

Association for Information Systems

AIS Electronic Library (AISeL)

ACIS 2013 Proceedings

Australasian (ACIS)

2013

Incorporation of a Research-Led, Problem-Based Learning Task into an AIS Curriculum

Carla Wilkin

Department of Accounting and Finance, Monash University, carla.wilkin@monash.edu

Follow this and additional works at: <https://aisel.aisnet.org/acis2013>

Recommended Citation

Wilkin, Carla, "Incorporation of a Research-Led, Problem-Based Learning Task into an AIS Curriculum" (2013). *ACIS 2013 Proceedings*. 16.

<https://aisel.aisnet.org/acis2013/16>

This material is brought to you by the Australasian (ACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ACIS 2013 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.



ACIS 2013
RMIT MELBOURNE

Information Systems: Transforming the Future

24th Australasian Conference on Information Systems, 4-6 December 2013, Melbourne

Proudly sponsored by



ACIS 2013 Principal Sponsor



Advancing ICT through Education and Research



Incorporation of a Research-Led, Problem-Based Learning Task into an AIS Curriculum

“Tell me and I forget, teach me and I may remember, involve me and I learn.”

Paraphrase of a Chinese Proverb <http://www.quotationspage.com/quote/4462.html> by Xunzi (312 to 230BC)¹

Carla L. Wilkin
Department of Accounting and Finance
Faculty of Business and Economics
Monash University
Caulfield East, Victoria, 3145 Australia
Email: carla.wilkin@monash.edu

Abstract

Issues relating to student learning outcomes, retention and engagement, coupled with pressure to reform and differentiate higher education through inculcating research-based material into the curricula, are repeatedly in the spotlight. In this paper results from a descriptive case study, wherein a student-focused, research-led, problem-based learning task was incorporated into the curriculum of an Accounting Information Systems (AIS) subject, is reported. This change to the curricula addressed an identified need for improved communication, analytical and critical thinking skills in tertiary graduates. Measures of student perceptions and academic performance suggest that the task was a success. The paper concludes with discussion of the contributions made to the task at hand by infiltrating three strategies, namely research-led teaching, problem-based learning and scaffolding.

Keywords

research-led teaching, problem-based learning, scaffolding, student-centred, AIS curriculum

INTRODUCTION

There is growing pressure to reform and differentiate higher education through inculcating research-based material into the curricula experiences of undergraduate and postgraduate students (Brew 2003). The motivation for this is three-fold. Firstly, a considerable body of literature (Brew and Pesta 2001; Healey and Jenkins 2005; Irving 2011; McGowan 2012) and many leading tertiary institutions (i.e. University of Sydney 2010; Monash University 2010) emphasize the merit of research-led teaching (RLT) for invigorating the classroom and ensuring students have the latest knowledge. Secondly, there is the influential pedagogical discourse that higher education should foster students' personal epistemology to enhance higher order thinking and the ability to make reasoned judgments (Hofer 2001; Jiang and Roberts 2011). Finally, there are initiatives suggested by senior academic researchers to improve the relevance of contemporary research (Galliers 2011; Moisander and Stenfors 2009), with less theoretically-driven, more people-focused approaches. Besides the benefit of demonstrating the differing emphases for research endeavours, improving the “practical relevance of contemporary research” (Galliers 2011, 1) may be achieved by engaging wider commentary on this research beyond the typical audience of academic journals. One such audience is undergraduate and postgraduate students who will hopefully become the very professionals who should be the objects and beneficiaries of such research.

“The literature consistently shows that core professional competencies (e.g. communication, analytical skill, critical thinking) are important for success in accounting. Research must shift away from documenting the importance, which is now generally accepted, toward identifying the best ways to teach or learn these competencies” (Apostolou et al. 2013, 146). Accordingly there is a compelling case to, at a minimum, include an element of research-led discourse in the curriculum. The contribution arising from this study is that as a designed, student-centred active classroom activity, the assessment task (henceforth referred to as the task) addressed AACSB's mission to promote scholarship, innovation and collaborative learning (AACSB 2013).

¹ The paraphrase is attributed to Paul Rowell writing in an article “Heavy Stress On Reading In Boston Schools” on 12 June 1967, Boston (MA) Traveler, pg. 3, col. 5, where he said “There is an ancient Chinese proverb that in its wisdom relates... ‘I hear...and I forget. I see...and I remember. I do...and I understand.’”

Moreover, consistent with earlier studies into the valuable outcomes arising from integrating research into the Accounting Information Systems (AIS) curriculum, the task was designed to develop critical thinking and communication skills, as well as experience of working in teams (Irving 2011; McGowan 2012; Bierstaker 2007). Yet the task had important differences. Firstly, the successful outcomes were generated in a postgraduate curriculum, with students whose primary language is not English (although this was the language in which the curriculum was established and taught). Secondly, selection of the research formed part of the task itself, rather than students simply being given the research. This required them to apply their own critical thinking to every stage of the task. Thirdly, part of the task required an accountable exercise in individual reflection, not only on the student's own syndicate's presentation of a research article, but also the syndicate's reflection on the presentation of a research article by another syndicate. This secondary part required critical thinking about the relevance and accuracy of material in a manner that tested student's capacity to apply knowledge from the curriculum to an unanticipated scenario. As such the whole task presents a new and replicable exercise in delivering a RLT, problem-based learning (PBL) strategy that stimulates critical thinking about the AIS curriculum and develops professionally desirable skills related to investigation of relevant issues, collaborative engagement, communication, analytical skill, critical listening and reflective appraisal. Whilst many would agree with the rationale, in reality there are impediments. Firstly, there is often a "considerable disconnect between academics' research interests and the curriculum they are required to teach" (Schapper and Mayson 2008, 5). Secondly, government and professional accreditation requirements create busy curricula and accountable outcomes such that educators have minimal space in which to build broader student experiences.

This paper reports on successful outcomes from using RLT and a PBL approach in a postgraduate subject concerned with enterprise systems. Material on RLT was built into the busy curriculum requiring understanding of both theoretical and practical knowledge of enterprise systems. Using a PBL approach, the assessment task was centred upon student engagement and enhancement of more relativistic cognitive development, including the capacity to critically reflect on both the process and the content. Having successfully evolved the task over four years, it now accounts for 20% of the total assessment in the subject². It is the linkage of RLT with PBL into a busy curriculum that provides a template for successful empowerment of student-centred learning. As such the reported case study provides new insight into methods for inclusion of RLT that enhances the students' learning experience and achieves currency with research that is most relevant to the curriculum.

The remainder of the paper is organised as follows: next RLT, PBL and scaffolding are introduced. The context, task, method and evaluation are then discussed. Following this the findings are reported and discussed, the research limitations are acknowledged and suggestions for future research provided. The paper then concludes with a summary of the research, statement of the contributions made and factors to be considered.

RESEARCH-LED TEACHING (RLT), PROBLEM-BASED LEARNING (PBL) AND SCAFFOLDING

Regarding people's cognitive development, high order thinking and the ability to make reasoned judgments have long been associated with higher educational attainment (Baxter Magolda 2002). These goals link to the distinctive purpose of higher education, namely "supporting students and the wider society's understanding of the complexities of the worlds in which we live" (Jenkins and Healey 2005, 6). Whilst there is debate about the educational experiences that foster development (Hofer 2001), there is acceptance of the usefulness of Perry's (1970) categorisation that students will begin with a dualistic perspective of knowledge (characterised by right-and-wrong); then to acknowledgment of more divergent viewpoints (multiplism); thence to relativism wherein they recognise more relative merit in viewpoints and self-consciously make meaning; and finally to commitment within relativism, which relates to ethical choices beyond intellectual engagement in the third stage (Moore 2001). As such, quality in teaching should be inclusive of material that provides opportunities for students to deal with diversity of opinion regarding new knowledge, and fosters understanding about how knowing occurs i.e. about learning and self (Moore 2001). Such knowledge about personal epistemological growth does and should inform learning and teaching strategies for higher education.

The strategic vision of many universities aligns with such directives. For example, it has been expressed as "we believe that the core function of a University is to produce skilled 'critical thinkers', people with fundamental skills in the analysis of data, in the construction and critique of argument, and in oral and written expression" (University of Sydney 2010, Ch. 5). Similarly, "[c]urricula have been developed to build depth of understanding within a discipline while situating knowledge in a broad and international intellectual and cultural framework, developing capacity for graduates to work adaptively in settings that are professionally, culturally and geographically diverse" (The University of Melbourne 2011, 6).

² The average mark in this assessment task was a mid-Distinction (D), which was consistently better than the average marks in the other within-semester assessment tasks, a low Distinction (D) and a low Credit (C) respectively. Scale: Fail (N) to High Distinction (HD).

Such cognitive development is and should be fostered through exposure to and consequent encouragement of a range of opinions about a topic (in developing cognition from dualism to multiplism); through encouraging confidence in accepting multiple scenarios and viewpoints from which to appraise a response (relativism); and thence to positions and knowledge that enhance personal values and identity (commitment through relativism). Among key teaching methodologies to achieve such outcomes are RLT and/or a PBL approach (Schapper and Mayson 2008; Dickie and Jay 2010). These and the role of scaffolding are now briefly discussed.

RLT

Whilst an approach like RLT is significantly endorsed (Jenkins and Healey 2005), how RLT is achieved varies widely, even to the extent that its practice may be considerably less than its espousal. The various names by which RLT is referred include research-led education, research-oriented and research-based teaching, each with subtly distinguishing characteristics. Yet there is merit in the definition by Brew and Prosser (2003, 3) that RLT *“in a research-intensive environment is teaching carried out in the atmosphere of imaginative enquiry that arises from leading-edge scholarship; teaching that stimulates reflective learning and critical, creative thinking and at all levels ... As such it needs to be student-focussed rather than teacher-focussed”*. The variety of names used to refer to RLT indicate the variety of typologies wherein research and teaching linkages have been expressed as learning about others' research; learning to do research; learning in research mode; and pedagogic research (Jenkins and Healey 2005, 21). Many learning and teaching activities with a research focus contain some or all of these typologies. These may be evidenced by teaching practices, such as an academic including aspects of personal research in the curriculum; a community of scholars contributing to on-line forums or as guest lecturers; curriculum development through research about learning and teaching; and encouraging student research projects (Schapper and Mayson 2008). The task reported in this paper involved aspects of learning about others' research; learning to do research; using this knowledge to apply critical thinking to the curriculum; and applying critical thinking skills to the work of other classmates. In doing so it contributes to pedagogic research.

PBL

Another methodology, PBL, also seeks to promote higher levels of cognitive learning through deep learning that extends the students cognitive engagement beyond the superficial understanding associated with surface learning. It promotes development of self-directed learning skills, as well as the ability to work in a syndicate and to communicate and present information effectively (DIT School of Physics 2012). PBL is a student-centred teaching methodology that aims to foster students' cognitive development and knowledge through requiring their participatory engagement in a collaborative task that demands resolution of a problem. As such, after the problem is defined, attainment of the goal is achieved through teamwork, collection of resources, and planning and resolving, with reflection upon both the process and the learning (Clarke and Hubball 2001; Saacti 2008). PBL encourages a range of learning strategies including critical thinking, interpersonal skills, reflective analysis and co-operative learning (Cobb and Bowers 1999). In this study PBL was used with RLT to foster appreciation that there are multiple answers to issues and to elicit student appreciation of the relativism of knowledge, including possible commitment within relativism. In doing so there was cognizance that the educator should remain a facilitator rather than an oracle (Kendler and Grove 2004) and of the importance of ensuring that students have sufficient prior knowledge and resources to build upon in order to achieve required outcomes (Morrison 2004).

Scaffolding

For RLT and PBL to be effective, scaffolding should be strategically available to facilitate/enhance student learning (Hmelo-Silver et al. 2007). Further, it should be used to make learning more accessible and manageable through directing students in terms of the stage of development (cognitive, meta-cognitive and affective) so that they learn both how to complete a task and why the task should be completed (Vygotsky 1978; Hmelo-Silver 2006). Whilst it may take many forms, scaffolding is best delivered to meet defined needs once the information has been presented (Edelson 2001). In this study scaffolding formed part of the design of the task through aspects such as: educator oversight in ensuring selected articles were relevant; the provision of detailed information on how to read a research article and what to look for in each section; availability of advice as needed; and through a command that the required reflection on another syndicate's presentation (which was an “impromptu” exercise) was a syndicate rather than an individual exercise.

In summary, prior research and University mission statements allude to the merit of considering curriculum strategies like RLT and PBL in enhancing student engagement and fostering quality in AIS tertiary education. Given the rapid growth in knowledge and technology, demand is growing for professionals who can adapt to changing circumstance (Savin-Baden 1998), act in situations of uncertainty and engage with new knowledge in

problem-solving scenarios (Griggs 2005). Research has shown the efficacy of such strategies, including reports that these methodological approaches to the curricula foster student engagement and persistence in higher education, and develop beneficially productive cognitive responses provided that the stresses of new challenges (wherein appreciation of new realities is embedded) is balanced with a counterbalancing structured support (Bedard et al. 2012; McGowan 2012; Irving 2011). Yet in prior research looking at RLT strategies, students have not been required to select course-relevant materials (Irving 2011), nor have they been required to critically reflect beyond the work related to the presentation (Bierstaker 2007; Paisey and Paisey 2003). In a sense the assessment task reported in this paper is similar to that of McGowan (2012) as it required the students to be quite self-directed and demonstrate critical appreciation. However the task reported in this paper also demands self-reflection and critical reflection on the work of others. As such, it addresses the need for stimulation of critical thinking about the AIS curriculum and of professionally desirable skills related to researching relevant issues, collaborative engagement, communication, analytical skill, critical listening and reflective appraisal.

CONTEXT, TASK, METHOD AND EVALUATION

Context

The task (see below) was embedded in a compulsory master's level subject in an advanced master's degree. Students enrolled in the subject had diverse backgrounds, with English not being their predominant language. Whilst some students possessed work experience, as it was not a formal requirement, others were freshly minted undergraduates. Collectively these attributes meant that skills, such as critical evaluation of oneself, were more challenging, as this is not common practice across all cultures.

The subject at the heart of this study aims to introduce students to the business aspects of integrated enterprise systems. Given the capacity of AIS systems to integrate information across multiple enterprise functions and business units, support key enterprise processes, and provide an enterprise wide view of business performance, their growth has been exponential. Besides offering students practical experience with a well-known integrated enterprise system, the subject curriculum covers systems and technology background, business processes and process reengineering, integration of core financial and logistics processes, enterprise wide reporting, and techniques for assessing enterprise productivity and enterprise dynamics.

Although rephrased in this paper to assist with anonymity, the learning goals associated with the subject were to foster students' ability to:

1. appraise the characteristics and global contributions of enterprise systems;
2. evaluate how business processes embedded in integrated systems support business decision making;
3. critically analyse the motivation for and benefits obtained from adoption of enterprise systems;
4. demonstrate practical skills in use of an enterprise system; and
5. apply critical thinking, problem-solving and presentation skills to assessment tasks and thereby demonstrate acquisition of comprehensive understanding of the topics covered by the subject.

Curriculum was delivered via a 2-hour weekly lecture related to theoretical and conceptual understanding, and a 2-hour tutorial that comprised a mix of hands-on use of an enterprise system, tutorial exercises designed to enhance student appreciation of theory and practice, and assessment of the RLT, PBL task. Holistically, assessment in the subject comprised an examination (60%); compilation of a research-oriented business report (10%); a practical exercise involving use of an enterprise resource planning system (10%); and the focus RLT, PBL task (20%), which played a key role in ensuring students had both the support and challenge required to address (in particular) learning goals 1, 3 and 5. The composition of assessment in the subject not only addresses calls to promote scholarship, innovation and collaborative learning (AACSB 2013), but also calls from the profession to develop student's communication, analytical and critical thinking skills.

Task

Design of the task took account of several factors, namely the need to: (1) engage students in a manner that required them to apply rather than rote learn responses; (2) be of sufficient depth and interest to command and test critical engagement; (3) minimise flow-on impacts from risk taking and persisting with wrong tangents; and (4) develop students communication, critical, analytical and reflective skills, and achieve engagement with current research in the field. Holistically the task needed to be student-centred and although working collegially in syndicates can be fraught (as it is difficult to ensure everyone contributes and learns from the experience), the task involved some group (syndicate) work. Specifically it required students to work together to achieve desired outcomes rather than being capable of having pieces 'hived' off and worked on independently. Finally, reflective self-assessment and the assessment of others' materials is an important element of cognitive development and work-place performance management. The task sought to develop students' skills in these areas. As with most good teaching, the task has evolved over four years, with the current format shown in Table 1 below.

Table 1. Components of the RLT, PBL Task

Components	Requirement(s)	Marks ³
A: Students select and present a research article in a syndicate of two	<ul style="list-style-type: none"> Students self-form syndicates of two Select relevant research articles (either journal articles or conference papers) related to some aspect/issue addressed in the curriculum 	3% Coverage
	<ul style="list-style-type: none"> Advise an academic regarding their final choice of article and gain approval for it. This quality control step ensures that the article is relevant, meaning students can achieve their potential 	3% Demonstrated relevance to the subject's curriculum
	<ul style="list-style-type: none"> In 15 minutes, the syndicate is required to jointly present material that summarises and critiques the contents of that article in a manner that addresses the criteria for assessment (i.e. the extent to which discussion of the research content is related to and enhances the curriculum knowledge acquired during the lectures and tutorials) 	1.5% Audience engagement
		1.5% Cohesiveness of delivery
B: Academic assessment of individual performance during the presentation	<ul style="list-style-type: none"> The assessment criteria includes the need to convey an understanding of the main business issues that would concern management and the viewpoint taken in the article 	3%
C: Individual reflection	<ul style="list-style-type: none"> Each student is required to write reflectively about his/her own syndicate's presentation and submit this reflection within 2 days of completion of the presentation 	4%
D: Joint reflection on another syndicate's presentation	<ul style="list-style-type: none"> Each syndicate is allocated another presentation upon which to write a joint reflective piece that must be submitted within 2 days of that presentation 	4%
Total mark as a % of the subject's final mark	Syndicate mark (13%) + Individual mark (7%)	20%

As detailed above, the task requires students to use the knowledge and understanding developed in lectures and tutorials and apply/relate this to a new context (a research article whose relevance must be assessed and justified). The interplay of the three strategies, RLT, PBL and scaffolding, are summarised in Table 2 below.

Table 2. How RLT, PBL and Scaffolding are Evident in the Task

Component	Evidence of Application of RLT and/or PBL	Scaffolding
A: Article selection, syndicate presentation and answering of questions	<ul style="list-style-type: none"> Reviewing and selecting an article. This increased students awareness of research related to the subject (<i>PBL</i> and <i>RLT</i>) Relating the chosen article to material contained in the subject and through the presentation demonstrating understanding and application of the concepts to discussion (<i>PBL</i>) Answering of audience questions, which required the syndicate to think about the research issues contained in their article (<i>RLT</i>) Preparing to answer questions on the presentation through anticipating how the audience will see problems/have problems in seeing connections between the presentation and the subject (<i>PBL</i>) 	<ul style="list-style-type: none"> Working in syndicates of two encouraged sharing and developing of ideas, whilst avoiding the problems of uneven output commonly found in larger syndicates Approval of the chosen article by an academic ensured that a wrong choice could be discussed and sorted without penalty The requirement to register and deliver a copy of the chosen article to the academics a minimum of 10 days before the presentation date necessitated contact and encouraged questions Submission of a copy of the presentation prior to delivery ensured preparation Where a syndicate's presentation was awarded a fail, it was required to be presented again to a second assessor within 48 hours
B: Academic assessment of individual performance	<ul style="list-style-type: none"> Evaluation of the relevance and accuracy of each student's engagement with Component A 	<ul style="list-style-type: none"> Provision of detailed feedback on content and delivery (i.e. strengths, weaknesses and aspects for improvement) within 7 days supported student learning regarding future presentations and knowledge about the curriculum
C: Individual reflection	<ul style="list-style-type: none"> The written reflection requires students to reflect on their capacity to engage with research as it relates to the curriculum (<i>PBL</i> and <i>RLT</i>) 	<ul style="list-style-type: none"> Provision of a template provided guidance regarding identification of the student's individual contribution to his/her syndicate's

³ Whilst subjective, the % assigned to completion of the requirement(s) within each component reflects the required effort and relative difficulty of achieving required learning outcomes.

<p>D: Joint reflection on another syndicates presentation</p> <ul style="list-style-type: none">• Appreciation of the stated relevance of the second research article to the subject's curriculum (<i>RLT</i>)• Understanding of how well the subject curriculum has been applied to discussion of the article (<i>PBL</i>)• Evaluation of the coherence of another syndicate's presentation and their answers to audience questions (<i>RLT</i> and <i>PBL</i>)	<p>presentation; and judgment of the relevance of the material to the curriculum, the depth of understanding and how well this was conveyed</p> <ul style="list-style-type: none">• Provision of a template provided guidance on the points that should be considered. Suggestions included: outlining and assessing the key messages; aspects of the presentation that appeared most valuable; aspects where improvement was needed; where the presentation enhanced understanding of the subject; and how/why another approach/viewpoint may have delivered better audience understanding• Positioning this as a joint exercise supported students as they critically listened and reflected upon the relevance of another syndicate's presentation related to the subject curriculum
---	--

Two issues were possible: duplication in the choice of article and the requirement to remark a failure in Component A as University regulations required assessment tasks worth >10% to be remarked. These were addressed as follows:

- Possible duplication (Paisey and Paisey 2003) was averted as syndicates were required to register their article a minimum of 10 days in advance of their presentation, with the list of registered papers regularly updated on the subject's learning management site. This practice also prevented recycling of materials from past years. Further, syndicates registering first have the widest options, providing an incentive to start early.
- Written feedback on each presentation was provided to the syndicate within seven days of their presentation, with the final mark made available at the conclusion of the last presentation for the semester. Where a syndicate was awarded a fail grade in Component A (syndicate presentation), the syndicate was required to deliver the presentation for a second time to a second examiner who independently evaluated the work, and consulted with the first examiner. Syndicates are notified immediately following their presentation of the need to re-present (within a period of 24 hours) the oral component of the assessment task.

Method and Evaluation

Through a descriptive case study (Tobin 2010) the experiences, thoughts and/or observations related to the task have been reported and scrutinised. This was informed by a combination of a voluntary questionnaire that was administered by a third party at the completion of all presentations and comparative data related to student performance in the task compared to their performance in the other assessment tasks in the subject.

Consistent with Ballantyne et al. (2000) who argue that student evaluations are more valid than other forms of teaching evaluations, the voluntary questionnaire sought to obtain data regarding the nature of the student cohort and their perceptions of this task, its usefulness and importance as compared with other subject assessment tasks. Herein akin to prior studies examining perceptions, use of a seven point Likert scale (1 strongly disagree – 7 strongly agree) enabled variability in responses to be acquired and the ceiling effect minimised (Zimet et al. 1988). Findings from the questionnaires seven sections (background information; article selection; syndicate presentation; personal reflection; joint reflection; feedback; and four global questions) are summarised below.

FINDINGS AND DISCUSSION

44 students were enrolled in the subject in Semester 1 2013, of which 41 completed the questionnaire. Two questionnaires (≈5%) were subsequently removed as sections were found to be incomplete (i.e. a page was missed), leaving an effective response rate of 88.6%. 71.8% of respondents were female and 28.2% male. 51.3% had completed their undergraduate degree in Australia, with only one student predominantly speaking English at home. Most had prior experience with group (syndicate) oral presentations (82.1%) and in general thought that the task of preparing and delivering an oral presentation made them think more carefully about the topic than they would have in a written assessment (median 5, standard deviation (SD) 1.33). Tables 3 to 6 presented below are patterned to correspond with the task deliverables outlined in Table 2 above.

Table 3. Sample of Findings from the Questionnaire Regarding Article Selection

Component A	Selected Statements	Avg.	SD
Article Selection	• We chose our article because it was easy to understand	4.87	1.28
	• We chose our article because it was easy to see how the material in it related to the material contained in the subject	5.03	1.02
	• We chose our article because it was interesting	4.67	1.18
	• I found that the task of finding an article for our presentation made me think more about the lectures and tutorials in the subject	5.08	1.29
	• I agreed to select the article because I was interested in the assessment task	4.97	1.64

Whilst consistently affirmative, responses regarding article selection (see Table 3) were lower than for other task components. This was supported by answers to a global question wherein 28.2% indicated that this was the most difficult aspect, followed by delivery (25.6%).

Table 4. Sample of Findings from the Questionnaire Regarding Delivery of the Presentation

Component A	Selected Statements	Avg.	SD
Own Syndicate's Presentation	• Delivering the presentation helped me to understand more about the subject's topics covered in our article	5.23	0.97
	• I learnt a lot about the subject course materials from presenting our chosen article	5.26	1.17
	• As we needed to answer audience questions about our chosen article, I found that I thought more about the article's contents and the relevant curriculum in the subject	5.44	1.06
	• Overall, delivering the presentation made me think more for myself about the curriculum in the subject	5.36	0.86
	• Overall, delivering the presentation made me test my own understanding of the curriculum in the subject	5.31	0.82

Given that the general tenor of responses reported in Table 4 are > 5 and that SDs are < 1.2, there is reason to accept that this task component achieved the goal of requiring students to independently think about the subject material, inform their learning through research and apply their knowledge in a new context. Collectively this challenged them to think and learn for themselves. In fact in responding to a global question, 38.5% of students found that delivering their presentation was the best aspect of the task, although 25.6% found this to be the most difficult aspect. These two responses are not mutually exclusive and may well support the responses presented in Table 3 above, which indicate that whilst challenging, the task was achievable.

Table 5. Sample of Findings from the Questionnaire Regarding Reflections on the Presentations

Components C & D	Selected Statements	Avg.	SD
Personal Reflection on Own Syndicate's Presentation	<i>Writing reflectively about my presentation made me think more about:</i>		
	• how well we conveyed the ideas contained in our article	5.64	1.10
	• how well we helped the audience to understand the article's contents	5.56	1.13
	• how we could have improved our presentation	6.08	0.83
	• what I still need to learn in the subject	5.67	1.07
Joint Reflection on Another Syndicate's Presentation	<i>Joint reflection on another syndicate's presentation made me think more about:</i>		
	• the content that they delivered	5.54	1.32
	• their presentation and how well it related to the subject	5.51	1.30
	• what I needed to learn about the topic(s) that they covered	5.38	1.17

Responses regarding the reflective component of the task (see Table 5) were interesting, especially considering that this was the most innovative aspect. In general, few students (12.8%) found this to be the best aspect and a number found it to be the most difficult (25.6%) and least likeable (23.1%). Yet the findings contained in Table 5 indicate that it challenged them to directly address how well they had conveyed the content of their chosen article to the audience and what gaps may have been evident. The joint reflection was deliberately designed to be a syndicate exercise (with scaffolding) as it required active, critical listening as well as good recall. In general students found this to be the more difficult of the two reflections. Findings regarding the feedback students received (see Table 6 below) are interesting given that this was provided by an academic.

Table 6. Sample of Findings from the Questionnaire Regarding the Feedback Received

Component B	Selected Statements	Avg.	SD
	<i>The feedback I received on my part of our presentation made me think more:</i>		
Academic feedback	• about how the material contained in the article related to the subject	5.54	0.96
	• holistically about the issues covered in the subject	5.56	0.81
	• about how well I understood the issues covered in the subject	5.54	0.98
	• about how well I had applied the article's contents to the subject curriculum	5.64	0.86

As with any innovation, the purpose of reporting it is both to delineate what has been done well and offer suggestions regarding how to improve the task. The results suggest that the students, despite not primarily speaking English at home, engaged with RLT/PBL task. Their responses support the premise that they achieved a breadth of engagement with the subject curriculum through active learning via RLT and PBL, albeit with some scaffolding.

Comparative analysis of the four assessment tasks (see Table 7 below) indicates that students' results for the reported RLT, PBL task are comparable with their performance in the final examination, which deliberately covers breadth and requires them to apply their knowledge and understanding of key issues and/or problems. This suggests that the foci task and examination are a comparable test of students' learning.

Table 7. Comparison of the Results from all Assessment Tasks in the Subject**

	RLT, PBL Task	Practical Test	Business Report	Examination
Mark as a % of the total for the subject	20	10	10	60
Average mark	Mid D	High C	Low-to-mid D	High C
Median	Almost mid D	Mid D	Almost mid D	Mid-to-high C
Range	Low-to-mid C to HD	Fail to HD	Fail to HD	High-fail to HD

** Grades awarded are: Fail (N), Pass (P), Credit (C), Distinction (D), and High Distinction (HD).

Before concluding, it is useful to review how the three strategies (RLT, PBL and scaffolding) contributed to these findings.

RLT

The RLT strategy successfully raised student awareness about current research related to the subject and prompted them to think about how research issues affect the relativism of their learning. Some students (17.9%) indicated that this was the best aspect of the task, others (28.2%) that it was the most difficult and least liked (12.8%). Yet they all engaged appropriately. For example, when surveyed about the basis for selecting an article, they responded that choice was related to it being *easy to see how the material in the article related to the material covered in the subject* (5.02) rather than because it was *easy to find* (4.46) or *interesting* (4.67). Similarly, regarding the joint reflection, students indicated that it made them think *how this material fitted into the curriculum* (5.64); and *about the relationship between the presentation and the curriculum* (5.51).

PBL

The core problem in the task concerned relating a self-chosen research article to the subject curriculum, developing understanding about this and clearly communicating how it enhanced/was reflective of/differed from the subject curriculum. In general students agreed that delivering an assessable oral presentation was more demanding than a written task, as it made them think *more about how the topic fitted into the subject* (5.38); made them *try harder to understand material with which they had difficulty* (5.23); and *learn more independently* (4.95). Equally, PBL was required in the joint reflection. Few found the joint reflection to be the *best aspect* of the task (5.1%); more found it to be the *most difficult* aspect (20.5%); and 12.8% found it to be the *least likeable* aspect. This may be because it was harder to prepare for and hence less able to be controlled. Even so student evaluations of this were consistently > greater than 5 (see Table 5), ranging from 5.38 to 5.64. Thus, there appears to be acknowledgement that this task contributed usefully to making students think about the subject curriculum. Furthermore whilst challenging, these findings and students' academic performance in the task suggest that students saw the benefit of the exercise.

Scaffolding

Whilst the value of scaffolding was not directly surveyed, except in the component related to feedback, it plays a critical role in building trust. As the task was student-centred and the RLT, PBL aspects required each syndicate to separately develop their understanding of how their article related to the subject curriculum, the successful outcomes suggest that the scaffolding was appropriately framed. The templates provided for Components C and

D (where written reflection was required) have evolved from reflection on students' problems. In initial instantiations of the task, despite oral instructions about how and what kinds of issues were relevant, student reflections were superficial. Recognising that students needed to engage more deeply with the task, templates were constructed. Consequently, student efforts have improved with 12.8% even regarding it as the *best aspect!*

RESEARCH LIMITATIONS AND FUTURE RESEARCH

A number of limitations related to this study create opportunities for future research. Firstly, the study is restricted to examining introduction of the task in a single subject. This creates opportunities to analyse the effects of replicating the task into other subjects and even looking at students' perceptions in multiple semesters/years. Secondly, the evidence base could be extended through the inclusion of interviews with students; through comparison of student evaluations of learning and teaching in this subject with the results from the questionnaire; and/or their evaluation of learning in related subjects. Thirdly, whilst it is thought that the task impacts student learning outcomes, evaluation of long-term student learning outcomes is yet to be derived. Finally, given pressure to inculcate research-based material into the curriculum experiences of undergraduate and postgraduate students, the research journey may usefully begin in the students' early years. Herein in line with the Research Skill Development (RSD) Framework (University of Adelaide 2012), wherein the proposed journey begins at Level 1 with 'Prescribed Research' culminating at Level 5 with 'Open Research', one example by which students can be introduced to research is to include pertinent journal articles as prescribed readings in early subjects. Then through tutorials they can be taught how to read, critique and use this material, meaning that as they progress in their degrees, tasks can be developed (using appropriate scaffolding) to embrace higher levels of autonomy. This would ensure maintenance of a balance between student's current capabilities and research agendas, whilst equally using research materials contextually appropriate to the field of knowledge.

CONCLUSION

This paper reports on a descriptive case study of how RLT may be linked with PBL (with appropriate scaffolding) to address an identified need for improved communication, analytical and critical thinking skills in tertiary graduates (Apostolou et al. 2013). Unlike prior research that has measured success in terms of student perceptions (Stanley and Marsden 2012; Irving 2011) or in terms of academic performance (Heagy and Lehmann 2005), the outcomes reported in this paper indicate that the task was successful on both fronts. Of particular interest in this RLT task is that students had to apply critical thinking to all components of the PBL task. Selection and presentation of the research article (where relevance had to be gauged and demonstrated) was a student-centred exercise, as were the two components related to reflection on performance. The most important contributions come from the inclusion of critical thinking about the relevance and accuracy of material both presented by the syndicate itself, which tested their capacity to appraise one's own analysis and communication; and as presented by another syndicate, which tested students' capacity to apply knowledge from the curriculum to an unanticipated scenario. The fact that the task was so successful with students who were studying in a language that differed from their native language, attests to the benefit of the underlying scaffolding.

There are, however, some important factors to be considered. The task creates an additional load for the academics involved as they must critique the suitability of each article at the time of its selection and be prepared to evaluate each presentation in terms of communication and demonstrated understanding of the relevance of the myriad of selected articles to the subject's curriculum, as well as students' capabilities to reflect on the presentation of another syndicate. Herein the academics involved may be more open to challenge. Yet equally the inclusion of new material and new ideas invigorates both the curriculum and the dialogue between the students and academic staff. As such the task reported on in this paper positively and proactively addresses calls to promote scholarship, innovation and collaborative learning (AACSB 2013).

REFERENCES

- Association to Advance Collegiate Schools of Business (AACSB) 2013. Eligibility Procedures and Accreditation Standards for Accounting Accreditation. Adopted: April 8, 2013 South Harbour Island Blvd., Suite 750, Tampa, FL USA.
- Apostolou, B., Dorminey, J.W., Hassell, J.M., and Watson, S.F. 2013. "Accounting education literature review (2010–2012)." *Journal of Accounting Education* 31 (2), p. 107–161.
- Ballantyne, R., Bothwick, J., and Packer, J. 2000. "Beyond student evaluation of teaching: Identifying and addressing academic staff development needs." *Assessment and Evaluation in Higher Education*, 25 (3), pp. 221–236.

- Baxter Magolda, M. 2002. "Epistemological reflection: The evolution of epistemological assumptions from age 18 to 30." In B. Hofer and P. Pintrich (eds.), *Personal epistemology: the psychology of beliefs about knowledge and knowing*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Bedard, D., Lison, C., Dalle, D., Cote, D., and Boutin, N. 2012. "Problem-based and project-based learning in Engineering and Medicine: Determinants of students' engagement and persistence." *Interdisciplinary Journal of Problem-based Learning* 6 (2), pp. 7-32.
- Bierstaker, J.L. 2007. "Using student-centred writing assignments to introduce students to accounting education and facilitate interaction with practitioners." *Global Perspectives in Accounting Education* (4), pp. 61-68.
- Brew, A. 2003. "Teaching and research: New relationships and their implications for inquiry-based teaching and learning in higher education." *Higher Education Research & Development* 22 (1), pp. 3-18.
- Brew, A., and Pesta, T. 2001. "Research-led teaching: What does it look like and how and why should academic developers encourage it?" Seminar presented at the Annual Conference of the Staff and Educational Development Association, Manchester, UK 20-21 November.
- Brew, A., and Prosser, M. 2003. Integrating quality practices in research-led teaching and institutional priorities. *Proceedings of the Australian Universities Quality Forum*.
- Clarke, A., and Hubball, H.T. 2001. "Physical education methods course as an immersion experience in an elementary setting." *Avante* 7 (2), pp. 11-27.
- Cobb, P., and Bowers, J. 1999. "Cognitive and situated learning perspectives in theory and practice." *Educational Researcher* 28 (2), pp. 4-15.
- Dickie, C., and Jay, L. 2010. "Innovation in postgraduate teaching: Mixed methods to enhance learning and learning about learning." *Higher Education Research & Development* 29 (1), pp. 29-43.
- DIT School of Physics. (2012). "Problem Based learning." Retrieved 17 July, 2013, from <http://www.dit.ie/physics/programmes/problembasedlearning/>
- Edelson, D. C. 2001. "Learning-for-use: A framework for integrating content and process learning in the design of inquiry activities." *Journal of Research in Science Teaching* 38, pp. 355-385.
- Galliers, R. 2011. "Call for Papers – Journal of Strategic Information Systems – Special issue: Information systems strategy as practice: Micro strategy and strategizing for IS." Retrieved 17 July, 2013, from http://www.aisnet.org/ais_lists_public_archive/2011_October
- Griggs, L. 2005. "Comment: The integration of teaching and research in higher education." *HERDSA News* 27 (3), pp. 1-5.
- Heagy, C., and Lehmann, C. 2005. Is PBL an improved delivery method for the accounting curriculum? In B. Schwartz and J. Ketz (Eds.) *Advances in accounting education teaching and curriculum innovation*, Elsevier pp. 221-251.
- Healey, M., and Jenkins, A. 2005. Supporting research informed teaching. *HERDSA News*, 25(3), 6-9.
- Hmelo-Silver, C.E. 2006. Design principles for scaffolding technology based inquiry. In A. M. O'Donnell, C. E. Hmelo-Silver, and G. Erkens (Eds.) *Collaborative reasoning, learning and technology* (pp. 147-170). Mahwah, NJ: Erlbaum.
- Hmelo-Silver, C.E., Duncan, R.G. and Chinn, C. A. 2007. "Scaffolding and achievement in problem-based and inquiry learning: A response to Kirschner, Sweller, and Clark (2006)." *Educational Psychologist* 42(2), pp. 99-107.
- Hofer, B.K. 2001. "Personal epistemology research: Implications for learning and teaching." *Journal of Educational Psychology Review* 14 (4), pp. 353-383.
- Irving, J.H. 2011. "Integrating Research into an Undergraduate Accounting Course." *Issues in Accounting Education*. 26 (2), pp. 287-303.
- Jenkins, A., and Healey, M. 2005. *Institutional strategies to link teaching and research*. The Higher Education Academy, York, U.K.
- Jiang, F., and Roberts, P.J. 2011. "An investigation of the impact of research-led education on student learning and understandings of research." *Journal of University teaching & Learning Practice* 8 (2), pp. 1-14
- Kendler, B.S., and Grove, P.A. 2004. "Problem-based learning in the biology curriculum." *American Biology Teacher* 66 (5), pp. 348-354.
- McGowan, S. 2012. "Going beyond the numbers in teaching financial accounting: The newsletter as an assignment option." *Issues in Accounting Education* 27 (4), pp. 1095-1117.

- Moisander, J., and Stenfors, S. 2009. "Exploring the edges of theory-practice gap: Epistemic cultures in strategy-tool development and use." *Organization* 16 (2), pp. 227-247.
- Monash University, 2010. "Faculty of Business and Economics, Faculty Strategic Plan for 2010/11." Retrieved 17 July, 2013, from <http://www.buseco.monash.edu.au/esg/agu/governance/faculty-strategic-plan-2010-11.pdf>
- Moore, W.S. 2001. "Understanding learning in a postmodern world: Reconsidering the perry scheme of intellectual and ethical development." In B. Hofer and P. Pintrich (eds.), *Personal epistemology: the psychology of beliefs about knowledge and knowing*. Mahwah, NJ: Lawrence Erlbaum Associates
- Morrison, J. 2004. "Where now for problem-based learning?" *The Lancet*, 363(9403), pp. 174-176.
- Paisey, C., and Paisey, N. 2003. "Developing research awareness in students: An action research project explored." *Accounting Education* 12 (3), pp. 283-302.
- Perry, W.G. 1970. *Forms of intellectual and ethical development in the college years: A scheme*. Holt, Rinehart and Winston, New York.
- Saacti, E. 2008. "Problem-based learning in an intercultural business communication course." *Journal of Business & Technical Communication* 22 (2), pp. 237-260.
- Savin-Baden, M. 1998. Equipping students for employment through problem-based learning: Realising curricula change across the boundaries. *Paper presented at Managing Learning Innovation. The challenges of the changing curriculum, University of Lincolnshire and Humberside, 1-2 September*. URL: <http://ultibase.rmit.edu.au/Articles/savin2.html>
- Schapper, J., and Mayson, S. 2008. "Research-led teaching: Moving from a fractured engagement to a marriage of convenience." *Journal of Higher Education and Research Development* 29 (6), pp. 641-651.
- Stanley, T., and Marsden, S. 2012. "Problem-based learning: Does accounting education need it?" *Journal of Accounting Education* 30, pp. 267-289.
- Tobin, R. 2010. Descriptive case study. In A.J. Mills, D. Durepos and E. Wiebe *Encyclopedia of case study research*, SAGE publications inc.
- University of Adelaide, 2012 "Research skill development for curriculum design and assessment." Retrieved 17 July, 2013, from <http://www.adelaide.edu.au/rsd/>
- University of Melbourne, 2011. "The University Plan 2011-2014." Retrieved 17 July, 2013, from <http://www.unimelb.edu.au/publications/docs/universityplan2011-2014.pdf>
- University of Sydney. 2010. "Green Paper." Retrieved 17 July, 2013, from http://sydney.edu.au/strategy/green_paper/index.shtml
- Vygotsky, L.S. 1978. *Mind in society*. Cambridge, MA: Harvard University Press.
- Zimet, G.D., Dahlem, N.W., Zimet, S.G., and Farley, G.K. 1988. "The multidimensional scale of perceived social support." *Journal of Personality Assessment* 52 (1), pp. 30-41.

COPYRIGHT

Carla L. Wilkin © 2013. The authors assign to ACIS and educational and non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The authors also grant a non-exclusive licence to ACIS to publish this document in full in the Conference Papers and Proceedings. Those documents may be published on the World Wide Web, CD-ROM, in printed form, and on mirror sites on the World Wide Web. Any other usage is prohibited without the express permission of the authors.