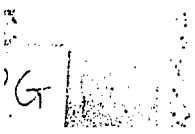

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ABSTRACT

Records of introductory college accounting students from 1976-78 were consulted to compare performance of those who had had exposure to bookkeeping courses in high school with those who had not. An underlying assumption was that high school counselors may be discouraging students from choosing business majors, in favor of liberal arts preparation for college. The hypothesis that high school accounting majors are underachievers was rejected; in the analysis, these students were found to perform better in college accounting. Recommendations for the high school and college include these: (1) that additional materials be used to stimulate self-paced learning; (2) that high school counselors be made aware of these results and aware that they should not discourage high school business majors; (3) that college accounting faculty do more to accommodate different student capabilities and backgrounds; and (4) that college students be given more experience in self-paced instruction. (MSE)

A COMPARISON OF PERFORMANCE IN COLLEGE ACCOUNTING BETWEEN HIGH SCHOOL BUSINESS MAJORS AND LIBERAL ARTS MAJORS

Applied Educational Research and Evaluation

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A Practicum presented to
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the Degree of Doctor of Education

Nova University

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A Comparison of Performance in College Accounting Between High School Business Majors and Liberal Arts Majors

by

Bryan L. O'Neil

The level of performance of the Accounting I students was the main problem to be dealt with in this practicum. It was necessary to evaluate the performance of Accounting I students to ensure a business program of high quality. This evaluation dealt with the problem of performance by dealing with students that have had exposure to Accounting and those who have not.

The underlying problems of this practicum was numerous. There was an assumption by many counselors that high school students should take college preparatory programs rather than the business programs in high school. As a result, students were sometimes advised not to take business related courses. The student that majors in business in high school was often perceived as an under-achiever because of the traditional image that evolved in the high school system.

The null hypothesis was rejected, students who complete courses in high school bookkeeping were shown to have performed better in College Accounting. This possibility presented a need for a new awareness in high school counseling as well as a need for innovative teaching techniques.

The total population was selected by the researcher from classes in Accounting I, which have been taken from the academic years of 1976 - 1978. The final grade results reflected the performance of each student who took high school bookkeeping to surmise whether they were part of

the total population.

The recommendation of researcher were:

1) additional accounting educational aids be acquired to stimulate self paced learning.

2) high school counselors were encouraged to be aware of this problem in accounting performance for incoming high school students.

3) that college accounting educators perform more research in the area of curriculum development to accommodate the different student capabilities or backgrounds.

4) educate the student about self paced instruction so that he/she may take steps to assure his success.

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Introduction

The level of performance of the Accounting I students was the major problem to be dealt with in this practicum. It was necessary to evaluate the performance of Accounting I students to ensure a business program of high quality. This evaluation dealt with this problem of performance by dealing with students that have had prior exposure to Accounting to those who have not.

The underlying problems of this practicum were numerous. There was an assumption by many counselors that high school students should take the college preparatory programs rather than the business programs in high school. As a result, students were sometimes advised not to take business related course. The student that majors in business in high school was often perceived as an underachiever because of the traditional image that has evolved in the high school system.

The null hypothesis was rejected. Students who complete courses in high school bookkeeping were shown to have performed better in College Accounting. This possibility presented a need for a new awareness in high school counseling as well as a need for innovative teaching techniques.

The students at Castleton State College come from various areas and different academic backgrounds. It was the purpose of this practicum to help understand how one of many variables helps to guarantee success in the area of accounting. In order to help to understand the different attributes that a student may have, one must first research the students' background.

The present accounting courses at Castleton State College have a high attrition rate. By showing that the reason for this high drop-out rate was the result of prior-preparation before taking college accounting is the purpose of this practicum. The need for a high school bookkeeping

factors.

Also as a result of varied high school backgrounds, it was difficult to establish just how comprehensive and advanced a student's business skills were. The awareness that the student was not being properly prepared for college level work would prepare the instructor to cope with this problem. This research has also given the instructor the ability to function as effeciently as possible by giving the student assistance where it is needed the most. The efforts of the instructor can now be directed toward the quality of the program and attempt to bring the student to his or her full potential in the area of accounting.

This research practicum also showed the need for a remedial program in the area of accounting. If a student was in need of a preparatory course in bookkeeping before having an introductory course of accounting, this would help to alleviate the problems of retention and comprehension. This study also showed the need for a tutorial program of service. This service could be given to any student but strong emphasis should be placed on students that have not taken high school bookkeeping or possible other business related courses.

The study was conducted by selecting the total population from classes in Accounting I, which have been taken from the academic years of 1976 - 1977 and 1978. The groups were set up into three conditions: First; groups with high school bookkeeping, Second; without high school booking, and Third; the total of both groups. In order that data be prepared for the t-test the sum of the total scores, the mean of the test scores, the sum of the squares, and the standard deviations was found for each condition.

Background and Significance

Until recently technical programs have been viewed as "convenient 'dumping ground' for [illegible] and non motivated drifters" (Monroe, 1972, p. 95). Yet studies comparing abilities levels between academic and occupational program students by Medsker (1960) and Clark (1960) concluded that there was very little differences between them, hopefully dispelling the notion that occupational students are incapable of further education.

Brown (1974) would like to see the walls between these two curriculum tumble down in order to adopt a new preparation of higher education. He contends that removal of these walls:

> Is essential to a new perception of post-secondary education, a perception that is unifying rather than divisive, integrated rather than segregated and inclusive rather than exclusive. (p.7)

Brown feels that the college should begin by abolishing the labels used to identify students as "technical" or "college transfer" which established a hierachy within the institution and had lead many to interpret one as being better than the other (p. 8).

Wattenburger (1972), insists the leadership for this integration must come from community colleges, but Kintzer (1972) contends that it should be a shared responsibility. The importance of developing a closer relationship between secondary schools and colleges was also expressed by the Carnegie Commission in its publication entitled, Continuity and Discontinuity. The report, published in 1973, urged that "schools and colleges once again view themselves as parts of the same continued process that is larger than either of them or both of them combined."(p.3)

the community college and the high school in the past was probably the:

> Mutual distrust and misunderstanding regarding the role scope, and purpose of each, with few efforts being made to coordinate programs between the two (Grable, 1971, p. 197).

An article appearing in the Community College Review regarding an articulation study between the community college technical institute and the secondary schools, promoted the idea of fulfilling the following objectives: (1) to prove coordination between the institute and the public school, (2) to develop proficiency tests for selected vocational education programs common to the community college and (3) to develop a comprehensive model to serve in other locations in the state and elsewhere. The areas used to develop competency based objectives were Business Education, Automotive Mechanics, and Mechanical Drafting (Woelfer, 1975).

The students at Castleton State College come from various areas and different academic backgrounds. It was the purpose of this practicum to help understand how one of many variables helps to guarantee success in the area of accounting. In order to help to understand the different attributes that a student must have, one must first research the students' background.

The present accounting courses at Castleton State College have a high attrition rate. By showing that the reason for this high drop-out rate was a result of prior preparation before taking college accounting was the purpose of this practicum. The need for a high school bookkeeping or accounting course prior to entrance to college was the result of several factors.

Also as a result of varied high school backgrounds, it was difficult to establish just how comprehensive and advanced a student's business skills were. The awareness that the study was not being properly

prepared for college level work prepares the instructor to cope with this problem. This research also gives the instructor the ability to function as efficiently as possible by giving the student assistance where it is needed the most. The efforts of the instructor can then be directed toward the quality of the program and attempt to bring the student to his or her full potential in the area of accounting.

This research practicum also showed the need for a remedial program in the area of accounting. If a student was in need of a preparatory course in bookkeeping before having an introductory course of accounting, this would help to alleviate the problems of retention and comprehension. This study also showed the need for a tutorial program or service. This service could be given to any student but strong emphasis should be placed on students that have not taken high school bookkeeping or possible other business related courses.

The emmergence of graduate schools of business administration are calling for students from the arts and sciences (Buckley, 1979, p. 9) with current demand from the public accounting profession are for recruits with more varied interests and skills than the traditional business majors (Ashworth, 1968, p. 46) attention focuses on the vital point at which students can be attracted into the accounting field - the elementary accounting courses.

Introductory accounting education typically emphasizes the transmission of technical skills in a highly structured learning environment. The implications of findings in the area of educational psychology provide for improvement in the ways of teaching accounting (Bedford, 1963, p. 406). Changes in the student-faculty roles in the learning process, increased concern over the quality of education, and, perhaps most importantly, the fact that many beginning students bring negative impressions of accounting into the classroom with them (McDonough, 1970, p. 10), the basic combination of lecture and blackboard problem-solving

still dominates as a pedagogic technique (Pattern, 1970, p. 165). Accounting is also taught by the case method, both computerized and non-computerized, and business games, but rarely at the introductory level.

One of the main problems with the use of a unidirectional teaching method is that it can introduce or reinforce negative attitudes. As experiments in classroom creativity by Torrance (1965:676) have shown, and as the experiences of other innovative educators have demonstrated, students learn best when they are actively involved, both physically and mentally, in the learning experience. Although accounting educators have long been aware of the need to move towards a sharing of the responsibility for learning, the basic reason for their slow response could well be due to their most exclusive focus on cognitive learning outcomes, (Horngren, 1963, p. 409-411). While some researchers in accounting education have surveyed and reported on students' motivational responses to learning situations, there is little evidence of any systematic attempt to include consideration of student attitudes in the planning and [illegible] of desired behaviorial outcomes. This, in spite of the fact that reduction of negative attitudes and, hopefully, creation or enhancement of positive ones, should be of significant and particular concern to accounting teachers.

Bloom and his associates have suggested several reasons for the general neglect of affective outcomes in American education. One reason is that cognitive goals are much easier to define and measure than affective ones and require a narrower range of teaching methods. The widely used and well-developed techniques involve lectures, discussions, printed materials and so forth, are most appropriate for verbal-conceptual outcomes (Bloom, 1971, p. 226-227).

The instructional methods employed by accounting professors today are hardly distinguishable from those employed in the 1800's. The typical instructional system uses a textbook, lectures, and problems.

most part, the accounting professor, like his colleagues in other disciplines in the university, has almost completely ignored the communication revolution that has swirled around him for the past twenty-five years (Carnegie Commission, 1972, p. 37). Few significant instructional innovations have been introduced as a way to break out of the rigid system that marches accounting students, lock-stop, through a series of almost identical classroom situations where the teacher dominates and does most of the talking and the student is in a passive role with little opportunity to either think or respond (Commission on Instructional Technology, 1970, p. 29).

There are signs about us today, however, that changes are in the wind. University educators and administrators see value in the educational technology movement and experimentation and innovation are taking place in the instructional process. Resources are beginning to flow into university centers for instructional development. At the top level of some university organizations are individuals designated as vice president for instructional development (U.S. Dept. of H.E.W., 1971). All of this is taking place in a professional environment that provides little regard for improvement in the instructional process. A university professor is still better off in the current reward structure (salary or promotion) to write the article or book rather than use his time to innovate in the classroom.

The aim of much of the innovation that is taking place in instruction is directed at making instruction more to meet the individual needs of each student. The result, hopefully, will be a more scientifically based learning system that recognizes that students learn in different ways at different rates. The present system

generally ignores individual learning differences, motivation, and most human behavior traits associated with the instructional process.

Education innovation has taken and is taking a wide variety of forms. Programmed instruction was clearly one of the first large moves to make the instructional process both more scientific and at the same time, more individual. In fact, some suggest that the current application of communication technology to education would not have been possible without the advent of programmed instruction and the Skinnerian concept of reinforced learning. The Skinnerian organization form and emphasis on differential reinforcement provided educators with the basis and opportunity to apply modern communication technology (Richmond, 1970, p. 17).

Other innovations have taken the form of more self-paced instruction, individualized learning, and modular-flexibility scheduling. Each of these developments offers a unique arrangement of resources, in order to achieve the goal of more effective instruction.

Procedures

The procedures for collecting data for this practicum originate from student analysis information. A computer service dated 2/16/78 gave the break-down of students by name, year, curriculum selection, and major. This information was used to select a sample of the total population of accounting students.

The next step in the procedure was to investigate the individual student's file in the Registrar's Office to determine whether the student has taken accounting, bookkeeping, or recordkeeping in high school, he was selected as a student having high school accounting exposure. The high school grade or level of accounting was not cirterion for consideration. After the student was selected, he was compared to the rest of the population.

The total population was selected by the researcher from classes in Accounting I, which have been taken from the academic years of 1976 - 1977, and 1978. The final grade results in Accounting I reflected the performance of each student who took high school bookkeeping to surmise whether they are part of the total population. The null hypothesis was tested and rejected.

The following procedures were from Bruce W. Tuckman's book Conducting Educational Research, (1978: 257-259). To choose the appropriate statistical test the researcher first investigated the type and the number of independent variables. Using the null hypothesis: There is no significant difference between final grades in Accounting for students that have had high school bookkeeping and those who have not had high school bookkeeping the researcher chose t-testing

to develop the study. The reason for this choice was to tell the distance between the judgements of two groups or a correlation between the two groups.

The following steps were taken by the researcher in order that the data was worked to accommodate the t-testing procedures that Bruce Tuckman expresses in his book. In Table I the groups have been expressed into conditions one, two and three. Condition one expresses the number of samples of students that have had high school bookkeeping. Condition two shows the group of students that have not had high school bookkeeping. Condition three is the total population that was selected from a computer service dated 2/16/78 which gave a break-down of students selection and major.

In order that data be prepared for the t-test the sum of the test scores, the mean of the test scores, the sum of the squares, and the standard deviations was found for each of the conditions as seen in Table I.

Procedures

Find:

1. Condition 1 - group with high school bookkeeping
2. Condition 2 - group without high school bookkeeping
3. Condition 3 - total population
4. N = number in each group
5. E x = sum of final test scores
6. E x^2 = sum of final test scores squared
7. $\bar{x}$ = mean
8. σ = standard deviations

Table I

Condition (Group)	1	2	3
N =	20	89	109
E x			
E x^2			
$\bar{X}$			
σ			

(Tuckman, 1978, p. 258)

Because of the grading system at Castleton State College, a conversion of grades (Table II) was created to equate the alphabetical grades to numerical grades. The conversion Table III was based on the college catalogue which is used by the registrar in evaluation of grades.

Next in Table III, formulas are given to calculate the variances for each of the two groups.

Table III

Group Variances

$$S_1^2 = \frac{N_1 \, Ex^2 - (E\, x_1)^2}{N_1 \, (N_1 - 1)} = \frac{\qquad}{\qquad} \qquad S_1^2 \qquad \frac{\qquad}{\qquad}$$

$$S_2^2 = \frac{N_2 \, Ex_2^2 - (Ex_2)^2}{N_2 \, (N_2 - 1)} = \frac{\qquad}{\qquad} \qquad S_2^2 \qquad \frac{\qquad}{\qquad}$$

These formulas are the same as:

$$S^2 = \frac{E(x - \bar{x})^2}{N - 1}$$

which was used in this study to formulate the calculation. This information is then used to calculate the t value (Tuckman, 1978, p. 258)

Table III

Conversion of Grades

A = 95

A- = 92

B+ = 88

B = 85

B- = 82

C+ = 78

C = 75

C- = [illegible]

D+ = [illegible]

D = 65

D- = 62

E = 50

Table IV

Calculations of T Values

Step 1 $\dfrac{(N_1 - 1)S_1^2 + (N_2 - 1)S_2^2}{\quad} = \_\_\_\_\_$

Step 2 $\dfrac{N_1 + N_2}{N_1 N_2} = \_\_\_\_\_$

Step 3 (Step 1 x Step 2)

Step 4 $\sqrt{\text{Step 3}} = \_\_\_\_\_$

Step 5 $\bar{X}_1 - \bar{X}_2 = \_\_\_\_\_$

Step 6 $t = \dfrac{\text{Step 5}}{\text{Step 4}}$ $\qquad df = N_1 + N_2 - 2$

Step 7 Look up T value. If T value in Step 6 exceeds the Table value at a specific p point then the null hypothesis can be rejected at that p level.

Step 8 Level of Significance (= .05)

(Tuckman, 1978, p. 258)

In step 1 of the t-test, worksheet illustrated in table IV, the variances are combined or pooled; in step 2, a term is calculated which is multipled by the pooled variances in step 3. In step 4, a square root is taken of the value in step 3, to provide a standard deviation estimate. This, when divided into the difference between the two means, yield a t-value which is then compared with the t-value which is then compared with the t-value from a t table to determine if the calculated t-value is significant. If the obtained t-value exceeds the table t-value at a specific p level, then the null hypothesis can be rejected at the p level.

Hypothesis

There is a significant difference between final grades in accounting for students that have had high school bookkeeping and those who have not had high school bookkeeping.

Null Hypothesis

There is no significant difference between final grades in accounting for students that have had high school bookkeeping and those who have not had high school bookkeeping.

Limitation of Study

1. Students at Castleton only.
2. Relative small sample in relation to total population of accounting students.
3. Inability to generalize beyond the particular program or institution.
4. Inability to use results in other programs and results will be used in the accounting area.

Basic Assumptions

1. High school bookkeeping covers the same context material in all institutions.

Definition of Terms

1. High school bookkeeping -- the study of the accounting cycle.

   A. Journal entries
   B. Ledger entries
   C. Preparation of formal statements
   D. Recordkeeping
   E. Accounting

2. College Accounting I -- Fundamental elements of accounting.

   A. Accounting cycle
   B. Merchandising
   C. Formal statement preparation and analysis

3. Test Score -- Final grade for Fall Semester Accounting I.

4. Student -- a person that is enrolled in the last two years in high school.

Note in table V that the researcher found the sum of the scores, the square of those sums, the mean and the standard deviation. The supporting documentation for these results can be found by referring to appendices A - F.

Table V

The results as illustrated in table V were based on three conditions: First; students that have taken high school bookkeeping, second; those whom have not,and third; the total population. The number of students in condition 1, 2, and 3 was 20, 89, and 109, respectively.

The sum of the test scores in condition 1;were 1,627, condition 2; 6,075, and condition 3; 7,702. The sum of the squares in condition 1;were 124,795, condition 2; 496,149, condition 3; 620,944. The mean for condition 1 was 81.35, condition 2; 67.50, and condition 3; was 70.01. The standard deviation for condition 1; was 1.3971, condition 2; 4.5490, and condition 3; 4.5051.

As a result of following the initial procedures layed out by Bruce Tuckman in his book conducting educational research t-test and group variances were done to establish whether is any significant difference between the two groups being tested.

Table V

Results

Condition	1	2	3
N=	20	89	109
ΣX =	1627	6075	7702
ΣX^2 =	124,795	496,149	620,944
$\bar{X}$ =	81.35	67.50	70.01
σ	13971	45490	45051

On the basis of the t-test the null hypothesis was rejected. It has been proven through this statistical techniques that there is a significant difference between final grades in college accounting for students that have had high school booking and those who have not had high school bookkeeping.

As seen in table VI, the procedures that Bruce Tuckman has established for t-testing was followed in a step by step approach. The first step was to calculate the variances for each of the two groups.

Table VI

As we follow each step in the t-test, step 1 was 359.54 (variances are averaged), step 2 was .0612 (a term is calculated which is multiplied by the pooled variances in step 3, step 3 was 22.003, step 4 4.69 (square root of step 3), step 5; 13.8 (standard deviation estimate), step 6; 3.0 (t-value), step 7; df=107 (degree of freedom) number of group 1 plus group 2 minus 2 = 107.

Because of a t-value of 3.0, there was significant difference between students that have had high school bookkeeping and those whom have not in their performance in college level accounting. In the t-table in Bruce Tuckman's book, Conducting Educational Research, p 443, a degree of frequency of 120 was chosen that which was closest to 107 from the data on table VI, With a level of significance for two-tailed test, the t-value was stated at 1.980. As a result the obtained t-value (3.0) exceeds the table t-value (1.980) and therefore the null hypothesis states that the means being compared are equal which is not true in this study.

With this criterior as a basis, the research has rejected the null hypothesis which was: there is no significant difference between final grades in accounting for students that have had high school bookkeeping and those who have not had high school bookkeeping. This has proven the hypothesis of this practicum that there was a significant difference

between final grades in accounting for students that have had high school bookkeeping and those whom have not had high school bookkeeping.

The major findings and results of this practicum were that people that have had high school bookkeeping perform better than those who have not had high school bookkeeping.

On the basis of the t-test, one may see in the following results that the null hypothesis was rejected. It has been proven through these statistical techniques that there is a significant difference between final grades in accounting for students that have had high school bookkeeping and those who have not had high school bookkeeping.

Table VI

Group Variance

Step 1 $S_1^2 = \frac{(20)124,795 - (1627)^2}{20\ (20-1)}$

$S_1^2 = \frac{249,590 - 2,647,129}{380} = -6,309.31$

$S_2^2 = \frac{89(496,149) - (6075)^2}{89\ (89-1)}$

$S_2^2 = \frac{44,157,261 - 36,905,625}{7832} = 925.89$

t Test

Step 1. $\frac{(20-1)(-6309) + (89-1)(925)}{20 + 89 - 2}$

$\frac{-119,871 + 81,400}{107} = -\frac{38,471}{107}$

359.54

Step 2. $\frac{20 + 89}{(20)(89)} = \frac{109}{1780} = .0612$

Step 3. 22.003

Step 4. 4.69

Step 5. 81.35 - 67.5 = 13.8

Step 6. $\frac{13.8}{4.6} = 3.0$ = T value

Step 7. df = 107

In Table df = 120 .05 significance 1.980 two tailed tests

By measuring students' performance in relationship to past exposures to accounting in high school, the student could be evaluated before taking college accounting and provided with the necessary support to better his/her performance at the college level.

Also, extra tutorial help could be justified to provide the student with additional preparation if the student had no prior exposure to accounting. This would enable the instructor to devote time in the areas most needed.

The results of this practicum could also establish the need for self-paced study of accounting, instead of taking the textual approach with workshops. The students, therefore with different levels of expertise in accounting, would be able to excel to their full potential and not be held back by the rest of the group.

The question of the formulation and modification of student attitudes during college is a many faceted one that has been extensively studied by sociologists. While the impact of the situation variables is quite complex, Feldman and Newcomb, Impact of College on Students, 1969, stress high school interaction with groups that support certain attitude formation. Since accounting students tend to interact highly with other accounting majors and the accounting faculty, it would appear that accounting education has great potential to be a supportive environment for attitude formation.

Further, the National Opinion Research Center study has demonstrated that certain attitudes, especially job-related attitudes, are identifiable by college major (Davis, 1965, p. 24). For example, business majors tend to be more money oriented and not interested in occupations that promise social service or an opportunity to be ori-

ginal or creative. Those differences in attitudes are accentuated by the process of attrition, as shown in Freshman to Senior studies. Thus, those that change their major during college tend to have attitudes more similar to those in the new major than in the major they left.

It would appear that attitudes are modified as a result of the collegiate experience and that the clustering of certain attitudes by the college major are apparent. Accounting educators should be more curious about the nature of these attitudes. For instance, Becker found that medical students began their professional education with a desire to learn all they could to help mankind (Becker, 1961, p. 54).

The findings of this practicum has a great deal of significance in understanding the abilities and backgrounds of incoming students that will be taking accounting at Castleton State College. By accepting the hypothesis of this practicum, we better understand the accounting student as he enters at an introductory accounting level. The ability of the instructor to structure the curriculum so that each individual with different backgrounds may take advantage of accounting education.

One of the most direct implications of this study was in relationship to high school students that have not yet been exposed to accounting background. In dealing with this student the instructor must be aware that he has not taken any business related course. In contrast, other students have had this background and used it as an advantage for achievement. There are several recommendations that can be made in relationship to incoming students. First, additional research in the area of self instruction techniques could be developed to help a student that has never had business background. Secondly, a student may receive extra tutorial help at the beginning and during the course so that he may not fall behind. Either through a lab situation or outside student tutorial help, this situation could be remedied. Thirdly, the curriculum could also be revised in the area of Accounting I so that admini-

stration accounting could be taught which would not be as comprehensive to non-accounting majors.

Other discussion by which this study implicates is the high school counselors. The awareness of the high school counselor to better advise the student is relationship to his career opportunities. By being exposed to this practicum, the high school counselor can better understand the benefit of taking high school business courses if he/she is planning to major in business at a college level. High school counselors have traditionally directed a student into liberal arts rather than business courses if the student showed a desire to go onto college. This has been proven in this study to be incorrect direction to high school studnets because students are no longer just interested in the liberal arts area but are going into the business and vocational area. It is therefore necessary to publicize as well as educate local public school counselors to direct potential business students to take business courses at the high school level.

Another area of discussion would be in curriculum development. There is a constant need for accounting educators to revise accounting curriculum. There has been a current trend in the area os self-paced instruction, either through techniques such as outside assignments, student/teacher tutoring, course module technique and other educational aids. This study implies that more of this type of curriculum development must be done to achieve a better understanding of the subject matter. As a result the accounting student will be able to, at his/her own pace, master the discipline to excell in industry.

The following recommendations were based on the findings of this practicum that high school students with business backgrounds do better in introductory level business courses than high school students that have not yet had business background. Because of the rejection of the null hypothesis of this practicum, the following are recommendations

for potential improvement at Castleton State College.

1. A copy of this practicum will be sent to the Academic Dean of Castleton State College recommending that the current four credit accounting course be retained because of the need for the laboratory to stimulate self-paced learning. Also to recommend that additional accounting educational aids be acquired for introductory level courses.

2. A copy of this practicum be sent to the Vermont State Board of Education to illustrate the need for high school counselors to be aware of the statistics of this practicum to better advise their students.

3. That current college accounting educators perform more research in the area of curriculum development for the better use of talent of the student and teacher, (e.g. self-paced instruction, transparency utilization, tutorial help, etc.)

4. To establish the awareness of the student who must also relaize that if he/she has not been exposed to business courses that the student must take his/her own steps to assure his/her success through other educational vehicles, (lab totorial, self-paced instruction).

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Appendix A

Condition I

1.	C	75
2.	A	95
3.	A	95
4.	E	50
5.	B+	88
6.	D	65
7.	E	50
8.	B-	82
9.	A	95
10.	A	95
11.	B	85
12.	B	85
13.	B	85
14.	B-	82
15.	B+	88
16.	C-	72
17.	A	95
18.	C+	78
19.	B-	72
20.	A	95
		1627

Average

1627 - 20 = 81.35

Condition II

1.	C-	72
2.	C	75
3.	C	75
4.	A	95
5.	C	75
6.	A	95
7.	E	50
8.	B-	82
9.	B-	82
10.	B-	82
11.	B-	82
12.	E	50
13.	D-	62
14.	B	85
15.	E	50
16.	B	85
17.	D	65
18.	C-	72
19.	B	85
20.	E	50
21.	D	65
22.	D	65
23.	D	65
24.	D-	62
25.	E	50
26.	C-	72
27.	E	50
28.	D	65
29.	E	50
30.	B	85
31.	D	65
32.	E	50
33.	E	50
34.	C	75
35.	C-	72
36.	E	50
37.	E	50
38.	E	50
39.	C-	72
40.	D	65
41.	C+	78
42.	A	95
43.	B-	82
44.	C	75
45.	D	65
46.	D	65
47.	C-	72
48.	C-	72
49.	C	72
50.	B-	82
51.	D+	68
52.	E	50
53.	B	85
54.	C-	72
55.	B-	82
56.	B+	88
57.	D-	62
58.	B	85
59.	C-	72
60.	E	50
61.	B-	82
62.	E	50
63.	D+	68
64.	B+	88
65.	C-	72
66.	E	50
67.	C+	78
68.	E	50
69.	B-	82
70.	C	75
71.	D+	68
72.	E	50
73.	A-	92
74.	B+	88
75.	E	50
76.	E	50
77.	C+	78
78.	E	50
79.	E	50
80.	E	50
81.	E	50
82.	E	50
83.	D	65
84.	b-	82
85.	D	65
86.	E	50
87.	E	50
88.	C+	78
89.	A	95

Average = 67.5

Appendix C

Condition 1

x	x_2
75	5625
95	9025
95	9025
50	2500
88	7744
65	4225
50	2500
82	6724
95	9025
95	9025
85	7225
85	7225
85	7225
82	6724
88	7744
72	5184
95	9025
95	9025

$\overline{X} = 81.35$

$EX^2 = 124,795$

Appendix D

Condition 2

	X_2		X_2		X_2		X_2
1.	5184	24.	3844	47.	5184	69.	6724
2.	5624	25.	2500	48.	5184	70.	5625
3.	5624	26.	5184	49.	5184	71.	4624
4.	9025	27.	2500	50.	6724	72.	2500
5.	9025	28.	4225	51.	4624	73.	8464
6.	5625	29.	2500	52.	2500	74.	7744
7.	2500	30.	7225	53.	7225	75.	2500
8.	6724	31.	4225	54.	5184	76.	2500
9.	6724	32.	2500	55.	6724	77.	6084
10.	6724	33.	2500	56.	7744	78.	2500
11.	6724	34.	5625	57.	3844	79.	2500
12.	2500	35.	5184	58.	7225	80.	2500
13.	3844	36.	2500	59.	5184	81.	2500
14.	7225	37.	2500	60.	2500	82.	2500
15.	2500	38.	2500	61.	6724	83.	4225
16.	7225	39.	5184	62.	2500	84.	6724
17.	4225	40.	4225	63.	4624	85.	4225
18.	5185	41.	6084	64.	7744	86.	2500
19.	7225	42.	9025	65.	5184	87.	2500
20.	2500	43.	6724	66.	2500	88.	6084
21.	4225	44.	5625	67.	6084	89.	9025
22.	4225	45.	4225	68.	2500		
23.	4225	46.	4225				

$\overline{X} = 67.5$

$EX^2 = 496,149$

Condition 3

(C1) 496,149

(C2) 124,795

(C3) 620,944

1. $\bar{X} = 70.02$

2. $EX^2 = 620,944$

Condition I Standard Deviation

95 = 14
92 = 10
88 = 7
85 = 4
82 = 1
78 = -3
75 = -6
72 = -9
68 = -13
65 = -16
62 = -19
50 = -31

C_1

	$X - \bar{X}$	$(X-\bar{X})^2$
1.	-6	36
2.	14	196
3.	14	196
4.	-31	961
5.	7	49
6.	-16	256
7.	-31	961
8.	1	1
9.	14	196
10.	14	196
11.	4	16
12.	4	16
13.	4	16
14.	1	1
15.	7	49
16.	-9	81
17.	14	196
18.	-3	9
19.	-9	81
20.	14	196

$\bar{X} = 81.35 = 81\%$

$E(X-\bar{X})^2 = 3,709$

$SD = \frac{3709}{N-1} = \frac{3709}{19}$

$SD = 195.2105$

$SD = 13971775$

Condition II Standard Deviation

95 = 27	82 = 14	68 = 0
92 = 24	78 = 10	65 = -3
88 = 20	75 = 7	62 = -6
85 = 17	72 = 4	50 = -18

C_2

	$(X - \bar{X})$	$(X - \bar{X})^2$		$(X-\bar{X})$	$(X-\bar{X})^2$
1.	4	16	29.	-18	324
2.	7	49	30.	17	289
3.	7	49	31.	-3	9
4.	27	729	32.	-18	324
5.	7	49	33.	-18	324
6.	27	729	34.	7	49
7.	-18	324	35.	4	16
8.	14	196	36.	-18	324
9.	14	196	37.	-18	324
10.	14	196	38.	-18	324
11.	14	196	39.	4	16
12.	18	324	40.	-3	9
13.	-6	36	41.	10	100
14.	17	289	42.	27	729
15.	-18	324	43.	14	196
16.	17	289	44.	7	49
17.	-3	9	45.	-3	9
18.	4	16	46.	-3	9
19.	17	289	47.	4	16
20.	-18	324	48.	4	16
21.	-3	9	49.	4	16
22.	-3	9	50.	14	196
23.	-3	9	51.	0	0
24.	-6	36	52.	-18	324
25.	-18	324	53.	17	289
26.	4	16	54.	16	16
27.	-18	324	55.	14	196
28.	-3	9	56.	20	400

$\bar{X} = 67.5 = 68\%$

G_2 Continued

	$X - \bar{X}$	$(X-\bar{X})^2$		$X - \bar{X}$	$(X - \bar{X})^2$
57.	-6	36	75.	-18	324
58.	17	289	76.	-18	324
59.	4	16	77.	10	100
60.	-18	324	78.	-18	324
61.	14	196	79.	-18	324
62.	-18	324	80.	-18	324
63.	0	0	81.	-18	324
64.	20	400	82.	-18	324
65.	4	16	83.	-3	9
66.	-18	324	84.	14	196
67.	10	100	85.	-3	9
68.	-18	324	86.	-18	324
69.	14	196	87.	-18	324
70.	7	49	88.	10	100
71.	0	0	89.	27	729
72.	-18	324			
73.	24	576			
74.	20	400			

$$SD = \frac{18,211}{N-1}$$

$$SD = \frac{18211}{88}$$

$$SD = 206.943$$

$$SD = 4549098$$

Condition III Standard Deviation

(C_1) $\Sigma (X - \bar{X})^2 = 3709$

(C_2) $\Sigma (X - \bar{X})^2 = 18,211$

(C_3) $(X-\bar{X})^2 = 21920$

$\bar{X} = 70.01$

$$SD = \frac{21920}{N-1}$$

$$SD = \frac{21920}{108}$$

$SD = 202.96296$

$SD = 450514$

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