Using Pacioli's Pedagogy and Medieval Text in Today's Introductory Accounting Course(*)

Alan Sangster
Griffith University, Australia

Ellie Franklin
Middlesex University, United Kingdom

Dee Alwis
Middlesex University, United Kingdom

Jo Abdul-Rahim
Middlesex University, United Kingdom

Greg Stoner
University of Glasgow, United Kingdom

Abstract

When double entry bookkeeping emerged in the late 13th century, students of accounting were mainly sons or employees of merchants and other craftsmen. They were highly motivated to learn and had ready access to real examples of what they were learning.

Students today see little relevance in learning double entry bookkeeping and find it difficult to learn how to prepare journal entries correctly and, in particular, struggle with the first stage of the double entry process: identifying which accounts are to be debited and which are to be credited for each transaction.

(*) Bu Araştırma,19-22 Haziran 2013 tarihinde İstanbul'da yapılan 3rd International Conference on Luca Pacioli in Accounting History'de bildiri olarak sunulmuştur

One possible solution to this situation, which can be identified in the literature, is to embed the topic within its historical foundation. This paper reports on an attempt to do so using the first printed instructional text on the subject (Pacioli 1494) as the principal textbook on a 20-hour component of the introductory financial accounting course in a U.K. undergraduate accounting degree program. Instruction followed the pedagogy presented by Pacioli and only minimal additional costs to faculty were incurred.

The innovation was successful. In their assessment, students not only demonstrated that they had learnt, understood, and knew the correct entries to make into the Journal, they did so correctly to an extent that no-one could have foreseen.

Key words: Cognitive Apprenticeships, Double Entry Bookkeeping, History, Introductory Accounting Course, Pacioli.
Jel Classifications: M41,M49,I20

Introduction

The formal teaching of double entry bookkeeping in schools, colleges, and universities has not changed dramatically over the past 100 or more years. It tends to either be taught from a balance sheet perspective or from a transaction or journal perspective and even the computer-based learning packages that have been developed on this topic adhere to these approaches. Yet, for many years, the accounting profession has complained about the poor ability of accounting graduates to perform double entry bookkeeping (Currie 1992) and this continues to be a cause for concern: double entry bookkeeping is the foundation that underpins modern accounting. It comprises of the basic rules and procedures enacted in order to maintain accurate and faithful financial records of a business. While the computerization of accounting systems places far less emphasis upon accountants needing to know and understand double entry in order to record transactions, being able to understand and explain entries made into accounting systems does require such knowledge and understanding (Sangster 2010). Double entry is not something accountants can ignore and it is not, therefore, a topic that can justifiably be ignored in accounting degree programs.

The importance of bookkeeping in the education of accountants can be traced back to the 13th century, when it was seen as the fundamental and first topic to be covered in accounting education. Initially it was single entry and debtor and creditor accounting that appears to have been taught but double entry bookkeeping is known to have been formally taught (as opposed to being learnt at the workplace) by no later than the mid-15th century (Postma and Van Helm 2000). The method was standardised following the publication in Venice of a 24,000-word treatise on bookkeeping in 1494 which formed the basis for much of the writing on that subject for the following 100 years (Geijsbeek 1914, 9) and laid the foundation for double-entry bookkeeping as it is practiced today.

The author of the first printed text was a Franciscan friar, Luca Pacioli (1446/7-1517) who had 30 years experience of working with merchants and other craftsmen and teaching their sons and employees, both present and future. It was principally for them that this book was written (Sangster, Stoner, and McCarthy 2008 and 2011; Sangster 2011). Pacioli's treatise differs from the typical modern text on this subject. Accounting is embedded throughout within the context of business and his approach to teaching double entry bookkeeping (as revealed in his treatise) constantly exposes students to the business context surrounding accounting. As a result, the relevance to business of every statement, and every instruction is clear (Sangster and Scataglinibelghitar 2010). All learning is done in context and, most noticeable of all, Pacioli's teaching method, his pedagogy, is distinctly different from those in use today: we introduce monetary amounts at the start, thus placing a layer of arithmetic across the procedures we seek to convey. Pacioli does not. He breaks the subject down, separating layout from entry of monetary amounts. Intuitively, by removing the fog of numbers, students should be better able to grasp the principles, and learn how to work with monetary amounts later. That is the main difference between Pacioli's pedagogy and what we do today when teaching double entry bookkeeping and is the focus of this paper.

Pacioli's students versus today's students

It was not just the approach to teaching the subject that differed 500 years ago, in the Middle Ages, students of business studies in Northern Italy where the treatise was published were principally sons of merchants or employees of merchants aged between 11 and 16 (Sangster et al. 2008). They were consequently strongly motivated to learn the method they were being taught. Their background also provided them with ready access to real examples of its use in practice in their businesses. Not only could they relate what they were being taught to their own 'real' world, they had ready access to examples from their work with which they could supplement their studies. In contrast, today students of accounting are from diverse backgrounds and few have either similar motivations to learn the subject or access to real examples as was the case for accounting students during the mercantile age of the 13th to the 18th centuries.

Thus, these students of the past were more motivated to learn and were taught in a less complex way than their modern counterparts. In contrast, many students today appear to see little relevance in learning double entry bookkeeping and find it difficult to learn how to prepare journal entries. In particular, they find it difficult to identify which accounts are to be debited and which are to be credited for each transaction. In part, this may be due to their being less motivated and less aware of business, but it may also be due to our having adopted an approach to the teaching of double entry bookkeeping that is, itself, inappropriate.

Students of Pacioli's day certainly learned how to do double entry bookkeeping in class, otherwise their fathers and employers would not have paid for their education, and the text many of the teachers would have used would have been Pacioli's or one based upon it. With respect to that text, Sangster, Stoner and McCarthy (2007, 455) suggest that, *"by noting and adopting [the] features found within the bookkeeping treatise, faculty… may better engage their students, and so make students' learning experience more productive and long-lasting."* Sangster (2010) goes further, suggesting that Pacioli's treatise, and the instructional method – the pedagogy – it

embraces, be adopted as the basis of instruction for the subject of double entry bookkeeping.

The rest of this paper describes an innovation in the teaching of introductory accounting and bookkeeping that was found to be highly beneficial to student learning. Students appear to have the greatest difficulty with the first stage of double entry bookkeeping: identification of the accounts to be debited and those to be credited for each transaction. The study sought to overcome this problem and had the following overall research objective: whether by applying the pedagogy of Pacioli's text – Pacioli's approach – and the test itself in the classroom, students could achieve understanding and correct application *of this first stage* of double entry bookkeeping.

As Pacioli himself implies in Chapter 16 of his treatise, once these principles are learnt and understood, it should be possible to correctly prepare journal entries for all situations. The next section gives further consideration to Pacioli's pedagogy and is followed by a section looking at how the topic is typically taught today.

Pacioli's Pedagogy

Pacioli's treatise has been described as reading like a transcript of a lecture (Taylor 1942, 196): it reveals how the subject was taught in the classroom. Pacioli adopts what is now known as a cognitive apprenticeship[1] approach (*see*, for example, Collins, Brown, and Newman 1989) presenting his core material on double entry bookkeeping contextualized and embedded within a discussion of business and business structures and processes, checks, and controls.

When adopting a cognitive apprenticeship, all instruction is contextualised so as to encourage engagement by giving meaning to the content; and the sequencing of instruction is established so that initial

1) This is a three-stage sequence: identify the processes of the task and make them visible to students; situate abstract tasks in authentic contexts, so that students understand the relevance of the work; vary the diversity of situations and articulate the common aspects so that students can transfer what they learn.

instruction focuses upon establishing the foundations of the subject. Once this base knowledge is acquired by the learner, it is built upon by increasing the complexity until the extent of knowledge required to perform the target skill has reached the desired level. Collins (2006, 51) provides an example relating to the teaching of reading skills: "increasing task complexity might consist of progressing from relatively short texts, with simple syntax and concrete description, to texts in which complexly interrelated ideas and the use of abstractions make interpretation more difficult."

Pacioli's pedagogy follows this design. He begins by contextualising the subject as being fundamental to maintaining a business and then describes the items that together comprise the capital of a merchant – his possessions. He then suggests that a note of these be recorded on a sheet of paper and he describes this as the merchant's inventory. Next, he names the three principal books of account (memorandum, journal, and ledger). Over the following chapters, he explains in turn the purpose of each of these books. With respect to the memorandum, he explains that all the details relating to each transaction should be entered in full in narrative form and he proceeds to give some examples of transactions that would be recorded in it. The entry that is made is descriptive and in a manner we would normally associate with entries in a diary, devoid of any structure or form.

He next deals with the journal, introducing the way in which the debit and credit entries are recorded in the narrative part of a journal entry. He then describes how to prepare the first page of the journal and explains and then shows how to record the first item of inventory in the journal, with the item entered as a debit and capital as the credit. He explains and shows how columns labelled with currency symbols are positioned to the right of the entry. Despite knowing what the monetary value to enter is – it is mentioned in the inventory – he leaves these monetary columns blank. He repeats this for each of the items from the inventory in turn. When he moves on to the ledger, he adds slightly more detail: he places an imaginary number in the first column of the first debit entry to show where the amount would go if it were to be included in the entry, but leaves the columns blank for the credit entry;

and repeats this lesson in the ledger entries from the second journal entry by using an actual amount as if it is an example of how the entry would look were that the value of the item. Thereafter, he reverts to blank monetary columns and it is a further 13 chapters into his text before he includes the entry of the actual monetary amount into any of the books.

His initial focus is, therefore, very much upon layout, something that is considered an important element in other fields also. For example, cognitive layout theory involves the use of specific areas on a computer screen which are dedicated to specific pieces of information (Norman, Weldon, and Shneiderman 1986), just as is the case with the layout of a journal entry, and this organizational aspect of the layout helps users to relate or organize information appropriately. In terms of absorbing information, more basic information related to form and location are analysed first, and more contextual elements are processed later (Berry 1990). The more complex the visual image, the greater the time that is required to understand it (Dwyer 1978) and the greater is the possibility that those who have not developed an adequate mental mapping of the layout and the knowledge being presented within it may make errors in processing the information it contains. In the design of instructional web pages, a screen which uses a standard layout will be more easily interpreted and requires a lower cognitive load than would otherwise be the case, leading ultimately to the learner not having to think about those elements when performing tasks with that layout (Berry 2000). Similarly, layout theory is relevant to classroom instruction (Rosenfeld 1977), again as engagement and learning are improved if the most appropriate layout is adopted.

Relating these theories to Pacioli's approach to instruction in double entry bookkeeping in which he focused first upon layout until it became instilled in the minds of his students, Pacioli encouraged his students to deal only with identifying the account to debit and the account to credit in each transaction. Only once he perceived that they had grasped this element of the layout, which must be correctly performed or the entry will be misleading no matter how accurate the amounts entered may be, did he increase the

complexity of their task (of making the entries in the journal and the ledger) by adding the entering of actual monetary amounts.

Thus, Pacioli's students learned each element of double entry bookkeeping as a series of building blocks and master each stage before being taken further. Through this approach, Pacioli provided them with the tools to develop transferable skills in double entry bookkeeping without the distraction of processing and calculating data. By presenting the layout, rules and principles in this way, Pacioli believed that students of his text had all the information they needed to record any transaction correctly.

Of course, students could practice what they learned in the classroom and in their own time – he had given them sufficient information when he started showing them how to make entries in the ledger for them to enter the amounts if they wished. From what is known of the teaching of double entry bookkeeping in the 15th century, following coverage of each topic in his treatise, practice in the method would likely have taken the form of recording examples of real transactions (possibly brought to class by the students) (Sangster and Scataglinibelghitar 2010), so encouraging and assisting students to master that stage of their 'apprenticeship' before moving to the next topic.

How Double Entry Bookkeeping is Taught Today

In contrast to the highly realistic contextualisation of Pacioli's treatise and his focus upon generalizable rules, double entry bookkeeping is generally taught today as a series of rules and procedures, typically based around the start-up of a fictitious small enterprise of which the students have no 'real' knowledge and no awareness of the various issues a system of record keeping may be addressing. Values are included from the start. It is viewed as important that students can enter the correct values and assessment typically awards the value entered as much, if not more than the correct placement of the amounts. Layout – despite it being something Pacioli believed to be important – tends to be given minimal credit.

In our experience[2], instructors generally give the impression it is an easy system to use and encourage students to learn it through the use of drill-and-practice. Very little is done to engage the students and make them keen to learn and understand the subject. Most teaching is done in a contextual vacuum. Compounding this situation, students are typically told early in their studies that computer programs can do most of the bookkeeping work for them.

It is not surprising, therefore, that students today often fail to identify the benefits to themselves as future accountants[3] of learning how to operate such a system manually and find it difficult to learn double entry bookkeeping. This is not a new phenomenon brought about by computerisation of accounting. It was the case even before the emergence of computerized accounting systems – see, for example, Rawlinson and Sangster (1992).

In response to this situation, rather than look for ways to make the subject relevant to students, in the U.K. the extent to which it is being taught is falling, particularly in the past ten years.[4] Even in textbooks, what was once a principal topic is now sometimes relegated to an appendix and, in many cases, it is taught willy-nilly, with no logical order, but simply on an as-needed basis.[5] Given that double entry bookkeeping is considered by many to be an essential tool of a practicing accountant, one that enables entries in the accounting records to be understood and explained, this trend is difficult to justify and also, apparently, unlikely to be beneficial for students as they progress through their careers.

Apart from adopting Pacioli's pedagogy in the classroom, another possible approach to increasing engagement with the subject which is compatible with the adoption of his pedagogy is suggested in the education

2) The authors have experience of teaching this topic in eight different U.K. universities and have been involved in validating programs and acting as external examiners – that is, overseeing assessment and reviewing student work – at over one-quarter of the 115 U.K. universities where accounting is taught.

3) See, for example, Sangster 2010, 27.

4) See, Sangster 2010, endnote 4, 36.

5) We are grateful to an anonymous reviewer for suggesting this point.

literature of many disciplines: to embed the topic within its historical foundation, using history to justify and explain the importance of the subject, so increasing student engagement which, in turn, should increase the perceived relevance of the subject, resulting in improved student understanding and ability to apply the method being taught.

History in The Curriculum

Authors from many disciplines have suggested that including the history of a discipline in the curriculum is an efficient means of increasing *engagement* with and *relevance* of a topic in the eyes of students. These disciplines include: *Astronomy* (Gingerich 1994); *Biology* (Eichman 1996); *Chemistry* (Lin et al. 2000); *Management* (Topping et al. 2006); *Marketing* (Savitt 2009); *Mathematics* (Hepel 1893; Collins 1894; Loria 1899; Rupert 1900; Fauvel 1991; Siu 1997; Bagni 2000; Bruckheimer and Arcavi 2000; Lit et al. 2001); *Medicine* (Arnott 2002; Sheard 2006); *Music* (McCarthy 2003); *Nursing* (Madsen 2008); *Social Work* (Riessman 1986); *Zoology* (Cockerell 1920); and *Accounting* (Previts et al. 2006).

The authors propose that including history in this way provides students with a context for their learning, rather than learning rules and techniques in a vacuum, and the inclusion of history in the curriculum facilitates greater understanding of the discipline and amplifies perceived relevance of topics. As with Pacioli's pedagogy, educational theorists would recognize this an example of the 'cognitive apprenticeship' approach to developing higher order learning, in particular, a personal approach to the construction of meaning (Collins et al. 1989). Through this methodology, the analytical and communication skills of students are enhanced: they understand better why they are doing things and improve their ability to both understand their discipline and to explain various aspects of it (Fauvel 1991). Arnott (2002) argues that a basic knowledge of the history of their profession would offer a number of benefits to medical students, such as broadening their educational horizons and developing their analytical approaches to medical knowledge and practice beyond the rigidly biomedical and statistical obsession of modern medicine.

On the broader aspect of learning for undergraduates, Gingerich (1994) points to three convincing motivations for incorporating historical materials in his course in astronomy:

1. They help to introduce basic concepts in natural sequence;
2. A historical perspective shows the changing and iterative nature of scientific explanatory structures; and,
3. History can also foster interdisciplinary training bridging to other interests.

The literature indicates that if history is appropriately integrated within the curriculum, it will not overload students with additional content. Furthermore, the introduction of history into education programs will, all other things being equal, generally lead to a greater understanding of their discipline, raise awareness of the relevance of what is learnt, and lead to greater engagement with the subject and so provide a base which facilitates the subsequent development of higher-order skills, something that has been recognised as an essential element of university accounting education, particularly during the past 20 or so years.

For example, after many years of teaching the subject the same way and with the same mechanistic, technical objectives as their predecessors, the publication in the United States by the Accounting Education Change Commission (AECC) of *Position Statement Number One: Objectives of Education for Accountants* in 1990 presented the first real opportunity for the accounting academic community to bring about widespread change in accounting education. The document declared that the curriculum *'... should develop in students the capacity for inquiry, abstract logical thinking, and critical analysis and should train them to understand and use quantitative data'* (AECC 1990). The Position Statement also declared that there was a need to develop historical consciousness in students.

Some accounting faculty are well aware of these benefits. In Italy, for example, accounting is taught in many universities by reference to the major Italian writers over the past 500 years and its development is traced and the reasons for changes made are set within a historical context (Torrecchia 2008;

Galassi[6] 2011). The Italians may be leading the way in this respect but they are not the only accounting educators who view the inclusion of history in the accounting curriculum as beneficial. Over the past century and, in particular, during the past 40 years, many scholars working in the English-speaking world have called for the inclusion of history within university accounting curricula.[7]

History in the curriculum – strategies, benefits, and challenges

The modern-day advocates of the inclusion of history in the curriculum propose a focus upon historical background materials including people, ideas, events, places, innovations, and experiments of the past that connect the past with the present (*see*, for example, Eichman 1996). Such historical artefacts help to explain the development of concepts and reasons for their development as well as providing opportunities to appreciate the problems that were important to past generations within the discipline, many of which may be as relevant today (Sangster 2010). As to how this may be done, there is a considerable body of literature across the disciplines that considers and suggests strategies for incorporating history into the curriculum and reveals a number of benefits and challenges (e.g. Nyman 1990; Arnott 2002; Olwell 2002; McCarthy 2003; Nelson and Gordon 2004; Sheard 2006; Timmons 2006; Gouk 2007; Madsen 2008).

Eichman (1996, 202), for example, suggests that, *'the use of historical information can be adjusted to the particular course, the level of the course, the*

6) Professor Giuseppe Galassi is Professor of Economia Aziendale at the University of Parma. He is considered to be one of the most influential professors of accounting of his generation, a past president of the European Accounting Association and Vice-President of International Association for Accounting Education and Research (IAAER).

7) These include Cleveland (1904); Piacker (1972); Homburger (1973); the American Accounting Association's Bedford Committee (1986); Bloom and Collins (1988); Previts, Parker, and Coffman (1990); Flegm (1991); Coffman, Tondkar and Previts (1993); Reinstein and Bayou (1997); Slocum and Siram (2001); Previts, Flesher and Samson (2006); Richardson (2008); and Bisman (2009).

type of students, and even the personality of the instructor. It could be added to the lecture, given in additional reading assignments, used in some sort of problem-solving exercise with data analysis from historical experiments, or incorporated into some sort of written assignment. The possibilities are only limited by the imagination of the instructor.'

However, whilst much of this literature demonstrates that incorporating history into the curriculum has resulted in students performing better, the inclusion of history in curricula presents a number of challenges that resurface in many of these studies:

(1) How can history be incorporated into already over-crowded curricula?

(2) How can the limited knowledge of many faculty of the history of their subject be overcome?

(3) How can history be integrated within subjects in a way that will achieve the pedagogical benefits it is claimed that its introduction may bring?

In addition, there appears to be a fourth challenge that may be the greatest of all: resistance by faculty. *"Innovation… is an act of rebellion not just against conventional wisdom but against existing practices and vested interests, and thus will normally lead to some kind of resistance"* (Mokyr 1998, 21). Or, as Hutchins (1958, 466) suggests, success breeds pride, complacency, and resistance to change: if faculty are already achieving the pass rates they seek, will they be motivated to make the effort to change significantly what they are doing simply because the evidence indicates that doing so should make their students 'better'?

In the case of the present study, the decision had already been taken to adopt Pacioli's pedagogy and his treatise not only provides the historical context of accounting and business at the birth of double entry bookkeeping, it is a historical artifact in its own right, giving an insight into business and business practices at the time that double entry bookkeeping emerged. It has the added advantage over modern texts of offering, not only a unique pedagogical approach to the teaching of the subject of double entry bookkeeping (which

is unrecognized in the modern world) but, of delivering it embedded in a historical context. We believed that if we adopted it as the core text of the course, it would open up the possibility of the students obtaining the known pedagogical benefits of integrating history of a topic into the curriculum without any need to make space for history in that curriculum by removing other topics; and that doing so would enable benefits to be gained from both elements of the innovation. Accordingly, the decision was taken to adopting Pacioli's treatise as the core text and his pedagogy as the teaching method. The study took place at a university in London, U.K.

The Study

The decision to change arose because it had been noted that despite the first few weeks of their introductory financial accounting course focusing on the topic, students did not appear to understand or learn how to perform double entry bookkeeping. Despite a change of instructor at the start of the 2008/9 academic year, they had continued to perform badly in their formative[8] and summative[9] assessments, seeming to have the greatest difficulty in deciding which account to debit and which account to credit in the problems with which they were presented. Rather than doing what others have done and downgrading the topic to an invisible element of the curriculum, a more positive solution was sought.

The instructor teaching the course was amenable to change and receptive to the concept of this integration of history within the curriculum. The teaching plan and structure of the course for 2009/10 was revised and, in order to enable an effective assessment to be made of the impact of the innovation, a number of benchmark outcomes were agreed.

It was decided that for ethical reasons, a full experiment was infeasible. Accordingly a quasi-experimental approach was adopted whereby the 2008/9 cohort was treated as the control group and data from that cohort was collected in order to provide a basis for subsequent evaluation of the

8) Formative assessment does not contribute to a student's overall grade.
9) Summative assessment contributes to a student's overall grade.

innovation.[10] While this use of technically non-equivalent groups limits the possibility of drawing causal links between what was done and the results, this is a widely used approach in social science research (Trochim and Donnelly 2007) and was the only option available. In line with this approach, in interpreting the findings, potentially confounding variables were controlled for as far as possible. In addition to data from the assessment, qualitative data was also gathered from end-of-course online responses to a defined series of questions concerning students' experiences on the course.

The research objective and the research questions

As indicated in the Introduction, the overall research objective of this study was whether, by applying the pedagogy of Pacioli's treatise – Pacioli's approach – and the treatise itself in the classroom, an improvement could be achieved in the level of understanding and correct application of the *first stage* of double entry bookkeeping, the one students have great difficulty with: the identification of the accounts to be debited and those to be credited for each transaction.

The benchmark outcomes formed the basis of the three research questions:

(i) Could double entry bookkeeping be taught successfully today using the first known textbook on double entry bookkeeping dating from the 15th century?

(ii) Could double entry bookkeeping be taught using predominantly the didactic lecture method of instruction[11] (the form of instruction in the 15th century and the form of instruction for which Pacioli wrote his treatise) with no small group tutorial workshops to support the students in their learning?[12]

10) Appropriate permission was obtained for this change and as what was done involved simply a change in teaching method that was neither deceptive nor punitive, no permission for the change was required from the students.

11) A form of instruction in which the active teacher presents information to the passive student. In other words, the instructor tells the students what they are supposed to know – a typical lecture.

12) In the U.K., most accounting undergraduate degrees are taught through a mixture of large class lectures supplemented by small class tutorials in which material covered in lectures is explored further either through discussion or through the completion of short examples of calculation and application.

(iii) Could students taught using Pacioli's treatise and pedagogy perform as well in a formative class test on the creation of journal entries as students who had been taught using conventional modern day accounting textbooks[13] and who had the opportunity to apply the methods taught in lectures by working through problems in small group tutorials?

The structure of the course

Approximately 250 students enroll on the introductory accounting class each year. It runs for 24 weeks and is compulsory for all accounting undergraduates a few exchange students from other European institutions and a small number of undergraduate banking students. Students of the other Business School disciplines are not eligible to take the course. The course is not split into sections: all lectures are delivered to the entire cohort by a single instructor. The first week is spent introducing the students to accounting and the following four weeks focus upon double entry bookkeeping. It was these first five weeks which were the focus of this study.

The previous structure

In the years preceding the study, students attended one 2-hour lecture and one 2-hour small group[14] tutorial each week. The lectures introduced the topics and guided students through a simple example relating to each concept or method introduced. The tutorials provided an opportunity for students to practice what they had learned and to receive assistance from their tutor. In addition to their classes, under the previous structure, students were advised to read relevant chapters in their textbook and were encouraged to make use of relevant chapters of a widely used computer-based learning (CBL) package on double entry bookkeeping. At the end of the coverage of double entry bookkeeping, the students sat a formative class test under exam conditions

13) In these modern texts, no attention is given to the history and rationale for why records are maintained in the way they are today.

14) Approximately 35 students, though only 20-25 typically attended each tutorial.

on the topic. The primary learning outcome for this part of the course is that students should be able to use double entry to record journal entries for a series of transactions.

English is the first language of virtually all students but there are always a small number of students from overseas, a few of whom have difficulty with English. As with most U.K. accounting degree programs, while the majority of the students have never previously studied accounting, some have studied A-Level[15] accounting or an international equivalent at high school or college, and so start the class with some knowledge of double entry bookkeeping. There is considerable overlap between the syllabus of this course and those of the various A-Level boards. Consequently, students with prior accounting experience often displayed signs of boredom and disengagement for a significant proportion of the course.

The 'new' structure in 2009/10

The same instructor led the redesigned course as in the previous year. In the first part, which looked at double entry bookkeeping, two (rather than one) 2-hour lectures were held each week. No tutorials took place. A modern textbook was not used, nor was the CBL package. Instead, all students were provided with a printed copy of Geijsbeek's 1914 translation[16] into English of Luca Pacioli's 1494 bookkeeping treatise and teaching was based upon the translation of the procedures and documents described within it. As in previous years, the first week was spent introducing students to accounting but with the addition of some coverage of accounting history principally

15) The later of two standardized assessments on a subject in an English, Northern Irish, or Welsh secondary (or high) school which is used as a qualification for university entrance in the U.K. The examinations are prepared, set, and marked by independent national examination boards, three based in England, one in Wales, and one in Northern Ireland.

16) The treatise is provided in English on the odd pages from page 33 to page 81, 25 pages in total, and it is faithful to the sequence and presentation of the text in Pacioli's original. It is free to download copyright free at www.archive.org/details/ancientdoubleent00geijuoft

using the material on this topic by Geijsbeek which precedes the translation, and the next four weeks were spent on double entry bookkeeping. During this period, all the chapters in Pacioli's treatise were covered in class in the manner presented by Pacioli – that is, the instructor adopted the style of coverage contained in the text, explaining and demonstrating just as Pacioli had done.[17] As in Pacioli's treatise, in general, values were only entered in journal entries after a topic had been presented and explained and the accounts to be used were identified and labeled as applying to either the debit or the credit entry.

Students were advised to read the treatise and to refer to it throughout these weeks. Mirroring presumed 15th century practice, examples that included values were added in class at the end of each section of text, so enabling the students to practice applying the method. To compensate for the lack of tutorials and as a substitute for the lack of real-world examples which were available to 15th century students, unassessed[18] formative homework was set in the later weeks in order that students might gain additional practice in applying what they were being taught.

As in previous years, there was a formative class test under examination conditions at the end of the series of double entry bookkeeping classes. The test was identical to the one used in the previous year.

To avoid any occurrence of a 'Hawthorne' reactivity effect (Adair 1984, 334, 337), at no time were the students told that the course was in any way different from how it had been in previous years. Also in order to avoid any reactivity effect, they were not accorded any 'special attention' compared with students on other courses taught by the instructor. Being in their first year of study in higher education, every class they attended was a 'novelty' compared to their previous learning experiences. This had the benefit of limiting any reactivity effect upon their learning resulting from the approach adopted in the classroom.

17) For obvious reasons, rather than read-out the text in class with its old-fashioned style of English, modern-day English was used by the instructor during the lecture.

18) Students could do this homework if they wished and then compare it with the solution provided by the instructor. The instructor did not look at this homework unless a student requested that she did.

Finally, to identify any interference from the two-experiment version[19] of demand characteristics theory (Orne 1973), at the conclusion of the experimental phase students were asked for their views on various aspects of the course so that their perceptions of what occurred could be identified.[20] This is also a recommended approach for identifying any 'Hawthorne' reactivity effect (Adair 1983, 343).

Was the innovation a success?

In order to address this question, multiple sources of evaluative data were used. Taken individually, both the class test results and the student feedback provide strong evidence that the innovation had been a success. Even though there are potential limitations in both measures, the overall portfolio of evaluations clearly triangulate with each other and together provide compelling evidence of that success.

The students' public reaction

No negative issues were raised by the students when they were asked in a lecture how they felt generally about the course after the teaching of double entry had finished. Nor were any negative comments made by students about the double entry classes at the official meeting of departmental staff and students (Board of Studies), which took place approximately halfway through the introductory financial accounting course. In addition, attendance was visibly higher than in previous years, suggesting that students were more engaged than previously with the subject.

19) Experimental subjects may view an experiment in a manner that is different from that by which it is perceived by the experimenters, thereby making appropriate interpretation of the results by the experimenters impossible unless they discover how it was perceived by the experimental subjects.

20) For example, students may have perceived that they were being taught history for history's sake and that it was irrelevant to their study, which may have led to their being disillusioned and unwilling to engage with anything being taught; or they may have perceived that they were being taught history and that double entry bookkeeping was simply the vehicle used and not very important. In either case, this would have suggested that they would have tried less to learn about double entry bookkeeping than had history not been embedded in the teaching.

The Class Test

Class test results of the two cohorts were compared. In order to avoid any inter-cohort comparability issues, the ages, prior study, and gender profiles of the students in each cohort were controlled for: a 2-tailed t-test found no significant difference between the age profile of the two cohorts ($p=0.8978$); a chi-square test found no reason to suggest that the proportion of students in each cohort who had previously studied accounting (25% in 2008/9 and 27% in 2009/10) was significantly different ($p=0.7604$). However, there was a significant shift in the gender balance ($p=0.0082$): the proportion of female students rose from 37 per cent to 52 per cent. While this could have been a concern, it is addressed in the analysis shown below by splitting the two cohorts into their two gender groups and then comparing the performance of the two cohorts by gender.

The test comprised of ten questions each of which described a transaction. The questions were identical for both cohorts[21] and the same instructor (the course leader), using the same marking scheme throughout, marked all scripts.

One hundred and four of the 2008/9 answers had been retained by the course leader and were available for analysis. Whether they had been retained depended upon individual tutorial tutors, some of whom chose to hand-back the scripts to students. As the assessment was formative, marks had not been retained or recorded for any student. However, a two-tailed z-test on final exam grades of the 2008/9 students found no reason to reject the null hypothesis ($p=0.6624$) that these 104 students were from (i.e. representative of) the 2008/9 class. The same result was found for the compulsory question on double entry within their final examination ($p=0.2512$). In addition, a chi-square test comparing the gender split of those students whose scripts had been retained against the gender split for the entire 2008/9 cohort found no significant difference in the gender balance of the group of students whose scripts were retained and the cohort as a whole ($p=0.1644$). That is, there

21) Students could have written-down the questions during the test in 2008/9 and passed them to the 2009/10 cohort to practice and memorise before the test but this is considered highly unlikely because the test was formative, not summative: there was no incentive for anyone to cheat. For the same reason, it was considered even more unlikely that anyone who did write them down would have retained them and passed them to anyone in the 2009/10 cohort.

is no evidence to suggest that this group of students whose scripts had been retained was not a representative sample of the 2008/9 cohort.

The Results

As can be seen in Table 1 and Figure 1, when compared question by question, the 2009/10 cohort significantly outperformed the previous cohort in each of the 10 journal entries, except JE8 (p=0.2049). This question was about a sale on eBay paid by PayPal and it was the second most poorly answered question in 2009/10, with only 27% of the students (20% in 2008/9) answering it correctly. While this could have occurred because this topic was something the students did not expect given the historical context of the course, the lack of a significant increase in the proportion of students who answered this question correctly suggests that it was likely to have more to do with a PayPal payment being something that many of them, even today, were not familiar with, and it was also something they had had very little practice in recording during their course. Interestingly, the worst answered question was JE5, although the proportion who answered it correctly increased significantly (25% versus 12% in 2008/9). The question involved the recording of a cash purchase along with two purchases on credit, a combination which seemed to confuse many students who credited an account in the name of the supplier in all three cases rather than crediting the cash account for the cash purchase. The other questions were more straightforward, and typical of questions used to assess ability to record double entries in a journal. They are reproduced in the Appendix.

In view of the significantly different gender balance between the two cohorts, in assessing the significance of these results, gender was controlled for by comparing the performance of the two cohorts on a gender-by-gender basis. As shown in the lower sections of Table 1 and Figure 1, male students in the intervention cohort significantly outperformed the males in the pre-intervention cohort on all ten questions. They also achieved a significantly higher overall mean average score: 47.8% versus 16.2% (2-tailed t-test; p=0.0000).

In contrast, overall the females in the intervention cohort significantly outperformed the females in the pre-intervention cohort (mean average 51.1% versus 22.9%: 2-tailed t-test; p=0.0000) and did so on all the

individual questions other than the two previously mentioned. It was the female students who found JE8 difficult, not the males; and they continued to find JE5 as difficult as their predecessors in 2008/9 whereas the male students performed significantly better at that question in 2009/10.

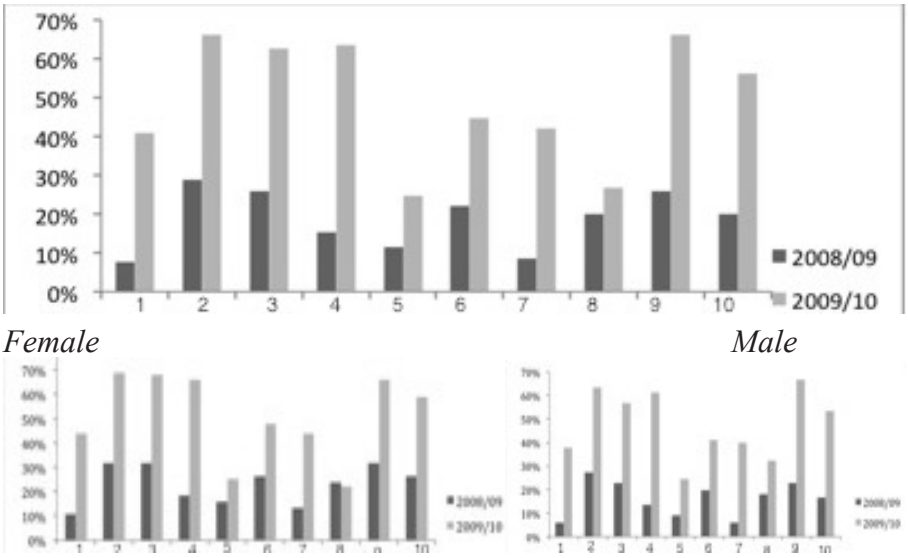
Thus, evidence was found to suggest that some of the significantly improved performance between the two cohorts may have been due to their significantly different gender balances with the males better at coping with the less typical Paypal payment in JE8 and better at isolating the treatment of the cash purchase from the two credit purchases in JE5. Compared to the female students, the male students did achieve a considerably higher level of performance compared to the previous year and seem to have learned more from the course. Nevertheless, even if treated in isolation, the female students in the 2009/10 cohort demonstrated significantly better overall knowledge and understanding of double entry than the female students in 2008/09.

Table 1. Comparison of performance by cohort (2008/9: n=104, f=38, m=66; 2009/10: n=190, f=100, m=90)

% of **ALL** students who were correct	JE1 Initial Capital	JE2 Rent	JE3 Admin Expense	JE4 Motor Vehicle on credit	JE5 Cash purchase	JE6 Cash Sale	JE7 Paying creditor	JE8 eBay Sale	JE9 Paying Utilities	JE10 Paying Wages
2008/09	8%	29%	26%	15%	12%	22%	9%	20%	26%	20%
2009/10	41%	66%	63%	64%	25%	45%	42%	27%	66%	56%
χ^2 (df=1) p:	0	0	0	0	0.007	0	0	**0.205**	0	0
% of **FEMALE** students who were correct	JE1 Initial Capital	JE2 Rent	JE3 Admin Expense	JE4 Motor Vehicle on credit	JE5 Cash purchase	JE6 Cash Sale	JE17 Paying creditor	JE8 eBay Sale	JE9 Paying Utilities	JE10 Paying Wages
2008/09	11%	32%	32%	18%	16%	26%	13%	24%	32%	26%
2009/10	44%	69%	68%	66%	25%	48%	44%	22%	66%	59%
χ^2 (df=1) p:	0	0	0	0	**0.247**	0.021*	0	**0.832**	0	0
% of **MALE** students who were correct	JE1 Initial Capital	JE2 Rent	JE3 Admin Expense	JE4 Motor Vehicle on credit	JE5 Cash purchase	JE6 Cash Sale	JE7 Paying creditor	JE8 eBay Sale	JE9 Paying Utilities	JE10 Paying Wages
2008/09	6%	27%	23%	14%	9%	20%	6%	18%	23%	17%
2009/10	38%	63%	57%	61%	24%	41%	40%	32%	67%	53%
χ^2 (df=1) p:	0	0	0	0	0.014*	0.005	0	0.049*	0	0

Note: the χ^2 results are significant at the 99% confidence level in all cases other than those marked * (95% confidence level) and those shown in bold (not significant)

Figure 1. What percentage of students were correct in answering each double entry question?



Overall, therefore, the performance between the two cohorts clearly improved, and there is no evidence of age, prior knowledge of the subject, or (except as noted above) gender impact upon the results. It appears that the changes introduced had a positive impact upon knowledge, understanding, and application of the principles of double entry in the identification of the accounts to be debited and those to be credited for each transaction, though as recognized above, female students may not have gained as much of a benefit as their male colleagues. One other finding concerned students with no prior knowledge of accounting. While those with prior knowledge outperformed their colleagues significantly in both years (2-tailed t-tests: 2008/9, p=0.0488; 2009/10, p=0.0310), the mean average score for the students with no prior knowledge rose from 14.7% to 44.2% while that of those with prior knowledge rose from 27.5% to 55.4%, suggesting that the intervention may have benefited those with no prior knowledge to a greater extent.

Overall, the assessment results indicate that all three research questions were answered positively:

(i) Double entry bookkeeping was taught successfully today using the first known textbook on double entry bookkeeping dating from the 15th century.

(ii) Double entry bookkeeping was taught successfully using predominantly the didactic lecture method of instruction (the form of instruction in the 15th century and the form of instruction for which Pacioli wrote his treatise) with no small group tutorial workshops to support the students in their learning.

(iii) Students taught using Pacioli's treatise and pedagogy performed better in a formative class test on the creation of journal entries than students who were taught using conventional modern day accounting textbooks and who had the opportunity to apply the methods taught in lectures by working through problems in small group tutorials.

So far as the validity of the result relating to the third research question is concerned, due to the quasi-experimental basis of this study by which the previous cohort was used as a control group, it is possible that confounding variables may have affected the result. However, from the data available on high school performance, age, and assessment, no evidence was found to indicate that the two cohorts were not homogeneous. There was a difference in gender balance but the analysis of the assessment data on a gender-by-gender basis suggests that this would not have caused the degree of difference in overall performance found. The instructor was the same for both cohorts. Another confounding variable could be the extent to which each of the students in the two cohorts had part-time jobs, but this is not something that appears to change greatly from year to year and, while no data was obtained at the time, there was no indication that this element was different for the two cohorts. Also, substitution of tutorials with lectures may have had an impact upon performance but any such effect would likely have been negative rather than positive (see, for example, Abbott 1994). Overall, even

if it were concluded that confounding variables invalidate the comparison, the fact remains that the cohort who studied the subject using Pacioli's text and who were taught using his pedagogy performed surprisingly well in their assessment compared to their predecessors. So far as embedding history in the curriculum was concerned, in this case it took the form of Pacioli's text and the rich stream of historical material it contains. On the basis of these results, there is little doubt that integrating history into the course in this way was a success.

In order to determine what the students had felt about the course in 2009/10, some qualitative data was also gathered.

Student feedback

In order to investigate further the absence of any negative comments about the course in public fora, in the week following the final lecture on double entry bookkeeping, students were asked to complete reflective entries on *PebblePad* (their personal online development portfolio space within the University intranet). They were asked to reflect on, among other things, their expectations versus the reality and, in particular, the use of Pacioli's treatise, plus anything else concerning the class that was of importance to them.

132 useable responses were obtained concerning Pacioli's treatise and are summarized in Table 2.

Table 2. Student opinion concerning Pacioli's treatise

Opinion expressed	Number of responses	% of useable responses
Liked it	83	63%
Were satisfied with it	14	11%
Disliked it	35	26%
Total	132	100%

Thus, of the 132 students, only 35 (26%) disliked the use of Pacioli's treatise which, in the context of accounting education in the U.K., would be considered a satisfactory outcome: a far higher level of dissatisfaction would typically be required before an alternative would be sought. Statements made by the students suggest that those who did not like the book either had modern textbooks they preferred to refer to or found the English of the text old-fashioned or difficult to read. A few reported that they found it difficult to cope with the lack of examples in the text.

Overall, the comments made by the students suggested that they engaged with the book and with the course. In addition, only two students indicated that they felt they were learning history rather than accounting, indicating no evidence of a two-experiment phenomenon: students appeared to accept that they were learning double entry bookkeeping and that this was a legitimate way in which to do so. A number of other issues were apparent in the feedback:

(a) Exceeding expectations

The students' comments suggest engagement that exceeded their personal expectations:

> *'Since I have done double entry accounting [before], this subject was [not] new to me but so far ... it's more interesting that I thought it would be...'*

> *'I was expecting this particular course to have the same old teaching style as I have been used to since I started studying accounting, I was pleasantly surprised to find that it was completely different. The lectures are much more interesting and stimulating.'*

Many comments like these were from those with prior experience of double entry bookkeeping who, in previous years, were more likely to fail to engage with this part of the course. The changes to the course therefore appeared to have been successful in engaging these prior experience students. This impression was supported by the visibly increased attendance at class, indicating that this improved engagement was probably the case with the cohort as a whole, not just those with prior experience.

(b) Changing attitudes to Pacioli's text

Some students were initially skeptical but persevered with the text and changed their opinion, suggesting to an extent that the integration of the text into the course had met with some success:

> *'When I first got the Pacioli book, I thought it has nothing to do with Double Entry, what is that all about? After attending the lectures and reading the materials, I start to the understand that I need to understand and grasp the principles to be able to do Double Entry.'*

> *'When we were given the book on Luca Pacioli I looked through it and I was baffled at what I was reading in the book. This is due to lack of accountancy skills. However now we have studied the section on double entry I now understand parts of the book and things are now gradually getting clearer and I feel this is a great step for me. I feel that the Double Entry process is very easy when using this book as it makes clear sense.'*

> *'I've never done anything finance related. First glance at [the] Pacioli book I thought I'd never understand it, but as they say "never judge a book by its cover", whilst the book inside looks ancient (because it is) it's surprisingly clear. Once I stopped thinking negatively towards Pacioli and read it for what it was, it's easy/clear to pick up the main points/messages he's trying to tell us and along with the lecture slides it's very good. Because the lecture slides just build on the basic understanding from Pacioli and write the same message but in a more 21st century way.'*

> *'Initially, I was not 100% convinced as to the usefulness or relevance of this book. I thought it was outdated (written in C.15th) and used outdated scenarios or examples. The old-English writing style (thou, art, etc.) actually put me off reading it, at one point. After [the instructor] went through Pacioli's book, chapter by chapter in the Lectures, I began to appreciate its relevance to modern Financial Accounting, It not only shows how to do financial accounting, but explains why this is even necessary for business to do it.'*

(c) Increased awareness of the relevance of accounting

A number of other students also referred to how they could now see the importance of accounting to business:

> *'Before I came to University I did not have any idea of what [accounting] was all about. [Now,] I can say that I am very happy that I am studying this particular subject. In the real world a lot of students do not have the clearest idea how to control their business. This is where Accounting is coming to hand. It is providing us with the skills and knowledge you need to control your business. And this is all possible thanks to Luca Pacioli.'*

> *'I am familiar with accounting since I have been doing it for four years now at [high] school level. While attending the Financial Accounting lectures, I realised that I did not master all the details in accounting despite the brilliant result I have got from exams previously. The Pacioli book is a very good reference to understand the why, how and the purpose of accounting. I am sure this book will always be helpful to us even after university.'*

(d) Being inspired

Pacioli's treatise provides instructors with a tool to engage the students with prior experience as well as the novices. Some of the comments provide evidence of student inspiration. Fox (1983), in the spirit of Vygotsky's *zone of proximal development* (Vygotsky 1978; Chaiklin, 2003), advocated application of 'growing theory' which pays attention to the intellectual and emotional development of the learner and sees the role of an instructor not simply as a conduit of knowledge but as someone in a position to present students with an opportunity to be inspired: to intrigue them and encourage them to want to find out more; to excite them about the knowledge they choose to acquire. From analysis of the student comments, it appears that Pacioli's treatise and the manner in which it was embedded into the course and the lectures developed around it enabled the creation of an educational experience for the students that proved to be inspiring:

'But all things considered [the course] is by far the most intriguing for me and [I] enjoy the fact that the instructor is trying to inspire us not just teach us.'

'To begin with, I find [the] course the most exciting, due to the fact that I like the material that it provides and because this course is extraordinary.'

'[This] is a really interesting course [on] something I have never done before. However learning all this rules I find fascinating. Pacioli the father of accounting I think is the most talented guy ever and his book is so amazing. It's unbelievable that people still use the rules and techniques that he invented till this day.'

The words 'amazing' and 'amazed' appear quite a few times in the student reflections. If education is about inspiring students, their being 'amazed' seems to confirm success thanks, in this case, to the use of Pacioli's treatise, the design of the course around it, and the commitment of the instructor. On the basis of this study, Pacioli's pedagogy, and his text, have a place in the accounting curriculum.

Lessons Learned

This study provides evidence that introducing history in this form into the accounting curriculum can have a positive effect upon learning. Student performance at preparing double entries was significantly better than that of the previous cohort which used a traditional modern textbook and CBL-based approach to the subject. While this may have been due to many factors, the lack of any evidence that suggests the two cohorts were not homogenous other than for a shift in the gender balance (which appears to have had only a limited impact upon the overall results) leaves the impression that students learnt better using Pacioli's pedagogy and text as the foundation for the course. They certainly performed much better on a topic that is typically one that students at this level have difficulty learning.

Adoption of a cognitive apprenticeship approach within a relevant historical business context appears to have helped students to better understand the context of the subject and engage better with it, perhaps in part due – in the spirit of Vygostsky's *zone of proximal development* – to their being constantly stretched outside their comfort zone (Sangster and Mulligan 1997) through use of a text translated into 19th century English (which meant that they had to read it carefully in order to understand it) and the embedding of the material they were learning in a Medieval business environment, which meant they had to seek modern-day equivalents in order to understand those business processes.

All three challenges identified from the literature were addressed in the design phase of the project through an emphasis upon instructor personal development, making history the foundation upon which and within which context the subject was taught. As a result:

1. History was incorporated into the curriculum without any reduction in the topics previously covered.
2. The instructor, who had no previous awareness of the history of accounting, gained the necessary historical knowledge through a brief program of focused reading and debate with colleagues – the Pacioli treatise translation by Geijsbeek (1914) includes Geijsbeek's own brief overview of the history of accounting, both before and after Pacioli, making it a useful additional contextual resource, not only for the instructor but also for the students.
3. Through the integration of all the accounting material within a historical business context, students were encouraged to see accounting as more than simply an abstract concept. They engaged with the material in a way not previously experienced by the instructor and significant pedagogical benefits resulted.

In this study, Pacioli's treatise led the students in their cognitive apprenticeship.

However, the embedding of one historical artifact in a course is not sufficient for success. Anyone contemplating innovations of this type needs to be aware that the most crucial challenge to be met is acknowledgement that a great deal of effort and commitment is required from the educators involved.[22] Instructors following this path do not need to be historians: the faculty who delivered this course and the authors cited earlier in this paper as advocates of history in the curriculum had little or no training in history but, echoing the concerns of Sheard (2006) and others, they need to know and understand the historical context they are presenting to their students if such innovations are to succeed.

The Future

The impact achieved in the course was dependent upon a number of key actions in its design and delivery:

1. Careful planning so that this historical artifact was the pivotal resource and source of student learning throughout the period for which it was being used;
2. Selling the idea to students from the start and continuing to do so;
3. Maintaining a 'thick skin', particularly at the beginning of the teaching phase, so that students accepted that this was an appropriate way to learn the topic;[23]

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22) Mainly because of the style of writing and style of presentation of material in the textbook, this implementation required that approximately double the amount of time was needed to prepare for each lecture than would be the case with the development of a typical set of lectures on a new topic.

23) Doing a good "selling job" and maintaining a "thick skin" is a 'normal' necessity for U.K. faculty whenever they introduce a topic or a style of teaching that is different from what students might be anticipated to expect. It is not something unique to the pedagogical implementation reported in this paper.

4. Including referents to today's world in the classes so that students could see the connections through time back to the historical context of the treatise;
5. Supplementing student learning through providing appropriate resources to which students could refer as they worked through the syllabus, including online sources of relevant material and lecture slides, plus audio and video sound bites that helped students identify and understand the historical context within which they were being taught.

The authors have continued to use Pacioli's treatise to teach students double entry bookkeeping and future studies will build on this experience and explore the perceptions of double entry bookkeeping 'novices' compared to those of students with prior experience of studying the topic. In addition, concerning future studies, the literature indicates that higher-order skills may be enhanced *subsequently* if understanding and engagement are raised. They would not be expected to be evident during the initial process of increasing understanding. Consequently, no attempt was made to detect whether higher order skills had been affected during the course of this study. Pursuing this line of enquiry in subsequent courses and years of study is the basis for another line of future research.

Conclusion

The findings of this study are consistent with the literature from other disciplines, demonstrating that history can be integrated into the accounting curriculum to teach a topic (double entry bookkeeping, specifically the accounts to debit and credit when preparing journal entries) that is frequently perceived as difficult for students to learn, with a potentially significant improvement in performance over conventional approaches to the teaching of the topic.

While the engagement with history by both faculty and students permeated throughout the period described, it is possible that the benefits identified arose more from the use of a pedagogy presented in a text which

describes how to prepare journal entries in a way that made it clear how to do so, than because the students had been immersed in the historical context of the journal entries themselves. Future research could involve a study that uses the pedagogy without the text, which was our original plan. However, the fact remains that the result came about because history, in the form of Pacioli's pedagogy and text, was integrated into the teaching of the subject.

Not all the students involved in this study appreciated the inclusion of history and a minority of those involved in the study did not find Pacioli's treatise helpful or appropriate. However, 74 percent did, which must rank the approach as highly successful in the context of individual approaches to learning. Furthermore, student performance in their assessment found that, even though there was opposition by some students to the approach adopted, students engaged better overall with the subject and performed better in the assessment than results in previous years would have foreseen. This may have been influenced to some extent by the instructor having started in academe in 2008[24] and it is possible that some of the improvement in student performance in 2009/10 was due to an improvement in classroom delivery that year as the learning curve all new instructors face was confronted. However, the performance of the 2008/9 cohort was not inconsistent with that of previous years, which suggests that any weaknesses in delivery relating to it being the first year of the instructor's academic career had no discernable impact upon student performance.

Rather than dropping double entry bookkeeping as a distinct stage in the curriculum, if the innovation described in this paper is replicated elsewhere, the benefits of doing so and the recognized benefits of including history in the accounting curriculum which permeate throughout the literature reviewed may be realized and, at the very least, our graduates may be nearer to being capable of doing what the profession expects.

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24) The instructor was by no means a novice teacher in that first year. The previous 5 years had been spent working as a facilitator with a Big-4 firm, which involved presenting a great number of audit and soft skills training courses over that period.

References

• *Abbott, A. S. 1994. Tutorials and independent study as methods of instruction. In Prichard, K. W. and Sawyer, R. M. (eds.) Handbook of College Teaching: Theory and Applications. Westport, CT: Greenwood Press: 179-188.*

• *Accounting Education Change Commission [AECC] 1990. Objectives of education for accountants: Position statement number one, Issues in Accounting Education, 5 (2): 307-312.*

• *Adair, J.G. 1984. The Hawthorne Effect: A Reconsideration of the Methodological Artifact, Journal of Applied Psychology 69 (2): 334-345.*

• *American Accounting Association Committee on the future structure, content, and scope of accounting education (The Bedford Committee). 1986. Future Accounting Education: Preparing for the Expanding Profession, Issues in Accounting Education 1: 168-195.*

• *Arnott, R. 2002. The University of Birmingham medical school and the history of medicine, Journal of Medical Ethics: Medical Humanities 28: 33-34.*

• *Berry, L. H. 1990. Effects of hemispheric laterality on color information processing. Perceptual and Motor Skills, 71(3): 987-993.*

• *Berry, L. H. 2000. Cognitive Effects of Web Page Design. In Abbey, B. (ed.). Instructional and Cognitive Impacts of Web-Based Education. Hershey, PA: Idea Group Publishing: 41-55.*

• *Bisman, J. 2009. Making accounting historians. The Accounting Historians Journal 36 (1): 135-162.*

• *Bloom, B. S. 1956. Taxonomy of educational objectives: The classification of educational goals, David McKay and Company: New York, NY.*

• *Bloom, R. and Collins, M. 1988. Motivating students with a historical perspective in financial accounting courses, Journal of Accounting Education 6: 103-115*

• *Bloom, R. and Solotko, J. 2005. Using an historical account book as a teaching tool, Accounting Education 14 (3): 239-269.*

• *Chaiklin, S. 2003. The zone of proximal development in Vygotsky's analysis of learning and instruction, In Kozulin, A., Gindis, B., Ageyev, V. S., and Miller, S. M, (eds.) Vygotsky's Educational Theory in Cultural Context. Cambridge: Cambridge University Press: 39-64.*

• *Cleveland, F. A. 1904. Introduction. In Haskins, C. W. (ed.) Business education and accountancy. New York: Harper: viii-ix.*

• *Coffman, E. N., Tondkar, R. H. and Previts, G. J. 1993. Integrating accounting history into financial accounting courses. Issues in Accounting Education 8 (1): 18-39.*

• *Collins, J. V. 1894. Plea for teaching the history of mathematics, Science 23, Issue 573: p. 40.*

• *Collins, A. 2006. Cognitive Apprenticeship. In Sawyer, R. K. (ed.) The Cambridge Handbook of the Learning Sciences. Cambridge: Cambridge University Press: 46-60.*

• *Collins, A., Brown, J. S., and Newman, S. E. 1989. Cognitive Apprenticeship: teaching the crafts of reading, writing, and mathematics. In Resnick L. B. (ed.) Knowing, Learning and Instruction: Essays in honor of Robert Glaser, Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.: 454-494.*

• *Currie, R. 1992. Chair of the Board of Accreditation's address to the ICAEW Fellows' Conference, Warwick.*

• *Dwyer, F. M. 1978. Strategies for improving visual learning. State College, PA: Learning Services.*

• *Eichman, P. 1996. Using history to teach biology, The American Biology Teacher 58 (4): 200-204.*

• *Fauvel, J. 1991. Using History in Mathemetics Education, For the Learning of Mathematics 11 (2): 3-6.*

• *Flegm, E.H. 1991. The relevance of history in accounting education: Some observations, Journal of Accounting Education 9: 355-363.*

• *Fox, D. 1983. Personal theories of teaching. Studies in Higher Education 8 (2): 151-163.*

• *Galassi, G. 2011. in conversation with the authors.*

• *Geijsbeek, J. B. 1914. Ancient double entry book-keeping. Denver: Geijsbeek (available on 13 July 2012 at www.archive.org/details/ancientdoubleent00geijuoft*

• *Gingerich, O. 1994. The use of history in Astronomy education, The American Astronomical Society, 185th AAS Meeting, #37.01; Bulletin of the American Astronomical Society 26: 1367.*

• *Gouk, P. 2007. Intercalated degrees in the history of medicine, In Gooday, G. (ed.) Teaching the history of medicine to medical students workshop report, The Higher Education Academy Subject Centre for Philosophical and Religious Studies. (available on 29 October 2011 at http://prs.heacademy.ac.uk/view.html/prsdocuments/95*

• *Homburger, R. H. 1973. The use of medieval statements for teaching accounting: a comment. Accounting Review 48 (4): 785-788.*

• *Hutchins, J. G. B. 1958. Business History, Entrepreneurial History, and Business Administration, The Journal of Economic History 18 (4): 453-466.*

• *Loria, G. 1899. La storia della matematica come anello di congiunzione fra l'insegnamento secondario e l'insegnamento universitario', Periodico di Matematica, anno XIV: 19-33.*

• *Madsen, W. 2008. Teaching history to nurses: Will this make me a better nurse? Nurse Education Today 28: 524-529.*

• *McCarthy, M. 2003. The past in the present: Revitalising history in music education, British Journal of Music Education 20 (2): 121-134.*

• *Mokyr, J. 1998. Science, Technology, and Knowledge: What Historians can learn from an evolutionary approach. Paper presented at the Conference on The Evolution of Science, Santa Fe, U.S.A.*

• *Nelson, S. and Gordon, S. 2004. The rhetoric of rupture: nursing as a practice with a history? Nursing Outlook 52 (5): 255-261.*

• *Norman, K. L., Weldon, L. J. and Shneiderman, B. 1986. Cognitive layouts of windows and multiple screens for user interfaces. International Journal of Man-Machine Studies, 25 (2): 229-248.*

• *Nyman, J. R. 1990. Teaching history with a purpose. Wallsend: Jack R Nyman.*

• *Olwell, R. 2002. Building higher-order historical thinking skills in a college survey class, Teaching History: A Journal of Methods 27 (1): 22-32.*

• *Orne, M. T. 1973. Communication by the total experimental situation: why is it important, how it is evaluated, and its significance for the ecological validity of findings, In Pliner, P., Krames, L., and Alloway, T. (eds.), Communication and Affect, New York: Academic Press: 157-191.*

• *Pacioli, L. 1494. De Scripturis, in: Summa de arithmetica, geometria, proportioni et proportionalita, Venice: Paganino di Paganini, ff. 197v-210v.*

• *Postma , J. and Van Helm, A. 2000. La riegolo de libro: Bookkeeping instructions from the mid-fifteenth century, 8th World Congress of Accounting Historians, Madrid, Spain, July.*

• *Previts, G. J., Parker, L. D., and Coffman, E. N. 1990. Accounting history: definition and relevance. Abacus 26 (1): 1-16.*

• *Previts, G. J., Flesher, D. L., and Samson, W. D. 2006. Using historical research in the classroom. In Reflections on accounting education research, L. M. Smith (ed.), Sarasota, FL: American Accounting Association Teaching and Curriculum Section: 17-43.*

• *Rawlinson, D., and Sangster, A. 1992. EQL Bookkeeping. The Demise of the Lecturer? In Williams, B. C. and Nicholson, A. H. (eds.) Selected Proceedings from the 3rd Annual CTI-AFM Conference, Bradford, U.K.: 31-40.*

• *Rosenfeld, L. B. 1977. Setting the stage for learning. Theory into Practice, 16 (3): 167- 173.*

• *Reinstein, A. and Bayou, M.E. 1997. Critical thinking in accounting education: processes, skills and applications, Managerial Auditing Journal 12 (7), 336-342.*

• *Richardson, A. J. 2008. Strategies in the development of accounting history as an academic discipline. Accounting History 13 (3): 247-280.*

• *Riessman, F. 1986. The use of history in teaching social work, Journal of Teaching in Social Work 2: 3-16.*

• *Sangster, A. 2010. Using accounting history and Luca Pacioli to put relevance back into the teaching of double entry, Accounting, Business & Financial History 20 (1): 23-39.*

• *Sangster, A. 2011. Luca Pacioli, School Teacher and University Professor. In Hernández-Esteve, E. and Martelli, M. (eds). Sansepolcro, Italy: Centro Studi "Mario Pancrazi": 457-472.*

• *Sangster, A. and Mulligan, C. 1997. Integrating the World Wide Web into an accounting systems course, Accounting Education: an international journal 6 (1): 53-62.*

• *Sangster, A. and Scataglinibelghitar, G. 2010. Luca Pacioli: The Father of Accounting Education, Accounting Education: an international journal 19 (4): 423-438.*

• *Sangster, A., Stoner, G., and McCarthy, P. 2007. Lessons for the classroom from Luca Pacioli, Issues in Accounting Education 22 (3): 447-457.*

• *Sangster, A., Stoner, G., and McCarthy, P. 2008. The market for Luca Pacioli's Summa Arithmetica, The Accounting Historians Journal 35 (1): 111-134.*

• *Sangster, A., Stoner, G., and McCarthy, P. 2011. In defense of Pacioli, The Accounting Historians Journal 38 (2).*

• *Savitt, R. 2009. Teaching and studying marketing history: A personal journey, Journal of Historical Research in Marketing 1 (2): 189-199.*

• *Sheard, S. 2006. Developing history of medicine in the university of Liverpool medical curriculum 1995-2005, Medical History 40: 1045-1052.*

• *Slocum, E. L. and Siram, R. S. 2001. Accounting history: a survey of academic interest in the U.S. Accounting Historians Journal 28 (1): 111-130.*

• *Taylor, R. E. 1942. No Royal Road. Chapel Hill, NC: University of North Carolina Press.*

• *Timmons, G. 2006. The future of learning and teaching in social history: the research approach and employability, Journal of Social History 39 (3): 829-842.*

• *Torrecchia, P. 2008. in conversation with the authors.*

• *Trochim, W.M.K. and Donnelly, J. P. 2007. The Research Methods Knowledge Base, 3rd edition. Mason, OH: Atomic Dog Publishing.*

• *Vygotsky, L. S. 1978. Mind in Society: Development of Higher Psychological Processes, Cole, M., John-Steiner, V., Scribner, S., and Souberman, E, (eds.). Cambridge, MA: Harvard University Press.*