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# The Effect of Computerised Accounting on the Understanding of Accounting Concepts: Some Preliminary Results

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by

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# THE EFFECT OF COMPUTERISED ACCOUNTING ON THE UNDERSTANDING OF ACCOUNTING CONCEPTS: SOME PRELIMINARY RESULTS.

## ABSTRACT

Accounting Information Systems students from an Australian University were tested to see whether the use of a computerised accounting package (sybiz Plus, rev L) enhanced their understanding of accounting concepts.

A five part test was given to students of Accounting Informations Systems of a Bachelor of Commerce degree. A similar five part test was given after a five week Sybiz section of lectures and workshop and an assignment. Each part of the test tested specific accounting concepts.

The results of the before and after tests in specific accounting concepts differed. There was a significant improvement in their overall performance in an accounting concepts test and particularly in their understanding of internal controls. There was no difference in the performance in concepts of short - term liquid assets and inventories. However, there was a deterioration of performance in tests on business income & adjusting entries and completing the accounting cycle. It is this difference which is surprising and which makes these preliminary results interesting, despite the lack of controls.

These preliminary results suggest that specific testing of the impact of specific packages is useful in attempting to address whether the use of computerised accounting in AIS meets the objectives of integrating computers in accounting education.

## ACKNOWLEDGMENT

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## INTRODUCTION

There is no denying that the technological change in the last 20 years has been astounding. Accounting education has also been significantly affected by computer technology and the integration of computers in the accounting curriculum is still an evolving process [Birkett 1987, McCall 1988]. Attention has been drawn to the objectives of such integration by McCall [1988, pg 12 ], who quotes the American Accounting Association [1985] as identifying the objectives as:

> "*1. To teach accounting more effectively; and*
>
> *2. To provide students with the prerequisite computing skills.*"

The results of Orpen and Ferguson [1991], indirectly confirmed that, the objective of providing students with prerequisite computing skills, was being met. In their study, students were found to have a positive attitude to working with computers, which was related to the amount of time they spent with computers (and quite likely related to students' computer literacy).

The objectives identified by Bromson, Kaidonis & Poh [1991], were consistent with those of AAA [1985] and helped to highlight research questions to be tested. Their objectives were as follows:

> ". develop and reinforce understanding accounting concepts
>
> . develop an understanding of the need for controls in an accounting computer environment
>
> . respond to the needs of the professional environment
>
> . expose students to a commercially available package." [Bromson, Kaidonis & Poh, 1991,].

It is the first two of their four objectives that this paper explored empirically. This paper looked at the impact of a commercially available package and text on the understanding of specific accounting concepts, including internal controls of a computerised accounting environment. Whether the use of a computerised accounting package improves computer literacy is not the focus of this paper.

Two distinguishing features need to be noted in this paper. The first, is that accounting performance is not only tested, but specific accounting concepts are addressed, rather than using final grades in Accounting subjects, as in Orpen and Ferguson [1991]. The second distinguishing feature, is that this paper focuses on the impact of specific software, namely, a commercially available integrated accounting package (Sybiz Plus, Revision L), instead of reference to computers in general.

## METHOD

### The Students

The students participating in the tests were enrolled in a second year Accounting Information Systems subject as part of their Bachelor of Commerce degree. This subject can be done after completion of first year Accounting or any time after. Hence some students were in their second year of study, while others were in their final year. The heterogeneity of the group was not explicitly explored, but may not be a problem for this experiment, given Orpen and Ferguson's [1991] conclusion that "attitudes to working with computers were independent of virtually all of the correlates assessed in the study" [pg 117]. This issue is addressed again later.

### The Test

Students were asked to complete a 5 part test consisting of 10 multiple choice questions and 10 true false questions in each part. The parts of the test increased in complexity and followed the progression of a typical first year accounting text book [Needles , Anderson, & Caldwell, 1984]. In this experiment the questions came from the data test bank which accompanied the text. The text book and corresponding data test bank were not used by any accounting subject during the degree course. Each part of the test addressed specific concepts, as described in the table 1.

INSERT TABLE 1. CONTENT OF TESTS.

Two similar[1] but not identical tests, were given to students during the lecture. Test B (consisting of Test 1B-5B) was given BEFORE the students had a 5 week Sybiz section (to be described below) and Test A (consisting of Test 1A-5A) was given AFTER the Sybiz section.

**The Sybiz Section.**

This section consists of five weeks of lectures, workshops and an assignment, specifically on a computerised accounting package, namely, Sybiz Plus, Revision L. The teaching approach adopted was consistent with that described by Bromson, Kaidonis & Poh [1991], namely one two-hour lecture and one two-hour workshop per week. Computerised accounting was included in the second year subject on Accounting Information Systems, of the Bachelor of Commerce degree. The use of a commercially available package, namely Sybiz Plus (rev L), and the corresponding text by Gerrard, Bromson & Kaidonis, [1989] was also in accord with Bromson, Kaidonis & Poh [1991] A sequential approach to teaching computerised accounting was used as shown in figure 1. Job costing was not included in this Sybiz section.

INSERT FIGURE 1. SEQUENTIAL APPROACH TO TEACHING COMPUTERISED ACCOUNTING.

**Hypotheses.**

Six specific hypotheses were tested to see if performance in specific topics of accounting concepts differed.

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1 A panel of experts compared the before and after tests (all parts) and judged them to be similar but not identical.

$Ho_1$: Students' performance in an accounting concepts Test 1 before (T1 B) using a computerised accounting package is the same as their performance in Test 1 after (T1 A).

performance T1 B = performance T1 A

$Hl_1$: Students' performance in an accounting concepts Test 1 before using a computerised accounting package is NOT the same as their performance in Test1 after using a computerised accounting package.

performance T1 B =/= performance T1 A

$Ho_2$: Students' performance in an accounting concepts Test 2 before (T2 B) using a computerised accounting package is the same as their performance in Test 2 after (T2 A).

performance T2 B = performance T2 A

$Hl_2$: Students' performance in an accounting concepts Test 2 before using a computerised accounting package is NOT the same as their performance in Test 2 after using a computerised accounting package.

performance T2 B =/= performance T2 A

$Ho_3$: Students' performance in an accounting concepts Test 3 before (T3 B) using a computerised accounting package is the same as their performance in Test 3 after (T3 A).

performance T3 B = performance T3 A

$Hl_3$: Students' performance in an accounting concepts Test 3 before using a computerised accounting package is NOT the same as their performance in Test 3 after using a computerised accounting package.

performance T3 B =/= performance T3 A

$Ho_4$: Students' performance in an accounting concepts Test 4 before (T4 B) using a computerised accounting package is the same as their performance in Test 4 after (T4 A).

performance T4 B = performance T4 A

$Hl_4$: Students' performance in an accounting concepts Test 4 before using a computerised accounting package is NOT the same as their performance in Test 4 after using a computerised accounting package.

performance T4 B =/= performance T4 A

$Ho_5$: Students' performance in an accounting concepts Test 5 before (T5 B) using a computerised accounting package is the same as their performance in Test 5 after (T5 A).

performance T5 B = performance T5 A

$Hl_5$: Students' performance in an accounting concepts Test 5 before using a computerised accounting package is NOT the same as their performance in Test 5 after using a computerised accounting package.

performance T5 B =/= performance T5 A

$Ho_6$: Students' performance in the total of all Tests before (TT B) using a computerised accounting package is the same as their performance in the total of all Tests after (TT A).

performance TT B = performance TT A

$H1_6$: Students' performance in the total of all Tests before (TT B) using a computerised accounting package is NOT the same as their performance in the total of all Tests after (TT A) using a computerised accounting package.

performance TT B =/= performance TT A

## RESULTS

INSERT TABLE 2. SUMMARY OF RESULTS.

The first column of table 2 relates to the first column of table 1. Parametric tests were done as the population was found to be normal. In test 1-5 BEFORE, there were 161 students participating, while in the test 1-5 AFTER there were 145 students. For each test the maximum score possible was 20. Therefore the total score for all parts of the test was 100. The mean scores and standard deviation for each part of the test BEFORE is shown in the second and third columns of table 2. The fourth and fifth columns show the mean score and standard deviation for each part of the test AFTER. The sixth column shows the probability while the last column of table 2 displays the t-test on the difference of the means of the scores in each part of the test BEFORE and AFTER. (Wilcoxon tests were also done giving the same conclusions).

The last row is the total performance of all parts of the test.

The following can be said about the hypotheses outlined earlier.

$H1_1$: (performance T1 B =/= performance T1 A) is supported.

That is, there is a significant difference between the before and after performances in Test 1 **and** the performance was **improved** in the test **after** the Sybiz section.

$H1_2$: (performance T2 B =/= performance T2 A) is supported.

That is, there is a significant difference between the before and after tests **and** the performance **after** the Sybiz section was **worse** than the performance before.

$Ho_3$: (performance T3 B = performance T3 A) is supported.

That is there is **no significant difference** between the before and after tests.

$H1_4$: (performance T4 B =/= performance T4 A) is supported.

That is, there is a significant difference between the before and after tests **and** the performance is **improved** in after the Sybiz experience.

$Ho_5$:  (performance T5 B = performance T5 A) is supported.

That is, there is **no significant difference** between the before and after tests.

$H1_6$: (performance TT B =/= performance TT A) is supported.

That is there is a significant difference overall between the before and after tests and **overall** there is an **improvement** in performance after the Sybiz experience.

## DISCUSSION OF RESULTS

From table 2, it can be seen that the performance in test 1 and test 4 AFTER the Sybiz section were significantly better than the corresponding tests BEFORE the Sybiz section. That is, the students' performances in the topics:

Accounting in Business and society,

Accounting as an information system,

the Double entry system,

Internal control and merchandising transactions,

General-purpose external financial statements,

were **improved**. The t-tests were significant and there is no probability that the difference

is due to chance. It may be that the difference is due to the Sybiz section, however, this

cannot be confidently asserted. Other factors could have confounded the results. It could

be that all students after a period of time would improve in their accounting concepts,

especially if they were doing other accounting subjects at the same time.

Not withstanding the possibility of confounding factors, the next set of results were

interesting. The BEFORE performance of test 2 was significantly better than the AFTER

performance. That is, the students' understanding of the topics:

Business income and adjusting entries,

Completing the accounting cycle,

was **worse** after a period of five weeks. If the results for test 1 and test 4 were in spite of,

rather than because of, the Sybiz section, then why would the results of test 2 be so

different? If students' performance is enhanced by confounding factors, such as, their

other concurrent subjects, time (etc), then the results of test 2 are likely to be similar to

the results of tests 1 & 4. The conflicting results of test 2 and tests 1 & 4, suggest that the

5 week Sybiz section was influential. One explanation possible, is that, the computerised

accounting package did not offer additional learning opportunity in the areas of Business

income and adjusting entries, and Completing the accounting cycle. However, the use of

a computerised accounting package, is likely to have reinforced the understanding of

Accounting as an information system and Internal controls.

The results of tests 3 & 5 indicated that there was not a significant difference between the BEFORE and AFTER performance. A possible explanation was that students may have learnt all there is to learn about the topics:

> Accounting for merchandising,
>
> Accounting systems and special purpose journals,
>
> Short-term liquid assets,
>
> Inventories.

Another explanation was that the computerised accounting experience did not offer additional learning opportunities in these areas.

The performance overall AFTER is significantly better than the overall performance BEFORE the Sybiz section. This emphasised the improvement in tests 1 and 4, which was significant enough to dilute the effect of the diminished performance of test 2 and the stable performances in test 3 and test 5.

## CONCLUSIONS

The results so far indicate that there is likely to be some positive influence of a 5 week computerised accounting section on the understanding of specific concepts such as Internal control. However these results should only be seen as encouraging rather than conclusive. The lack of a control[2] group (of students who were not doing the 5 week computerised accounting section) means that confounding factors have not been identified.

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2   It was considered unethical to give one group of students in the subject the Sybiz section and another group not to have the Sybiz experience, especially if there is a difference in their learning experience and ultimate outcome.

The use of tests to identify performances in different accounting concepts is more complex and interesting than just using totals or indeed overall grades. It was apparent that using overall performance can mask differences in specific aspects of accounting concepts. This was useful, particularly if the objective of using computerised accounting was to enhance knowledge /experience in specific areas of an Accounting Information Systems subject.

Further, the performance of students as a whole may have disguised the performance of some students. Good students may do well in both BEFORE and AFTER tests as a function of their attitude towards computers [Orpen and Ferguson, 1991]. It would interesting to see whether poor students' performance was helped at all. By maintaining the students' identity (rather than remaining anonymous), it would be possible to match their BEFORE and AFTER scores and therefore to highlight individual differences in performances. This would overcome the lack of control.

Equally interesting would be to use a questionnaire of students demographics (for example, age, work experience, progress in their degree), to match with their performance in tests BEFORE and AFTER a computerised accounting section. The contribution, if any, for this particular group of students can be explored.

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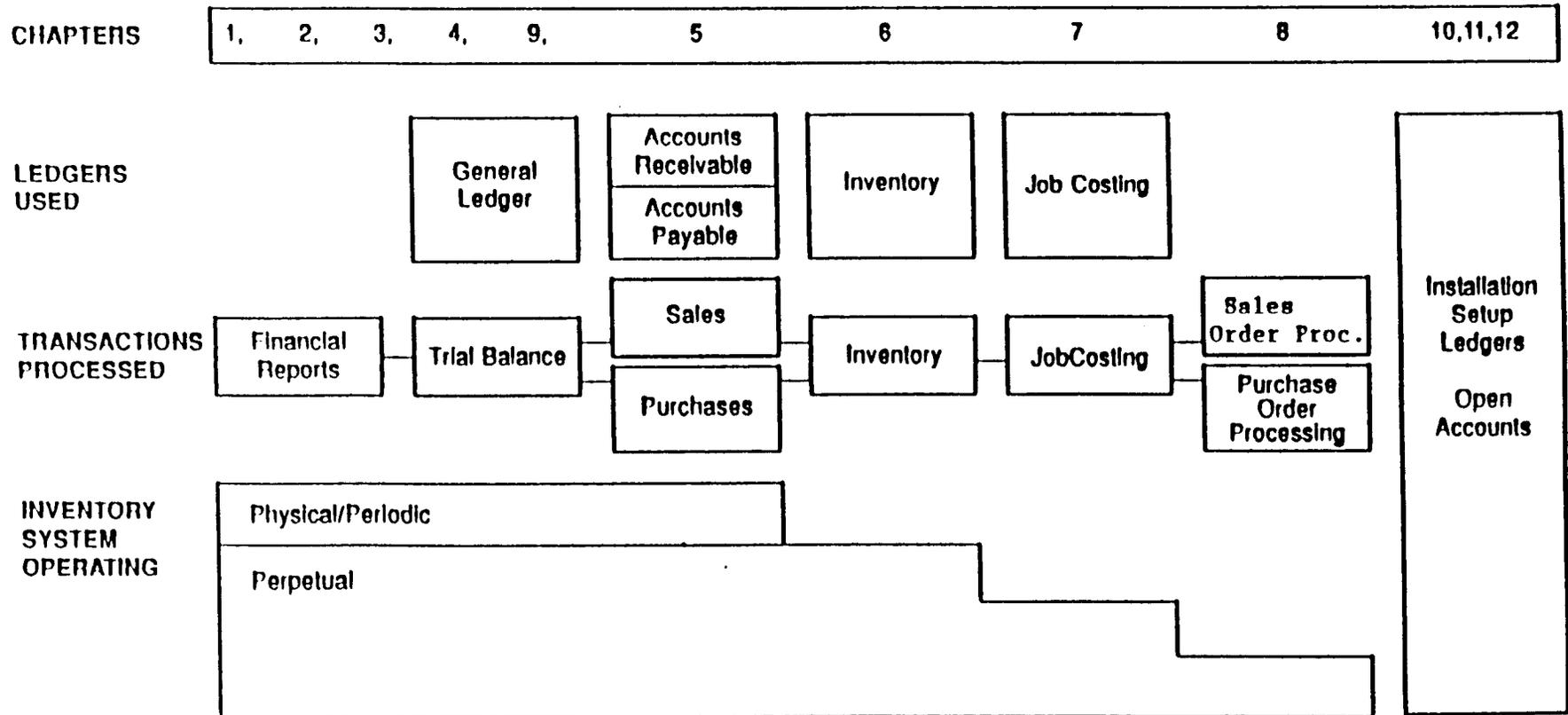Needles, B. E., Anderson, H. R., and Caldwell, J. C., [1984], *Principles of Accounting*, Houghton Mifflin, second edition, Boston.

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# FIGURE 1. SEQUENTIAL APPROACH TO TEACHING COMPUTERISED ACCOUNTING

(The approach adopted by Gerrard Michael J, Bromson Garry, Kaidonis Mary A,
Computerised Accounting Using SYBIZ, Melbourne: Prentice-Hall, 1989)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CHAPTERS** | 1,  2,  3,  4,  9, | 5 | 6 | 7 | 8 | 10,11,12 |

**LEDGERS USED**

| General Ledger | Accounts Receivable / Accounts Payable | Inventory | Job Costing | Installation Setup Ledgers  Open Accounts |
|---|---|---|---|---|

**TRANSACTIONS PROCESSED**

| Financial Reports | Trial Balance | Sales / Purchases | Inventory | JobCosting | Sales Order Proc. / Purchase Order Processing |
|---|---|---|---|---|---|

**INVENTORY SYSTEM OPERATING**

Physical/Periodic

Perpetual

| Table 1. Content of Tests. | | |
|---|---|---|
| Test Number Before & After | Chapters in Needles et al | Concepts |
| 1 | 1<br>2<br>3 | Accounting in Business and Society<br>Accounting as an Information System<br>The Double-Entry System |
| 2 | 4<br>5 | Business Income and Adjusting Entries<br>Completing the Accounting Cycle |
| 3 | 6<br>7 | Accounting for Merchandising Operations<br>Accounting Systems and Special-Purpose Journals |
| 4 | 8<br>9 | Internal Control and Merchandising Transactions<br>General-Purpose External Financial Statements |
| 5 | 10<br>11 | Short-Term Liquid Assets<br>Inventories |

| Table 2. Summary of Results. | | | | | | |
|---|---|---|---|---|---|---|
| TEST No | BEFORE Mean | BEFORE SD | AFTER Mean | AFTER SD | PROB-ABILITY | t-test |
| 1 | 6.42 | 1.22 | 8.79 | 1.69 | 0.0000 | -13.98 |
| 2 | 9.11 | 1.76 | 7.94 | 1.77 | 0.0000 | 5.75 |
| 3 | 8.77 | 1.73 | 8.63 | 2.59 | 0.58 | 0.56 |
| 4 | 6.27 | 2.02 | 7.88 | 3.10 | 0.0000 | -5.31 |
| 5 | 6.25 | 2.81 | 5.75 | 3.79 | 0.20 | 1.29 |
| T | 36.81 | 5.29 | 39.00 | 8.69 | 0.0093 | -2.62 |