Audit Decision Making:
Action Research, Pedagogy and Student Engagement

By

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Abstract

The purpose of this study is to evaluate that learned from the process of developing and testing an audit computerised learning package for the classroom. The contribution is in the knowledge acquired about what engages students in computerised programs and exercises about audit decision-making, and under what circumstances engagement occurs. The paper first describes the content of the package, the process by which the programs and exercises within in it are formed, and their foundations in education and audit theory. A learner's perspective is adopted to evaluate the program's effects, and students' experiences and views are observed and surveyed over seven further years of study. Observations are logged and surveys are analysed. Results emerge in the form of those features which most engage students in the classroom. Discussions consider the implications of these experiences for instruction, particularly as to lecture and lab distinctions that emerged, student engagement and offers suggestions for further research.

Key words:
Audit
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CAATs

1.0 Introduction

The audit professional is expected to be skilled and knowledgeable about matters to do with systems, standards, law, financial accounting, management and finance. The auditor is expected to be able to gather evidential matter, analyse complex systems and come to difficult decisions about ethical and accounting matters (Allen & Elder 2005; O'Donnell 2004; Solomon & Troutman, 2003; AAA 1986, pp.174-178). Computer skills are part of the auditor's expected skill base as well (Debreceny, Lee, Neo & Toh, 2005; Braun & Davis, 2003; Baldwin & Chesser, 2003; Boyce 1999).

One might assume then that educators would prepare auditing students for this demanding role. This is not consistently the case however. Traditional approaches to learning tend to dominate audit curriculums, including lectures that require 'listening' and assessments that look for 'right' answers as opposed to solutions 'reasonably derived'. All too common to is a pedagogy which passively transmits knowledge but which fails, with the possible exception of large case studies, to engage the learner in active decision-making (Grumet 2007; Bhattacharjee & Shaw, 2001; Van Peursem & Julian, 2006; McCoskey & Warren, 2003; Davies 2000; Adler 1998; Wilson, 1995). While such traditional methods may be useful in some respects, they do not allow learners to develop the skills needed in 'real' audit situations (e.g. Solomon & Troutman, 2003).

One means to improve this situation may be to incorporate computerised decision-making exercises into the audit classroom. This research asks the fundamental question of how best to do so by evaluating the lessons learned from the formulation of a computerised audit learning package. The aim of this study is to evaluate that learned from the process of formulating, refining and testing a computerised learning package for use in the audit classroom. Those

served directly by the project are students exposed to engaging learning experiences, instructors who wish to excite their audit students in audit decision-making, and researchers who are concerned with student-engaged learning.

2.0 Limitations in Scope

This project looks to student engagement as the primary indicator of package success. This is because lessons -- audit or otherwise -- are unlikely to be absorbed unless students are truly interested, that is 'engaged', with the material (Bar-Hava, 2002; Wilson, 1995). This is found to be the case for computerised packages as well. Poorly-designed computerised lessons can fail if not constructed to take into account student interest (Lane & Porch, 2002). Student views and experiences are integral toward developing this package therefore and, so while the educational literature is a 'guide' in designing the original package, this analysis focuses on those features of the package that most interest the students with whom it is formed.

To understand how the package can be used for students at different stages of learning, both introductory and advanced audit students are brought into the study, early on and over time as the full package forms. So as to facilitate a package that can supplement, but not dominate, textbook learning, it is also a goal to ensure a development that is considerate of the time it takes to complete an instruction or exercise so as to fit in normal instruction schedules. From this process therefore are lessons learned as to what features of an audit learning package seem to best 'work' in the classroom.

2.0 Prior Research

Prior research reveals a gap to which this study can contribute. In particular, the accounting learning literature has long called for more instruction in conceptual principles, more audit judgement exercises and for more computer applications (Wyer 1984; Schute 1979; Wilson 1979; Perry 1980; Kurfiss 1988).

Unfortunately, few classroom material developments are directed toward such goals (e.g. Braun & Davis, 2003; Cooper, Adams & Lukaitis, 2000). Computerised packages which do exist, for example, tend to focus on isolated audit functions or on pedantic elements of practice such as preparing working papers, selecting samples or downloading data (Dale, 2002; Briner & Pearson1987; Davies, 2000; Gallagher, 1996). Other packages, including some real-practice software and manual cases, tend to be large and impractical for the classroom (e.g. Gelinas, Levy & Thibodeau 2001; Davies 2000; Nieschwietz, Pany & Zhang, 2002). There may be value therefore in sharing lessons learned from the process of formulating a learning package which addresses this particular combination of challenges: encouraging audit judgement-building skills in a classroom and computerised format.

The following section first introduces the package that evolved from this process so as to enable the reader to understand the analysis to follow. A methods section introduces the action process used to bring students into the development and analysis of the package. Results then reveal the outcome of that process and the features that seem to work, or not work, in engaging students in the audit package. The Discussion section considers implications for learning and package development, and Conclusions look to avenues for further research.

3.0   The Package

Computer assisted learning is, simply put, that in which the instructional content is delivered by computer (Ott, Mann & Moores 1990). The package ultimately formed falls within this category as it consists of a number of computerised (Excel) subroutines and accompanying exercises. The (final) package is composed of 21 such subroutines and 40 exercises.

The package was initiated with five practice-like worksheets designed to emulate real audit software known, in combination, as Computer Assisted Audit Techniques (CAATs). CAATs consist of application programs, data download subroutines and user interfaces designed to assist the auditor in planning and documenting an audit (Paukowits & Paukowits, 2000; International Accounting Education Standards Board (IAESB), 2006, p. 7; International Federation of Accountants (IFAC), 2001, p.699). Auditor 'input' of client information (or the auditor's assessment of client information) usually initiates a CAAT subroutine from which analysis of some type then emerges. The analysis may be in the form of, for example, materiality assessments, risk assessments, doubtful debt estimates, error messages or virtually any information of interest to the auditor. Both sophisticated and generic CAAT software is widely available and used in practice[1].

The package developed here (entitled 'CAATs in the Classroom' or CITC[2]) is, like CAATs generally, a series of Excel subroutines, application programs and relational databases designed to support audit planning and testing decisions. Unlike CAATs however, CITC uses

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[1]   This includes commercial packages such as ACL (Yu, 2000; www.acl.com/solutions/audit.aspx, 2006); IDEA data analysis software (http://www.audimation.com, 2006); and Monarch (www.michigan.gov/budget/0).   They typically download and convert client data to 'live' data for audit testing, incorporating audit-relevant subroutines (sorting, calculating, ratios analysis and so on).
[2]   Used with permission, Pearson Education

abbreviated 'trial' data, incorporates classroom exercises and makes visible the 'effects' of audit decisions (e.g. see Figure I). CITC thus takes its form from practice software (CAATs) but looks to educational goals in its structure.

Insert Figure I about here

A CITC 'framework' consists of one subroutine plus one or more related exercises (Table I). Students enter data in the lighter coloured cells; darker cells (protected to prevent modification) reveal the 'effects' of the student's data entry. Figure I is an illustration for a going concern analysis.

A similar approach is adopted for other subroutines, all of which include a decision framework, case material and visible relational effects. Excel worksheets are also, where relevant, linked to each other to show how, as in practice, multiple audit working papers can be updated simultaneously. So for example, and in the Going Concern subroutine (Figure I), information is drawn *from* the Working Trial Balance, the outcome (a Going Concern risk decision) is transferred *to* a 'Risk Analysis' working paper. Linking functions can also be embedded within one worksheet as in, for example, an analytical review subroutine in which financial statement data is linked to nearby graphs (Figure II).

Insert Figure II about here

Some frameworks are reasonably complex, such as the Risk-Materiality subroutine (Figure III) which combines 'sampling', 'risk', 'evidence' and 'materiality'.

Insert Figure III about here

The number of subroutines grew over a period of seven years from an original five to a final 21 (Table I).

Insert Table I about here

This then is the CITC learning 'package'. It is however as to its development with which this study is concerned.

4.0 Action Research

> The research will be directed towards improvements in the practice, but it will also promote participation on the part of organizational participants during the process … (Baker 2000, p. 371).

Action Research allows knowledge to be developed while engaging in the research itself (Ballantyne 2004, p 322). Action Research and its forbear in education -- Action Learning – are grounded in the "philosophies of learning and change" (Zuber-Skerritt & Farquhar, 2002; Marsick & O'Neil 1999, p. 159) and permits participants (students in this case) to become part of the research process. Using Action Research, the researcher brings student input into the development of the program over time.

Action Research has been used elsewhere in audit research. Menda (2004) applied Action Research to evaluate evolving manufacturing audit practices. Neely, Richards, Mills, Platts and Bourne (1997) used Action Research project outcomes to evaluate performance measure quality, and Moultrie, Clarkson and Probert (2006) used Action Research to develop a process audit tool. Applications in accounting include Howcroft's (2006) effort to understand and improve spreadsheet practices. Action Research has been shown to be a useful approach for evaluation in the audit field even as its practice is being formed. Action Research and Action

Learning have also been extensively employed in educational contexts (e.g. Williamson, 2002; George, Craven, Williams-Myers & Bonnick 2003).

> Action research as innovation in this context represents a 'culture' that is brought into relationship with the culture within a school system or classroom (Altrichter, Kemmis, McTaggert& Zuber-Skerritt, 2002, p. 128).

Using Action research for educational development allows the researcher to understand a pedagogy of interest (i.e. student engagement) in a personalized and pragmatic context. The educational Action Research literature also enables theoretical contributions.

> This [knowledge] leads to generalizations or the formulation of abstract concepts, the implications of which are tested in new situations…. Understanding, improvement, and transformation of the specific situation in which the group are working is the ultimate outcome of these learning cycles (Cardno & Piggot-Irvine 1996, p. 20).

Such 'generalizations' could well emerge in the form of that which inspires student engagement in learning about audit and audit judgement.

Within accounting, Baker (2000) identifies three methodological manifestations of Action Research: the interpretive, the critical and the mainstream. An interpretivist approach demands intensive involvement by a single group at a point in time on an unknown problem (Baker 2000, p. 372) and is not used here as the problem is 'known' prior to engagement. Baker's second position -- the 'critical' -- attempts to bridge the gap between problems of the social and informant underlying theory. While the 'social' informs here, it is a 'construction' (not a critical deconstruction) that is sought. It is Baker's (2000) third or 'mainstream' understanding that is applied to develop and test particular interventions through repeated 'challenges'. The problem-statement in a 'mainstream' approach comes from a researcher-identified need which is, in this case, the challenge of engaging students in computerized audit judgment practices. 'Mainstream' action learning is initially informed by extant theory, as is

this project with learning theory and audit concepts. Baker (2000) claims that the 'mainstream' perspective is particularly useful for theory refinement; here, carried out and communicated in the context of computerized learning package development.

4.1 Procedures

> Methods and modes of action are formed over time through dialectic movement between action and reflection… and the understanding and change that evolve… occur as a function of this reflexivity (Kidd & Kral, 2003, p. 187).

Using an Action Theory cyclical phase approach (Singh, 2006, p. 181; Baker, 2000), the project began with a theory-informed package in 2000, and moved on to seven cyclical phases, one per year. In Action Research

> there is typically a planning phase, an action phase, an evaluation phase, and a reflective phase, where the newly-changed practices can be further investigated and the spiral re-visited (Williamson 2002, p. 39).

In this project, the 'planning' process of each cycle draws from the 'evaluations' and 'reflections' of the previous year (and cycle) to take the project to the next research 'action'. This process is illustrated in Figure IV.

Insert Figure IV about here

From 2001 all introductory (110-150 students per class) and (from 2002) advanced audit students (6-14 students per class) are exposed to the package. Lab work is instituted in 2002 and over the years three instructors log student questions and their own impressions of student engagement. The exercises and subroutines are rotated so that by 2007 all of the subroutines have been used at least once and some repeatedly in both lecture and in lab. The level of instructor participation also changes over time: in 2001 CITC is lecture-led and demonstrated,

while by 2007, students in computer labs operate relatively independently. Students are not assessed on lab work so as to reduce non-learning incentives to participate.

In 2005 the seven institutions which had adopted CITC (and related text material) are asked to complete an open-ended survey seeking feedback and advice. Years three (2002) and eight (2007) are used to obtain direct feedback in addition to exposing students to CITC in the usual manner (presentation and lab). Year three (2002) is chosen for this purpose because the range of subroutines and exercises now provides a basis for evaluation. Year eight (2007) is chosen as it represents CITC in its most advanced stage of development. Throughout, feedback and reflections lead to package modification, expansion and refinement.

5.0 Results

The development is illustrated in Figure V and discussed in the following order: initial development, first exposure in 2001, deepened student involvement 2002, ongoing enhancement 2002-2006 and deepened student involvement 2007.

Figure V about here

5.1 Initial Development: 2000-2001

Five audit subroutines form the foundation of the computerised package: risk assessment, materiality assessment, two forms of evidence (sampling and analytical review) and a working trial balance/ adjusting journal entry subroutine. Risk, materiality and evidence are chosen because of their conceptual significance to the audit process (Pratt & Van Peursem, 1993; Mautz & Sharaf, 1980; Flint, 1988). Sampling and analytical review are selected because they are common computer audit applications (e.g. see for example Audimation Services, 2007;

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ACL Services Ltd, 2007; Helliar, Monk, Stevenson & Allison, 2008). These functions are also chosen because the decisions auditors make in relationship to them are common to the audit planning and/or testing process.

Learning theory informs the original package so as to nurture the sorts of critical judgement skills that are sought (e.g. see Greenawalt 1997; Kurfiss, 1988). In particular, Kolb's learning theory, Productive, Constructive, and Behavioral learning theories are of interest.

Kolb's four-way classification of cognitive learning styles[3] is useful because it suggests how different 'learners' learn (Wolfe, Bates, Mankowske & Amundsen 2005). Kolb's framework is not new to computer situations (e.g. Nicholson, 1993) and it here is useful to inspire *variety* in the way material is presented such that different types of learners will be made to feel at ease. The following CITC features are influenced by Kolb's learning style classification:

- opportunities to act alone (for reflective learners and abstract conceptualizers), or interact with others in small 'teams' to resolve problems;

- different ways of making information visible: narrative description, bullet points, graphs, diagrams, financial data, and visual aids for learners that perceive data in different ways;

- different feedback loops for processing information such as visible 'trails', data for trials and immediate feedback on related elements; and

- different ways for them to receive the information, both in lecture and in lab.

Other useful informants are Productive and Constructive theories which together encourage active and responsible classroom learning. Proponents of Productive Learning Theory claim that the learner should not memorize facts, but should understand individual principles and

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[3] Divergers (creative and people oriented); Assimilators (abstract conceptualizers, prefer reflection, planning, models); Convergers (pragmatic, hands-on, logical, problem-solvers); Accommodators (prefer concrete experiences, hands-on experimentation). (Kolb 1984; Wolfe, Bates, Manikowski & Amundsen 2005)

solve problems (Wertheimer 1959). This advice is followed as exercises expose students to concept-driven problem-solving dilemmas (e.g. Figure I, GC1). Productive Learning theorists also claim that, for deeper understandings of the material, students should be encouraged to make decisions in an orderly and logical fashion (Bryant & Hunton 2000). CITC thus attempts a step-by-step approach to complex topics within the routines and exercises (see Figures I, III and VI as examples).

Constructivism, embracing experiential learning and instructional design, is also useful. Its proponents claim that learners construct meaning from personal exposure and control (Fox 2006; Underhill 2006; Thompson et al. 1996). It encourages the very existence of a hands-on component in which they make their own decisions and observe the impacts. So, for example, the student controls account adjustments and observes their effects on ratios or sample sizes (Figure II and Figure III). Constructivists also claim that 'learning' is best achieved as life 'experienced' (Underhill 2006; Thompson et al. 1996, p. 14); practice-relevant case situations attempt to recreate a constructive learning environment for the CITC user.

The final learning theory informant, Behaviorism, is also founded on the principle that learning comes about through personal involvement (Underhill 2006, p. 166; Bonner, 1999; Bryant & Hunton 2000; Thompson et al., 1996). Bonner (1999), furthermore, distinguishes between Verbal, Intellectual and Cognitive learning within Behaviorism. While Verbal learning (knowledge of rules and facts) is useful, it can be achieved from reading and lecture. CITC development encourages higher levels of learning by setting exercises in which a student applies and classifies audit information (Intellectual learning) (e.g. also see ACL Services, 2007; Helliar et al, 2008), and in which the student is asked to draw meaning from seemingly unrelated observations (Cognitive Strategies) (Bonner, 1999; Watters, 2000; Ewell,

1994). A Cognitive Strategy is in, for example, the planting of information in one location (e.g. family members deliver supplies) for the purpose of assessment in another (where a cost of sales is revealed) to encourage the student to raise questions about its combined effect (e.g. whether related party transactions are occurring). Intellectual Skills and Cognitive Strategies are incorporated into package development as summarized in Table II.

Insert Table II about here

Overall, these features inspire the form of the initial package. The initial subroutines at this stage (2001) include:

- PPS (MUS) and random number selection sampling exercises (3)
- Risk assessment and risk model applications (2);
- Materiality and tolerable misstatement decision applications (2);
- Overall analytical review applications (2); and
- Working Trial Balance and Adjusting Journal Entry data platforms

5.2 First Exposure: 2001

The following, from logged observations in the introductory lectures, indicate general interest in the package.

> Some after-lecture questions requested more exposure to these and how they could get the 'program' (Logged, 2001, Introductory lecture)

And most comments indicate that they actively seek hands-on work:

> Several students asked that the program be made available in lab situations so that they could operate it hands on.   (Logged, 2001, Introductory lecture)

The lecture format means that the instructor controls the learning process; nonetheless, and unusual in large lecture format, a number of questions are raised. They respond well (raising

hands, working in-lecture, asking questions) to the questions that ask to anticipate whether the sample size (or tolerable error) would go 'up' or 'down' once other elements are changed.

> students only commented and asked questions on routines that made single points at a time (Logged, 2001).

When they are asked to calculate answers, or incorporate multiple concepts into their responses, the class is silent. The concern is that the problems are too complex for this environment, so the Risk subroutine (that part designed for lecture) is later subdivided and the number of response options are reduced (Figure VI). Exercises are extended and plans for adding guidance for independent study are made. A further discovery at this point is the need to add audit working papers to the package:

> Students expressed confusion as to the use of audit working papers (Logged, 2001)

Even though working papers are covered in the accompanying text, it seems to be that the purpose is not well understood. Three 'working paper' subroutines – using professional formats -- and related exercises are added to familiarize them with coding, sourcing and working paper review. Some of the subroutines are too large to visually demonstrate all effects of a decision on the projector used in lecture. This became difficult to deal with as an instructor, so modifications ensure that 'cause and effect' could be shown without shifting away from the screen.

5.3 Deepened Student Involvement: 2002

By 2002, introductory and advanced students are exposed to the package in lecture and in lab.

5.3.1 Lab Experiences of Introductory Students

The one lab offered in 2002 to introductory students is full (40 students). Their interest in the

package is noted (Appendix III):

> Three students finished early, turned in their surveys and left, but by the end of the
> formal session – one hour – all other [computers] were occupied [by the remaining
> 37 students]… most of the students taking advantage of the lab stayed on to the end
> and some beyond, playing with different routines or finishing up the questions…
> students appeared quite keen to work on it… (Logged, 2002 Introductory Lab)

Much of the instructors' time is taken up by individual questions. While instructions for the

exercises are written on the board in front of them, the two instructors

> were kept busy with questions as students encountered an instruction or a finding that
> they did not understand (Logged, 2002).

The log for this period shows that most of the questions have to do with understanding the

instructions and few have to do with the meaning of what they are finding. To remedy

unnecessary use of instructor time, instructions are added or extended to subsequent versions

of CITC. In particular, larger exercises are broken down into component exercises for ease

of use, and non-intrusive embedded 'comment box' instructions are added. New also to the

findings is that the lab experience facilitates 'group learning':

> Students… worked together as well as alone in solving elements of the problems,
> shared knowledge [with each other], and sometimes asked questions [of the
> instructor] as a pair. No one appeared to sit back and not get involved. (Logged,
> 2002 Introductory Lab).

This does not lead to modifications of the package per se, but reveals the potential for small

group work, particularly for students with learning styles compatible with associationism.

Twenty four of the lab students complete the in-lab survey. Results do not contradict

observations made in logs, and students call for more instructional material for independent

study (Appendix II(a)). Four of the five respondents who do 'not' find it interesting gave the

following reasons:

- 'Too hard'
- 'I don't understand what you want'
- 'I don't know how to work the computer well enough'
- 'Needs more instruction on how to use the Excel program'

In contrast, 19 of the 24 found the lab work 'interesting', a desired result. Some of the comments indicate that *Intellectual Skills* (applying audit knowledge) are being applied:

- 'I understand internal control and risk directions better'
- 'The triangle was helpful'
- 'I learned about why to accept risk'

Engagement appears to be strong:

- 'It was fun to work on it myself'
- 'We need to do more than just one lab'

Minor program errors are discovered in this process, instructions are revised and elements of the exercises used in lecture are ultimately incorporated into the package exercises.

5.3.2 Experiences of Advanced Students

All 14 of the 2002 graduate audit students work with the package and complete the survey (Appendix II(b)). All nine women and five men had completed the introductory class in either 2000 or 2001 (so had been exposed to CITC in lecture there as well), and three had attended the optional lab in 2001. All are from a similar age group (roughly 19-25), all bar one are on a traditional track through university[4]. Their interest in the hands-on work led most to stay as long as they could and several continued on after the lab ended.

Most recommendations are to improve user-friendly aspects of the program such as wrap-around titles, highlighted titles, colour-codes and separate explanations. They recommend that acronyms be eliminated and request fuller explanations, particularly for materiality, random number generation and for illustrations. Visible and colour-coded highlights are suggested.

There is, as with the introductory class, interest in having visible access to everything they need to complete an exercise. So for example, a common recommendation is to use multiple 'sheets' (effectively, 'pages' on the Excel file) to reduce clutter. Split-screen viewing is recommended to facilitate visibility of several sections at once. One student recommends more data protection functions. A few technical (calculative) changes are advised and some technical errors are picked up. Some of the students' relatively advanced knowledge of Excel proves useful as they identify spreadsheet integrative shortcuts.

There is general appreciation for the material presented and a consistently-expressed desire to be exposed to more of the same, more ratios, more risk-types and more analytical review data. One student recommends 'discussion sections' to the screens so that students can disclose (and usefully reveal to the instructor) their rationales for decisions made. Only one student suggests a completely new subroutine (that for 'going concern' analysis, later added).

While some recommendations are technical, most lead to greater visibility or better instruction. All of the suggestions are seen to be valuable from a user point of view, and on reflection some form of all of them are added to the program. Overall there is a high level of student-perceived value in the program. In response, CITC (2003 version) now includes:

- An introductory worksheet with instructions for students and contents table
- PPS (MUS) and random number selection sampling exercises (expanded)
- Risk assessment and risk model applications (ordered and clarified)
- Materiality and tolerable misstatement decision applications (exercises added)
- AJEs and the working trial balance (modified and (AJEs) expanded);

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[4] The exception was a woman who attended University part time and was employed in accounting.

- Overall analytical review (expanded with exercises)

5.4 Ongoing Enhancement: 2001-2006

Refinement and expansion mark the period from the end of 2001 though the end of 2006. Student-discovered errors emerge and are resolved. External feedback is provided from instructors using the package. Findings as to student engagement follow.

5.4.1 Evolving Experiences in the Classroom

Errors discovered during labs include unintentionally hidden instructions, nonsensical account balances or entries (e.g. a debit in Payables after adjustment), nonsensical outcomes (e.g. a negative tolerable error turning up in a risk exercise) or sampling data that does not integrate into other calculations as it should. Expansion also occurs in response to student interest and includes more on the audit opinion, audit working papers, advanced sampling exercises, internal control and more exercises throughout (Logged, 2002-6). As to learning, even as early as 2002, some questions indicate that higher levels of learning, in particular Intellectual Skill development, may be going on:

> In lecture, where an adjusting entry led to a change in analytical review ratios, the following questions were raised in lecture: "How do you know that the original accounts are wrong?" and "Can you go back and change the risk?". (Logged, 2002 Introductory Lecture)
>
> 'What third row change was' [risk model subroutine] and 'how do you know [the] precise risk level?' (Logged, 2002 Introductory Lecture)

The 2003 logs reveal the need for more instruction and exercises as they start to work with less up-front instructor-provided instruction:

> '[I don't understand] … should we use the working trial balance for this exercise?' (Logged student question, 2003)

'Is this adjusting entry from the [accounts payable] worksheet?' (Logged student question, 2003)

I did not have to put exercises or instructions on [the] whiteboard or separate sheets this year (Logged, 2003)

By 2004 some of these are starting to be resolved as other needs are expressed:

They needed quite a bit of guidance to get started [on the new Going Concern and Audit Report subroutines] (Logged, 2004)

The risk model worked well by having the instructor up front asking them to 'anticipate'… (Logged, 2004)

This [risk-materiality] subroutine is not one that worked that well on an individual basis in lab, better for presentation (Logged 2004)

The [new] working papers were of interest to students… (Logged, 2004)

2005 records show that this pattern of refining and expansion continues:

The basic sampling exercises seem to be working better now (Logged 2005)

Expanded risk and materiality exercises… [still] needed instructors for frequent questions on what to do with 'effect' program (Logged, 2005)

Materiality subroutine better [now that it is changed] in lab, it is more step-by-step and they come up with a solution… (Logged,2005)

Using 'boxes' for explanation useful as they can spend time writing in them and instructor can go around and check [and discuss, a recent modification] (Logged,2005)

Students don't seem to be able to work through the [reasonably new] Accts Receivable working paper exercise on their own (Logged, 2005)

By 2006 the package is starting to show stability as more time is spent helping students with

their results and interpretations than in instructing them about what to do:

The risk-materiality complex model now only used in presentation (Logged, 2006)

Much instructor time taken to help [introductory students] 'review' basic debits and credits for [one exercise] (Logged, 2006)

The revised Audit Report program… worked better to keep [advanced students] occupied without instructor guidance (Logged, 2006)

[Advanced students] flew through the Accounts Receivable Aging exercise [after clearer instruction provided] (Logged, 2006)

The new diagrams, graphs and bar charts worked great in [introductory] class… (Logged, 2006)

The Risk/Materiality subroutine (Figure III for parts) requires students to use Cognitive Strategies to pull different elements of audit risk, materiality and testing together. It remains notoriously difficult to produce a version suitable for independent study, and this issue is further considered in the Discussion section. A discovery in 2006 is the engagement value apparent from providing suggested 'solutions' within the worksheets. Students seem to use that information when they are ready for it. These subroutines are the most favoured in 2006 and (later) 2007 results (Appendix III).

4.4.2 External Instructor Input: 2005

Three responses are received from the survey to the seven tertiary institutions which adopt the package and related text (2002 to early 2005). Of them, two are in Universities and one is from a degree-granting Polytechnic (similar to a community college). Others either did not respond (two) or did not use CITC to a sufficient degree to comment (two). All recommendations are listed below:

- Materiality subroutine requires more exercises;
- Materiality (and other topics) should demonstrate the relationship between the income statement and balance sheet more;
- Sampling needed to be built up more given high use;
- Equity section emphasis should be reduced for Materiality problems due to relevance;
- Increase exercises, particularly those emphasising judgement;
- Add more and clearer instructions;

- Add more exercises; and

- Simplify the databases and charts for use.

Except for point four (on Equity), these issues are essentially similar to those raised by students in lab and lecture, and are incorporated into further CITC development. The instructor feedback also provides some external confirmation that engagement is possible and interest exists outside the author's context and in other classrooms (Appendix IV).

5.5 Deepened Student Involvement: 2007 and 2009[5]

The package is now exposed to both introductory and advanced classes in 2007 and 2009.

5.5.1 Experiences of Introductory Students

The introductory class lab, the primary form of assessment in 2007, is attended by 31 of the 128 students in one of the two labs offered[6] (Table III):

Insert Table III about here

Of the 26 in lab who complete the survey, 24 (92.3%) find the experience 'interesting'. While this group may not be affected by self-selection bias, neither of the two who said it was 'not' interesting had reasons related to the quality of the package. Both wrote that that they find the (risk/ evidence) concepts too hard to understand (generally). The bulk of all comments received indicate strong interest in engaging with the package:

> 'It gives a better understanding on how risks and materiality are related. It also enables us to practice our judgement in audit tasks. .. it would be a useful revision activity for our tests and exams' (Survey respondent, 2007).

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[5] 2009 results are currently under collation, but appear to offer slightly improved but similar results to 2007
[6] The other lab was run by an instructor not part of this project, so logs and surveys are not available.

'Helps to see how changes in different elements of risk change the need for testing… it helps in understanding :>)' (Survey respondent, 2007)

'It was good to see the effects on the risk etc.. more practice [is] so good. .. I enjoy the more hands-on approach' (Survey respondent, 2007)

'It gives a picture of how everything relates to each other…' (Survey respondent, 2007).

Students make multiple references to the relationships between decisions, input and outcomes (Appendix V(a)). There are also expressions of support for independent study. Of the 26 surveyed, 23 would work on it 'in their spare time', the other two would not only because they are too busy. One student specifies independent study conditions:

'At [the] beginning stage, I need[ed] instructions in class to make sure I understand the program, and how to use it properly. After that I would like to work on my own beyond the class time. Class tutorial is very helpful. (Survey respondent, 2007)

His suggestion is consistent with the view now being formed that the package is not stand-alone. The support for using the package, and its perceived value, is very strong (Table IV and Appendix V). A test of the potential for independent study is carried out in 2007.

5.5.2 Experiences of Advanced Students

There are seven advanced students in 2007, all participate throughout the semester (Table V). Four separate labs are carried out to give them exposure to all subroutines now made.

Insert Table V about here

Students complete assigned exercises in labs, and are further challenged by receiving no upfront guidance from the instructor. Results (Table VI) indicate that instructor guidance is still needed however, even at the beginning.

'Clarify explanation of what is required on DFD exercise' (Student comment, 2007).

'More explanation [needed] to clarify requirements' (Student comment, 2007)

Survey results indicate that students believe the package improves their understanding with mean results ranging from 2.0 (AJEs, WTBs and Working Papers) to 2.7 (Risk Model and Materiality) on the five-point scale used ('1' being 'Highly Valuable'). Means range from 1.9 (Analytical Review) to 2.6 (Risk Model and Materiality and Sampling) on the question of whether they found it engaging, and from 2.0 (Game Mix: Engagement Scope, Going Concern/Audit Report, Internal Control and Analytical Review) to 2.7 (Risk Model and Materiality) as to its perceived practice relevance (Table VI).

Insert Table VI about here

The (new) Internal Control and (updated) Analytical Review subroutines are the most favored and the (notoriously difficult) Risk/Materiality and Risk subroutines remain the most challenging (Table VI). Students make only two recommendations: revise a specific cell format (to correct an error); and provide an example for one of the newer subroutines. Instructions for some subroutines and exercises are also requested.

These advanced students – whose equivalents in 2002 had provided extensive advice about reconstructing the subroutines for visual effect – now have fewer comments overall and fewer on visual matters. Instead, even though they are only asked for recommendations, compliments appear. Questions about 'content' (audit) rather than 'form' now predominate. This would seem to indicate a desired maturity of the package.

6.0 Discussion

This research asks the question of how best to develop a decision-based learning package for the audit classroom answered by evaluating a lengthy package formulation process. The contribution of the study is to evaluate that which has been learned from this process of formulating, refining and testing this computerised learning package for use in the audit classroom. Student engagement is used as the primary indicator of package success, though features of the learning literature are also incorporated into the package. Student views and experiences are however the primary measure of the package's 'success'.

From the very beginning, student interest was strong, even when exposure was limited to a presentation. Ongoing student interest continues to be an inspiration for the development of the package and points to their interest in practical applications, even if at a distance. Constructivism has resonance in this context as students and instructors work directly with audit material. These features have engagement value.

A closer look reveals why some elements of the package seem to inspire more, or less, of this engagement under different conditions. One finding relates the importance of matching the decision exercise to the format of the class. In instructor-led large-group lecture, the exercises that engage students are those which provide few decision options and no calculations. There is more activity in 'lecture' if, for example, students are asked whether an account is likely to go 'up' or 'down' in response to a decision made than if they are asked to calculate answers. Two of the initial subroutines incorporate this practice (the impact *on* sample size of a tolerable error or risk decision, Figure III; the impact *on* tolerable detection risk of other risk decisions, Figure VI), and it is a pattern repeated once similar frameworks are formed (e.g. Analytical Review and Game Mix exercises with 'increase' or

'decrease' options). It does not seem to matter whether the concept is new to them or whether it is complex. If the decision to be made requires too refined a choice, the lecture hall is quiet. The lesson learned is that the solution they derive, although not necessarily the thinking they must do to arrive at it, should require them to select from only a few alternatives in this perhaps intimidating format.

Other types of exercises seem to obtain better responses in lab, such as Materiality and Sampling calculations, Working Paper completion, AJE preparations and Analytical Review adjustments. They require decision-making as to the creation of and/or manipulation of numbers, 'facts', calculations or multiple categories of choice, scales, numeric values or narratives. The lecture-lab distinctions come to bear on the complexity of the *decision*, not with the complexity of the *concept* being studied. It seems that while the thought-provoking assumptions of Productive Learning Theory can be achieved in the classroom, this is so only if the requirement of the exercise fits the format of the class.

Productive Learning Theory also informs why students may participate less, or struggle more, when instructions do not meet their needs. A 'lesson' learned is as to the importance of providing independent opportunities to work, and also appropriate levels of difficulty. One of the greatest challenges has been to formulate frameworks that students can use independently. After many changes over the years, four techniques seem to resolve most of these problems: creating a 'series' of exercises, each one more challenging than the last, is the first of these. So for example:

> The first of three Sampling subroutines demands less student input than the last two, only having to enter different sample sizes to observe effects. The second two subroutines are similar but required student input on other elements as well. Starting with the first subroutine, students seemed able to proceed on their own and were less

reluctant than [in previous labs] to go onto the more advanced subroutines (Log from 2007 graduate lab).

The second technique is to disaggregate the exercises, allowing each to require one and only one decision. The third is to incorporate 'commentary' to increase instruction without interfering with the 'look' of the spreadsheet. The fourth is to ensure that the subroutine and exercise fit the format (lecture or lab) in the manner discussed above.

The learning needs of introductory and advanced students, conceptually, seem to be similar. While the advanced students could, for obvious reasons, engage with more advanced content (e.g. statistics) other package features they seek to which they and respond are similar. Students at all levels seek embedded instruction and hands-on exercises. Both groups respond similarly to the different formats of lecture versus lab. The principles learned here seem to be adaptive to a wide range of skills and educational experience.

While we do not attempt to measure learning styles, it seems that behavior and engagement indicative of different learning styles do occur. In labs and lecture, some students work alone, others in groups. In lab each work to their own time and style. Some students engage comfortably in subroutines requiring creativity (e.g. Game Mix) while others prefer pragmatic problem solving (e.g. Sampling and Accounts Receivable). Learning styles can, to some extent, be accommodated: students who seek concrete experiences have access to solutions as they work through of an exercise; seek opportunities for reflection before they seek guidance. In terms of 'lessons learned', it seems that enabling students to receive and process information in different ways can go on in computerized audit learning.

The effort to create a completely independent package may have been misplaced as students

may not benefit from events if the instructor is not available when questions arise.

> Even though [by 2007] it was now preceded by easier subroutines – one each on each element of the risk model -- and this advanced subroutine had been revised [on several occasions over the years] for clarity, it remained a topic for which students still needed a fair amount of guidance in order to evaluate the impact of one risk on the model, planning, materiality and evidence (Log from 2007 graduate lab).

The instructor's presence is important as students find their way into higher forms of

learning.

7.0 Conclusions and Further Research

Engagement may have had real learning effects as well. In particular, and in the last year of

development (2007), there are indications that higher levels of Intellectual learning may have

been achieved (Appendix V(c)):

> Students had to adduce alternative and audit-relevant reasons for events in the exercise that was 'observed'. Significant effort was taken by all to produce an explanation, and 1 highly complex reasoned response was developed, all formed a conclusion from at least two of the 'observations'. (Log, 2007 Graduate Lab)

> Test results revealed an error that, when combined with another error, created intolerable error. All were able to determine that it had *some* effect on their planning for internal control analysis, and 2 took that evaluation further to suggestion implications for substantive testing types as well as sizes.(Log, 2007 Graduate Lab)

> Students identified [the] problem, later came to combine evidence to picture likely cause of fraud… identify debt distortion and effects… picked up going concern issue from long-term to short-term debt adjustment and implications… identified distortion possibility for stock overstatement… identified different reasonable rationales to explore… all closed with reasoned followup queries… all provided extensive options reasoned from facts (Logged, 2007, Graduate Lab)

Intellectual Skills are also indicated from logged notes in the 2007 introductory lab:

> [It is] easy to change the data and [see the effects] it helps to understand the audit tests (Survey, 2007, Introductory Lab)

It gives me a better understanding of how risks and materiality are related (Survey, 2007, Introductory Lab)

Helps to explain how changes in different elements of risk change the need for testing (Survey, 2007, Introductory Lab).

This is an important outcome in that it affirms the value of student engagement. Further research could extend these indications by measuring learning achievements from package applications.

The results also indicate that computerised learning can be effective in a lecture as well as in the lab. While lecture-based teaching is much derided in the education literature, it may serve learning if packages are, at least in part, structured specifically for its use there. Value may emerge from developing teaching techniques and packages for the large group for institutions under resource constraints.

Finally, further study could usefully enhance our understanding of expectations of a new generation of users. If the 'visual' has grown in importance as indicated from student comments, then research on satisfying visual effects may be more important than in the past.

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Figure I: Going Concern Subroutine: Selected Portion

Analysis of Going Concern	Instructions for in-class demonstration: *See Arrow*			

Red arrow 'advice' boxes available to user

Analysis of Going Concern	Materiality*	Risk*	Total (weight times risk)	Going Concern Decision (justify)
Liquidity ratios	0	0	0	
Media reports	0	0	0	
Litigation	0	0	0	
Activity risk	0	0	0	
Board changes	0	0	0	
Internal Control Risk	0	0	0	
Macro-econ factors	0	0	0	
Competition	0	0	0	
Solvency ratios	0	0	0	
Market	0	0	0	
Ranking (max 30 ea)	0	0		
Total ranking (maximum 90)			0	

*Use a scale of 1-3, 3 of greatest importance (Weighting) and high risk

Effects of Materiality and Risk decisions shown in 'rankings'

GC1: Weighting Going Concern Risks
Use Cosmos Working Trial Balance. They are a wholesale distributor of security devices and related products. Assume that industry patterns show a recent and significant drop in sales. While there is no negative publicity, have been known to be engineering problems of the alarms sold. A new competitor has market in your district. Ownership-management change in over seven years.

Data sourced from and linked to other worksheets

Required: Experiment with and decide upon the weightings you would use for each of the variables above, and how you would rank each of the related risks as to their importance (materiality) and likelihood of error (risk). Consider the 'effects' of your decision on the total rankings, justify your decision. Total rankings will automatically be transferred to Working Paper C on Worksheet 8.

Figure II: Analytical Review Subroutines: Selected Portions

Sample WTB	(v)
Cash	2300
Accounts Receivable	100000
Provision for BD	-1000
Inventory	200000
Notes Receivable	20000
Fixed Assets	250000
Accum Depreciation	-175000
Notes Payable	-12000
Accounts Payable	-29000
Payroll Taxes Payable	-19000
Long Term Debts Pay	-180000
Share Capital	-200000
Retained Earnings	-30000
Sales	-350000
Sales Returns & Allow	24000
Cost of Sales	270000
Wages	60000
Income tax expense	15000
Depreciation Exp	17500
Bad debt expense	1200
Interest expense	18000
Rent Expense	18000
Net profit	-73700
WTB total	0

Changing Sales or Cost of Sales affects graph relationship; Wages & Returns affects bar chart

Sales to Sales Returns Pattern

(Graph: Dollars vs Time, with legend "Sales Returns & Allow" and "Sales")

Cost Patterns Over Time

(Bar chart: Cost Types — Wages, Cost of Sales, Sales Returns & Allow — vs Dollars)
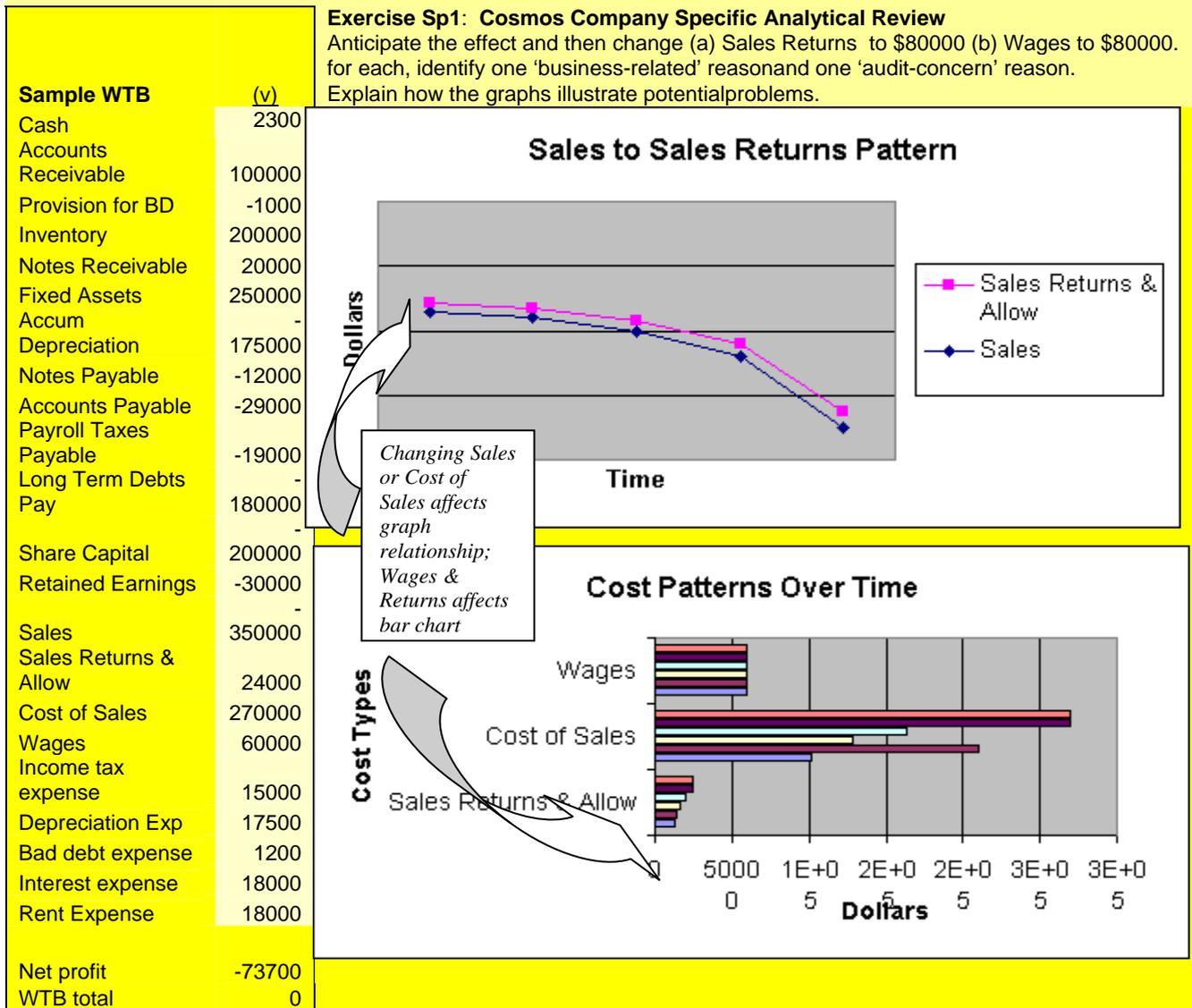
Figure III: Risk-Materiality Subroutine: Selected Portions

Selected elements of subroutine before (on left) and after (on right) student-entered changes (arrowed)

Initial configuration						*After changes to tolerance, risk & test results*				
No.	per book $	per audit $	Sample Error	%Book value x interval		No.	per book $	per audit $	Sample Error	%Book value x interval
27	670	670	0	0		27	670⟹	760	-90	-319.8
96	100	100	0	0		96	100	100	0	0
3	2900	2900	0	0		3	2900	2900	0	0
17	50	50	0	0		17	50	50	0	0
72	800	800	0	0		72	800	800	0	0
43	170	170	0	0		43	170	170	0	0
46	2000	2000	0	0		46	2000	2000	0	0
31	750	750	0	0		31	750	750	0	0
89	80	80	0	0		89	80	80	0	0
Tolerable error		2000	0			Tolerable error		5000		
Population size in $		100000				Population size in $		100000		
Inherent Risk (IR)*		0.6				Inherent Risk (IR)* ⟹		0.9		
Control Risk (CR)*		0.6				Control Risk (CR)*		0.6		
SpAR Risk (APR)*		0.6				SpAR Risk (APR)*		0.6		
Assurance Factor *		1.8				Assurance Factor *		2.1		
Sample size (n)		90				Sample size (n)		42		
Sampling interval		1111				Sampling interval		2381		
Est Population error		0				Estimated population error		-319.8		

Student-entered changes in light cells; effects in darker cells

Figure IV: Action Research Spirals

2000: Initiate from researcher & literature

2001: Introductory student exposure in lecture

2002: Intro and graduate intensive student exposure in lecture/lab,

2003: Ongoing student exposure: lecture/lab

2004: Ongoing student exposure: lecture/lab

2005: Instructor survey; Ongoing student exposure: lecture & lab

2006: Ongoing student exposure in lecture/lab

2007: Intro & graduate student involvement in intensive labs, three surveys; ongoing class exposure: lecture/lab

Figure V: Action Research Spiral Results

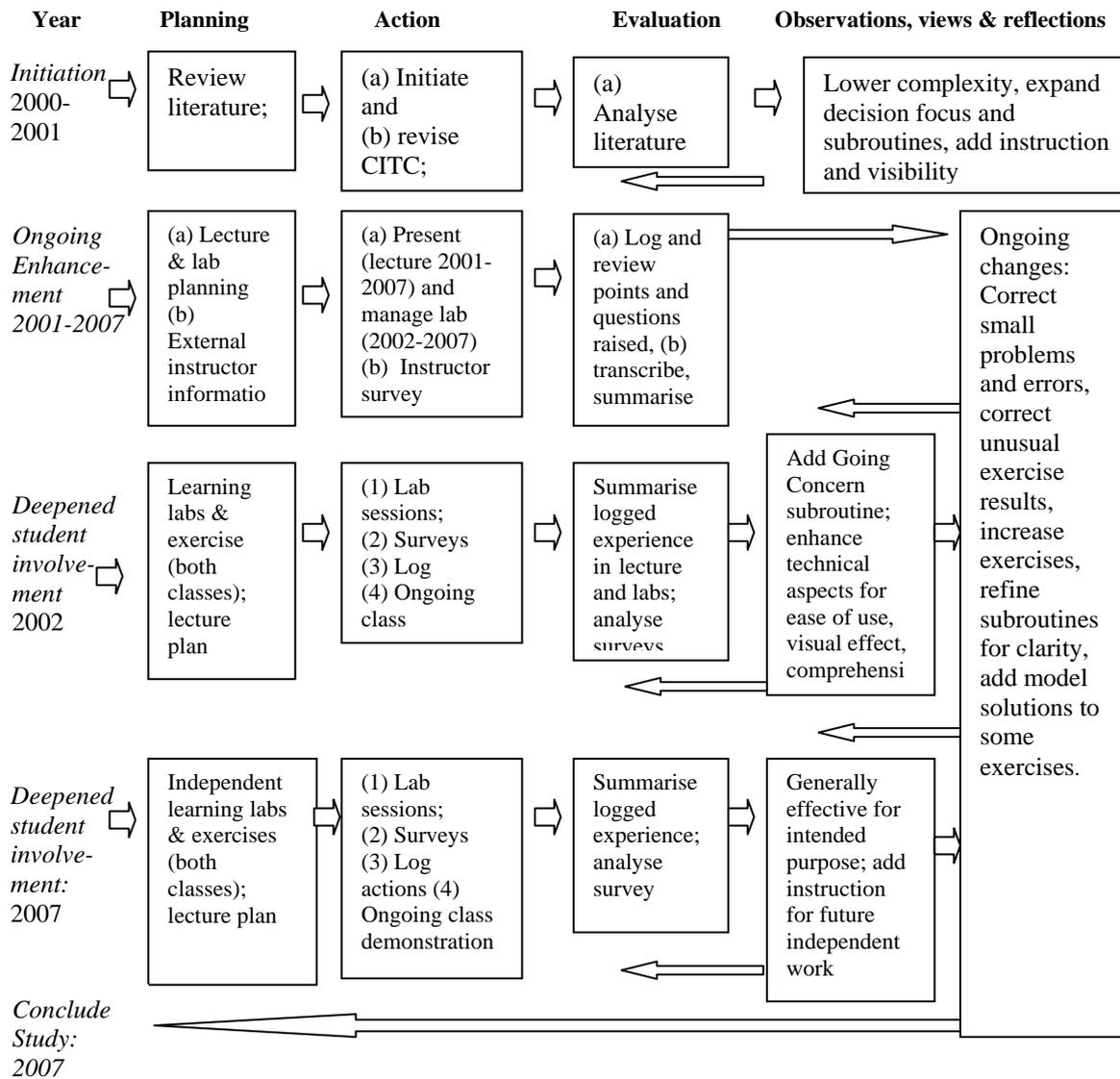| Year	Planning	Action	Evaluation	Observations, views & reflections
Initiation 2000-2001	Review literature;	(a) Initiate and (b) revise CITC;	(a) Analyse literature	Lower complexity, expand decision focus and subroutines, add instruction and visibility
Ongoing Enhancement 2001-2007	(a) Lecture & lab planning (b) External instructor informatio	(a) Present (lecture 2001-2007) and manage lab (2002-2007) (b) Instructor survey	(a) Log and review points and questions raised, (b) transcribe, summarise	Ongoing changes: Correct small problems and errors, correct unusual exercise results, increase exercises, refine subroutines for clarity, add model solutions to some exercises.
Deepened student involve-ment 2002	Learning labs & exercise (both classes); lecture plan	(1) Lab sessions; (2) Surveys (3) Log (4) Ongoing class	Summarise logged experience in lecture and labs; analyse surveys	Add Going Concern subroutine; enhance technical aspects for ease of use, visual effect, comprehensi
Deepened student involve-ment: 2007	Independent learning labs & exercises (both classes); lecture plan	(1) Lab sessions; (2) Surveys (3) Log actions (4) Ongoing class demonstration	Summarise logged experience; analyse survey	Generally effective for intended purpose; add instruction for future independent work
Conclude Study: 2007				

Figure VI: Pre- and Post-Enhancement Risk Model Subroutine Compared

Risk Model Subroutine Pre-Enhancements: 2002

RISK MODEL	RISK FORMULA CALCULATION					0.05
	OAR**	CR	IR	APR	DR Accpt Risk	DR Conf*
No risk reduction	0.05	1	1	1	5%	95%
Materiality (TE) changes	0.06	1	1	1	6%	94%
Reduce CR/APR	0.05	0.8	1	0.7	9%	91%
Weightings effects	0.05	0.8	1	0.7	6%	94%
Exercise row:	0.05	0.6	0.6	0.6	23%	77%

Risk Model Subroutine Post-Enhancements: 2006

Understanding the Risk Model and Effects of Underlying Assumptions	Overall Audit Risk	Control Risk	Inherent Risk	Other *Risks*	Analytical Review Risk	Acceptable Detection Risk	Detection Risk Confidence
Standard model: Introductory ARM	(OAR)	(CR)	(IR)		(APR)	(DR)	Required
No risk reduction	0.05	1	1	1	1	5%	95%
One risk reduction effect	0.05	1	1	1	0.7	7%	93%
Risky (sensitive) engagement	0.01	1	1	1	1	1%	99%
Advanced Issues in ARM construct:							
Give less weight to one risk	0.05	1	1	1	0.7	4%	96%
Introduce new variables: 'Other'	0.05	0.8	1	0.8	1	8%	92%
Mitigate effect of new variables	0.05	1	1	0.8	1	6%	94%
Consider non-independent risks	0.05	1	1	1	1	5%	95%
For you to experiment!	0.05	1	1	1	1	5%	95%

Summary of enhancements:

1. Protected dark sections; added unprotected light sections for students to work on their own
2. Arrow instructions (not visible above) added to provide further guidance
3. More explanation in titles (shown) and footnotes (not shown),
4. Replaced calculation .05 'Box' with 'Confidence' column for clarity
5. Divided subroutine between 'introductory' and 'advanced' elements
6. Added computer 'Other' risks column and linked to separate subroutine
7. Expanded risk-option rows (shown) and number of exercises (not shown)

NB: Portions of Risk Model Cases. All cell changes made affect the 'Acceptable Detection Risk' and the 'Detection Risk onfidence' columns. Exercises not shown.

Table I: CITC Subroutines, Problems and Exercises: 2007

<u>Subroutine</u>   <u>Problems & exercises</u>

(1) Engagement scope (2006)[7]   Game Mix Exercises (2)

Working trial balance (2001-2006)
(1) Adjusting journal entries   AJEs 1-6: doubtful debt, depreciation, payables,
                                                          sampling, analytical review, dividends, stock
(5) Planning: (2001-2006)
  Planning materiality   Planning materiality exercises (2)
  Risk and Materiality
  Risk and Decisions
  Materiality disaggregation   Allocation to accounts exercise (2)
  Decision model: Complex   Risk model & decision effects (2)

(4) Sampling (2001-2006)
  Sample size   Sampling exercises (9)
  PPS sample   PPS: decision effects exercises & AJE (8)
  PPS sample   PPS: sample selection & extrapolation (1)
  Random number generation   Random number problem (1)

(2) Analytical Review (2001-6)
  Overall analytical review   OAR: Effects of AJEs data & exercises (2)
  SpAR: WTB & Graphs   SpAR: Data for ratio analysis problem (1)
                                                          Effects of changes on graph (2)

(2) Audit Completion (2002-6)
  Going Concern   Analysis of going concern problem (1)
  Audit Report & Opinion   Audit report preparation problem (1)

(3) Working Papers (2002-5)
  Notes Payable   Short term liability problem & AJE (1)
  Accounts Receivable Aging   Accounts receivable aging problem and AJE (1)
  Fixed Assets   Fixed asset schedule & sort problem (1)

(3) Internal Controls (2006)
   Classify control types   Integrated problem (1)
   Document control system   Integrated problems (1)
   Fraud detection practice   Integrated problem (1)

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[7]   Date refers to date first developed. More than one date indicates growth over this period of time.

Table II: Behavioural Theory and CITC

Intellectual Skills Applied	*Cognitive Strategies Applied*
• Applying materiality rules to calculations • Classifying audit-related risks • Re-structuring client data for audit uses • Selecting samples using various techniques • Sampling techniques • Creating adjusting journal entries • Performing analytical review calculations • Insert audit notes on working papers • Classify internal controls into 'typologies' • Apply case situation to incomplete Dataflow Diagram	• Anticipate the effects of materiality and risk on evidence and testing • Analyse the interrelationship between materiality, risk and evidence • Analyse the effect of different samples on audit decisions • Anticipate the effects of adjusting journal entries on analytical review audit decisions • Formulate audit, related party and going concern opinions based on 'client' data • 'Imagine' control risk or fraud scenarios from indicia • 'Imagine' engagement scope risk implications from basic data

Table III: Introductory audit student survey respondents: 2007

Characteristic:		#	%		#	%
Attendees participation rate	Respondents	26		Lab attendees	31	84 %
Class participation rate	Lab attendees	31		Class number	128	24 %
Gender	Men	20	65%	Women	11	35%
Student home	Domestic	18	58%	International	13	42%
Audit experienced?	Yes	0	0%	No	31	100%

Table IV: Introductory Student Survey Results 2007

Questions asked and written comments	Yes		No		Totals
	#	%	#	%	
Have you had *any* practical audit experience?	0	0	26	100	26
Did you find working with this program an interesting experience?	24	92%	26	8%	26
Would you work with this program beyond the class time, or in your own (free) time?	23	88%	26	12%	26
Those who completed the exercises and survey in the lab (3 arrived late and didn't do the survey, 2 left early)	26	84%	31	16%	31
Summary of student comments on CITC 'experience' • Supportive of understanding it gave on risk, materiality, testing or related matters • Struggle with audit concepts as taught in course generally (not critique of CITC) • Specific request for more CITC in the class • Critical of CITC • Instructions: supports introduction to this material in-class Total					18 2 2 0 1 21*
Additional comments from students on likelihood of working with CITC in their 'free time'					
• Yes because it's a useful for exam revision • Yes because it aids understanding • Yes because flexibility (time or speed) it offers • I would, or should, if I have time • No because not enough time to do so • No because audit too hard to understand • No because CITC too hard to understand Total					6 9 2 3 3 1 0 16*

* Some students' comments were more extensive and covered several categories

Table V: Advanced audit students survey respondents: 2007

Characteristic		#	%		#	%
Attendees participation rate	Number	7		Lab attendees	7	100 %
Class participation rate	Lab attendees	7		Class number	7	100 %
Gender	Men	2		Women	5	
Student home	Domestic	4		International	3	
Audit experienced?	Yes	2		No	5	
Accounting experienced?[8]	Yes	4		No	3	

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[8] Any accounting or any audit experience, irrespective of depth or length.

Table VI: Advanced Student Survey Results and Lecture Log 2007

Questions asked and written comments	Mean	Range		Instructor's analysis(log) summary	Student recommendations for improvement
Game Mix: Engagement scope				Instructor –guidance needed, then they picked up. Complex answers increased on 3rd exposure	Clarify requirements of exercise Provide an example
You could understand what was required	2.3	1	4		
It helped you apply audit knowledge in a way you found engaging	2.1	1	3		
It helped you apply audit knowledge in a way you think could be useful in practice	2.0	1	3		
AJEs, WTBs & Working Papers				No questions on how to complete (used basic bookkeeping skills); questions on accounting	"It was good :>)" [More] linkage to other areas
You could understand what was required	2.0	1	3		
It helped you apply audit knowledge in a way you found engaging	2.1	1	3		
It helped you apply audit knowledge in a way you think could be useful in practice	2.3	1	3		
Going Concern/ Audit Report				'Activity' risk to be clarified; complex learning apparent from questions asked.	It was a good exercise
You could understand what was required	2.3	1	3		
It helped you apply audit knowledge in a way you found engaging	2.1	2	3		
It helped you apply audit knowledge in a way you think could be useful in practice	2.0	2	2		
Internal Control				Students completed and resisted using model solutions instructor guidance needed on both exercises, they were highly engaged.	Clarify explanation of what is required on DFD exercise.
You could understand what was required	2.0	1	2		
It helped you apply audit knowledge in a way you found engaging	2.1	1	3		
It helped you apply audit knowledge in a way you think could be useful in practice	2.0	2	2		
Sampling				Needed some guidance, other proceeded without; learning included client versus auditor role in use of client data	More explanation… to.. clarify requirements
You could understand what was required	2.3	2	3		
It helped you apply audit knowledge in a way you found engaging	2.6	1	4		
It helped you apply audit knowledge in a way you think could be useful in practice	2.3	1	3		
Analytical Review				All questions related to cognitive learning issues, and complex case analysis.	Recommend [specific] cell formatting in one location to automatically merge [align within a cell]
You could understand what was required	2.4	2	3		
It helped you apply audit knowledge in a way you found engaging	1.9	1	3		
It helped you apply audit knowledge in a way you think could be useful in practice	2.0	1	3		
Risk Model and Materiality				Struggled but ultimately observed effects of judgement on their own. Struggled with some bookkeeping review issues.	Didn't really understand what I was supposed to do [recommends] more instructions. Instructions could be clearer.
You could understand what was required	2.7	2	4		
It helped you apply audit knowledge in a way you found engaging	2.6	2	4		
It helped you apply audit knowledge in a way you think could be useful in practice	2.7	2	4		