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Lesley J. Stainbank Prof
University of KwaZulu-Natal, lesleystainbank@gmail.com

Thanesha Reddy Jankeeparsad
University of KwaZulu-Natal, reddyt@unizulu.ac.za

Aarthi Algu
University of KwaZulu-Natal, algua@ukzn.ac.za

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Teaching Note

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Lesley June Stainbank
University of KwaZulu-Natal
stainbankl@ukzn.ac.za

Thanesha Reddy Jankeeparsad
University of KwaZulu-Natal
thaneshareddy@yahoo.com

Aarthi Algu
University of KwaZulu-Natal
algua@ukzn.ac.za

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ABSTRACT

The aim of this paper is to report students' perceptions on whether the use of accounting software enhances their understanding of the accounting cycle, and improves their information technology skills. Kolb's experiential learning cycle is used to argue that offering a concrete learning experience increases effective learning. The study uses survey research to determine students' perspectives of the usefulness of using accounting software in enhancing their understanding of the accounting cycle in a real business environment. The results show that students perceived the accounting example they used in the accounting software training to have some benefits in helping their understanding of the accounting cycle, and that it had improved their information technology skills. This paper adds to extant literature, where the accounting literature on information technology use in teaching accounting is relatively scarce. The findings are useful to teaching faculty, who may be considering adding a more practical element to their teaching.

Keywords: Accounting software, teaching, learning, second year.

INTRODUCTION

In an attempt to improve the knowledge of students' understanding of the accounting cycle in a second-year accounting module, information technology (IT) has been integrated into their study program by using accounting software. A further reason for the introduction of the accounting software is that in terms of the South African Institute of Chartered Accountant's (SAICA) *Competency Framework* effective at the time this study was carried out, chartered accountant (CA) candidates need to be able to demonstrate an understanding of business and accounting systems (SAICA, 2014). In 2021, SAICA issued the *CA2025 Competency Framework*, which places emphasis on digital acumen (SAICA, 2021a). The International Accounting Education Standards Board (IAESB) of the International Federation of Accountants (IFAC) also requires proficiency in IT as one of its competency areas (IAESB, 2015).

In previous years, a free software package was used in this accounting module; however, this proved unsatisfactory, as the software company was not willing to assist with training in this software, nor was the software widely used. A further problem related to issues with the software program itself. During the help sessions, it also became apparent that the computer skills of certain students were inadequate, and that basic computer training was required. Many students did not take ownership of their project, turning to the lecturer for every query instead of making an attempt to solve issues on their own.

Although the cost of the software program was an issue, a decision was made to change to a more well-known commercial software program in 2014, one which would involve the student incurring cost. However, the students would benefit by receiving training from the software provider, a software manual, an interactive training CD, and upon successful completion of the online assessment, receive a certificate which could be added to their résumés. The software provider also provided four consecutive days of training using the manual. The commercial software package, Pastel Partner, was chosen as the preferred software, and students were required to purchase a Pastel manual for use during the training. Each student was assigned to a four-day training session conducted by a certified Pastel trainer during their July vacation. In addition, Sage Pastel (2015) issued each student with a unique serial number and login details to complete the online multiple-choice assessment after training. If they score more than 75% in the assessment, they are awarded a Pastel certificate of training. They are then allowed two attempts at the multiple-choice assessment.

The purpose of this study is to use survey research to determine students' perspectives on the usefulness of this intervention in enhancing their understanding of the accounting cycle, and whether the intervention improved students' IT skills. The contribution this paper makes is in two main areas. Firstly, the paper provides evidence on students' perspectives on the usefulness of an accounting software package which is widely used in South Africa. Secondly, there is a noticeable gap in the literature on studies which have described and tested the usefulness of accounting software in a tertiary environment (Apostolou et al., 2015; Daff, 2021). The current study addresses that gap.

The remainder of the paper is organized as follows. The next section provides the background to this intervention, followed by the theoretical framework. The paper then discusses the research methodology and the presentation and discussion of the results. The paper ends with conclusions, limitations, and suggestions for future research.

BACKGROUND

In South Africa, universities accredited by SAICA are expected to implement the *Competency Framework* as produced by SAICA (2021a, 2014). According to SAICA, this document is for use by, amongst others, academics to guide them in preparing their courses. The 2014 *Competency Framework* outlined a number of competencies in the various accounting-related disciplines, with a separate section on the information and technology competencies required by prospective chartered accountants. This section elaborated that the reason for this is that "information and information technology competencies have become an integral part of virtually every task undertaken by CA candidates" (SAICA, 2014, p. 19). Furthermore, "there are many competencies in the framework that refer to 'information', 'processes' or 'systems' where, although not explicit in the description, information technology (IT) [proves to be] a consideration" (p. 19). The section ended with the wording that "when reviewing all the competencies in the framework, it must be borne in mind that both manual and automated systems are contemplated" (SAICA, 2014, p. 19). In a section dealing with Accounting and External Financial Reporting, the competency "Develops or evaluates reporting processes to support financial reporting" was included (SAICA, 2014, p. 69). In March 2021, SAICA approved a new framework entitled

CA2025 Competency Framework. This latest framework emphasizes digital competencies (i.e., digital acumen). The ability to use accounting software to create and view financial transactions is listed a learning outcome in the section on using technology for optimizing decision making and promoting business efficiencies and controls (SAICA, 2021b). This emphasis is welcomed, as Kotb et al. (2019) found that professional bodies' accreditation requirements tend to inhibit the coverage of technological developments in British and Irish undergraduate degrees. Bressler and Pence (2019) argue that, besides other skills, universities ought to be responsible for teaching Accounting Information Systems (AIS).

Although the competency frameworks (SAICA 2014, 2021a) do not direct universities to use any particular accounting software in their courses, and while an accounting software application was previously taught in a stand-alone AIS course, pressure on the content of the degree has meant that this course was discontinued a number of years ago, and that for some time, its incorporation into the accounting degree was subject to ad-hoc approaches, but usually part of an existing course. However, the university committed itself to provide students with some exposure to accounting software during their studies, and to support and facilitate their preparation for the working environment and, as explained previously, the accounting software application is now offered as part of the second-year accounting module. Making learners aware of computerized accounting software and that it uses the same accounting principles they are being exposed to in lectures and tutorials, emphasizes the relevance of what they are being taught.

IFAC has also emphasized the importance of IT in the accounting curriculum. The IAESB defines IT as "Hardware and software products, information system operations and management processes, and the human resources and skills required to apply those products and processes to the task of information production and information system development, management and control" (IAESB, 2015, p. 134). IES 2, *Initial Professional Development – Technical Competence*, includes IT as a competence area for aspiring accountants. While the learning outcomes, "(i) Analyze the adequacy of general information technology controls and relevant application controls, (ii) Explain how information technology contributes to data analysis and decision making, (iii) Use information technology to support decision making through business analytics" (IAESB, 2017, p. 36), do not refer directly to the ability to use an accounting software program, it is submitted that knowledge of such a program would enhance students' IT skills.

The Pastel training starts off with the students creating a new company and then processing customers, suppliers, and inventory in a one-month cycle using subsidiary ledgers, the cash book, and the general ledger. Students learn not only to process the entries, but also create quotations, orders, invoices, and credit notes. Students also extract a trial balance and financial statements. A second trading month is then added. Students are then shown how to create reports, correct errors and reconcile the bank account. On the assumption that the company was previously using a manual accounting system, students take on the opening balances and complete the second month of trading. The manual in divided into 12 lessons, and at the end of each lesson are a number of assessment questions. Students thus use the concrete example of a company and its transactions over a two-month cycle and gain first-hand experience of the accounting principles used in its trading cycle. Extant literature (Marriott, 2004) suggests that this provision of a concrete example for learning is supported by Kolb's (1984) learning cycle, which is described next.

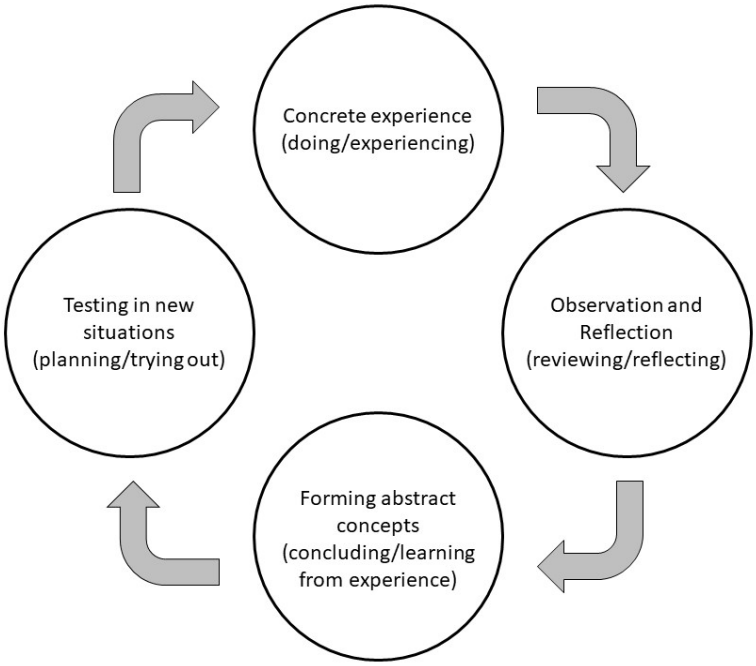
THEORETICAL FRAMEWORK

As the intention behind the implementation of the Pastel project was to enhance the learning skills and knowledge acquisition of the second-year students, particularly with reference to the accounting cycle, the following section provides a brief overview of the theoretical framework used as background to this study. Marriott (2004) uses education psychology to place his study on the use of computer simulations in higher educational into a theoretical context. He argues that experience is an essential component of successful learning. Experiential learning is defined as "a sequence of events that require active involvement by students at various points" (Walter and Marks, 1981 as cited in Marriott, 2004, p. 57). Marriot refers to the four-stage learning cycle described by Kolb (1984), where individuals are categorized according to the extent they favor a particular learning style. Marriott (2004) explains that the central argument is that students learn best by actual involvement. Marriott (2004) further argues that the use of "computer technology in accounting education may have a role to play in providing this concrete experience and this may enhance the learning process for students" (p.59).

Kolb's (1984) experiential learning cycle is usually shown as a four-stage learning cycle, where the student moves through all stages. This cycle is shown in Figure 1.

Figure 1

Kolb's Experiential Learning Cycle



Note: Adapted from McLeod, 2013.

Abramoff (1993), writing more than ten years before Marriott (2004), also referred to Kolb's (1984) experiential learning theory noting that accountants tend towards the convergent learning or style, "which means that they are best at solving specific, structured problems, where there is one correct solution" (p. 277). Convergers learn better when provided with practical applications of concepts and theories (Marriott, 2004). Bagranoff (1993) supports the idea of teaching different learning strategies

along with the subject matter, which helps students, move from "solving structured technical problems to handling more abstract, conceptual issues in a dynamic environment" (p. 277). Acquiring software knowledge requires students to "…exercise critical thinking and employ learning strategies for solution" (Bagranoff, 1993, p. 277). Kaidonis (1993) also reported the results of an intervention using a computerized accounting system and indicated that the teaching approach used "intended to offer the opportunity for experiencing, observing and reflecting, forming abstract concepts and testing implications […] in the expectation that this opportunity would increase the chances of inducing effective learning" (p. 5). In this project, students are provided with a concrete example (by creating a new company and recording transactions), where there is observation and reflection (by learning how to process entries), concluding and learning from the experience (by coming to the end of the first accounting cycle) and finally, testing in a new situation (by starting a second accounting cycle and attempting the assessment questions).

It must be noted that the objective of this paper is neither to test whether students have significant differences in their learning styles, nor to test whether this project is aligned to any particular learning style. It was also not the intention of this intervention to test students' acceptance of technology using the technology acceptance model (Davis, 1989). Students in the CA(SA) accounting stream at universities complete a three-year training contract after graduation at accredited training offices and therefore become accustomed to the various accounting software packages used by clients. The intention of the computer project was to provide students with a concrete example using an accounting information system, and it may therefore assist students whose particular learning style benefits from such an experience. The next section provides the literature review.

LITERATURE REVIEW

There has been limited research investigating the use and usefulness of accounting software in accounting courses (Daff, 2021). Apostolou et al. (2015), in their literature review of accounting education, found a dearth of research evaluating teaching innovations in AIS. Meanwhile, Jackling et al. (2013), in their review of 20 years of publication of *Accounting Education*, noted that studies on IT addressed the increasing IT skills of students and how technology can be used in the classroom to enhance students' learning. Some studies (Togo & McNamee, 1995) did not conduct empirical research, but instead provided advice or insights into the topic.

Togo and McNamee (1995) provided a literature review examining the learning benefits, problems, and guidelines for integrating the computer into the accounting curriculum. They suggested three guidelines (use the computer for integrative topics; require a basic business computer skills course as a prerequisite to an accounting course which has computer projects; and complete any computer projects on the examinable material before the examination as preparation) to enhance the net learning benefits of computer integration. Boyce (1999) argued that computer assisted learning technologies have the potential to make a contribution to accounting education and the development of generic or soft skills in students. Boyce (1999) cautioned that the technology ought not to be regarded as a passive addition to teaching, but that the technology should be placed within a pedagogical framework. He reasoned that, as the computer increases its importance and decreases the need to focus mainly on technical skills, this would allow more time to be devoted to the development of generic skills, and in particular human and interpersonal skills (Boyce, 1999. Stoner (2009) examined accounting students' IT application skills over the years 1996/97 to 2007. Stoner (2009) argued that, although students' IT skills are improving, a diversity exists in entrant students' IT skills, which needs to be addressed in the accounting curriculum.

Badua et al. (2011) argued for the need for a second course in AIS. Pan and Seow (2016) proposed four AIS undergraduate courses to prepare accounting students for the digital revolution.

Spraakman et al. (2015) focused on the needs of employers for IT skills. They found that the IT knowledge and skills that employers require from management accounting graduates was competency in Microsoft tools (especially EXCEL), with only some familiarity required for an Enterprise Resource Planning (ERP) system such as the Systems, Application and Product (SAP) data management program. Lee et al. (2018) reported similar findings in their study of accounting practitioners' opinions on the importance of various software tools. Kotb et al. (2019) and Al-Hattami (2021) argue that the lack of IT in the accounting curriculum is contrary to the job market demands for IT. Daff (2021) meanwhile found that most employers wanted graduates with knowledge of accounting software, but that there is a need to understand the movement of information in the accounting system to evaluate the output. These studies emphasize that there is a need for more IT to be included in the accounting curriculum.

Other studies (Bagranoff, 1993; Boulianne, 2014; Kaidonis, 1993; Marriott, 2004; Papageorgiou, 2014) have examined the relationship between computer software in an educational environment and its impact on learning. Bagranoff (1993) describes the use of commercial-use software as an educational approach to teach students how to learn. An AIS course project was developed in order to teach learning strategies, develop cognitive thinking skills, and to prepare students to solve unstructured problems. Bagranoff (1993) explains in this regard that by "adopting commercial-use software, students learn how to read software manuals, acquire knowledge about 'how to learn' new software, and learn the strengths and weaknesses associated with computerized accounting applications" (p. 280). In addition, students learn about the accounting cycle in a small business setting, how to process transactions, and the documentation required in order to provide an adequate audit trail. While the usefulness of this approach was not tested empirically, the article provides some advice to educators concerning the implementation of such an approach, such as the length of time students take to learn the software and solve problems, as well as the costs involved.

Kaidonis (1993) investigated students' understanding of accounting concepts and the effects of a computerized accounting package using data from both Australia and Hong Kong. Tests were administered both before and after a five-week computerized accounting section. The study notes that the intention was not to determine whether students had different learning styles, or to see which aspects of the teaching approach responds to the students' particular learning styles. Kaidonis (1993) reported that the results were encouraging but inconclusive, due to the "differential outcomes" (p. 14). In some topics, the students did worse, and this raised some questions about the "first and second year accounting subjects as well as questions about the use of computerized accounting" software (Kaidonis, 1993, p. 14). Further investigation was warranted. Marriott (2004) describes the use of a computer business simulation, using spreadsheets, in a final year accounting course in an undergraduate degree in a traditional UK university. Students were asked to write a two-page reflection of their experiences. Marriott (2004) outlined a number of advantages of the simulation, such as, students were "learning by doing, content to learn from their mistakes in an unthreatening simulated real-world environment" (p. 68). Marriott (2004) argued that the approach was more in line with experiential learning. Boulianne (2014) investigated the impact that software utilisation may have on accounting students in a Canadian Business School. The main objective of the study was to determine to what extent does using computers to study the accounting cycle lead to better knowledge acquisition. Three groups of students participated: students who only completed the case study manually; students who first completed the case study manually and then used accounting software; and students who completed the case only using accounting software. The results indicated that students who used both methods had the best knowledge

acquisition, followed by the students who used only the software. Papageorgiou (2014) investigated whether the inclusion of computerised accounting in a first-year accounting course helped students to acquire the skills that relate to real-life practice and improve their IT skills. Her findings, relevant to this current study, indicated that students agreed that the inclusion of computerised accounting would be beneficial to them in terms of real-life practice, and that their increase in IT knowledge would be relevant when they entered the business world.

Lane and Porch (2002) and McDowall and Jackling (2006) examined the impact of computer aided (or assisted) learning on performance. Lane and Porch's (2002) focus was on non-specialist accounting graduates. Students' perceptions of computer aided learning (using an accounting software package) were that it was easy to use; however, it was not viewed as valuable in improving computer literacy and they were less likely to choose accounting as a career (Lane and Porch, 2002). Furthermore, Lane and Porch (2002) did not find the use of computer aided learning to be a determinant of student performance. In contrast to the study by Lane and Porch (2002), McDowall and Jackling (2006) found that the use of an accounting software package significantly influenced performance.

Other studies focused on the technological readiness (Lai, 2008) or technology acceptance (Sriwidharmanely & Syafrudin, 2012) of accounting students. Watty et al. (2016) provided evidence on the technological acceptance of educators. Studies (Blount et al., 2016; Kotb et al., 2019; Mgaya & Kitindi, 2008, 2009) also focused on the skills required by teaching staff in order to integrate accounting software in classrooms. Mgaya and Kitindi (2008) found in a study on academics and practising accountants in Botswana that accounting packages are rated highly amongst the most important skills for practising accountants, but that both academic and practising accountants' IT skills did not meet the desired levels. The study recommended that accounting and auditing packages ought to form part of the accounting curricula in accounting colleges in Botswana. They also recommended in a separate publication (Mgaya & Kitindi, 2009) that the Botswana Institute of Accountants ought to liaise with employers and educators so as to ensure that educators have the necessary skills and experience. Blount et al. (2016) found significant challenges for students to achieve learning outcomes using SAP in large classes, mainly due to the technical competencies required by the teaching staff to integrate SAP into the accounting curriculum. Kotb et al. (2019) found the lack of competent staff with IT skills, the lack of staff interested in teaching IT and the already overcrowded curriculum to be the three top barriers for incorporating IT into the curriculum.

To conclude this literature review, there have been limited studies reporting on the use of accounting software for teaching and learning purposes (Apostolou et al., 2015; Daff, 2021). Studies (Bagranoff, 1993; Boyce, 1999; Marriott, 2004; Papageorgiou, 2014) have found or proposed that there are benefits to adopting accounting software for teaching purposes, although in some instances (Kaidonis, 1993) the results were encouraging, rather than conclusive. Boulianne (2014) found that both approaches (manual and computerised) provided the best results. While Lane and Porch (2002) found no relationship between the use of accounting software and performance, this can be contrasted with the McDowall and Jackling (2006), who did find a positive relationship between its use and performance. Blount et al. (2016) found that integrating software in the classroom had specific challenges for the teaching staff. This was also noted by Mgaya and Kitindi (2008) and Kotb et al. (2019), who found the IT skills of educators lacking. Blount et al. (2016) also noted the challenges for educators in introducing accounting software into the classroom. Studies have also called for an increase in IT in the curriculum (Al-Hattami, 2021; Daff, 2021; Kotb et al. 2019; Stoner, 2009).

METHODOLOGY

Using questions adapted from extant literature (Boulianne, 2014) and personal knowledge of the Pastel project, a questionnaire was drawn up to address the study's objectives. The use of survey research allows for both a quantitative and qualitative approach through the use of closed and open questions. The questionnaire was pre-tested using second year accounting tutors and teaching staff. Where necessary, further adjustments were made. The questionnaire consisted of background questions, and a number of statements, which students were required to answer on a Likert scale of 1 (strongly disagree) to 5 (strongly agree). A number of general questions were also posed with the aim of soliciting students for the views on why they may not have considered Pastel an effective learning tool, which aspects of the Pastel training helped them the most with their understanding, which reflection technique the students had used, and what suggestions could they make to improve the project. These general questions were populated with some of the reasons students could choose for their answers, but also allowed the students to add their own responses. These questions were thus a mixture of open and closed questions.

The questionnaire was distributed in a paper-based format to all second-year accounting students in their tutorial classes after the completion of the Pastel project. Students' participation was voluntary and as their names or student numbers were not required, they remained anonymous. At the time the questionnaire was administered, 426 students were enrolled in the course and 221 students completed the questionnaire, providing a response rate of 51,88 percent. As the survey was anonymous (and only administered once), it was not possible to examine for non-response bias. The data from the questionnaire was entered onto an Excel spreadsheet before importing into SPSS version 24. Using SPSS, the following results were obtained. Table 1 shows the students' gender and home language. The means and standard deviations (SD) for the total sample, and on a gender basis (Table 2) and a language basis (English first language (EFL) vs. English second language (ESL)) (Table 3) were then calculated. To identify statistically significant differences in the students' opinions on a gender or language basis, the Mann-Whitney U test for independent samples was used. These results are also shown in Tables 2 and 3, respectively. The results to the general questions are then discussed.

RESULTS AND DISCUSSION

Table 1 shows the gender and language background of the students.

Table 1

Background Information

Gender	Number[a]	%
Male	91	42.3
Female	124	57.7
Total	**215**	**100.0**
Home language (mother tongue) English?	Number[a]	%
Yes (English first language – EFL)	171	77.4
No (English second language – ESL)	50	22.6
Total	**221**	**100.0**

Note.[a] In some instances questionnaires were not filled in completely, leading to differences in the totals.

Table 1 shows that the majority of students were female (57.7%) and that most of the students were EFL speakers, although a substantial number (22.6%) are ESL speakers. South Africa has 11 official languages, but most tertiary education is delivered in English. Determining the number of ESL students is useful when addressing the usefulness of teaching strategies, as more attention could be given to strategies that prove to be more effective for ESL students. A question on the students' prior computer experience revealed that 198 (90%) students had computer experience from secondary schooling, and 131 (59%) students indicated that they had had previous computer training. All students are required to pass a first year Information Systems Technology (IST) module, which may have served as a benchmark. Alternatively, in South Africa, many schools offer learners the opportunity to write the International Computer Drivers Licence (ICDL) examinations, which would have provided them with a further opportunity for computer training. Notwithstanding this, 90 students (41%) indicated that this was the first time they had received any formal computer training. This group of students may have had an inferior secondary schooling experience with poor computer facilities due to a legacy of injustices that still exist in the South African schooling environment (Mdepa & Tshiwula, 2012).

Table 2 shows the students' responses to a number of statements which were designed to address the objectives of this study.

Table 2

Students' Perceptions of the Usefulness of the Pastel Project (Gender)

No.	Statements	Female $n = 124$		Male $n = 91$		Total $N = 215$		Mann-Whitney U test[a]	
		M	*SD*	*M*	*SD*	*M*	*SD*	*Z*	*p*
1	I found the step-by-step procedures set out in each chapter of the manual beneficial to my learning.	4,32	0,72	4,17	0,86	4,26	0,78	-1,164	0,244
2	Completing the accounting software project increased my understanding and knowledge of accounting entries.	3,79	0,97	3,66	1,05	3,74	1,00	-0,829	0,407
3	Although I could use Pastel, I did not understand the underlying accounting principles.	2,38	1,20	2,43	1,20	2,40	1,20	-0,303	0,762
4	Completing the accounting software project was an interesting and enjoyable learning experience.	3,78	1,00	3,64	1,09	3,72	1,04	-0,837	0,403
5	I enjoyed being exposed to a real-life business environment.	3,98	0,90	4,40	4,34	4,16	2,90	-0,024	0,981
6	I was able to apply the accounting principles I had learned in lectures and tutorials in the Pastel project.	3,63	1,01	3,66	1,11	3,64	1,05	-0,448	0,654

No.	Statements	Female $n = 124$		Male $n = 91$		Total $N = 215$		Mann-Whitney U test[a]	
		M	*SD*	*M*	*SD*	*M*	*SD*	*Z*	*p*
7	The Pastel project was a practical approach to accounting unlike our lectures and tutorials which are more theoretical.	3,83	0,97	3,71	0,97	3,78	0,97	-0,951	0,342
8	Having done the Pastel project, I am now more confident to use information technology.	3,86	0,89	3,96	0,82	3,90	0,86	-0,748	0,455
9	The Pastel project improved my technology/ software skills.	4,02	0,78	3,68	0,98	3,88	0,88	-2,603	0,009*
10	The Pastel project taught me new technology/software skills.	4,12	0,71	3,75	0,95	3,96	0,84	-2,956	0,003*
11	I found Pastel easy to use.	3,97	0,83	3,93	0,89	3,95	0,85	-0,178	0,859
12	Completing the accounting software project was a difficult task.	2,23	1,00	2,59	1,21	2,38	1,101	-2,137	0,033*

Note. A Likert scale where 1 = *strongly disagree*, 2 = *disagree*, 3 = *neither agree nor disagree*, 4 = *agree*, and 5 = *strongly agree* was used.
[a]The *p*-value from the Kolmogorov-Smirnov test indicates that none of the distributions are normal. Hence, non-parametric tests were used.
*$p < .05$

Statements 1 to 7 (as shown in Table 2) focused on the learning aspects of the Pastel project, where the analysis of these responses addresses the purpose of this study which was to determine whether the Pastel training and project enhanced students' understanding of the accounting cycle. Statements 3 and 6 focused on the accounting principles; however, the total mean was only 3.64 for the statement *I was able to apply the accounting principles I had learned in lectures and tutorials in the Pastel project* (statement 6). Students disagreed with the statement *Although I could use Pastel, I did not understand the underlying accounting principles,* indicating they did have an understanding of the accounting principles. Statements 3 and 6 can also be linked to statement 2, *Completing the accounting software project increased my understanding and knowledge of accounting entries* (m = 3.74), as the teaching of these entries are firmly embedded in the relevant accounting principles used in the accounting cycle. The statement with the highest mean was *I found the step-by-step procedures set out in each chapter of the manual beneficial to my learning* (m = 4.26); this was followed by *I enjoyed being exposed to a real-life business environment* (m = 4.16). These responses indicate that there were positive benefits to the Pastel project, supported by statement 4, which referred to the *accounting software project as an interesting and enjoyable learning experience* (m = 3.72). When sorted on a gender basis, there were no statistically significant differences shown between male and female responses in respect of statements 1 – 7. These findings, that students perceived useful benefits from the Pastel project, support the findings of Boulianne (2014) and McDowall and Jackling (2006), although the current study did not attempt to find any relationship between the project and student performance. However, this is contrary to the findings of Lane and Porch (2002).

The secondary objective focused on whether the project improved students' IT skills. The statements which focused on this aspect (statements 8 – 12) showed a high level of agreement when considering the

mean scores for the total sample. Three of the statements (*The Pastel project improved my technology/software skills* (m = 3.88); *The Pastel project taught me new technology/software skills* (m = 3.96); and *Completing the accounting software project was a difficult task* (m = 2.38) showed significant statistical differences at p <.05 on a gender basis. The female students' means for three statements were 4.02, 4.12 and 2.23, respectively. Students also agreed with the statements on finding Pastel easy to learn and easy to use with means approaching 4.00. Therefore, with regards to the second objective, based on the mean scores, the project did improve students' IT skills, but more so for the female students than the male students. Students were also accepting of the new technology (easy to learn and easy to use). With regards to the gender results, Stoner (2009) noted that an earlier reported gender gap in IT skills was diminishing. This study shows that female students found their IT skills were improved more so than the male students, which may indicate that there remains a gender gap in IT skills in this environment.

In summary, with regards to the two objectives, the results indicate that there were learning benefits for the students from participating in the project and that the project improved students' IT knowledge. Only in a few statements (discussed above), did the female and male students have statistically significant different responses to the statements.

Table 3 shows the results in respect of the same statements, but split on a language basis.

Table 3

Students' Perceptions of the Usefulness of the Pastel Project (Language)

No.	Statements	EFL[b] *n*=171		ESL[c] *n*= 50		Total *N* = 221		Mann-Whitney U test[a]	
		M	*SD*	*M*	*SD*	*M*	*SD*	*Z*	*p*
1	I found the step-by-step procedures set out in each chapter of the manual beneficial to my learning	4,24	0,77	4,34	0,80	4,26	0,78	-0,991	0,322
2	Completing the accounting software project increased my understanding and knowledge of accounting entries.	3,73	1,05	3,76	0,87	3,74	1,01	-0,097	0,923
3	Although I could use Pastel, I did not understand the underlying accounting principles.	2,32	1,21	2,68	1,12	2,41	1,20	-2,158	0,031*
4	Completing the accounting software project was an interesting and enjoyable learning experience.	3,69	1,09	3,78	0,93	3,71	1,05	-0,410	0,682
5	I enjoyed being exposed to a real-life business environment.	4,21	3,21	4,02	0,79	4,17	2,85	-0,052	0,958
6	I was able to apply the accounting principles I had learned in lectures and tutorials in the Pastel project.	3,63	1,09	3,71	0,91	3,65	1,05	-0,382	0,703

No.	Statements	EFL[b] *n*=171		ESL[c] *n*= 50		Total *N* = 221		Mann-Whitney U test[a]	
		M	*SD*	*M*	*SD*	*M*	*SD*	*Z*	*p*
7	The Pastel project was a practical approach to accounting, unlike our lectures and tutorials, which are more theoretical.	3,82	0,99	3,68	0,87	3,79	0,97	-1,293	0,196
8	Having done the Pastel project, I am now more confident to use information technology.	3,92	0,86	3,86	0,83	3,91	0,86	-0,539	0,590
9	The Pastel project improved my technology/ software skills.	3,89	0,91	3,88	0,77	3,89	0,88	-0,219	0,827
10	The Pastel project taught me new technology/software skills.	3,97	0,88	4,00	0,67	3,97	0,84	-0,142	0,887
11	I found Pastel easy to use.	4,03	0,79	3,72	0,99	3,96	0,85	-2,032	0,042*
12	Completing the accounting software project was a difficult task	2,37	1,12	2,44	1,05	2,38	1,10	-0,595	0,552

Note. A Likert scale where 1 = *strongly disagree*, 2 = *disagree*, 3 = *neither agree nor disagree*, 4 = *agree*, and 5 = *strongly agree* was used.
[a]The *p*-value from the Kolmogorov-Smirnov test indicates that none of the distributions are normal. Hence non-parametric tests were used. [b]English first language. [c]English second language.
*$p < .05$.

An examination of the means in Table 3 shows that five of the first seven statements on learning were more supported by the ESL students. Statement 3 (*Although I could use Pastel, I did not understand the underlying accounting principles*) showed a statistically significant difference in the responses, with ESL students showing less disagreement with the statement when compared to EFL students. In other words, ESL students did not disagree with the statement to the same extent as the ELS, and presumably found some benefit using the software to understand the accounting principles. The support of the ESL students for the usefulness of the project to improve their understanding may be useful for educators who are contemplating teaching and learning strategies aimed at helping ESL students. With regards to the statements on information technology (statements 8 to 12), only one statement was more supported by the ESL students, and that was statement 10: *The Pastel project taught me new technology/software skills.* Statement 11 (*I found Pastel easy to use*) showed a statistically significant difference in the responses. Here, the ESL students were less in agreement with this statement. ESL students may not have had the prior experience that EFL students had with computers in secondary schools. As none of the studies discussed in the literature reported on any language differences, no comparisons to other studies are made.

The following discussion provides helpful information to the teaching staff of this course and may be helpful to other educators who have already introduced accounting software in their courses or are thinking of doing so. Students, when asked to report any reasons why they did not find Pastel to be an effective learning tool, reported that the time spent on learning the software was too short (32 students). The next reason highlighted was the procedure-driven focus of the manual, which students felt did not complement their learning styles (21 students). Fourteen students indicated that they were already

familiar with different software programs, and six students commented that they had not learnt anything new. Finally, two students felt that the time taken up by Pastel was too long.

When asked what aspects of the project the students found to be the most beneficial, 141 students indicated that actually working with the software had been the most beneficial, followed by attendance at the practical sessions 134 students. Amongst other students, 95 highlighted the usefulness of the practical activities, and re-reading material covered in the practical sessions was also highlighted as being useful by 66 students. Providing students with a hands-on concrete example of recording transactions using accounting software was therefore beneficial to their understanding, and hence their learning. A number of students indicated that they had used a reflection technique to help with their understanding. In the Pastel training sessions, reflection techniques comprised of the completion of short objective questions at the end of each chapter, and summaries of the principles provide by trainers. Students were encouraged to make their own summaries during the training sessions, as well as to use mind maps. Some 63 students felt that revising short objective questions would be most beneficial, followed by a revision of principles, summarized at the end of Chapter 52. Although students were also given the opportunity to add suggestions for improving the Pastel project, only a few used this opportunity. Suggestions ranged from making the project longer (9 students) or shorter (4 students), with some indicating that the timing was inconvenient (three students), while 7 students wanted the project to count towards their class mark.

This study has found that there are benefits to adopting accounting software for teaching purposes. Comparing the results of this study to those preceding it is difficult in view of a discrepancy of focus. However, this study does support the results and commentaries of other authors (Bagranoff, 1993; Boyce, 1999; Marriott, 2004; Papageorgiou, 2014). As the actual intervention reported on is used to re-enforce the teaching of the accounting cycle using a manual method, these students have benefitted, as Boulianne (2014) found that both approaches (manual and computerised) provided the best results. Because the teaching of the software was outsourced to the service provider (Sage Pastel), the challenges found by Blount et al. (2016), Mgaya and Kitindi (2008), and Kotb et al. (2019) for teaching staff were avoided.

CONCLUSIONS, LIMITATIONS AND FURTHER RESEARCH

The objective of this paper was, having described the Pastel project and training, to provide some evidence regarding whether the project had helped students in their understanding of the accounting principles involved in the accounting cycle, and whether the project and the training had improved their IT skills. The results provide support for Kolb's experiential learning cycle, demonstrating that students learn best by actual involvement in a project, which requires them to engage in all four stages of the learning cycle.

The results, in general, supported that the Pastel project is useful in students' understanding of the accounting cycle with some means approximating 4.00 (indicating agree) for most of the statements in that section. Students found the greatest benefit from the Project to be the exposure to a real-life business environment, and that the manual set out the procedures very clearly. With regards to improving students' IT skills, the responses showed stronger support, with the means for the positive statements all approximating 4.00. The female students were more supportive of the statements concerning IT and saw more IT benefits from the project than did the male students. On a language basis, the EFL students found the project to be easier than the ESL students in some areas, which had statistically significant different responses (understanding of the accounting principles, and ease of use of Pastel).

There were mixed comments regarding the effectiveness and improvement of the Pastel project, with a majority of the comments (albeit from only a small number of students) wanting the training to be longer. However, students indicated that it was the actual working with the software and attendance that helped them the most with their understanding. In summary, the Pastel project proved useful by exposing students to a real-life business environment and improving students' IT skills. This may be useful to other accounting educators, who are not using any accounting software currently, or who may be considering the use of such a program in the future.

The limitations of the study are that, although the project is presented on two campuses, only the students on the larger campus were asked for their opinions on the Pastel project. Therefore, the results cannot be generalised beyond this group of students. Furthermore, the data used in the study was all self-reported by students and it was not possible to verify their answers. There was an imbalance in the number of EFL and ESL students, which may have biased the results on a language basis. As this questionnaire was administered before the students wrote their final examinations, it was not possible to determine any relationship between the Pastel project and performance. The study also only used the Kolb's experiential learning cycle as background to the study and did not consider using the technology acceptance model (Davis, 1989) to make other inferences from this teaching and learning intervention.

Future research might seek out the opinions of the students on the smaller campus to provide comparative results. Comparing the use of this software to the use of other software in other accounting courses may also provide further information on the efficacy of accounting software in accounting education. The study was conducted before SAICA issued its CA2025 Competency Framework (SAICA, 2021). Future research could evaluate the impact of the new framework on the curricula of accounting programs in accredited universities in South Africa. Future research could also test Kolb's experiential cycle by operationalising its core concepts as measures in a questionnaire or restructure the questionnaire to test the Technology Acceptance Model using accounting students who are not in the CA(SA) accountancy stream.

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