Mountain Plains Journal of Business and Technology

Volume 6 Article 3

Date Published: 10-1-2005

Enhancing Long-Term Retention in the Basic Managerial Finance Course

D. Stuart Bancroft
Pacific Lutheran University

Larry P. Hegstad
Pacific Lutheran University

ENHANCING LONG-TERM RETENTION IN THE BASIC MANAGERIAL FINANCE COURSE

D. STUART BANCROFT & LARRY P. HEGSTAD
PACIFIC LUTHERAN UNIVERSITY

ABSTRACT

Students typically perceive the basic finance course to consist of a series of complex and disparate topics, each with its own conceptual framework, equations, and graphs. In the absence of a meaningful cognitive structure, they may fall back on rote memorization and find it difficult to internalize financial decision-making fundamentals. Some tenets of learning theory offer useful insights into ways to organize classroom instruction for the purpose of enhancing long-term retention of critical concepts and procedures.

II. LEARNING THE BASICS OF FINANCE: SHORT-TERM RECALL VERSUS LONG-TERM RETENTION

1. ASSESSING STUDENT KNOWLEDGE AND UNDERSTANDING OF FINANCIAL CONCEPTS

Results obtained on the Educational Testing Service Major Field Tests provide some insight into the matter of coursework retention. These tests ". . . are designed to measure the basic knowledge and understanding achieved by senior undergraduates in their major field of study. (Educational Testing Service, 2003a) In the spring of 2003, 359 colleges and universities administered the Major Field Test in Business. Assessment indicator scores, which are reported on the world-wide web (Educational Testing Service, 2003b), show a median score of 37 percent in the finance section.

Changes in the Major Field Test in Business were introduced in 2003 that preclude comparisons with prior years. However, the result referenced here would seem to confirm what many instructors of intermediate-level managerial finance courses and business "capstone" courses already know; namely, a high proportion of students who pass the introductory finance course exhibit weak retention of the principles and procedures supposedly learned in that course.

The managerial finance course is widely considered to be an integral part of a business school's core curriculum. Business school faculties (and their advisory boards) presumably expect that many of the concepts and procedures studied in this

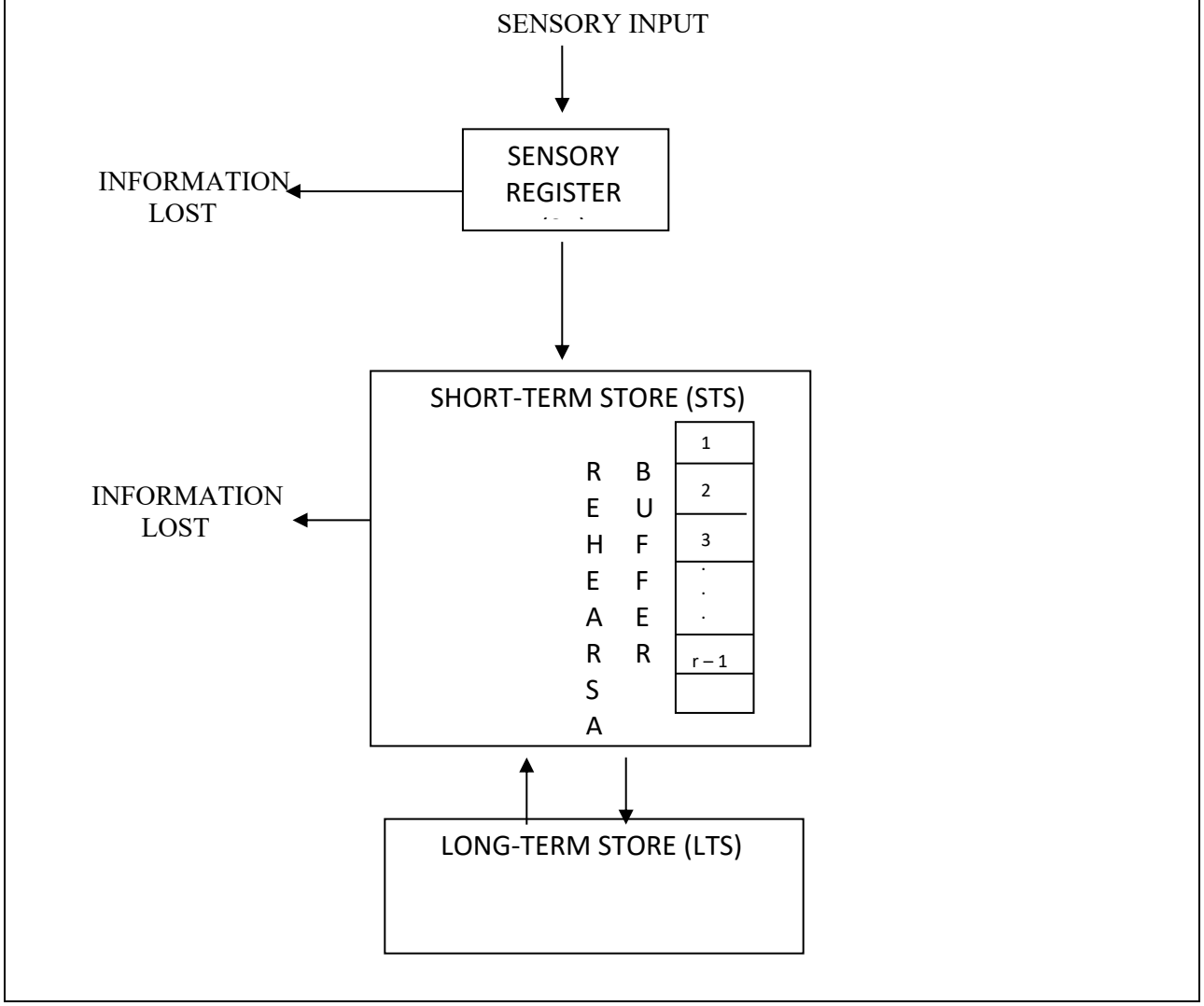
course will prove useful in subsequent non-finance coursework (e.g., capstone courses), and in post-baccalaureate work, irrespective of whether or not that work is directly in the finance field. The Major Field Test results referenced above provide a reasonable basis for questioning whether such expectations are being met.

Faculty assigned to teach the basic managerial finance course are professionally obligated to be informed concerning how well students are "internalizing" critical concepts and procedures addressed in that course. They are equally obligated to consider ways in which they can, in their capacity as teachers, improve the likelihood that students' familiarity with managerial finance fundamentals will survive the next exam, and even the course, itself. Toward this end, certain aspects of learning theory should be examined, as they provide useful insight into the matter of short- versus long-term retention.

2. GENERAL STRUCTURE OF THE LEARNING SYSTEM: SOME TENETS OF LEARNING THEORY

In a paper presented under the auspices of the Learning Research and Development Center at the University of Pittsburgh in 1971, Richard D. Atkinson and Thomas D. Wickens (Glaser, 1971: 72) discuss and graphically illustrate (see Figure 1) the structure of the learning system, noting that some information that is visually or audibly detected will be "lost" even before it is registered in the "short-term store" (STS). Information that is successfully stored in short-term memory can subsequently be either "lost" or transferred to the "long-term store" (LTS). The way in which information is moved from the STS to permanent memory (the LTS) "can be quite different in nature from one task to the next. In one task the subject may use STS to rehearse several items simultaneously in order to maintain them over a short retention interval, whereas in another task each item may be studied and coded individually in an attempt to form a mental image for long term storage." (Glaser, 1971: 71) Furthermore, "If the major portion of the subject's effort is devoted to rehearsal in STS, relatively little information will be transferred to LTS, whereas if he attempts to develop appropriate ways of organizing and encoding the material, a great deal may be transferred." (Glaser, 1971: 73)

Figure 1



3. THE LEARNING PROCESS IN THE BASIC MANAGERIAL FINANCE COURSE: STAGE ONE

As illustrated in Figure 1, some information never progresses from the "sensory register" to the "short-term store." Failure to transit this first stage of the memory system (referred to here as "first-stage failure") is certainly not unique to students in the basic finance course, but it does characterize the performance of many such students on sectional examinations. Questions are incorrectly answered or passed over, even though the matter at hand may have received extensive attention by the textbook author(s) and in classroom discussions. Some of the possible

explanations for such first-stage failure (e.g., lack of preparation on the part of the student; poorly constructed examination questions) are beyond the scope of this paper.

A third possible explanation for first-stage failure is very relevant to this discussion: some students may not comprehend the "sensory input" and are, therefore, incapable of even registering that input in their short-term memory. To some extent, this may reflect a lack of motivation, on the part of the student. Marketing or human resource management majors, for example, may be required to take the basic finance course but may feel that it has no relevance to their intended career. When the information involves equations, even motivated students often have difficulty moving information past their "sensory register" and into the STS. Numerical analysis and equations are hallmarks of the basic finance course. Many business students have successfully achieved junior-year status despite a deep-seated aversion to anything mathematical. For such students, one equation is sufficient to induce fear. A textbook chapter or classroom discussion replete with equations simply causes the mind to "seize up."

The fundamentally quantitative nature of the basic finance course cannot be changed. However, since students will typically have studied algebra, statistics, and financial accounting and are at least vaguely familiar with the rudiments of compounding and discounting prior to registering for the basic finance course, instructors can take steps to alleviate equation-induced student anxiety. Toward this end, the preferred *modus operandi* is to encourage students to actively participate in the learning process. Active learning increases the likelihood that information will be successfully transferred from the sensory register to short-term memory. "Thoughtfulness and attention tend to promote learning." (Winch, 1998: 126) One way to do this (as early as the first-class period) is to invite students to solve a problem that is

- essentially quantitative; but
- amenable to an essentially intuitive solution;
- indicative of a great many of the problems and equations that comprise the course; and
- broadly appealing.

With respect to these four points, consider initializing the course with a simple in-class exercise involving valuation. For example;

1. Ask students how much they would pay today for the guaranteed right to receive $10,000 exactly one year from today.

2. To conclude the ensuing discussion, write the generalized valuation identity on the board, *in words*:

   Market Value = Present Value of Expected Future Benefits

3. Note that we always (a) measure the "expected future benefits" variable in terms of cash flows and (b) use the investors' required rate of return as the discount rate.
4. Rewrite the valuation identity in standard form: $\sum [CF_t / (1 + R)^t]$
5. The instructor may find it worthwhile to repeat the entire process, using a somewhat more complex security having periodic cash flows and/or asking students to view the same security from the standpoint of the issuing corporation. (The latter variation has the advantage of enabling students to discern, early on, the relationship between required returns and capital costs.)
6. Close the discussion by emphasizing that the valuation identity is at the heart of nearly every decision model encountered in the basic finance course, although its precise configuration will change to reflect differences in the nature of the anticipated cash flow stream (annuities, non-growing perpetuities, perpetuities that grow at a constant rate).

By beginning the course with an intuitive and general discussion of how securities are priced, the instructor may successfully enlist the interest of even non-finance majors. By encouraging students to effectively "derive" the valuation identity, and by emphasizing its virtual universality in the course, the instructor begins to neutralize equation phobia. The intended result, of course, is to increase the likelihood that more introductory finance students will successfully complete the first stage of the learning process—transferring information from their "sensory register" to short-term memory.

4. THE LEARNING PROCESS IN THE BASIC MANAGERIAL FINANCE COURSE: STAGE TWO

The second stage of the learning process consists of processing information that has been successfully transferred from the sensory register to short-term memory. Depending on how information is processed in this stage, it may or may not be moved from the STS to permanent memory (the LTS). Information not transferred to permanent memory will be lost and is, therefore, unavailable for use in subsequent applications. For example, financial statements, in general, and cash flow determination, in particular, will typically be addressed fairly early in the basic finance course. Since students will (in most instances) have recently completed a financial accounting course, the basic finance instructor may assume that his/her

students are already knowledgeable concerning these topics and thus accord them cursory treatment. There is, in other words, a tendency to assume that this information resides in the student's permanent memory and can be recalled when, in fact, it may have (and often has) been "lost," after processing in the STS, prior to enrollment in the basic finance course. Fundamental compounding and discounting applications, as well as expected returns and variances, are further examples of topics that students will typically have studied (and passed examinations over) prior to enrollment in the basic finance course but of which they may now appear to be essentially ignorant.

These (and other) failures to ensure that students move information from the STS to permanent memory in various "prerequisite" courses necessitate time-consuming reviews in the basic finance course that detract from the instructor's ability to adequately address "new" material. When, course after course, students fail to move critical information from the STS to the LTS, their ability to comprehend "new" information that builds on "old" information is impeded. As a result, critical financial management concepts and procedures may not be successfully incorporated into subsequent finance courses, the capstone course, or the post-graduation work experience, even though the student "passes" the basic finance course.

Atkinson and Wickens (Glaser, 1971: 73) observe that the transfer of information to permanent memory is most likely to succeed if this process takes the form of appropriately "organizing and encoding the material," and less likely to be successful if it takes the form of simple "rehearsal in STS." (Glaser, 1971: 73) Phillips and Soltis (2004: 69) concur with this observation, noting that "Learning is facilitated by presenting the student with 'advanced organizers' or 'anchoring ideas' – ideas that are fairly general and fairly basic to the topic about to be leaned."

In contrast, basic finance textbooks are commonly organized around discrete "parts" or "sections." (e.g., "capital budgeting;" "risk and return;" "cost of capital") and examinations are commonly geared to one (or more) of these discrete sections. An unintended result may be that students are, thereby, encouraged to "rehearse" information for short-term retrieval. They often do so by tediously working through as many end-of-chapter and/or student problem manual "practice problems," as time allows. The student's goal is to achieve a satisfactory score on each successive examination and thereby "pass" the course. This learning structure would, however, seem to be designed, albeit inadvertently, to stimulate what Atkinson and Watkins refer to as "rehearsal in the STS "for maintenance over a short retention interval." (Glaser, 1971: 71)

There is little choice but to divide the basic finance course into manageable units. What is often lacking—and what would assist in the successful transfer of information from the STS to permanent memory – is an explicit attempt to connect seemingly disparate topics by building the discussion of them around a unifying, or "anchoring" idea. For example, the bond and stock valuation, capital budgeting, risk and return, and cost of capital topics all encompass discussion of an appropriate discount rate. However, students often fail to recognize that the "required rate of return" discussed in conjunction with the bond and stock valuation chapter(s) is, in any way, connected to the "cost of capital" utilized in the chapters devoted to discussion of the capital budgeting and cost of capital topics. Similarly, the connection between the material presented in the "risk and return" chapter(s) and investors' required rates of return and a company's capital costs is often undetected by students.

Students who fail to successfully complete the second stage of the learning process; namely, transferring information from short- to long-term memory, may well pass the basic finance course. Thereafter, though, they will exhibit an inability to recall the critical concepts and procedures supposedly "learned" there, for application in another context (e.g., the intermediate financial management course, capstone course, or post-graduation employment). Instructors who understand the fundamental nature of the learning process will take steps to increase the likelihood that students will successfully transit both stage 1 and stage 2 of the learning process. Short of completely remodeling the textbook, a well-reasoned effort to structure classroom presentations and discussions around a simple, unifying (or "anchoring") idea would be consistent with the tenets of learning theory noted in this paper.

III. APPLYING TENETS OF LEARNING THEORY TO THE BASIC FINANCE COURSE

Since the mid- to late-1960s, value maximization has been recognized, in virtually all introductory finance texts and courses, as the appropriate goal of financial management. As such, it is admittedly integral to virtually all the principal topics addressed in the basic finance course. However, neither textbooks nor course syllabi consistently and explicitly use this unifying principle as the information "organizer" or "anchoring" idea that learning theorists tell us is necessary to help students transfer material from short- to long-term memory.

Instructors can address this shortcoming by organizing classroom presentations and discussions around the valuation identity, either in its basic form (Figure 2), or appropriately extended to highlight particular topics.

Figure 2

Market Value = Present Value of Expected Future Cash Flows

$$= \sum_{t=1}^{n} [CF_t / (1 + R)^t]$$

Because it is essentially intuitive, and because many of the equations adduced in the course are simple variations on or extensions of it, the valuation identity enables the instructor to combat what has previously been referred to as equation phobia and thereby minimize the likelihood that information will be lost between the "sensory register" and the STS.

Visually anchoring discussions of each successive topic in the identity increases the likelihood that students will understand why the topic is being discussed, and its relationship to the other topics addressed in the course. In other words, this classroom procedure enables the instructor to organize nearly the entire course around one essentially intuitive, unifying principle. In doing so, the teaching methodology is brought into conformity with the tenet of learning theory that asserts that more information is likely to be transferred from the STS to the LTS if that information is appropriately organized and encoded. (Glaser, 1971: 73)

When the dimensions of the "expected future cash flows" component of the identity are under discussion, whether in conjunction with the financial statements topic, the stock and bond valuation topic, the capital budgeting topic, etc., that part of the identity should be visually emphasized. As the discussion of the topic is developed, the relevant portion of the identity should be expanded, as appropriate.

For example, suppose the topic under discussion is financial statements. Typically, the author(s) of the text will have reviewed the balance sheet, income statement, and statement of cash flows. They may also delve into ratio analysis and financial planning models. What they typically do not do, at this stage, is explicitly discuss this topic's relevance to the rest of the course. Failing to see its relevance to subsequent topics, students may "rehearse (the information) in order to maintain (it) over a short retention interval." (Glaser, 1971: 71) While this information processing procedure may be sufficient to enable them to pass the exam over the financial statements topic, it will likely fail to facilitate the transfer of the information to the LTS. Consequently, when cash flow matters are subsequently examined in conjunction with, say, the capital budgeting topic, the student may be unable to recall the information for use in that later application.

Using the valuation identity as the "information organizer" or "anchoring idea" advocated by Phillips & Soltis (2004: 69), the basic finance instructor can improve the likelihood that information learned in one context will be available for recall in a later context and thereby minimize the time needed for extensive review and/or relearning. In the example under consideration, unless students understand that an ability to work with financial statements is integral to the valuation process (see Figure 3), they may well view it as an isolated matter that must be recalled (from short-term memory) for the next

Figure 3

Market Value = Present Value of **Future Cash Flows**

derived from pro forma

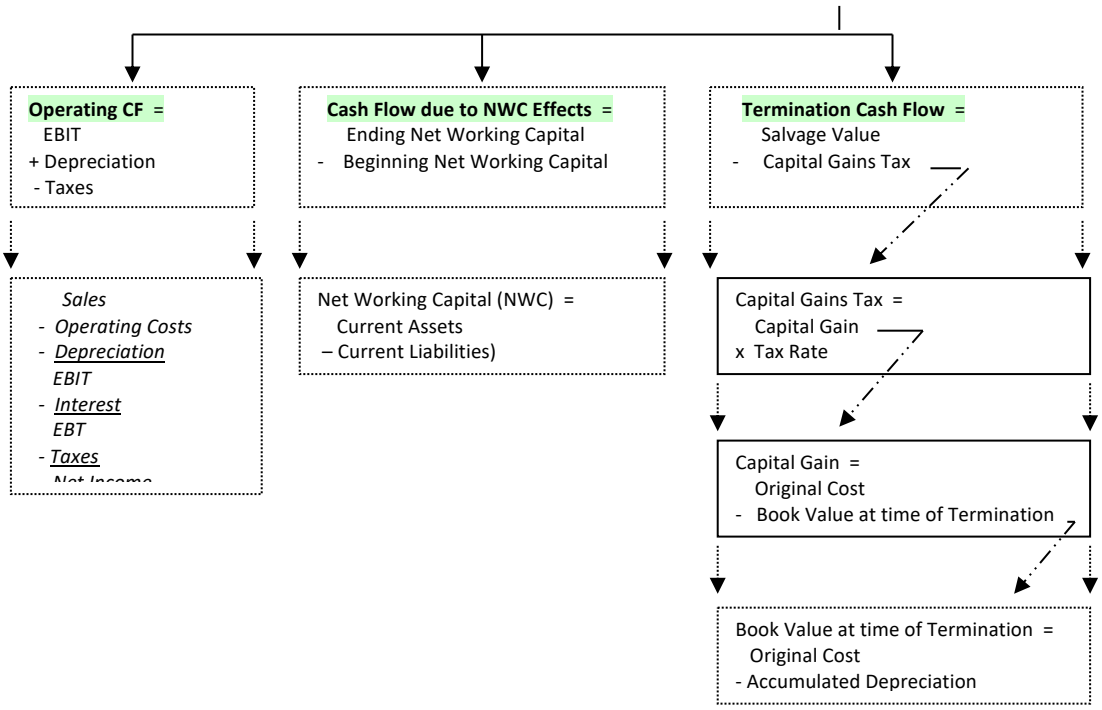
- *Income Statement*
  - *Operating Cash Flows*
- *Balance Sheet*
  - *After-Tax Salvage Values*
  - *Net Working Capital*

exam but which can then be forgotten. The information is, in other words, processed in the STS in such a way that it fails to be transferred to the LTS. (See Figure 1). Discussing the topic in the context of an "anchoring" idea -- the valuation identity -- enhances the likelihood that the information will be successfully transferred to the LTS for later recall. At that time, the "anchoring" idea should again be pressed into service to facilitate recall of the information. (See Figure 4 for a detailed example of how this might be done.)

This "anchoring idea" tenet of learning theory has broad applicability to the basic finance course. The preceding paragraphs have focused on its use in conjunction with discussions of topics bearing upon the "future cash flows" variable. When a topic relates to determination of the discount rate variable (for example, time value of money, risk, cost of capital), that part of the identity should be visually emphasized and extended, as appropriate.

Figure 4

Market Value = Present Value of **Future Cash Flows**



IV. LIMITATIONS TO THE USE OF THE VALUATION IDENTITY

Introductory finance textbooks typically devote one or more chapters to working capital issues and decision models. At that point in the course, the instructor should note that, although the valuation identity theoretically applies to current asset and current liability account management, as a practical matter the discount rate, R, is typically assigned a value of 0 when the time horizon is one year or less. That is, book values are implicitly substituted for market values, in such instances. Moreover, particularly in the case of the current asset accounts, the overarching goal of stock value maximization is served by *minimizing,* rather than maximizing, those values. Thus, the valuation identity is not well suited to instruction concerning management of the working capital accounts.

V. CONCLUDING REMARKS

Weak long-term retention of critical concepts and procedures taught in the introductory finance course should be of great concern to students and teachers, alike. It adversely affects student performance in subsequent courses (including intermediate financial management and capstone strategic management or business policy courses). It also limits the ability of instructors in these subsequent courses to extend students' understanding by introducing new material and/or analytical methods.

Learning theorists provide some insights into how the problem of weak long-term retention might be assuaged. In particular, students' comprehension can be enhanced by "anchoring" discussions of the various topics in a concept that is both general and basic. In the context of the introductory finance course, the valuation identity can serve this purpose. This construct enables instructors to easily integrate the "organizing idea" tenet of learning theory into nearly all of the topics typically addressed in that course.

REFERENCES

Educational Testing Service. 2003a. Major Field Tests – Business. Princeton, New Jersey. Retrieved July 1, 2004 from the World Wide Web: (*http://ftp.ets.org/pub/corp/ContBusiness.pdf*) Cited with the permission of the ETS.

Educational Testing Service. 2003b. Major Field Tests – Business. Princeton, New Jersey. Retrieved July 1, 2004 from the World Wide Web: (*http://ftp.ets.org/pub/corp/kbusdata0203.pdf*) Cited with the permission of the ETS.

Glaser, R. (Ed.) 1971. *The nature of reinforcement*. New York: Academic Press.

Phillips, D.C. & Soltis, J.F. 2004. *Perspectives on learning* (4th ed.). New York: Teachers College Press.

Winch, C. 1998. *The philosophy of human learning*. London: Routledge.