Cognitive apprenticeship in accounting education: preparing students for the profession

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Sourced from a review of generally recognised problems in accounting education, the aim of the research discussed in this paper is to help ensure that students are well equipped to enter the profession. This research forms part of a curriculum renewal initiative within the business faculty of a multi-campus regional university, and involves the redesign of an undergraduate course in accounting. Guided by design-based research methods, the implementation of the redesigned course is documented, analysed and evaluated. Research findings suggest favourable results, as highlighted in the students' perceptions of their learning experience, and as evidenced in the significant improvements to students' academic performance. The experience reported in this paper may serve to advance understandings of learning innovation in accounting education, and promote the adoption of apprenticeship-style learning in the classroom.

Keywords: situated learning, seven principles, constructive alignment

Introduction

The issue of adequately preparing accounting graduates for work that meets the demands and challenges of the profession remains a critical challenge for accounting educators. The recent scoping study on business education in Australia by Freeman, Hancock, Simpson & Sykes (2008), highlights critical problems, and urges tertiary institutions to improve students' learning outcomes by promoting active learning, thereby ensuring that graduate accountants are well equipped for modern business environments. Adler & Milne (1997a, p. 273) define active learning as:

> *"Tasks which embody generic skills and attitude development, as well as the acquisition of a knowledge base, and in which the learners take some control and responsibility for their own learning."*

However, researchers, employers and professional bodies alike suggest that the usual approaches to educational delivery in accounting education are at odds with these aspirations, producing graduates unprepared for the demands of contemporary workplaces (Freeman et al., 2008; Kavanagh & Drennan, 2008). Bisman (2008, p. 2), for example, argues that the delivery modes in accounting education are "largely fixed on knowledge transference" within which instructional approaches tend to focus on "the procedural and technical aspects of accounting, rather than the cultivation of professionally relevant generic skills". Therefore, although graduate accountants may be technically proficient, many of them cannot "integrate rule based knowledge with real world problems" (Catanach, Croll & Grinaker, 2000, p. 583).

As a direct response to these concerns, the authors took part in a curriculum renewal initiative within the business faculty of a multi-campus regional university, one of the projects for which involved the redesign of a course in auditing within the Bachelor of Accounting program. This paper discusses the implementation of the new learning design, aimed at facilitating change to this traditionally taught course. The renewal of the design of this course drew upon a process informed by a combination of constructive alignment (Biggs, 2003) and Chickering & Gamson's (1987) 'seven principles of good practice in undergraduate education'. This renewal process moved the design towards the situated learning theory (McLellan, 1996) and approaches embodied in cognitive apprenticeship (Brown, Collins & Newman, 1989). In describing the research for this curriculum renewal initiative, the paper outlines the theoretical and methodological perspectives that guided the study, and presents critical analysis of outcomes achieved. The paper also discusses important observations and findings that gave credence to the potential of classroom-based apprenticeship, the approaches for which may assist in delivering the pedagogical shift sought in accounting education.

Pedagogical and theoretical perspectives

Preparing students for the accounting profession necessitates the acquisition of skills, knowledge and professional orientation, which form the basis of lifelong learning (AECC, 1990; Freeman et al., 2008). These skills can be gained from active learning practices, such as working in groups to improve communication and interpersonal skills and foster the development of analytical and conceptual thinking abilities (Mathews, 1994; Tempone & Martin, 2003). In line with these views, Lucas (1997, p. 189) identified four pedagogical features, which include:

> *"...a search for meaning and understanding, a greater student responsibility for learning, a concern with skills as well as knowledge, and an approach to the curriculum which looks beyond graduation to wider career and social settings."*

These pedagogical features are embodied in situated learning (see Herrington & Oliver, 2000; Lave & Wenger, 1991; McLellan, 1996), the main tenet of which is to empower learners to learn "knowledge and skills in context that reflect the way the knowledge will be used in real life" (Collins, 1988, p. 2). Within the situated learning movement is an approach known as cognitive apprenticeship (Collins, Brown & Newman, 1989), which involves the idea of a learning environment where experts coach and model the cognitive activity, and then *gradually* cede control of the learning task to the learners, providing just-in-time support when needed (Bonk & Cunningham, 1998). In this learning environment, participation in practice is the main activity through which learning occurs (Lave & Wenger, 1991).

Pedagogical approaches that aim to promote student engagement in authentic contexts need instructional practices carefully designed around key learning outcomes (Biggs, 2003; Bransford, Brown & Cocking, 1999). As Biggs (2003) asserts, students construct meaning from what they do in order to learn, so learning tasks need to align with the desired learning outcomes, and that assessment methods must merge learning outcomes and activities. Such constructively aligned teaching methods help to develop higher order cognitive skills and are therefore suited to preparing students for a professional career (Biggs, 2003). This in turn requires a set of guiding principles upon which stakeholders may draw when facilitating and supporting learning in authentic contexts. Chickering and Gamson (1987) claim that if the seven principles of good practice in undergraduate education are applied *so that the support*

Table 1: Strategies for facilitating and supporting apprenticeship-style learning

Seven principles	Learning and teaching strategies
Encourages contact between students and staff	*Facilitate ongoing and frequent interaction with teaching staff.* The design of authentic learning activities facilitates frequent interaction during the lecture, tutorial and workshop, as both parties take on their respective roles in audit team settings. Approaches encourage three-way communication: student to student; teacher to student; and student to teacher whilst students undertake and complete authentic audit tasks. Online communication tools are widely utilised to motivate and encourage students to keep in close contact with teaching staff.
Develops reciprocity and cooperation among students	*Provide team-based tasks in a collaborative and cohesive learning space.* In the first workshop students are given team-building activities to complete to get to know one another. All students are allocated to an 'audit team' where they assume the role of 'Audit Assistant' and rotated as 'Audit Senior' for a fictitious audit firm, Hird & Co (students' employer shown on the machinima). Through scaffolding and modelling in the machinima and Hird & Co intranet, students are provided opportunities to foster peer-driven learning where 'Senior Auditors' in 'audit teams' scaffold the learning of 'Audit Assistants'. Members of each audit team are required to interact and collaborate to prepare weekly audit working papers for Hird & Co's client, Sealant Products Pty Ltd. Team-based audit tasks facilitate the sharing of varying perspectives amongst team members.
Encourages active learning	*Facilitate active and ongoing engagement in the learning journey.* Every assessment item is linked to weekly learning activities and course outcomes, which facilitate active and continuous engagement, e.g. students are required to reflect on their ongoing learning engagement and development of generic skills in an online journal – this is linked to an assessment item. The dual roles each student plays in the audit process allow them to actively experience real-life audit procedures throughout the term – this is linked to another assessment item, which facilitates students' active and meaningful engagement.
Gives prompt feedback	*Provide ongoing and timely feedback from multiple sources.* Students receive feedback weekly on audit tasks submitted for review. On-campus students receive feedback from their 'audit managers' during the workshops whereas off-campus students receive feedback in an online environment. Students can receive instant feedback on their knowledge and competence on the weekly course content by completing an online end-of-module quiz. Students receive feedback from team members as more knowledgeable students clarify concepts their peers don't understand.
Emphasizes time on task	*Direct student learning through realistically scheduled authentic tasks.* Activities replicate real audit processes, demands and deadlines – guidelines and timelines to these activities are first given through the machinima then reinforced in the classroom and online. Moreover, the course profile provides specific timeframes for learning activities and assessment tasks. A weekly guide is also provided on the course website to direct student's attention to the required weekly tasks linked to learning outcomes.
Communicates high expectations	*Provide strategies and guidance for producing high quality work.* Pattern and depth of, and timelines for engagement are clearly articulated in the section "Managing Course Workload" and "Minimum Course Expectations" within the Course Profile. Marking rubrics are used for assessment tasks, which convey and differentiate the various standards of academic performance. Proformas are provided as a guide to students on the content and presentation of audit related tasks. Weekly feedback on written work is provided, which explains the required standards of performance in a given task.
Respects diverse talents and ways of learning	*Offer diverse learning experiences and vary assessment strategies.* Each 'audit team' consists of students with a range of ability levels, based on previous performance in the program, so that all teams can benefit from the diverse skills and attributes of its members. Individual and collaborative activities provide students with the opportunity for both self-directed and reciprocal learning while working collaboratively towards common goals. A variety of assessment tasks, supported by a range of learning tools encourage students to explore new ways of learning and show their acquired knowledge in the course.

needs of students are met, then the quality of learning outcomes will be improved. The seven principles "focus on contact between students and staff, consideration of multiple approaches to learning, and engagement of students in learning" (Arbaugh, 2006, p. 2). These principles provided practical guidelines for the radical but germane changes made to the design of a course investigated in the current study, as illustrated in Table 1.

The study

This study was focused on designing, developing, implementing and evaluating an educational intervention intended to equip students with knowledge and skills that prepares them for modern work environments. The aim of the research is to investigate the impacts of the learning design within which students are empowered to perform and practice the kinds of activities that they will encounter once they join the profession. The research question guiding this study is: 'Can an apprenticeship-style model of learning be integrated into traditional delivery modes to enable active learning and help prepare students for the profession?'

The sample in this research consisted of 322 students undertaking an advanced core course in the Bachelor of Accounting program at a multi-campus university. The course, ACCT19064 Auditing and Professional Practice, ran in face-to-face mode for on-campus students and fully online for off-campus students over a 13-week period, and was supported by a course coordinator, curriculum designer, five lecturers, six tutors, and one student mentor.

Implementation

The study was implemented within the normal program of instruction, consisted of activities facilitated during lectures, tutorials and workshops for on-campus students, and self-directed and collaborative activities online for off-campus students. Textbooks were prescribed and, regardless of the mode of enrolment, students also received a print study guide as well as access to an electronic version of the guide. All electronic learning resources specifically designed for the course were centrally accessible from the course website, along with group spaces containing collaborative tools, discussion boards, personal spaces for journal writings and guidelines for active engagement.

To integrate and enact the authentic practices of the auditing profession in the classroom, students assumed roles as 'audit assistants' and rotated as 'audit senior' while tutors became 'audit managers' and the course coordinator, the 'audit partner'. Students were allocated to small audit teams of four to six students based on their geographical location and a mix of ability levels. Group spaces with communication tools were provided on the course website for off-campus students to 'meet' and 'collaborate' on a regular basis. An 'intranet' was set up for the 'audit firm' to enable students to appreciate the authenticity of the learning experience. Along with the intranet, 'machinima' was used to facilitate authentic learning in the classroom.

Machinima is "real-world filmmaking techniques applied within an interactive virtual space" (Marino, 2004). The design and use of machinima can enable the embedding of critical stages of apprenticeship in classroom environments within which learners are exposed to highly engaging third person experiences by viewing the story. This then changes to a first person experience when learners actively engage in identifying problems and in helping to solve the main character's dilemmas. With the same story format and characters, additional conditions can be set for individuals and/or teams of students working together to solve a series of new challenges. Such challenges are situated against the backdrop of authentic workplace

activities and practices, within which the stages of apprenticeship are creatively entwined in the story, i.e. modelling, scaffolding and fading (Brown, Collins & Duguid, 1989).

The machinima was used as an anchor to support authentic learning activities and assessment tasks, directly connected to learning outcomes. Both formative and summative assessment tasks were explicitly linked to weekly authentic learning activities in the physical classroom and/or online. The summative assessment consisted of a choice between mid-term test and minor team-based authentic assessment (10%), team-based portfolio assessment with individual reflective task component (30%), and final examination (60%).

Methodology

Collins, Joseph & Bielaczyc (2004, p. 15) suggest that design research has been developed as a new approach "to carry out formative research to test and refine educational designs based on principles derived from prior research". Applying this approach to the present study enabled researchers to design, test and evaluate the educational intervention, the process of which refines both theory and practice. The design-based research approach facilitates an holistic analysis of experiences in the evaluation of the educational intervention, rather than focusing only on students' reactions to the new instructional material and activity structures in a given learning environment (Tabak, 2004). This approach requires generation of multiple forms of data to document the evolution of the design and its impacts on learning and teaching. Another critical feature of design-based research that is helpful to the current study is that it can inform theoretical understandings of the ways that a particular learning design plays out in practice (Joseph, 2004; Tabak, 2004), with the aim of continually improving support mechanisms as students apprentice into the cognitive practices of accounting experts.

Methods

Both quantitative and qualitative methods of data gathering and analysis were employed in this study. A survey was used to investigate students' perceptions of their learning experiences. The survey targeted 31 questions relating to the seven principles and included ten demographic questions. The survey questionnaire included both quantitative and qualitative enquiry.

Qualitative data were also collected from field notes, recorded while the first author was engaged in ongoing observations of group activities in the online environment. In addition, narratives through journal writing, performance review documents and portfolio submissions were analysed, as they provided rich data for evaluating the impact of the design to student performance. The analysis of qualitative data drew primarily on the grounded-theory tradition of Huberman & Miles (2002) and the constant comparative approach suggested by Strauss & Corbin (1998). These allow for emergent themes to unfold from multiple sources of data.

The quantitative survey questions were measured using a five-point Likert scale ranging from 1, strongly agree, to 5, strongly disagree. The survey was administered online towards the end of the term, and remained available for four weeks allowing students to complete the survey after the final examination. Survey data were tabulated and analysed using SPSS. Data generated by respondents who commenced but did not complete the survey were excluded. The results outlined below are based only on respondents who completed the survey, representing 26% of the total population.

Results

Demographic data indicate that the sample of off-campus students included more: domestic, mature-age, repeat and female students studying non-accounting majors part-time compared to the sample of on-campus students. A comparative analysis of off- and on-campus students revealed there was no significant difference between the responses to the survey between the two cohorts.

The responses to the questions relating to each of the seven principles were aggregated so that the results could be analysed using only seven variables (see Table 2).

Table 2: Cumulative percentages for seven principles of good practice.

	Principle 1	Principle 2	Principle 3	Principle 4	Principle 5	Principle 6	Principle 7
% Agree or Strongly agree	76.0%	86.5%	80.0%	82.8%	75.9%	66.1%	83.6%
% Disagree or Strongly disagree	6.4%	1.4%	5.8%	6.3%	4.8%	9.7%	4.9%

For all seven principles the majority of students either agreed or strongly agreed with the statements relating to the seven principles of good practice. For example, for principle 3, encourage active learning, 80% of students agreed to the following questions:

1 The learning spaces I have been provided (e.g. lectures, tutorials, workshops, Blackboard) and the activities within them encourage my active participation in the course.
2 The learning activities provide self-directed learning opportunities, which enable me to engage actively with auditing topics, particularly those that are relevant and important to me.
3 The range of resources and tools (e.g. study guide, tools and resources on Blackboard) provided in the course facilitate my active engagement with the course content.

It is important to note that some changes to the course were made incrementally in 2007, such as 1) the introduction of lecture activities; 2) change in prescribed textbook; 3) rewritten study guide; 4) change to other assessment tasks; and 5) increased level of interaction between students and staff. However, a radically redesigned course based on the apprenticeship model was implemented in 2008. Analysis was conducted to compare the performance of students in 2008 to those enrolled in term 1 in 2006 and 2007. Table 3 indicates the assessment results for the 2006, 2007 and 2008 cohorts. It is evident that the results improved each year for each type of assessment.

Table 3: Course averages of results for 2006 to 2008.

Year	Course result	Exam	Other assessment
2006	44.1%	36.3%	62.1%
2007	57.0%	54.6%	62.2%
2008	64.1%	58.7%	71.4%

To test the significance of the improved results, independent samples t-tests were conducted for 2006–2007 and 2007–2008. The independent samples t-tests showed a significant difference between results overall ($p<0.005$) and for the exam ($p<0.005$) for students in 2007

compared to 2006. The results of an Independent Samples t-Test for comparison of results for 2007 and 2008 showed assessment a significant difference between students in 2007 and 2008 for all assessment tasks: other ($p<0.005$); exam ($p<0.005$); and overall results ($p<0.005$).

The results for 2006, 2007 and 2008 shown in Table 4 indicate the grades received by the three cohorts.

Table 4: Comparative course results

Year	High distinction (%)	Distinction (%)	Credit (%)	Pass (%)	Fail[#] (%)	Other[*] (%)	Total (%)
2006	0.2	1.9	8.5	29.6	50.7	9.1	100
2007	3.0	8.8	15.0	42.7	24.9	5.6	100
2008	3.4	13.4	38.8	35.4	8.4	0.6	100

[#]Includes students that did not attempt all pieces of assessment.
[*]Includes supplementary pass, pass conceded, and pass terminating.

Following the redesign of the course in 2008, in which encouraging active learning and engagement was a major focus, the failure rate reduced to only 8.4% for Term 1 2008 compared to 24.9% in 2007 and 50.7% in 2006. Indeed, another important observation in Table 4 is that the overall course results have improved each year. The most common grade in 2006 was a fail, compared to a pass in 2007, and a credit in 2008.

Findings, reflection and discussion

It is important to first acknowledge the limitations of this research. The method of administering the survey using the LMS did not allow matching of respondents to their responses so no tests could be performed on the relationships between the survey data and the students' course results. Another limitation is that data obtained from the students' journal entries or performance review documents may have been biased as they were assessment tasks.

A number of important findings emerged in the study, one of which pertains to curriculum alignment. By ensuring that all assessment items were linked to authentic learning activities and clearly measure the intended learning outcomes, results suggest this learning design strategy optimised active learning engagement, facilitating improvements to the quality of the student learning experience. These results support the argument made by Bransford, Brown & Cocking (1999, p. 139) that issues of alignment are an important consideration in the design of learning environments, "[w]ithout this alignment, it is difficult to know what is being learned". Findings in this investigation indicate that the impact of curriculum alignment has been profound, and show that a high level of active engagement and participation occurred across all cohorts of students. The evidence certainly supports this assertion in that students appreciated the linking of all curriculum elements, and acknowledged the positive impacts this made on their motivation and learning, as the following survey comments indicate.

> *"I could appreciate how the weekly group tasks were building towards the assessment..."*

"I have enjoyed the learning process while working within an audit team. Each weekly review task was relevant to the subject and was a stepping stone to the end goal."

"I can honestly say I have never learnt more in a subject and truly appreciate the structure of the course."

The apprenticeship learning model proved to emphasise relationships between content knowledge and thought processes to perform complex tasks. The study found that by bringing real-world problems into the classroom for students to explore through the machinima-based cases, students were actively involved in solving authentic complex problems and demonstrated the capacity to identify and solve new, emergent problems. This result highlights the importance of experiential activities, a view shared by Collins, Brown & Newman (1989), as these activities emphasise the inherently context-dependent nature of learning. Indeed, by allowing students to perform and practice the kinds of activities that they will encounter outside formal learning environments, facilitated students' appreciation of the challenges and demands of their chosen field. The representative comments below capture the meeting of the minds between design intentions and students' perceptions of their learning journey.

"It forces you to consider things differently to the way you would normally look at them and opens your mind to other possibilities."

"The hands on attitude of the course that you actually see what happens in the real world not just theory."

"The relevance of the course to real life which prepares one for employment situations. The learning of tools each week to complete the task step by step. The high expectations provide a challenge."

"The interaction with the team and online videos during the course. The Hird and Co scenario made the course more life like and made a tough course interesting."

Evidence also suggests that the methods used for reflective practice in this course (e.g. journal writing, self and peer evaluation, and performance review) improved the likelihood of students recognising the challenges in their profession while actively engaging in their learning journey. It is aligned with Ericson's view that learning is more effective when people engage in "deliberate practice" that includes active monitoring of one's learning experiences (cited in Bransford, Brown & Cocking, 1999. pp. 46–47). The following extract from a student's performance review summary supports these assertions.

"As auditing in the real world is based on teamwork it was quite a rewarding assignment. I think that personally I have gained many skills and attributes from this task... It has been amazing to see through my journals how our team and myself as a person grew throughout this term. It has also provided me with the chance to individually look over my work and evaluate my personal performances in an effort to improve myself in the future."

Another finding that emerged in this study is that collaboration plays an important role in the situated learning model where students work in a complex learning environment. This finding

supports the conclusion in the Herrington & Oliver (2000) study in that, the current study also found that students benefited from the opportunity to articulate, reflect and scaffold with members of their 'audit teams', and highlighted the importance of ongoing guidance and feedback as shown by the following representative comments from students' performance review summary:

> *"I found the opportunity to collaborate with a group to be very rewarding. Doing a subject that required me to interact with others was a culture shock and dragged me out of my comfort zone... I realised that receiving input from others and hearing their point of view can only be an asset to me"*
>
> *"The Audit team not only helped me by explaining concepts that I struggled with but my understanding was increased by having to explain concepts to others. It gave me a taste of my future work environment as I will undoubtedly be working in a team environment."*
>
> *"The greatest part of the experience for me was feeling like we were a real audit team, learning together and conducting the audit together."*

Summary and concluding remarks

Curriculum renewal that draws from theories of learning and sound pedagogical practice was shown to facilitate significant improvements to the quality of student learning experience. The majority of students commented on the benefits gained from situated learning and collaboration with other students in an authentic setting. As Herrington & Oliver (2000. p. 22) suggest:

There are many advantages to be gained from implementing instructional materials of any form in a manner which creates collaborative learning environments and provides forms of scaffolding to support the construction of knowledge.

The study demonstrates that most students can be motivated to actively engage in the course in an aligned curriculum and enable them to meet higher order outcomes. The use of the seven principles to facilitate and support student apprenticeship in formal education contexts was also shown to deliver desirable results. Given these insightful findings, the strategies discussed in this paper should have the potential to influence curriculum design decisions, not only in accounting, but also in a range of disciplines.

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