allows for the learner to add additional information without destroying what has been previously learned. The overall result

is that the learner is more pleased with the experience, feels more productive throughout the experience, and more importantly has employed meaningful learning techniques as a method to understand the curriculum.

Context. Historically a fundamental accounting course has been a gateway class to other business courses, and the instructor has been the gatekeeper. If a student could not survive the fundamental accounting course, many times they were asked to leave the program. This led to an over emphasis on the jargon of accounting. Many teachers (me included) do not encourage the student to explain concepts in their own words, but require the student to use the "proper words." I do not allow students to "add and subtract" only increase and decrease. Some failure of students is not based on their inadequate knowledge of the principles of accounting, but on their inability to use the "correct" words. Computerized programs in the workplace have dramatically shown us that we do not need the proper words to understand accounting principles. Jargon allowed accounting teachers to restrict participation in business programs which leads to the pressure to complete the class. This jargon is no longer a barrier to employment. Constructivist learning theory instructs to a different level of understanding than is being currently attained with business students. Constructivist learning theory will help attract students to the study of accounting and not keep them from it.

Novak (2010) writes that context includes how the subject relates to other classes and disciplines. In accounting education many times there is little relation to how accounting decisions impact other departments. Focus is placed on the protocols

and routines that fit with the accounting scheme. Managing account receivables is an example of this. The direct write-off method, the income statement method, and the balance sheet method are the three essential methods of managing accounts receivable. Most texts do not give coverage to the issues behind each of these methods. They do not explain why one is better or what the decision criteria would be to choose one over the other. Few textbooks take advantage of the subject to show how changing account management affects other areas like sales and production. On the other hand changing the classroom discussion from a procedural one (how to do the balance sheet method) to a conversation about the reasons to make the choice adds depth and understanding to the subject. The conversation is even further enhanced by the use of the cash flow statement and how cash flow decreases as accounts receivable increase. Being able to understand the effects of a particular action is a meaningful learning technique. It is also a deep learning strategy. (Novak, 2010)

Teacher. Leveson (2004) argued that the bulk of accounting education is in levels "A" and "B". These levels limit learning to an accumulation of facts and concepts external from the student. Additionally these are teacher-centered areas. Leveson is supported by Novak (2010) in his discussion of discovery and receptive learning. Wamsley (2012) documented the widespread use of publisher accounting grading systems which reinforces the procedural or surface methods.

This is the traditional method for teaching accounting and is still the dominant model (Albrecht & Sack, 2000; Catanach, Croll, & Grinaker, 2000;

Davidson & Jones, 1995). This is the instructional model that is currently supported by many publishers with online question answering.

Assessment. Novak (2010) reported that in 1989 Wiggins identified 27 characteristics of authentic assessments in the four basic categories of structure and logistics, intellectual design features, grading and scoring standards, and fairness and equity(Wiggins, 1989). Three themes are recurring in Wiggins work. First in assessment, there should be a number of different types of assessment including setting, product, and rationale. Assessment should be given in different types of circumstances, with a variety of instruments to access different components. The second theme is good assessment is not confined to a particular time (point certain due dates) or range (grading on the curve). The last recurring characteristic is that tests should not be in secret or contain surprises. Traditional accounting education has been mostly assessed by publisher generated test questions. These test questions are generally not related because the attempt is to document student familiarity and accuracy with certain routines. Good testing is not dependent on what others in the class produce (norm-referenced). It is interesting that the ultimate accounting exam, the Certified Public Accountants test, is not graded on the curve for those taking it, yet many instructors evaluate with this method. As a general rule, teachers will not reveal test questions in advance of the test in fear it will skew the results. Novak argued that more "authentic tests" should be encouraged. Reflecting real world situations is a much more valuable measure than the computational examinations that are popularized in current publisher material (Novak, 2010; Wamsley, 2012).

While this is a short list and explanation of different testing techniques is not complete, at a minimum it can be concluded that publisher produced tests and do not fulfill the requirements of a deep learning approach to evaluation. A more complete study of the intention of testing and how testing should be incorporated in accounting courses is needed (Shavelson & Huang, 2003).

Summary

More research is needed to provide a comparison between this method and the traditional accounting instructional method. A statewide data gathering project that would include the majority of accounting students should be undertaken. Some demographic information should be included in addition to the Holschuh Preliminary and Final Strategies Checklist. Other demographic information should have been included, such as gender, educational goals, and year in school. This information could then be used to inform transitions from traditional accounting education. Knowing our current state of affairs is an important starting point.

The use of graphic organizers needs to be encouraged much more actively than currently. Graphics give a unique insight into the how the student understands the material. The challenge is to expand familiarity of this technique so that it becomes more embedded in our accounting systems. Writing and retrieval practice also seem to be valid ways of sharing our meaning, but graphics are much more flexible for students. Creating graphical representations of information is difficult for students because educational institutions do not encourage or recognize the use of such representations as an educational tool. Graphical representations are a valuable

and efficient method to transmit information from one to another. It can be used successfully in fundamental accounting education.

Chapter 6: Conclusion

The need for a change in accounting curriculum seems apparent from a number of different authors. From many decades accounting courses were used as gate keeper classes meaning that if students were not able to successfully complete the accounting course, they should choose other disciplines. This has led to an over dependence on procedural techniques employed to assure the student knew a variety of correct procedures to arrive a one correct answer. Unfortunately for the industry, this has not guaranteed success. New understanding of the important roles for accounting information has led some to explore different methods of learning and teaching in accounting. Creating a productive learning plan is essential to the success of any learning institution, and this is also true for the accounting field.

Novak (2010) gives a variety of suggestions for meaningful learning. It is helpful to break them down into the five basic components of learning. Each of the components interrelates with other the components which lead to a system of education and not a variegated one. Learners, teachers, and institutions all need to know and understand how the curriculum fits in the context and how evaluations support the other four components. Novak writes about these ideas to help with meaningful learning. Eisner (1991) defines a different set of components to establish a qualitative nature to learning. These include intentionality, structural characteristics, curricular considerations, pedagogical design and evaluative techniques. Combining the Eisner with Novak as a way of evaluating what teachers and learners do in the

accounting classroom could lead the accounting instructor to a different way of teaching (Appendix I). While part of this change could include the use of graphical organizers, there are a number of other considerations to examine.

Instructors need to be comfortable with both accounting curriculum and mapping techniques. Buckhaults and Fisher (2011) identified student and instructor anxiety as barriers to enrollment. They suggested that different classroom experiences be used to make the classroom more attractive and realistic for the student. All of the suggested learning experiences are outside the confines of the textbook. Some of the suggestions like adding service learning curriculum and the incorporation of field trips may be impractical for the community college environ. However other suggestions like embedding the history of accounting into curriculum could be helpful. I believe that these kinds of additions increase the chance that students will develop deep learning approaches because there is a scaffolding effect that gives the student a framework of understanding. Consequently, students are more likely to be life-long learners and be more prepared for the workplace.

Instructors starting to use this technique should anticipate some transition difficulties. Primarily understanding that this is a different manner of communication with the student will help with the transition. The student will have difficulty expressing the concepts and the instructor will have difficulty in understanding what the student sees. Both the teacher and then learner need to learn how to generate and use maps. However if the instructor works a systemized model, the student will soon learn how to communicate with this method. Transfer students tend to have less

difficulty with mapping than bookkeeping non-transfer students. This could be due to transfer student exhibiting more deep learning approach characteristics. The career/technical education (CTE) students tend to be more surface and procedurally oriented. However experience has demonstrated that both learning groups benefit from mapping.

Most accounting curriculum is based on the student attaining one single correct answer. Course ancillaries reinforce the single answer method with immediate feedback systems. Many courses are scored based on the sum of the singular correct answer. Instructors have a broader responsibility for student beyond the immediate class. There should be instructional consideration to give students some of the tools to be successful in future classes and in the workplace. Teaching with the one answer method does not aid in transitioning student to higher academic levels. Single answers are also not widely used in the workplace. Many instructors prefer it because certain efficiencies can be gained.

Initially using graphics can be very time consuming. Beyond the time investment, there are a variety of additional barriers to using mapping. It is not an easy skill to learn and sometimes maps are not a tidy product. Most maps require refinement and editing like any communicating document. Both instructors and students are sometimes more comfortable with more traditional organizing tools like outlines. One of the areas for improvement in this study would have been to spend more time on how to teach with graphics. It is a different tool and instructors may not recognize the value. If instructors do not value them, then students probably will not.

Students do look for affirmation and the greatest measure is the grade. Inability to present and grade maps coherently for the student significantly reduces their value.

This study attempted to measure differences in students' approach to learning. A preliminary checklist was compared to final checklist. Differences in the means were noted. It was thought that the class using organizers would increase their responses to deep learning characteristics. Inversely, it was expected that the untreated class would select more surface responses. An unexpected result was that both groups selected fewer characteristics. Some different sources might be attributed to this double decline. Primarily there may not have been sufficient training in the use of graphics for the instructor. Failure to adequately direct students and reduced ability interpreting graphics may have caused less of a measurable impact. Students may also have a higher intention of performance at the beginning of the term than the actual performance level. There was not a value assigned for the completion of the graphs. Lack of grade points could have decreased the student perceptions of the value of the maps. Lastly, the checklist may not have been the correct measure for this study.

Change is difficult. It is difficult to instruct differently than we were taught. Five different components of meaningful learning (learner, teacher, curriculum, context, evaluation) need to be addressed as a comprehensive plan to change accounting education (Novak, 2010). All courses should reflect the interplay of these five educational components. Accounting education should be used as not only a discipline but also as a structure for understanding the way organizations operate. This deep learning goal can be enhanced by the use of graphic organizers in the

classroom. Currently we do not have the general expertise in our instructors or the system to pre-teach visual learning to learners. There is a great deal that students miss by not having these deep learning approaches used in the curriculum. The addition of qualitative dimensions to the current quantitative attributes in accounting education will enhance and improve the overall learning success of our students. Using concept maps in our classes can change the way we learn and the value of our learning for the better.

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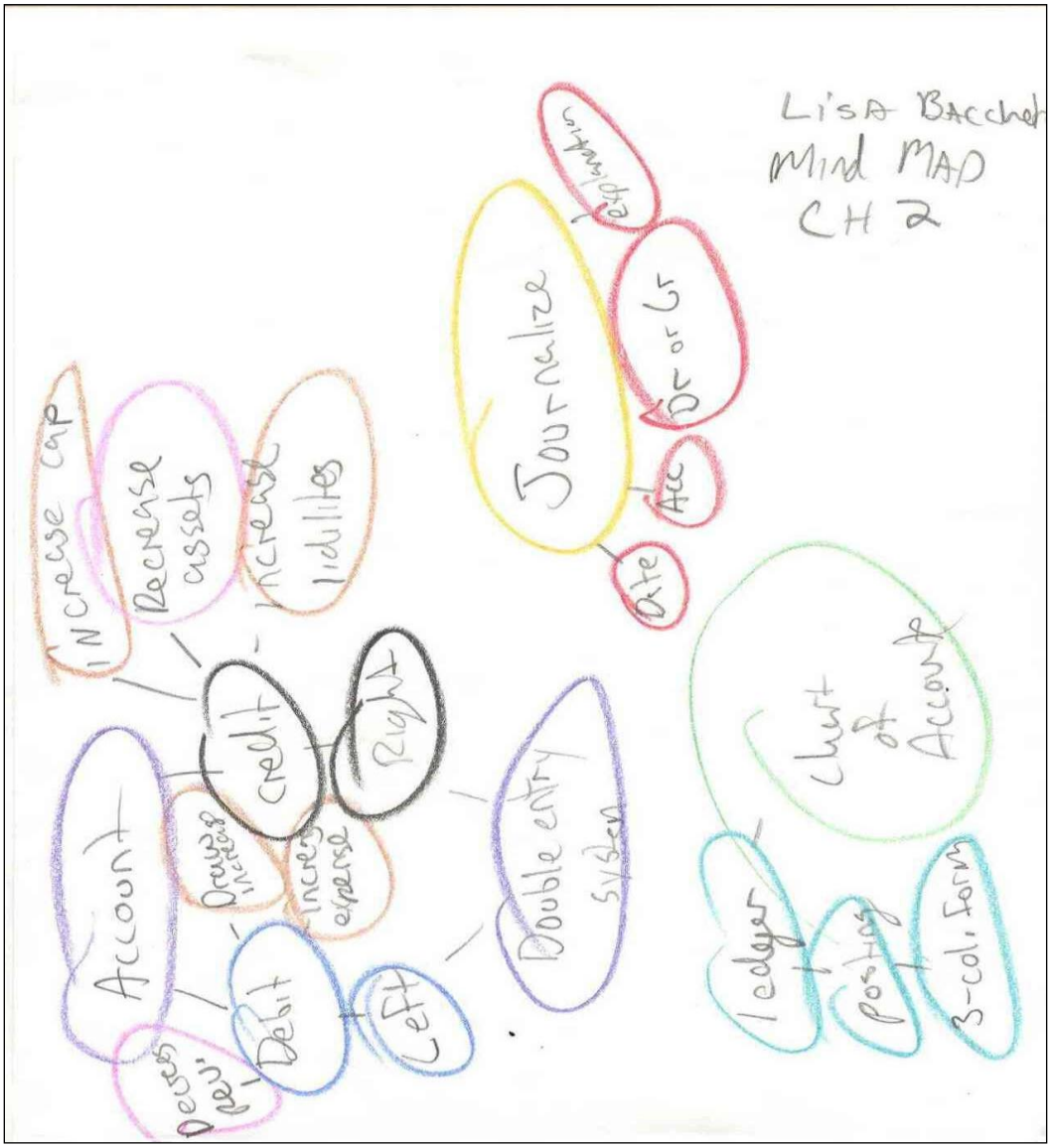
Appendixes

Appendix A: Examples of Concepts Maps from student A and student B

Student A



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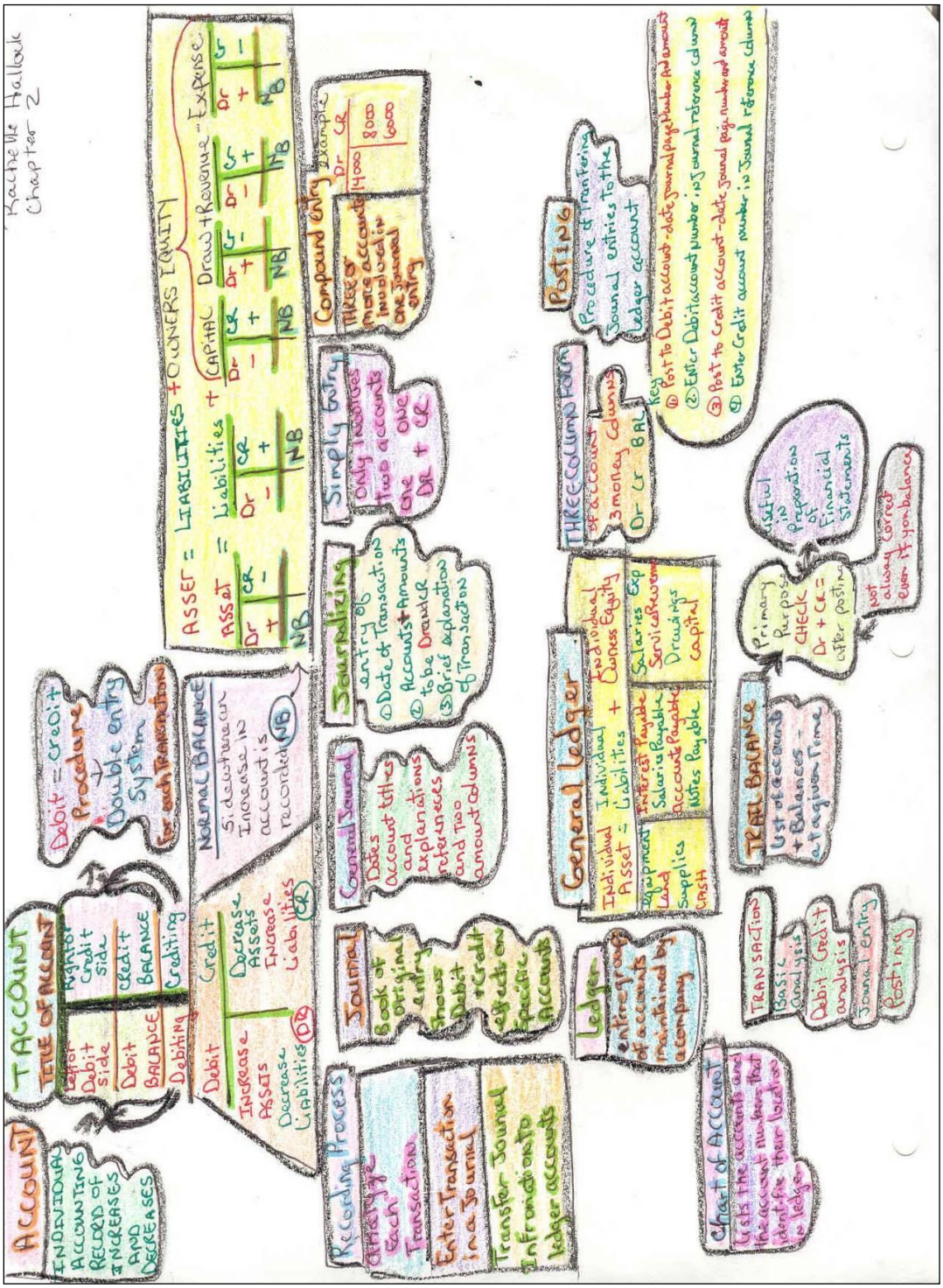
Student B



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Appendix B: Sample procedural problem from Dansby, Kaliski, & Lawrence

The challenge problem in this chapter is designed to test your knowledge of relationships among the parts of the manufacturing cost calculation.

Directions: Fill in the missing amounts in each column. Each column[2] is independent of the others.

	Work in Pro. Beg.	Raw Mat. Beg.	Raw Mat. Purch.	Raw Mat. Avail.	Raw Mat. End	Cost Raw Mat. Used
(a)	$25,000	$50,000	$110,000	?	$45,000	?
(b)	$40,000	$45,000	?	$205,000	?	$140,000
(c)	?	?	$210,000	?	$29,600	?
(d)	?	?	$306,500	$337,500	&29,600	?

And then on the following page:

	Labor and Overhead	Total Mfq. Costs	Total goods in Production	Work in Pro.End	Cost of goods Mfq.
(a)	$200,000	?	?	$ 20,000	?
(b)	?	$310,000	?	?	$320,000
(c)	?	$510,000	?	$ 55,000	$550,000
(d)	$125,000	?	$455,000	$ 37,200	?

[2] This should actually be row. It is believed this is a typographical error. While this does increase student confusion, it does not invalidate the example.

Answer:

	a		b		c		d	
Work in Pro. Beg.		$ 25,000		$ 40,000	605,000 - 510,000	***$ 95,000***	455,000 - 432,900	***$ 22,100***
Raw Mat. Beg.		50,000		75,000	265,000 - 210,000	***55,000***	337,500 - 306,500	***31,000***
Raw Mat. Purch.		110,000	205,000 - 75,000	***130,000***		210,000		306,500
Raw Mat. Avail.	50,000 + 110,000	***160,000***		205,000	265,000 + 35,000	***265,000***		337,500
Raw Mat. End		45,000	205,000 - 140,000	***65,000***		35,000		29,600
Cost Raw Mat. Used	160,000 + 45,000	***115,000***		140,000		230,000	337,500 -29,600	***307,900***
Labor and Overhead		200,000	310,000 - 140,000	***170,000***	510,000 - 230,000	***280,000***		125,000
Total Mfq. Costs	115,000 +200,000	***315,000***		310,000		510,000		432,900
Total goods in Production	315,000 + 25,000	***340,000***	310,000 + 40,000	***350,000***	55,000 + 505,000	***605,000***	307,900 + 125,000	***455,000***
Work in Pro.End		20,000	350,000 - 320,000	***30,000***		55,000		37,200
Cost of goods Mfq.	340.000 - 20,000	***320,000***		320,000		550,000	455,000 - 37,200	***417,800***

Dansby, Kaliski, & Lawrence 2010, p. 1119 Reprinted with permission of Paradigm Publishing, Inc., St. Paul, MN.

Appendix C: A comparison of traditionalist and constructivist contexts

Traditional

Learner	Teacher	Curriculum	Context	Evaluation
Task is to acquire information (usually by rote learning).	Management and class control emphasized.	Fixed, textbook centered.	Schooling is good. Minor improvements may be needed.	"Objective" tests are the key to evaluation, with grades assigned "on a curve".
Emphasis on lesson planning focused on discipline, not learner's prior knowledge.	View that teachers cause learning.	Emphasis on coverage techniques.	Children should do as they are told.	Frequent testing helps students meet course objectives.
Failure regarded as lack of aptitude or motivation.	Motivation strategies emphasize clear statement of rewards and punishments.	View that knowledge is truth to be learned (i.e., memorized).	School curriculum is generally okay, but more emphasis on "basics" is needed.	Scores on standardized state publishers' tests are good criteria of success.
Use of "objective" tests validates view of learner as "empty vessel" to be filled with information.	Teacher charisma is a desired goal.	Little planning or regard for student's feelings.	Teachers should be rewarded according to standardized test scores received by their pupils.	Time-consuming evaluation methods are not worth the effort (e.g., essay exams, group project reports).
Group instruction validates view that failure is due to lack of aptitude.	Audiovisual aids, computers seen as information givers rather than as tools to help in meaning making.	Subject matter taught and testing should show close to one-to-one correspondence.	Years of service and college credits/degrees earned are primary basis for salary levels.	"Test item banks" – collections of test questions "covering" various subject matters – are a primary resource for teacher made tests, together with tests prepared by book publishers.
Rewards and punishments are principal motivators for learning.	Lecturing, test writing skills emphasized.	School, state, or university exams set the criteria for what is covered.	Educational theory and research is of little relevance and value to teachers or program planners.	Facts must be learned before understanding can develop; hence, tests should stress knowledge of facts.
	Little concern for curriculum development by teachers.	Publishers are responsible curriculum developers.	Administration should run the schools.	
Learner must make new meanings based on his/her prior knowledge.	Emphasis on finding out what the learner already knows.	Emphasis on major conceptual ideas and skills.	Schooling emphasizing rote learning is domesticating.	Progress of students should be monitored with files containing a broad range of performance indicators.

Constructivist

Learner	Teacher	Curriculum	Context	Evaluation
Meaningful learning is primary basis for positive motivation and sense of empowerment.	Research and theory guide practice.	Recognition of diversity of learners and need for variety in learning resources.	Schooling emphasizing meaningful learning and creativity is empowering.	A broad range of evaluation measures are needed.
Teacher skills needed for appraising student's prior knowledge) e.g., pretests, concept maps, occasional interviews).	Clear distinction between topical or "logical" organization of subject matter and "psychological" organization. Use of concept maps to help with latter.	Efforts in student involvement in planning and executing instructional program.	Much of the school curriculum is anachronistic, and major revisions in curricula are needed.	Objective tests measure only a small percentage (about 10%) of aptitudes and achievement relevant to real-life application.
Learners need help to learn how to learn.	Techniques needed for helping students learn how to learn.	Emphasis on evolving nature of knowledge.	Teacher preparation should be viewed as lifelong with continuing efforts for appraisal and "renewal".	Evaluation measures should help students and teachers identify conceptual problems and work toward their resolution (e.g., concept maps.
Human potential is much greater than usually manifest.	Optimistic view of human potential.	Wide variety of learning approaches, with flexible evaluation.	"Career ladders" are needed to keep the most talented teachers in classrooms and help them to help their peers.	Evaluation should help students take responsibility for their own learning (e.g., use of journals, self-report measures, concept maps, etc.)
Feelings are important.	Lack of motivation seen as derived in large part from lack of meaning/ understanding.	Confidence in meaningful learning as preparation for standardized exams.	Teaching practice should be theory and research based and evaluated.	Teachers should conduct occasional in-depth interviews with students.
Learning is the responsibility of the learner.	Teacher is responsible for sharing meanings with/ between learners. Gaining skills is lifelong process.	Emphasis on empowering learners rather than "coverage" of material.	Major decision should involve teachers, parents, and administration.	

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Appendix D: Conversation Rubric

Name:

The most difficult concept to draw was:

The most difficult relationship to draw was:

Number of pages:

Time Investment
Low High

Student
Instructor

Hierarchy: What is more important?
Emerging — Over-Emphasized

Integration: How are concepts the same?
Emerging — Over-Emphasized

Differentiation: How are concepts different?
Emerging — Over-Emphasized

Reasoned Organization:
Emerging — Over-Emphasized

Articulation Is it correct?
Emerging — Correct

Comments

Timely
Yes No

Chapter Objectives:

		Emerging	Demonstrated
1	Purposes of the Statement of Cash Flows.		
2	Distinguish between operating, investing, and financing activities.		
3	Prepare the Statement of Cash Flows (indirect).		

Points

Appendix E: Preliminary Strategies Checklist

Preliminary Strategies Checklist (Coded)
Directions: Please check any of the following items that accurately describe how you plan to study/learn in accounting this quarter. Check all that apply.

Text

 1. I will look through the chapter in my accounting text before reading it to help me know what will be covered. (D)
 2. I will take notes on the main ideas in the text. (D)
 3. I will make a reading schedule to help me organize my time and to leave me time for a final review before the exam. (D)
 4. I will highlight or underline my accounting text by marking just about everything because it is all important. (S)
 5. I will read my accounting text over and over to try to memorize the information. (S)
 6. I will study the diagrams to help me understand the accounting processes. (D)
 7. I will read the study guide instead of my text because it will highlight everything I need to know. (S)
 8. When I read my accounting text, I will look for connections between ideas. (D)
 9. When I read an accounting chapter, I will think about what I already know about the subject. (D)
 10. When I read accounting material, I will look only for facts and will try to memorize all the definitions. (S)
 11. When I come across an unfamiliar word, I will usually skip it. (S)
 12. I will read an entire accounting chapter before I stop to think about it. (S)
 13. I will distinguish exam-related information from unimportant information in my accounting textbook by highlighting or marking the text. (D)
 14. I will reorganize the information in the text when I study by making notes about it. (D)
 15. I will test myself on key information from my accounting text. (D)
 16. When I read my accounting textbook, I will not turn the page until I understand what I have read. (D)

Studying

17. I will tend to cram for my accounting exams. (S)
18. I will plan my study sessions so that I know what I will work on each time I study. (D)
19. I will use a variety of strategies when I study accounting. (D)
20. I will change the way I study if I am doing poorly in accounting. (S)
21. To prepare for accounting tests, I will try to memorize a lot of facts. (S)
22. I will try to predict questions that might be on the accounting exams. (D)
23. I will use what I already know to help me learn new information in accounting. (D)
24. I will distribute my study time over several days. (D)
25. I will study both the concepts that are covered in class and concepts that are only covered in the text. (D)

□26. I will make sure I can explain the diagrams when I prepare for a test. (D)

Lecture Notes

□ 27. I will buy student notes instead of taking notes in accounting class. (S)
□ 28. I will recopy my accounting notes to make them neater. (S)
□ 29. I will highlight or underline my accounting notes by marking just about everything because it is all important. (S)
□ 30. I will review my notes almost every day by asking myself questions about the information. (D)
□ 31. I will study only those sections in my textbook that are covered in the notes. (S)
□ 32. I will recopy my accounting notes to reorganize the information. (D)
□ 33. I will read the text before the accounting lecture to be familiar with the topic. (D)
□ 34. I will try to copy down everything the professor says because it will all be important. (S)
□ 35. I will test myself on key information from my lecture notes. (D)
□ 36. I will usually cram to review my notes before the exam. (S)

Supports

□ 37. I will use the accounting computer tests or test supplements to help determine what I am going to study for the test. (S)
□ 38. I will use the accounting notes available on the computer instead of taking my own notes. (S)
□ 39. I will compare my notes to the notes available on the computer to check that I am taking good notes. (D)
□ 40. I will use the accounting-related computer tests or test supplements to make sure I know the concepts after I have studied for the test. (D)
□ 41. I will go to the accounting review sessions because it will give me a chance to ask questions. (D)
□ 42. I will attend accounting class every day because I will not know what is important if I don't go. (D)
□ 43. I will study with friends to prepare for the accounting exams. (D)
□ 44. I will meet with an accounting tutor when I need help. (D)
□ 45. I will meet with the accounting professor or TA to ask questions when I need help. (D)
□ 46. Other:
_____
_____
_____
_____

Appendix F: Final Strategies Checklist

Final Strategies Checklist (Coded)

Directions: Please check any of the following that accurately describe how you studied/learned in accounting this quarter. Check all that apply.

Text

 1. I looked through the chapter in my accounting text before reading it to help me know what would be covered. (D)
 2. I took notes on the main ideas in the text. (D)
 3. I made a reading schedule to help me organize my time and to leave me time for a final review before the exam. (D)
 4. I highlighted or underlined my accounting text by marking just about everything because it was all important. (S)
 5. I read my accounting text over and over to try to memorize the information. (S)
 6. I studied the diagrams to help me understand the accounting processes. (D)
 7. I read the study guide instead of my text because it highlighted everything I needed to know. (S)
 8. When I read my accounting text, I looked for connections between ideas. (D)
 9. When I read an accounting chapter, I thought about what I already knew about the subject. (D)
 10. When I read accounting material, I looked only for facts and tried to memorize all the definitions. (S)
 11. When I came across an unfamiliar word, I usually skipped it. (S)
 12. I read an entire accounting chapter before I stopped to think about it. (S)
 13. I distinguished exam-related information from unimportant information in my accounting textbook by highlighting or marking the text. (D)
 14. I reorganized the information in the text when I studied by making notes about it. (D)
 15. I tested myself on key information from my accounting text. (D)
 16. When I read my accounting textbook, I did not turn the page until I understood what I had read. (D)

Studying

 17. I tended to cram for my accounting exams. (S)
 18. I planned my study sessions so that I knew what I would work on each time I studied. (D)
 19. I used a variety of strategies when I studied accounting. (D)
 20. I did not change the way I studied even though I did poorly on accounting tests. (S)
 21. To prepare for accounting tests, I tried to memorize a lot of facts. (S)
 22. I tried to predict questions that might be on the accounting exams. (D)
 23. I used what I already know to help me learn new information in accounting. (D)
 24. I distributed my study time over several days. (D)
 25. I studied both the concepts that were covered in class and concepts that were only covered in the text. (D)
 26. I made sure I could explain the diagrams when I prepared for a test. (D)

Lecture Notes

□ 27. I bought student notes instead of taking my own notes in accounting class. (S)
□ 28. I recopied my accounting notes to make them neater. (S)
□ 29. I highlighted or underlined my accounting notes by marking just about everything because it was all important. (S)
□ 30. I reviewed my notes almost every day by asking myself questions about the information. (D)
□ 31. I studied only those sections in my textbook that were covered in the notes. (S)
□ 32. I recopied my accounting notes to reorganize the information. (D)
□ 33. I read the text before the accounting lecture to be familiar with the topic. (D)
□ 34. I tried to copy down everything the professor said because it was all important. (S)
□ 35. I tested myself on key information from my lecture notes. (D)
□ 36. I usually crammed to review my notes before the exam. (S)

Supports

□ 37. I used the accounting-related computer tests or test supplements to help determine what I was going to study for the test. (S)
□ 38. I used the accounting notes available on the computer instead of taking my own notes. (S)
□ 39. I compared my notes to the notes available on the computer to check that I was taking good notes. (D)
□ 40. I used the accounting computer tests or test supplements to make sure I knew the concepts after I studied for the test. (D)
□ 41. I went to the accounting review sessions given by the professor because they gave me a chance to ask questions. (D)
□ 42. I attended accounting class every day because I would not have known what was important if I didn't go. (D)
□ 43. I studied with friends to prepare for the accounting exams. (D)
□ 44. I met with an accounting tutor when I needed help. (D)
□ 45. I met with the accounting professor or TA to ask questions when I needed help. (D)
□ 46. I went to the strategies intervention sessions because I needed help learning accounting. (D)
□ 47. Other:
_____
_____
_____
_____

Appendix G: Sample Difficulties with the Holschuh Checklist

Section and Question Number	**Issues**
Question Number: 6 Text	What are "diagrams? Each student may have a different concept of what constitutes a diagram.
Question Number: 7 Text	The term *study guides* has different educational uses. Student generated guides are more valuable than instructor guides, which are more valuable than publisher guides.
Question Number: 8 Text	The term "ideas" may have different meanings for students.
Question Number: 16 Text	Many students "think" they understand, or "think" they do not understand which may impact how the student applies this question.
Question Number: 26 Studying	The term diagrams can mean both student generated and instructor generated representations.
Overall	The questions are focused on examination as being the major measurement tool for assessment. Some instructors are beginning to use different assessment techniques that may not be reflected in this survey.

Appendix H: Ideas for Meaningful Learning:

Learner	Teacher	Curriculum	Context	Evaluation
Needs to understand to be successful	Should have a greater reliance on research	Requires a diverse teaching approach	Creativity and empowerment should be the central educational themes	Different measures to indicate meaningful learning
Should be aware of meta-cognition	Expose the differences between logical and psychological organization	Should create student ownership of the material	Set in place organized processes to update and revitalize curriculum	Objective testing should be limited to approximately 10% of the total evaluation
Best to have conversations with instructional leaders (teacher)	Develop in students a "how to learn" attitude	Emphasize the "living" nature of knowledge	Use teacher workshops and formative evaluation to assist in teacher development	Evaluation should measure progress
Understand the human potential is realized through understanding rather than skills.	Shared meaning is the purpose of the instruction	Provide flexible evaluation	Utilize career ladders maintaining the idea that good teachers should remain in the classroom	Evaluation should include in depth conversations
Know that feelings are important.		Learning is not demonstrated in standardized testing	Allow increased research-based activities	Evaluator roles should be clearly communicated
Confidence enhances responsible learning		Student empowerment should be the goal and not simply coverage of material	Include students in classroom decisions	

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Appendix I: Comparison of Eisner (1991) and Novak (2010)

Eisner/Novak	Learner	Teacher	Curriculum	Context	Evaluation
Intentionality	Establish clear goals Avoid excessive use of ambiguity	Determine what is "important" (hierarchy)	Identify "hidden" curriculum (unintentional learning)	Operationalize education Define goals and objective (outcomes)	Cognitive vs. non-cognitive learning Goal attainment does not ensure meaningful learning
Structural	Move from compartmentalization to relational education	Identify structural influence	Coordinate disciplines like "Writing across the curriculum"	Learning environment (time/place setting)	Potential of non-classroom learning credit
Curricular	Create a higher order of learning	Interprets important components of the discipline	Means and ends integrity Enable application to other disciplines Enable applications	Define the encounter with content (how, when, etc.) Determine the amount of time to learn	What is graded? What counts?
Pedagogical	Learn beyond the intentions	Mediate curricula Biological determinism	Teacher/curricula different a not contrived Course design identifies "tradeoffs" Assist in student confidence	Is classroom consistent with education goals "Best practices" does not ensure "best" approach	Measure what is learned, or what is missing Evaluate lecture and presentations Evaluate style w/ genre (teleographical assessment)
Evaluative	Do students understand the purpose of testing? Does testing reflect what the learner has learned?	Does the testing share the teacher sense of importance? Recognizes the importance of "informed evaluation"	Avoid teaching to the test Understand that test influence what is taught	Testing is a (the most?) powerful tool. Operationalizes the schools values No changes should be expected until the evaluation is in compliance with the schools values	Is testing sole instrument Late testing (in term-finals) limits ability to respond and change Recognize informal evaluation occurs continually

Appendix J: Comparison of Beattie, Collins, and McInnes (1997) Surface and Deep Learning Characteristics with Holschuh Checklist.

Beattie Collins and McInnes categorized the differences between surface and deep learning approaches. This appendix compares the different sections of the Holschuh Checklist with those categories. This section identifies and verifies that the questions on the Holschuh Checklist reflect deep and surface learning approaches. For a more complete discussion please see Chapter 3 of this paper (Beattie, Collins, & McInnes, 1997).

Surface Learning Characteristics	Deep Learning Characteristics
1. Memorizing ideas and accepting ideas without question (1).	1. Understanding issues and interacting with the contents of particular teaching materials (1).
2. Concentrating on memorization without distinguishing underlying principles or patterns (2).	2. Relating the ideas to previous knowledge and experience (2).
3. Being influenced by assessment requirements (3).	3. Examining the logic of arguments and relating the evidence presented to the conclusions (3).

Holschuh Checklist Question	Beattie, Collins and McInnes
Text	
1. I will look through the chapter in my accounting text before reading it to help me know what will be covered. (D)	Understanding issues and interacting with the contents of particular teaching materials (1)
2. I will take notes on the main ideas in the text. (D)	Examining the logic of arguments and relating the evidence presented to the conclusions (3)
3. I will make a reading schedule to help me organize my time and to leave me time for a final review before the exam. (D)	Understanding issues and interacting with the contents of particular teaching materials (1)
4. I will highlight or underline my accounting text by marking just about everything because it is all important. (S)	Memorizing ideas and accepting ideas without question (1)

Holschuh Checklist Question	Beattie, Collins and McInnes
5. I will read my accounting text over and over to try to memorize the information. (S)	Concentrating on memorization without distinguishing underlying principles or patterns (2)
6. I will study the diagrams to help me understand the accounting processes. (D)	Examining the logic of arguments and relating the evidence presented to the conclusions (3)
7. I will read the study guide instead of my text because it will highlight everything I need to know. (S)	Memorizing ideas and accepting ideas without question (1)
8. When I read my accounting text, I will look for connections between ideas. (D)	Relating the ideas to previous knowledge and experience (2)
9. When I read an accounting chapter, I will think about what I already know about the subject. (D)	Relating the ideas to previous knowledge and experience (2)
10. When I read accounting material, I will look only for facts and will try to memorize all the definitions. (S)	Concentrating on memorization without distinguishing underlying principles or patterns (2)
11. When I come across an unfamiliar word, I will usually skip it. (S)	Memorizing ideas and accepting ideas without question (1)
12. I will read an entire accounting chapter before I stop to think about it. (S)	Concentrating on memorization without distinguishing underlying principles or patterns (2)
13. I will distinguish exam-related information from unimportant information in my accounting textbook by highlighting or marking the text. (D)	Examining the logic of arguments and relating the evidence presented to the conclusions (3)
14. I will reorganize the information in the text when I study by making notes about it. (D)	Examining the logic of arguments and relating the evidence presented to the conclusions (3)
15. I will test myself on key information from my accounting text. (D)	Understanding issues and interacting with the contents of particular teaching materials (1)
16. When I read my accounting textbook, I will not turn the page until I understand what I have read. (D)	Understanding issues and interacting with the contents of particular teaching materials (1)
Studying	

Holschuh Checklist Question	Beattie, Collins and McInnes
17. I will tend to cram for my accounting exams. (S)	Being influenced by assessment requirements
18. I will plan my study sessions so that I know what I will work on each time I study. (D)	Relating the ideas to previous knowledge and experience (2)
19. I will use a variety of strategies when I study accounting. (D)	Relating the ideas to previous knowledge and experience (2)
20. I will change the way I study if I am doing poorly in accounting. (S)	Memorizing ideas and accepting ideas without question (1)
21. To prepare for accounting tests, I will try to memorize a lot of facts. (S)	Memorizing ideas and accepting ideas without question (1)
22. I will try to predict questions that might be on the accounting exams. (D)	Examining the logic of arguments and relating the evidence presented to the conclusions (3)
23. I will use what I already know to help me learn new information in accounting. (D)	Relating the ideas to previous knowledge and experience (2)
24. I will distribute my study time over several days. (D)	Understanding issues and interacting with the contents of particular teaching materials (1)
25. I will study both the concepts that are covered in class and concepts that are only covered in the text. (D)	Examining the logic of arguments and relating the evidence presented to the conclusions (3)
26. I will make sure I can explain the diagrams when I prepare for a test. (D)	Examining the logic of arguments and relating the evidence presented to the conclusions (3)
Lecture Notes	
27. I will buy student notes instead of taking notes in accounting class. (S)	Memorizing ideas and accepting ideas without question (1).
28. I will recopy my accounting notes to make them neater. (S)	Memorizing ideas and accepting ideas without question (1).
29. I will highlight or underline my accounting notes by marking just about everything because it is all important. (S)	Concentrating on memorization without distinguishing underlying principles or patterns (2).
30. I will review my notes almost every day by asking myself questions about the information. (D)	Understanding issues and interacting with the contents of particular teaching materials (1).

Holschuh Checklist Question	Beattie, Collins and McInnes
31. I will study only those sections in my textbook that are covered in the notes. (S)	Being influenced by assessment requirements (3).
32. I will recopy my accounting notes to reorganize the information. (D)	Examining the logic of arguments and relating the evidence presented to the conclusions (3).
33. I will read the text before the accounting lecture to be familiar with the topic. (D)	Relating the ideas to previous knowledge and experience (2).
34. I will try to copy down everything the professor says because it will all be important. (S)	Concentrating on memorization without distinguishing underlying principles or patterns (2).
35. I will test myself on key information from my lecture notes. (D)	Understanding issues and interacting with the contents of particular teaching materials (1).
36. I will usually cram to review my notes before the exam. (S)	Being influenced by assessment requirements (3).
Supports	
37. I will use the accounting computer tests or test supplements to help determine what I am going to study for the test. (S)	Concentrating on memorization without distinguishing underlying principles or patterns (2).
38. I will use the accounting notes available on the computer instead of taking my own notes. (S)	Memorizing ideas and accepting ideas without question (1).
39. I will compare my notes to the notes available on the computer to check that I am taking good notes. (D)	Relating the ideas to previous knowledge and experience (2).
40. I will use the accounting-related computer tests or test supplements to make sure I know the concepts after I have studied for the test. (D)	Relating the ideas to previous knowledge and experience (2).
41. I will go to the accounting review sessions because it will give me a chance to ask questions. (D)	Relating the ideas to previous knowledge and experience (2).
42. I will attend accounting class every day because I will not know what is important if I don't go. (D)	Understanding issues and interacting with the contents of particular teaching materials (1).

Holschuh Checklist Question	Beattie, Collins and McInnes
43. I will study with friends to prepare for the accounting exams. (D)	Understanding issues and interacting with the contents of particular teaching materials (1).
44. I will meet with an accounting tutor when I need help. (D)	Understanding issues and interacting with the contents of particular teaching materials (1).
45. I will meet with the accounting professor or TA to ask questions when I need help. (D)	Understanding issues and interacting with the contents of particular teaching materials (1).