Interactive Computer Assisted Learning for Real Estate Accounting and Finance

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Abstract
This paper considers the philosophy, rationale and methodology of computer aided learning. The requirements for efficient delivery of subject material are analysed with particular regard to the learning needs and time availability of aspiring real estate professionals. An interactive Windows™ based system which assists in the learning of basic accounting and financial mathematics is described and demonstrated. This program includes self-paced learning units, animated graphics, an infinite test bank, true/false, multiple choice and numerical exercises, drag-and-drop trial balancing and inbuilt worksheets.

Introduction
In recent years the widespread use of computers as electronic books has grown. Encyclopaedia, dictionaries, fiction and non-fiction books are now widely available on computer media. The use of multi-media technologies which combine text and graphics with animation, video and sound have become affordable with huge increases in computer power and memory at reduced costs. There is now a growing trend for academics to use these technologies to assist in the learning process without considering the costs and benefits of doing so. This paper looks at the rationale of computer aided leaning (CAL) as well as examining some methodologies and equipment requirements to implement CAL. Major authoring software will be critically analysed and compared to the use of systems that enable student interaction. Finally a system that enables student interaction will be discussed. The system is called **InteraXtion™™** and is currently being produced by the authors for use by Prentice Hall Australia. The system is being introduced for use with the book Accounting by Horngren, Harrison, Best, Frazer and Izan.

Why use CAL - (the rationale of computer aided learning)

There is a vast amount of literature which implicitly or explicitly supports the use of CAL and discusses the major types of presentation. Vu and Burden (1985) noted that students responded favourably to high quality graphics, text and animation, and that their concentration spans were increased greatly. Salter (1985) contends that CAL programs may be instructionally useful or otherwise, depending on how well thought out they are from an educational point of view. Salter sees great benefit in the involvement of the people responsible for teaching a subject in the design of CAL packages, as they have a better understanding of the specific learning objectives, prerequisite skills and styles appropriate to different material. Rowe (1993) highlights the growing use of CAL in primary schools where the use in the total teaching package is emphasised
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Collins and Brown (1988) highlight the importance of providing students with facilities for replaying and observing their own performance, the performance of other students, and the performance of an advanced performer of the problem-solving task. CAL provides the ideal environment for achieving this. Clarke (1985) discusses the continuum of cognitive styles from Serialists to Holists. Serialists prefer to learn just the essential facts which should be well defined and sequentially ordered and related by simple links. They use a simple step by step learning strategy and regard anecdote, illustration and analogy as distracting. They adopt a "local" approach concentrating on specifics which may lead to emergence of the overall picture. Holists prefer a global approach to problem solving. Complex, non-linear, "globe trotting" learning strategies are used and holists thrive on anecdote, illustration and analogy. They concentrate on synthesizing broad overviews into which details may be fitted. Clarke concludes that CAL programs should be available in tutorial-type and simulation-type versions to cater for different cognitive styles. While there are many advantages propounded for the use of CAL, the major practical advantages for a CAL system are that it:

- helps to develop understanding and encourage an holistic approach to learning
- removes mundane work from the classroom
- reduces the time and cost of educating students at educational institutions
- improves equality of access of education
- interactive activities encourage students to develop skills through "drill"

Particularly in skills based areas where students tend to learn at different rates, the use of CAL will allow efficient learners to progress further while allowing other students to "drill" to develop skills and promote better understanding. Classroom time would then be devoted to more conceptual issues and remedial work for some students and not become bogged down by the need to continually present model answers to questions.

How to use CAL - (methodologies for computer aided learning)

The requirements for the use of CAL systems in education can be divided into software and hardware requirements.

Software

There is a wide range of software available to the computer author. This enables writers to cover a wide variety of media and ideas. Software such as LISP™ and LOGO™ allow the author to experiment with "expert systems" or intelligent computer assisted instruction (ICAI). Using many concepts of artificial intelligence, these systems are ideal for use in "physical" instruction areas such as medicine, health sciences and defence applications. Modern multi-media systems such as Multimedia Toolbook™, Hypercard™, Authorware Professional™, Icon Author™, Guide™ and Plus™, have become popular as these enable the writer to incorporate sound and video with text, graphics and animation by be use of CD-ROM technologies to cope with the vast amounts of memory needed for these applications. These systems might best be described as "a solution awaiting a problem" by making it easy to produce "computer books" which are guaranteed to impress typical viewers. Simpler hypertext such as Windows™ Help™ systems enable the writer to incorporate text and graphics in hypertext format and to launch other applications.

Hardware

The hardware requirements vary with the software. ICAI applications normally require large Mainframe computers with designated work stations. Multimedia software require machines with CD-ROM, sound and large memory requirements. Windows Help™ driven software requires smaller machines with a minimum Windows™ capability.

Interactive   Computer   Aided   Learning

While the main thrust of modern CAL projects has been towards multi-media applications, there are some problems in this approach. These applications are **not truly interactive**. While they enable participants to progress at their own pace and discretion (self paced) and use animation, video and sound to enhance learning, most don't enable the user to participate in interactive activities. Activities produced in many multi-media "books" might best be described as **variable animations.** These allow the user to vary one or two variables within a limited range. The input and output opportunities are limited by the author. An interactive activity allows the user infinite variabilities (in a large range) in multiple variable problems, giving the control of experiments and learning to the user. InteraXtion™™ is designed to include interactive activities for the user. Consider the example in figure 1 .

Figure 1 - Example of an interactive activity
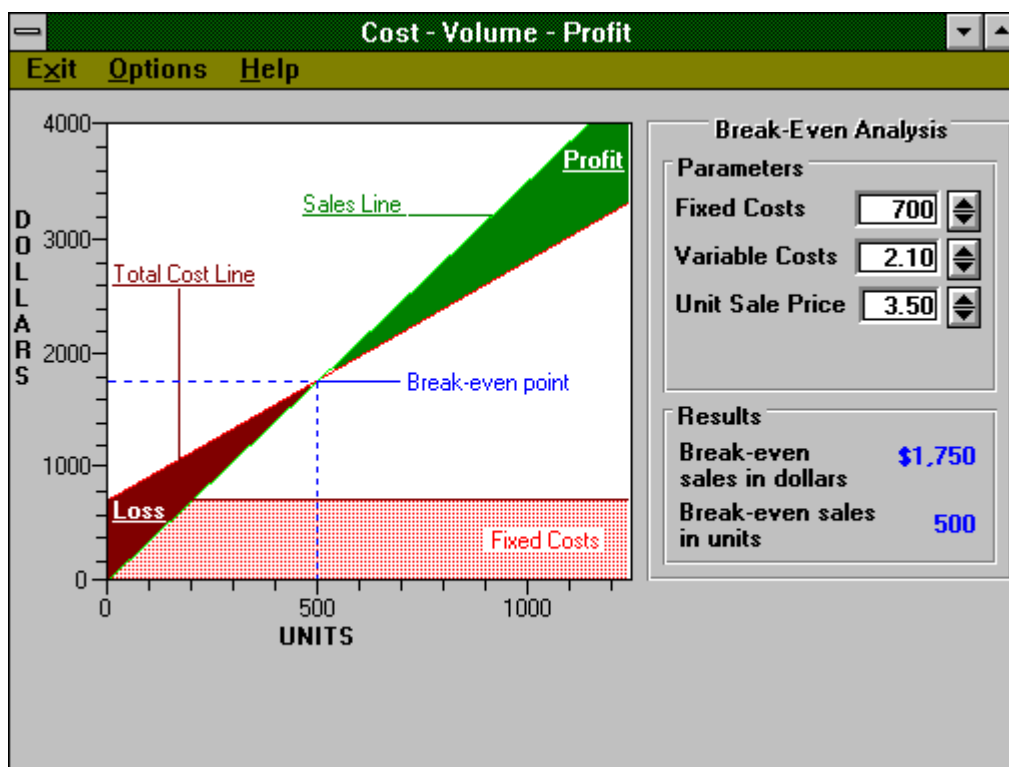
Figure 1 shows an interactive activity where the relationship between fixed and variable costs and returns can be moved to affect the break even point. Fixed and variable costs as well as the unit sale price are infinitely variable (within a large range). Any change in any variable instantly registers as a change to the graph and the break even point. In a typical multi-media activity the user would be restricted to several options which "demonstrate" the outcomes in much the same as having multiple graphs in a printed book.   The aim of InteraXtion™ is to mix some of the advantages of hypertext and animation with the ability to run appropriate activities based on the text and animations. This enables the students to **practice** using the computer, as they learn. The activities and associated testing facilities use infinitely variable sets of numbers to assist the user to learn **how to solve problems** rather than learning answers to set problems.

Inexpensive Computer Aided Learning

While the cost of multi-media machines has fallen in recent years the fact remains that access to machines with multi-media capabilities is likely to be a problem in the immediate future. The use of video and sound is very "memory hungry". One second of full screen high resolution video uses up to 1 megabyte of memory. A modern CD with over 600 megabytes of storage space can store just over 10 minutes of video. Put simply, to run multi media software with an array of video and sound as well as animation, graphics and text requires a computer with a large amount of memory as well CD-ROMS, sound boards etc. Large numbers of these machines are not available in most educational institutions, nor are they typical of machines owned by most users. One of the aims of InteraXtion™ was to provide the material in a format suitable to most users. The use of Windows Help™ to drive the text and graphics and launch other Windows™ activities means that the system can be run on small machines with relatively low memory and hard disk capabilities. The current version of the InteraXtion™ system for Horngren occupies less than 1.4 megabytes (one high density 3"" disk) and will run satisfactorily on an IBM 286 clone with 1 megabyte of memory and Windows™ version 3.1 installed. This means that access to the system is very much greater than would be available with typical multi-media systems both within educational institutions and typical users at home or in the work place.

What InteraXtion™ Offers

InteraXtion™ is designed to be readily available to students on small PC's with a minimum Windows™ platform. The system is made up of various components as shown in figure 2.

Figure 2 - The InteraXtion™ System
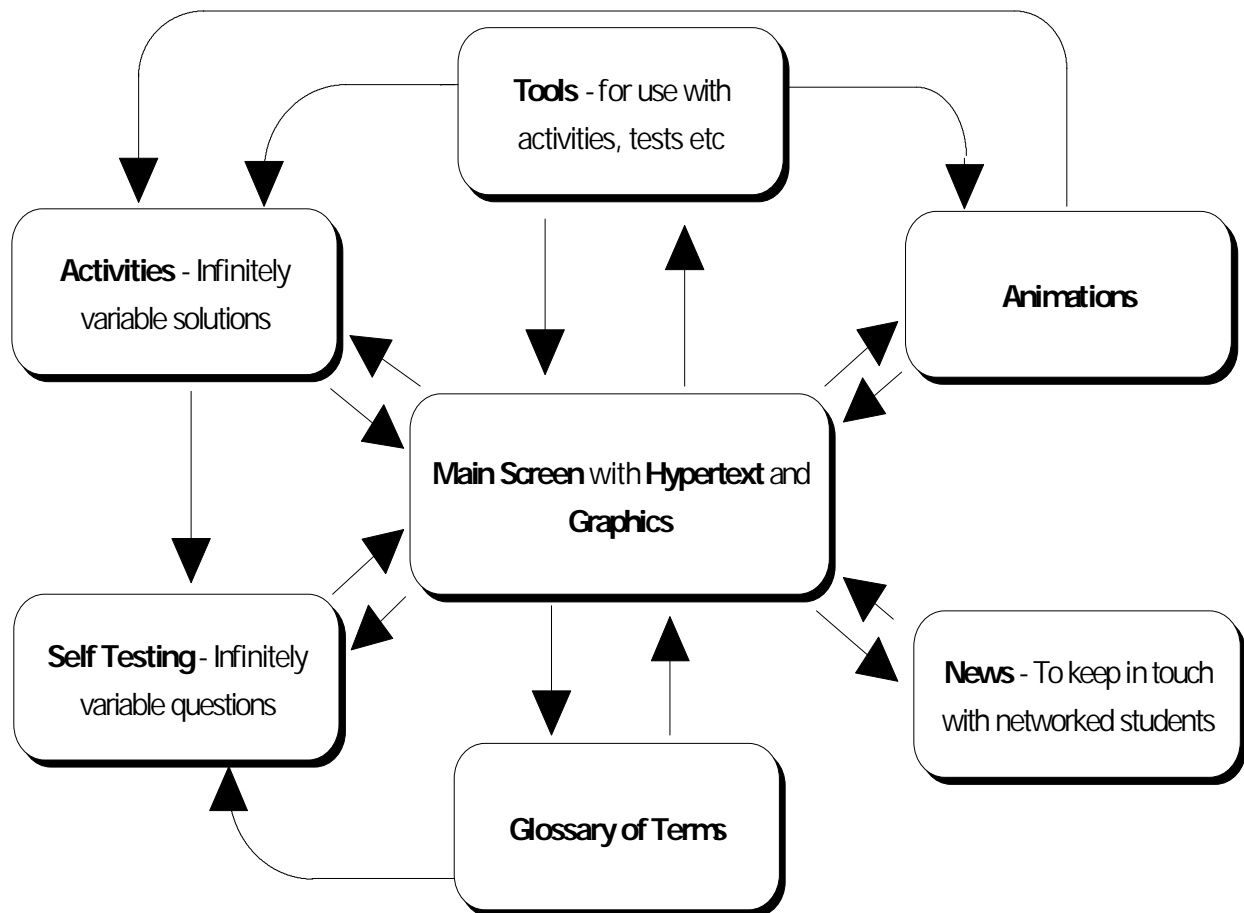
Hypertext Base

The base of InteraXtion™ is the hypertext documentation equivalent to the text book. This looks almost identical to the paper text except that colour is more prevalent and graphics are in colour. Hypertext allows users to "browse" through the material in the same way as a book, to search for particular items, or to jump infinitely between topics. This encourages the holistic approach to learning as suggested by Clarke (1985) and Rowe (1993). Users can check definitions, meanings and concepts by simply "hyper-jumping" to that item.   The user can use bookmarks and annotations to add to the material. The text includes self study questions. These help to give instant feed back with right-wrong indicated after the user's attempt. The main hypertext base is used as the "launch-pad" for animations, activities, testing etc.

Figure 3 - The Hypertext Base

Animations

Some of the information is best described through animation. Where appropriate, animation is used to demonstrate skills and explain concepts. In the animation shown in figure 4 the user is shown the steps involved in balancing a T account by showing the steps progressively.

Figure 4 - A Typical Animation

Activities

The activities are designed to enable users to quickly and easily develop skills through repetitive activities with variable content. Consider the activity shown in figure 5 involving the preparation of a trial balance. To practice this skill using traditional methods, the learner would have to laboriously write figures into debit and credit columns and add these up. This could be made easier with a computerised spreadsheet where some of this is more automatic, however users quickly tire of this laborious task. In InteraXtion™ activities the user simply drags and drops numbers to the appropriate column which can be summed at any stage with the "total" button. The exercise can be repeated **but** account items and their dollar values change. Users will quickly develop and test skills. This is also useful for revision in line with modern "just in time" principles of learning. The activities generally enable the user to practice animated examples.
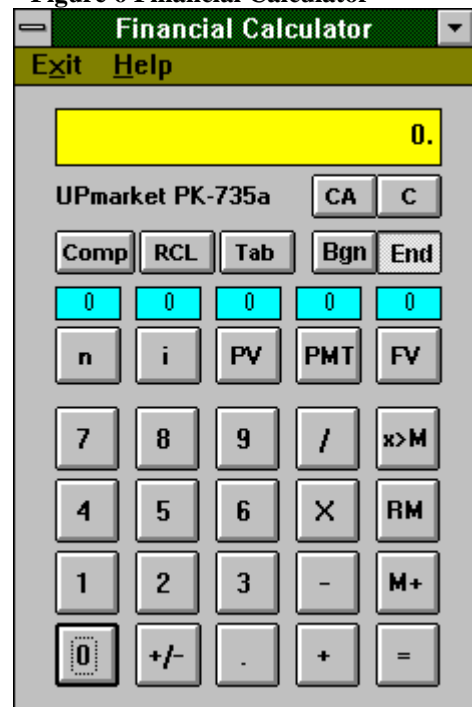
Figure 5 - Trial Balance Activity

Tools

A series of tools for general use in the accounting-finance area will be available to the user. Many of these tools will be used in both animations and for activities. Consider the financial calculator shown in figure 6. This is a "cut down version" of a calculator typically used for financial mathematics however only the critical keys have been used here to make it easier for users to become familiar with the necessary keystrokes to solve typical problems. Animations of the tool would indicate how to solve problems. Activities are designed to use the tool and testing can be carried out using the tool. One of the major advantages of the computer based version is that the system can be programmed to give feed back to the user if an incorrect procedure has been used (Intelligent CAI). Other tools such as financial tables (with infinitely variable factors) and simple accounting, finance and property work sheets will also be available. Many of these tools will be available to the user outside of the InteraXtion program.

Figure 6 Financial Calculator

Testing

Figure 7 - Typical Testing Facility

Test banks offering true/false and multiple choice questions are readily available in many disciplines. The InteraXtion™ system includes this type of testing and testing on various skill activities. These could be used as self testing or for academic assessment.

Glossary

A glossary of terms is included. The glossary can be accessed directly or from jumps in the hypertext material. This is particularly useful in the early stages of learning when quick and easy access to terms and definitions are frequently used. Testing is available on glossary terms.

News

The news facility is used for network applications as a simple method of communicating with students. Important news items can be added with a standard text editor to provided quick and easy broadcasting of information to users of the system.

Conclusion

This paper has considered practical and philosophical aspects of computer aided learning and investigated one particular system. The InteraXtion™ system being developed is an example of a system which provides most of the advantages of modern user interfaces without the need for expensive hardware and software. The system includes interactive activities to encourage users to practice the skills that they are learning. These activities can be substituted for a significant part of classroom activity, which is to the advantage of staff and students.

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Interactive learning - computer assisted learning - teaching methods - accounting - finance - Windows ï£ª applications. Abstract. This paper considers the philosophy, rationale and methodology of computer aided learning. The requirements for efficient delivery of subject material are analysed with particular regard to the learning needs and time availability of aspiring real estate professionals. An interactive Windows ï£ª based system which assists in the learning of basic accounting and financial mathematics is described and demonstrated. This program includes self-paced learning units, animated Real estate accounting can be complex, but there are way to make it easier. Find out what software to look out for to simplify accounting tasks.Â Use Xero Learn to support the delivery and teaching of beautiful financial lessons using Xero. Pricing. Free trial. Simplify real estate accounting. Small Business Guides. 6 min read.Â Well-managed real estate accounting is vital. Working in real estate means dealing with large sums of money on a regular basis. That's true whether you: run a real estate agency employing commissioned salespeople. manage commercial or residential real estate for clients. handle the accounts of a housing association. run a building construction firm. manage an investment trust. provide residential sales and lettings services. Real estate is changing rapidly, and machine learning is playing a role in new functions, including: Automation in Property Management, Marketplaces, and...Â The real estate market in the US is currently a sellerâ€™s market, with demand outstripping supply, and housing affordability going down steadily for 2018 (Source: Gallup, May 2018). As more efficient means of buying and selling properties are being made possible with the help of machine learning, other AI-based applications are creeping their way into maintenance, energy management, and more. In the article below, weâ€™ll explore the applications of machine learning in real estate. Weâ€™ll examine the buying and selling process, in addition to a more in-depth look at facilities management and build Desire to learn accounting & finance. Access to Excel or other spreadsheet program. Passion to empower yourself with knowledge.Â Chris Benjamin definitely has used his real world experience and education to create a course which teaches entrepreneurs and startups everything they should know from the start about accounting and finance. Kudos!" - JT Lexington, Maven Capital. What Do You & I Cover In This Course? This course teaches entrepreneurs, startups and small businesses all things business accounting and entrepreneurial finance related, A to Z. Starting with an introduction to accounting concepts, we move into financial reports and how to create them, understand them and analyze them. Computer Assisted Learning can make lessons much more interactive and engaging, and can pique the interest of even the most reluctant of pupils. This isnâ€™t to say that CAL is not without its flaws, however.Â Computer Assisted Learning encompasses a lot of different technologies and ideas, but can be understood easily enough. The Intense School, which focuses on computer and information technology, summarizes it simply as â€œthe use of electronic devices/computers to provide educational instruction and to learn.â€Â Computer Assisted Learning also includes online courses and supplemental course materials used in colleges, homeschooling and distance learning.