

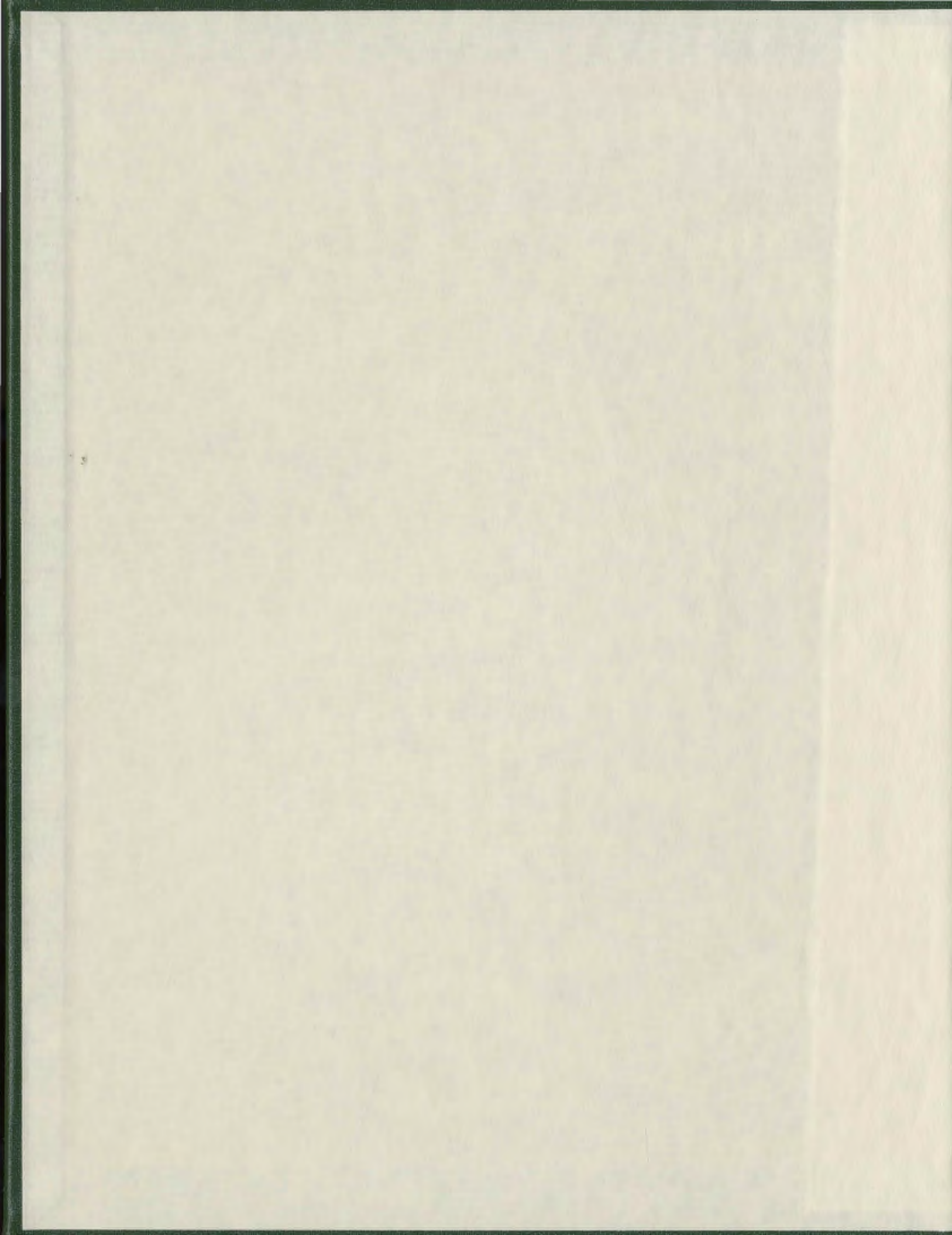
AN INVESTIGATION INTO THE EFFECTS OF  
SELECTED FACTORS ON STUDENT SUCCESS  
IN THE BUSINESS EDUCATION AND HEAVY  
EQUIPMENT OPERATION PROGRAMS AT THE  
BAY ST. GEORGE COMMUNITY COLLEGE

CENTRE FOR NEWFOUNDLAND STUDIES

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AN INVESTIGATION INTO THE EFFECTS OF SELECTED FACTORS  
ON STUDENT SUCCESS IN THE BUSINESS EDUCATION AND  
HEAVY EQUIPMENT OPERATION PROGRAMS AT THE  
BAY ST. GEORGE COMMUNITY COLLEGE

by



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A Thesis submitted in partial fulfillment  
of the requirements for the degree of  
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## ABSTRACT

The aim of this study was to determine what effects selected factors had on the successful performance of students in Business Education and Heavy Equipment Operation programs at the Bay St. George Community College in Stephenville, Newfoundland. The primary question to be investigated was whether the route by which students obtained their entry requirements was significant or not.

The three groups of students in question were those who came: (1) direct from public school, (2) through Basic Training for Skill Development (BTSD) without Basic Literacy, and (3) through BTSD with Basic Literacy. Students in the Heavy Equipment Operation program came through all three routes whereas students in Business Education came through routes one and two only. The overall performances of these three groups were compared, using four selected factors: route of entry, age, prior experience, and accommodations.

The information for this study was extracted from the student files at the Bay St. George Community College. The sample was based on the 11-year period from 1973 to 1983. A standardized method of calculating performance scores was devised to ensure that a uniform system of recording data was used for both programs.

In the data analyses each factor was tested against overall performance of the students in each of the programs. A significant relationship was found between route of entry and student performance in Heavy Equipment Operation but all other analyses indicated insignificant relationships. However, in Business Education the experience factor, although not related significantly to performance, indicated that a weak relationship may exist between lack of experience and low performance.



## ACKNOWLEDGEMENTS

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## CHAPTER I

### BACKGROUND TO THE STUDY

In today's society it is very important for people to be trained and retrained for specific occupations. For a considerable time governments have been engaged in offering training programs for many workers, especially those who are in low level occupations. However, many of these programs require a certain level of academic education which has not been attained by the people for whom they were originally designed. It has, therefore, been necessary to develop programs that will enable adults to obtain the level of education required to enter these training programs. A more recent trend is that of providing concurrent programs where an adult student is able to upgrade academically and learn a skill at the same time.

In Canada there are different routes and programs by which adults can upgrade their educational level. In this study the relative strength of these different routes is examined.

#### Adult Basic Education (ABE) and Basic Training for Skill Development (BTSD) Programs

At present in Newfoundland and Labrador there are two upgrading programs available prior to enrolling in vocational training. These are Adult Basic Education and Basic

### Training for Skill Development.

Essentially, ABE is a part-time evening program which offers courses in three core areas: communication skills, mathematics, and science. Up to the Grade X level, students accumulate all the necessary credits from these three core areas. However, for the Grade XII level, which requires 36 credits, only 30 may come from the core areas. The other six are categorized under General Options and may be taken from any field of study outside the core areas.

BTSD is a full-time program which permits adults to attend school on a regular day-to-day basis. The program consists of three core areas of instruction: communication skills, mathematics, and science, and is organized for the student with a specific vocational goal. The BTSD program was set up for students with educational levels ranging from Grade V to Grade XI.

These two programs are similar in that their core areas are identical. The courses in each program are also ascribed a number of specific objectives and students progress on completion of these objectives. In each case the grades achieved are considered equivalent to high school grades and are acceptable as pre-entry requirements for the various vocational courses.

Despite these similarities there is also a number of characteristics that set them apart. These are:

- (1) the goals of ABE are broader than those of BTSD;
- (2) ABE is a part-time program and a portion of the cost of administering it is the responsibility of the student, whereas BTSD is a full-time program funded totally by the Government of Canada; and
- (3) ABE is administered by the Division of Adult and Continuing Education, whereas BTSD is administered by the Division of Technical and Vocational Education.

#### Basic Literacy

Shortly after the BTSD program was developed and in wide use throughout the country, it was determined that there was a large number of illiterate adults who were unable to enter the BTSD program. In the early 1970's in response to this need, a Basic Literacy program was developed as a "stepping stone" to BTSD. It concentrated primarily on communication skills but also included basic mathematical concepts.

Throughout the 1970's this program provided an opportunity for many illiterate adults to return to school and upgrade to a level whereby they could qualify for the BTSD program. At the time of this study, the Basic Literacy program was still popular. However, in the intervening period, as a result of changes in Canada Manpower policy, this program has been considerably reduced.

#### Three Routes to Training

The training programs for the various trades have different grade-entry requirements. For example, to enroll



in a Heavy Equipment Operation course a student must have completed Grade VIII; for a Motor Vehicle Repair course the requirement is Grade X; and, for Business Education courses the requirement is Grade XI.

Adult students in Newfoundland and Labrador who wished to take vocational training courses could acquire the entry requirements in one of three ways: (1) the public school system (students could complete the required grade-entry before leaving school); (2) the BTSD program (students who dropped out of the public school system could enroll in the BTSD program and proceed to complete the grade-entry requirement); and, (3) the Basic Literacy program (students who had dropped out of school, at a low level could enroll in the Basic Literacy program, progress to BTSD and complete the grade-entry requirement).

In the more recent "concurrent training" programs, students are not required to take BTSD prior to enrolling in a vocational course. However, the two programs described above are still in operation and may be for some time to come.

A question arises from consideration of the three routes of entry to vocational training: Are there differences among the three groups of students in their performance in the vocational courses? In other words, do the three routes differ in the extent to which they prepare students for the vocational courses?

This question was of primary interest to the writer in conducting the study herein reported. In addition, another question was studied: What factors contribute to the success of students in the vocational courses?

It would appear that very little material is available on the relative effectiveness of these programs.

In a publication from Information Canada, Who Knows (1973), it is stated:

Even Saskatchewan NewStart Inc., which produced the greatest body of material in this field [adult basic education], was aware that its evaluative procedures had concentrated on the improvement of its programs rather than on proving how effective they were. (p.71)

In another Information Canada publication, Achieving Occupational Competence (1974), reference is made to the lack of evidence indicating that completing ABE programs affects the results of occupational training programs.

Shearon (1970), in discussing the evaluation of adult programs, emphasized the need

to determine the impact of Adult Basic Education . . . to provide proof of their legitimacy and effectiveness in order to justify society's continued support. (p. 15)

More follow-up studies are therefore required to determine whether the adult education programs in Canada are as effective as the public school system in preparing students for occupational training.

Information gathered from this study may assist personnel working with curriculum, budgeting, admission requirements, and counselling services. Also, this study

may promote a more complete study of the adult learners within Newfoundland's vocational schools, technical institutions, adult centers, and community colleges.

#### Organization of the Study

Chapter I provides a brief background to the problem. Chapter II is a review of the research literature related to this study and examines in detail the problems outlined in Chapter I. The problems, questions, and hypotheses are presented in Chapter III. Chapter IV presents the design of the study and also explains the methods used in selecting subjects. The collections and treatment of the data are also presented in this chapter. The testing of the hypotheses is outlined in Chapter V. A discussion of the results and recommendations for further research are presented in Chapter VI.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

#### Introduction

This study concerns three routes by which a student may obtain the grade-entry requirements necessary to enter a pre-employment or vocational program. The most familiar route is the public school system where a student who completes the desired level may choose a vocational or occupational program and be directly enrolled in that program.

The Basic Training for Skill Development (BTSD) program provides the other two routes. This program is designed for students who drop out of the public school system without reaching the level necessary to qualify for the vocational program of their choice. Students with reading levels of Grade V and above enroll directly in the BTSD program and progress to the required grade-entry level. Students with reading ability below Grade V must first complete a Basic Literacy program before entering the BTSD program to complete the entry requirements.

These latter two routes are known throughout the study as BTSD and Basic Literacy. Both are sponsored by the Canada Employment and Immigration Commission (CEIC) which provides the student with a training allowance while attending school.

Is the route of entry a factor in the students' success? Is it better to have completed the prerequisites from the public school system or is it better to have enrolled in a prevocational course and obtained the prerequisites?

In this chapter the views of several authors are discussed and the results from various studies are presented to show the similarities and differences that relate to graduates from various programs.

#### Philosophical Framework

Education and training are treated separately in Canada. The provincial governments assume control over education while the federal government, through the Canada Employment and Immigration Commission, is heavily involved in manpower training. The various levels of government in co-operation with the major industries in Canada decide which skills are likely to be in greatest demand throughout the country, but the federal government alone is responsible for the cost of providing the necessary training to ensure that these skills are taught.

If we compare the aims of education with the aims of training, as sponsored by the federal government, it is evident that the purpose of general education is different from that of training.

Brooke (1972) explained the aim of the public school system is to "teach broad knowledge and to foster broad

interest in order that the individual may adjust more rapidly, and more easily to the changes that are required" (p. 160).

On the other hand, the primary function of BTSD, as stated in BTSD Review (January 1973), is

to raise the basic educational level of a trainee in the shortest time possible so that he or she may achieve one of two aims: (1) to obtain employment for which a designated academic level is a pre-requisite, or (2) to meet the entrance requirements of a vocational skill training course which will prepare the trainee for his desired occupation. (p. 18)

These aims are not a contradiction of the objective of BTSD according to Lynn (1974), "to upgrade the educational qualifications of unemployed or underemployed individuals to meet the requirements of further training courses" (p. 38).

Lynn (1974) stated, "education is intended to prepare an individual to perform undefined functions in unpredictable situations [whereas] training is intended to prepare an individual to perform defined functions in predictable situations" (p. 38).

However, the distinction between the two concepts is becoming somewhat blurred. For example, Tremblay (1975), an instructor with the Youville Regional School Board in Quebec, explained that the role of the school should be changing because it is no longer adequate

to make youths into adults who match the behavior of other adults. The capacity to adjust to change is more important. . . . As a result of

this "new pedagogical system" he stresses that the aims should be: (1) to develop the individual, (2) to make him acquire the ability to act and to come to terms with change, and (3) to make him autonomous and responsible. (p. 9)

Giles and Conti (1978), in advocating a union of vocational education and Adult Basic Education (ABE), stated that

education is more than just preparing people for the needs that industry is currently vocalizing. It is a process of helping people find a life path, of providing them the opportunity to leisurely select a path that will serve their total needs in a modern technocracy and for providing them with the tools for surmounting restricting sociological and psychological barriers . . . . education is, in short, learning to learn. (p. 10)

If we look at the objectives of ABE as published by Information Canada in The Adult Learner (1974), we see a definite parallel to that of education in general as stated by Page (1978), Brooke (1972), and Tremblay (1975). These objectives as stated are:

(1) to help adults acquire communication and computational skills necessary to meet their needs, (2) to raise the total education level of adults with an objective of making them more independent citizens, (3) to improve the adults' ability to benefit from occupational training, (4) to increase opportunity for more productive and profitable employment, and (5) to make adults better able to meet their responsibilities. (p. 8)

#### The Adult Student

In addition to these apparent differences of philosophy and aims, another factor which may affect the routes in question is that of adult learner characteristics.

The adult learners are different from pre-adult learners because they do not have the time, inclination or motivation to sit and learn specific subjects which may or may not be useful to them in the future. The pre-adult learner and the adult learner have many similarities when considering such principles of learning as reinforcement, feedback, satisfaction, and activity (Thorndike, 1928), but adults have other characteristics that set them apart from the pre-adult. Brooke (1972), Abramson (1976), and Ballantyne (1977) agreed that most adult learners have the following characteristics:

(1) They are volunteer learners who enroll because they want to, whereas children are compelled by law to be in school until a certain age. The advantage to this for the adult teachers is that it provides a more effective learning environment but the disadvantage is that the adult learner will discontinue the program if the teacher's behavior, the classroom activities or other features of the program are not acceptable.

(2) They have much more experience. They know about and have met many experiences, often more than those of the teacher. Consequently, they are more skeptical and evaluative.

(3) They have many concerns that are different from those of the pre-adult learner. They quite frequently have family and work responsibilities. The pre-adult may be still struggling with adolescence while the adult may be



trying to understand his/her own child's adolescence.

(4) They are more independent and responsible. They have a psychological need to be treated with respect and to be perceived as having the ability to run their own lives. They avoid situations where they are treated like children.

#### Demographic Information

In considering such demographic information as students' age, sex, and family background, very little literature is available on the adult student, and even less on the adult who successfully completes a vocational or occupational course. However, a number of studies have been completed on the reasons why students drop out of school. A brief look at this literature may point out some of the characteristics of those students who do succeed. Relative to this research in Canada are the Technical and Vocational Training Assistance Act of 1961, the Adult Occupational Training Act of 1967, and the National Training Act of 1982. These acts of the federal government have provided training assistance to adults who returned to school to complete pre-vocational and vocational courses. This incentive has permitted many more adults to return to school on a full-time basis. However, it has also added another element to the motivational factors concerning their return. For example, the enrollment increased from less than 10,000 persons in 1960 to 36,000 in 1963, and 70,000 in 1965. There has been,

however, a considerable rate of dropout and failure.

A study by Forsyth and Nininger (1966) stated that the failure rate in these early years was between 61% at Sarnia and 34% at Cornwall and Welland. Also, in 1981-82 in the Province of Newfoundland and Labrador the failure rate for BTSD was 33.3% (Annual Statistical Bulletin 1981-82, 1983). This report informs us also that for the same year in Canada there were 15,471 BTSD students who completed, and 6,486 who discontinued the program; that is, there was a failure rate of approximately 30%.

The total expenditure for BTSD in 1981-82 was approximately \$19 million and with a 30% failure rate at a cost of more than \$6 million, research is perhaps appropriate, not so much to ascertain the reasons why students do not complete as to how the training program might capitalize on the factors that have caused the 70% to stay and graduate.

In a report to the United States Congress by the U.S. Secretary of Health, Education and Welfare (1966), it was suggested that research was needed in the following areas:

- (1) data and research on the ability levels, educational attainments and potential of trainees,
- (2) instruments for measuring and predicting occupational and learning potential, and (3)
- motivation studies including attitudinal, socio-economic and cultural factors. (p. 62)

The ability to predict the potential dropout would provide an opportunity for counselling and remedial help.

In studies which compare the dropout with the graduate the number of factors identified are many and complex. A summary of the adult studies in Canada by Verney and Davis,

Jr. (1964) and a single study by Forsyth and Niningér (1966) indicated the following characteristics of the graduate in relation to the dropout: (1) higher intelligence, (2) higher reading ability, (3) higher social class, (4) better adjusted personally and socially, and (5) better life experiences.

The annual bulletin published by CEIC outlines specifically the reasons why adults drop out. This information is collected by means of a survey that is sent to all adult students three months after they have discontinued their program. The 1981-82 bulletin indicates that 28.8% of dropouts from BTSD were due to unsatisfactory progress and 19.3% due to illness/maternity/death. A study by Mann (1966) in Ontario reported that students who were under 21, had a low educational level and who had held a large number of jobs at low rates of pay were most likely to drop out. Other studies in Canada and the United States have indicated that factors such as age, sex and inadequate training allowances may affect the number of dropouts as well.

A review of the literature on dropouts compared with graduates indicated that those who graduate from upgrading programs are more likely to be more intelligent, have higher reading ability, be better adjusted socially and have had more positive and successful experiences.

### Related Follow-up Studies

The programs considered in this study are BTSD and Basic Literacy. BTSD provides a direct route to vocational training and Basic Literacy, which feeds into BTSD, provides an indirect route to vocational training. The public school program is not studied as it is considered the base on which the others are rated. All the vocational courses are given a grade-entry level based on the public school program. Every aspect of adult education appears to be measured against the strength of that curriculum. In this light, studies done on related programs such as BTSD, the General Educational Development (GED) program, the Adult Performance Level (APL) program, and the many Adult Basic Education (ABE) programs in Canada and the United States are discussed as related literature. The program in the public schools is the underlying standard on which the others are graded and as Prey (1979) reported, "Since both the public school system and BTSD tests purport to measure reading, writing, and occupational skills, it is reasonable to hypothesize that the constructs being assessed are not significantly different" (p. 79).

In an article concerning the success of BTSD graduates, Woodrow (1976) stated that

the BTSD graduates entering skill courses generally do not seem to have any trouble in their courses resulting from inadequate academic preparation . . . most of them [students in post-secondary courses] do better than high school graduates and many make the Dean's list . . . in general we are

extremely pleased with the system because it enables us to provide a much better service to the community. Students disillusioned by the regular school system have blossomed under the second chance they are given in our system.  
(pp. 21-22)

In a background paper prepared for the Skill Development Leave Task Force, Stoodley (1983) concluded:

. . . those workers who have received adult education, the experiences have largely been positive although there is still frustration with many of the ABE programs. Most workers have found that their employment opportunities have improved after taking ABE and of equal importance they felt more self confident and that they have taken a major step in their life. . . . ABE is a major factor in giving workers a more positive attitude toward work and life in general. (p. iii)

A survey by Coombs (1971) also indicated that students' attitude toward academic upgrading is positive. He reported that 87% of the respondents from the survey felt adequately prepared by the upgrading program at Stephenville, Newfoundland.

In some contrast to these reports, a study by Hynes (1982) found that graduates from the ABE programs in Newfoundland and Labrador scored significantly lower than graduates from both the BTSD program and the public school system when overall vocational achievement was measured.

Gunderson (1976) stated that

preparatory services such as BTSD [were] unprofitable on narrow efficiency grounds. Since these preparatory courses concentrate on the disadvantaged, they would have to be justified on social equity grounds or on the long-run benefits from those who use basic training as a stepping stone to more remunerative industrial or vocational training. (p. 16)

Gunderson also reported that although the cost-benefit ratio is tabulated at 10 to 4, this training is justified when the broader social benefits are considered.

It is questionable whether the programs from the high schools and those from ABE can be equitably compared. The former is quite broad in its objectives and as Dudgeon (1973) pointed out, "instructors can not specify what a student must be able to do after receiving instruction for a long period of time" (p. 30). However, the BTSD program has very clearly defined objectives. Also, the overall objective, as has been indicated, is quite different. The BTSD program offers courses in communication skills, mathematics and science that will permit the adult learner to acquire the necessary background to be able to cope with training in a skill course. Success should perhaps be related to: (1) the goals that the adults set for themselves, and (2) the objectives as set out in the program. Comparing the two programs is perhaps unfair to both. Also, most of the evaluation of the Canada Manpower programs have been done internally by that department and they are inadequate as ". . . there are no qualitative bases for determining the relative success of one project or program versus another . . . ad hoc, after the fact, assessments have been made that result in highly speculative findings" (MacMillan et al., 1976, p. 61).

In other follow-up studies, it has generally been found that being an adult student is an asset rather than a

liability. In a study of 162 graduates from the Manpower Development Training Act program of the United States, Brooke (1972) reported that when four groups--strict vocational training, a combination of vocational and academic, purely academic and a control group--were compared, it was found that: (1) the vocational, combination and academic groups were employed significantly more than the control group, and (2) the vocational and combination groups showed significantly higher employment than the purely academic group.

This latter study may be an argument for the present concurrent training in which academic and skill training are being taught concurrently.

A study by Goodman et al. (1972) compared the literacy performance of graduates from the Adult Performance Level (APL) program and from the high school. APL is an American program designed to meet the educational needs of the functionally illiterate adult. When adults satisfactorily complete the functional literacy performance tests they are awarded a high school diploma. Both groups were tested on skills needed for competent functioning as adults, as outlined in the Adult Performance Level Study, published by the Adult Education Department of the Office of Education (1975). The tests were designed by the Community Services Department of Wichita, Kansas Public Schools. In the four APL knowledge areas it was found that:

- (1) The APL graduates scored significantly higher in the combined area of knowledge than did the high school graduates.
- (2) The APL graduates scored significantly higher in the areas of consumer economics and occupational knowledge than did the high school graduates.

Wilson et al. (1980) compared the success patterns of students entering post-secondary vocational education with a high school diploma to those who had received a high school equivalency certificate by successfully passing the General Educational Development (GED) tests. This is a battery of tests developed in the United States to assess the general knowledge of adults with a view to granting high school standing without enrollment in formal courses. The two groups were compared by grade-point average, program completion and employment placement. All three comparisons found no significant differences between the groups. It was concluded that GED students succeed fully as well as high school diploma students in post-secondary vocational education programs.

Reed (1980), when studying the relationship of selected demographic characteristics of adult learners to academic success in a self-directed learning program, revealed that there were no significant differences in success for adult learners on the basis of: (1) educational level of fathers or spouses, (2) occupation of fathers or spouses, (3) marital status of subjects, and (4) previous completed college.



course work of subjects. However, it pointed out that subjects who had children had a significantly better chance of success than did subjects who had no children. He also found that job-related motivation is one of the major factors related to successful adult learning.

The findings of Fiebig (1968) are applicable to most American studies on adult education graduates compared with high school graduates. In studying the characteristics of adults enrolled in the Kalamazoo public school's adult high school program, he found that adult graduates:

- (1) possessed normal intelligence range;
- (2) dropped out at a medium age of 17;
- (3) returned after a medium absence of 8 years;
- (4) subsequently earned higher grades than before.

This study also pointed out that older adults performed better than young adults and that adults can perform as well as regular school students in parallel courses.

Follow-up information generally indicates that whether a trainee was referred directly to a vocational class or through pre-vocational training did not make any significant difference as to whether one was employed or unemployed.

Evidence from the literature, then, tends to suggest that there is no significant difference in the performance of graduate students in vocational courses regardless of the route by which they came.

Boshier (1979) emphasized that adult education must become more accountable. Hynes (1982) pointed out that this

accountability can only be determined by the performance of students who enroll in vocational or other programs after they have successfully completed an adult upgrading program.

This study may help in that respect by attempting to determine whether a number of selected factors are relevant to success. Information gathered from this type of study may help learning institutions increase the effectiveness of their educational and training programs.

## CHAPTER III

### PROBLEM, QUESTIONS AND HYPOTHESES

#### The Problem

Inherent in the preceding chapter is the concern that follow-up studies are necessary to evaluate the effectiveness of upgrading programs. This study was designed to analyze the successful performance of students in vocational courses. The purpose of the analysis was to relate this performance to a number of selected factors which may have influenced the students' success. It was speculated that the following factors were most influential:

(1) The route by which they entered their vocational training program (the public school system, BTSD without Basic Literacy, or BTSD with Basic Literacy).

(2) Their age.

(3) Their experience (the trade-related experience they may have had prior to enrollment).

(4) Accommodations (whether they lived at home or boarded away from home while enrolled in the vocational course).

The major problem areas that were addressed were:

(1) Are there significant differences in performance between the three types of students that complete vocational courses?

(2) What differential effects did these factors have on student success?

The following section outlines the specific questions that address the relationships between individual factors and overall performance.

#### Statement of the Questions

The specific questions outlined below were considered to be a guide to the investigation of the problem.

(1) Is there a relationship between students' overall performance and the route by which they entered the course?

(2) Is there a relationship between the students' overall performance and their age?

(3) Is there a relationship between the students' overall performance and the type of experience they had before entering the course?

(4) Is there a relationship between the students' overall performance and the type of accommodations they used while they were enrolled in vocational courses?

#### Statement of the Hypotheses

The following hypotheses, in null form, were generated from these questions:

(1) There is no significant relationship between the overall performance of the students and the route by which they entered the course.

(2) There is no significant relationship between the overall performance of the students and their age.

(3) There is no significant relationship between the overall performance of the students and the type of experience they had prior to entering the course.

(4) There is no significant relationship between the overall performance of the students and their living accommodations--whether they lived at home or in a boarding accommodation while enrolled in their course.

## CHAPTER IV

### RESEARCH METHODOLOGY AND DATA TREATMENT

This chapter is a report of the procedures and methods used in selecting subjects and collecting and recording the data for the study. It includes a rationale for the program areas selected and the time period under study. The treatment of the data and the scope and limitations of the study are also indicated.

#### Selection of Subjects

To address the questions and hypotheses outlined in Chapter III two programs were selected from the Bay St. George Community College in Stephenville, Newfoundland. They were Heavy Equipment Operation and Business Education.

The Heavy Equipment Operation program is a 14-week long course offering general instruction on heavy equipment and specific instruction on various types of heavy machinery such as front-end loaders, backhoes, and off-highway trucks. The entry requirement is Grade VIII.

Business Education includes the following courses: Bookkeeper-Clerk Typing, Clerk Accounting, Stenography, Dictatyping, and Shorthand-Typing. These courses are individualized and students progress at their own pace.

Most students require between 9 and 10 months to complete either of these courses. The entry requirement is Grade XI.

These two programs were selected for the following reasons:

(1) More students had graduated from these courses than from any others and selection was therefore less difficult.

(2) These programs catered to two different populations. The Heavy Equipment Operation program consisted of 100% male and the Business Education program consisted of 98% female.

(3) The Heavy Equipment program presented an opportunity to analyze the performance of students from many levels; the entry requirement was Grade VIII but a majority of the students in this program had grade levels higher than eight.

(4) The Business Education program presented an opportunity to analyze the performance of students who were all at the same level; the entry requirement being Grade XI.

(5) In order to test the performance of students who had entered at the Basic Literacy level and who had proceeded through the system and completed a vocational course, an area had to be chosen where the entry requirement was not high. For this reason the Heavy Equipment Operation program was selected.

### Design of the Study

This study was based on the performance levels of successful students in two program areas. They were Heavy Equipment Operation and Business Education. Those students completing the Heavy Equipment Operation program had come by way of three routes whereas those from Business Education had come by way of two routes. Since the entry requirement for Business Education was high, the basic literacy route was eliminated because the number of students who were able to progress from there to the Grade XI level was too small for analysis.

### Five Groups of Students

The five groups of students dealt with in this report are indicated in Figure 1. They were:

- A. Graduates from the Heavy Equipment Operation program having entered the program
  1. directly from the public school system;
  2. from the BTSD program, having entered the BTSD program directly from the public school system;
  3. from the BTSD program, having entered BTSD from the Basic Literacy program, after attending public school.
- B. Graduates from the Business Education program having entered the program



4. directly from the public school system;
5. from the BTSD program, having entered the BTSD program directly from the public school system.

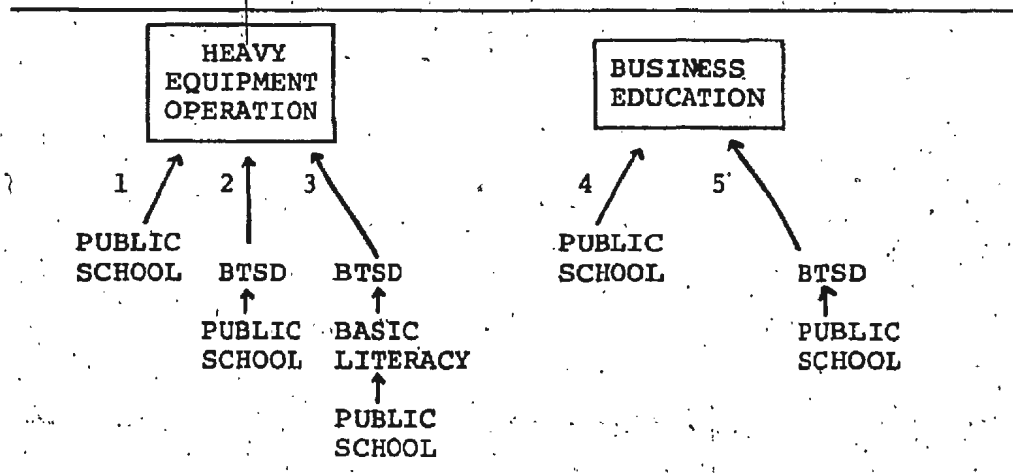


Figure 1. Five groups of students.

#### Collection of Data

The student files at the Bay St. George Community College (the former Adult Education Centre) were the source of the data used in this study. These files date from 1966 to the present, but to address the hypotheses of Chapter III the writer chose data from the period 1973-83. This time period was selected for the following reasons:

- (1) The Basic Literacy course was not begun until 1972.
- (2) The implementation, in 1972, of the BTSD program with its individualized approach to instruction had made it possible for many students to complete a number of grades

in one training year.

(3) The early 1970's saw the highest enrollments at the College thus providing more graduates.

(4) The files for this period were better organized than those prior to 1973.

From this population a sample of 272 files were chosen. A list of the categories and the numbers in each category are shown in Figure 2.

|  |     |
|--|-----|
| (1) Public school to Heavy Equipment Operation . . . . .                           | 60  |
| (2) Public school to BTSD to Heavy Equipment Operation . . . . .                   | 70  |
| (3) Public school to Basic Literacy to BTSD to Heavy Equipment Operation . . . . . | 21  |
| (4) Public school to Business Education . . . . .                                  | 61  |
| (5) Public school to BTSD to Business Education . . . . .                          | 60  |
| Total  | 272 |

Figure 2. Number of student files by category.

In these totals were included files for each category from each of the years in the period studied. The category was selected first and then files were examined to determine whether the student:

- (1) fitted the category selected;
- (2) met the requirements through public school or otherwise;

(3) enrolled in one of the selected programs after meeting the requirements;

(4) successfully completed the selected program.

Those files which met the criteria had the following information extracted from them:

- (1) performance score;
- (2) student age;
- (3) prior experience;
- (4) type of accommodations.

W. Feller (1957) stated that random sampling is that method of drawing a portion (sample) of a population or universe so that all possible samples of fixed size 'n' have the same probability of being selected. The selection of files for this study was not entirely random according to the above definition nor to the discussion of random sampling by Kerlinger (1973),

In the selection of data, all available examples of students who had entered by way of Basic Literacy were used, but for BTSD and public school students this was not feasible because of the large number of files for each category. Also, these files were organized alphabetically by year rather than by program or student category.

This lack of total randomization, while it does not detract from the conclusions based on this particular sample, does limit the extent to which generalizations can be made from these conclusions.

This section is an explanation of how the recorded performance scores were standardized for the two programs under study, and what statistical tests were applied to the data in an attempt to analyze the effects of each of the selected factors.

#### Standardization of Data

The first problem to be addressed was the method of recording performance. The two programs had different ways of reporting the performance of students. The Heavy Equipment Operation program consisted of two parts--theory and practical--and students were given a percentage score on each part. This system prevailed throughout the entire 11-year period in question. However, the method of recording performance in Business Education changed from percentage grades on seven separate subjects to that of grading students on a 1-5 scale on a large number of specific objectives.

This scale-grading approach adopted in Business Education was based on the DACUM (Designing a Curriculum) chart developed by Nova Scotia NewStart in 1968. It involved the participation of employers and experts in the occupations in defining the nature and structure of the skills required in a particular occupation. The DACUM chart is a single-sheet skill profile that presents skills in performance terms. General areas of competence are first identified and each is subsequently subdivided into individual skills that

collectively enable an individual to perform competently within the general area. These skills are defined briefly and simply and are placed independently in small blocks on the chart. Each block can serve as an independent goal for learning achievement.

In order to have all grades recorded uniformly, the following procedure was adopted:

(1) Every grade that was recorded in percentage in both programs was categorized and given a scale value as follows:

| <u>Percentage</u> | <u>Scale</u> |
|-------------------|--------------|
| 80% - 100%        | 5            |
| 70 - 79           | 4            |
| 60 - 69           | 3            |
| 50 - 59           | 2            |
| Below 50          | 1 (Failure)  |

These scale values were then totalled and averaged. For example, a student with 75% on theory and 65% on practical would be assigned a scale value of 4 and 3, respectively. The average would be  $(4+3)/2 = 3.5$  for overall performance.

(3) All Business Education students whose grades were recorded on a scale of 1-5 had their grades totalled and averaged in like manner.

In order to accommodate decimal fractions each of the levels on the scale had to be assigned a set of boundaries. Since this study concerns only successful students the scale will include only levels 2-5. Each of these levels is identified in Table 2.

Table 1  
Scale Boundaries

| Scale | Boundaries  |
|-------|-------------|
| 2     | 2.50        |
| 3     | 2.50 - 3.49 |
| 4     | 4.49        |

These four levels are further reduced to two levels for purposes of analysis using the Chi-square test. The reason for making this reduction to two levels is that if cells in a contingency table have zeros or extremely low numbers, the results of the Chi-Square test are somewhat compromised. To avoid this limitation the levels were collapsed from 4 to 2. As collapsed scores, performance level 1 will represent the combination of scale 2 and 3, and performance level 2 will represent the combination of scale 4 and 5.

#### Data Analysis

Having recorded all the necessary information according to the standardization method, totals were found for each factor and category and compared with overall performance scores. From observation there appeared to be significant trends in the totals for route of entry and overall performance. However, without a reliable and valid

testing instrument all interpretations were speculative and subjective. The instruments chosen were the Chi-square formula and test of statistical significance. With these tools each of the hypotheses was formally tested and the results recorded. A report of these results is included in Chapter V.

#### Scope and Limitations

(1) This study is based on the student file data from one community college, consequently any generalization that includes other student bodies may not be entirely accurate.

(2) The sample population for the Business Education program was 98% female and caution must be exercised in generalizing to a population which includes male students.

(3) The sample population for the Heavy Equipment Operation program was 100% male and caution must be exercised in generalizing to a population which includes female students.

(4) The Business Education and Heavy Equipment Operation programs were selected because they represent the most popular programs for the period 1973-83. Results in other programs may be totally different and generalizing is not recommended.

(5) This study selected four factors for analysis. They are considered to be most significant but indeed, there may be other factors that may have had significant effects

on students' performance in the courses selected.

(6) This study deals only with those students who successfully completed their vocational course. Whether the dropout rate for BTSD is higher or lower than that of public school students is not determined.



## CHAPTER V

### ANALYSIS OF THE DATA

This chapter is a report of the results obtained when the hypotheses of this study were tested. The students' overall performance was tested against each of four factors: route of entry, age, prior experience, and accommodations to determine whether their effects of the students' success were significant or not. Since there were two programs under study each hypothesis was tested twice. The results are indicated below.

#### Hypothesis 1

There is no significant relationship between the overall performance of the students and the route by which they entered the course.

#### Test of Hypothesis 1 (Heavy Equipment Operation)

The contingency table of observed frequencies shows the three routes of entry and the two levels of performance. The results are shown in Table 2.

The Chi-square value was calculated at 11.7054 with 2 degrees of freedom. The level of significance was calculated at .0034, thus indicating a rejection of the null hypothesis. There is, therefore, a significant relationship between the students' performance in Heavy Equipment

Operation and the route by which they entered the program.

Table 2

Overall Performance and Route of Entry for  
Students in Heavy Equipment Operation

| Performance Level | Basic Literacy | BTSD     | Public School |
|-------------------|----------------|----------|---------------|
|                   | n=21           | n=70     | n=60          |
| 1                 | 9 (.43)        | 7 (.10)  | 14 (.23)      |
| 2                 | 12 (.57)       | 63 (.90) | 46 (.77)      |

$\chi^2 = 11.705$ ;  $df = 2$ ; Level of significance = 0.003 ( $p < .01$ )

From observation of the data it is noted that 43% of Basic Literacy students fell within performance level 1, but only 10% of BTSD students and 23% of public school students fell within this level (see bracketed numbers in Table 2). The raw data indicated that of the 21 students who entered through the Basic Literacy route, a total of 19, or 90.1%, had reached the Grade VIII level only. However, for BTSD and public school students the percentages in this category were 12.9% and 25%, respectively. This may account for the results of Hypothesis 1 in the Heavy Equipment Operation program. The table also indicates that 90% of the students from BTSD had a performance level of 2. It is speculated that a combination of age, academic standing and experience may account for their relatively high performance.

Test of Hypothesis 1 (Business Education)

Table 3 below shows the results when the route of entry of students in Business Education were tested against overall performance.

Table 3

Overall Performance and Route of Entry  
for Students in Business Education

| Performance Level | BTSD     | Public School |
|-------------------|----------|---------------|
|                   | n=61     | n=60          |
| 1                 | 31 (.51) | 39 (.65)      |
| 2                 | 30 (.49) | 21 (.35)      |

$$\chi^2 = 2.529; df = 1; \text{Level of significance} = 0.107 (p > .05)$$

The Chi-square value was calculated at 2.529 with 1 degree of freedom. The null hypothesis was supported, indicating that there is no significant relationship between the students' overall performance and their route of entry. However, Table 3 does indicate that a much wider discrepancy exists between the performance of students from public school than between the performance of students from BTSD.

Summary

The results as shown in Tables 2 and 3 indicate that Hypothesis 1 is rejected for Heavy Equipment Operation but supported for Business Education. It would appear, then, that route of entry is less important to the students in

Business Education than it is to the students in Heavy Equipment Operation. This may be partly due to the low grade-entry of the students from the Basic Literacy route in Heavy Equipment Operation. Also, Tables 2 and 3 both indicate that more students from the BTSD route performed at level 2 than from the other routes. In Business Education 49% of the students from BTSD performed at level 2 compared with 35% from public school.

### Hypothesis 2

There is no significant relationship between the overall performance of the students and their age.

#### Test of Hypothesis 2 (Heavy Equipment Operation)

To test Hypothesis 2, age was divided into four categories: 17-22; 23-28; 29-34; and > 34. The results of Hypothesis 2 for Heavy Equipment Operation are shown in Table 4.

Table 4

Overall Performance and Age for Students  
in Heavy Equipment Operation.

| Performance Level | 17-22    | 23-28    | 29-34    | > 34     |
|-------------------|----------|----------|----------|----------|
|                   | n=46     | n=52     | n=30     | n=23     |
| 1                 | 11 (.24) | 9 (.17)  | 3 (.10)  | 7 (.30)  |
| 2                 | 35 (.76) | 43 (.83) | 27 (.90) | 16 (.70) |

$\chi^2 = 4.1349$ ;  $df = 3$ ; Level of significance = 0.246 ( $p > .05$ )

The Chi-square value was calculated at 4.1349 with 3 degrees of freedom. The level of significance was 0.246, thus supporting the null hypothesis. There was no significant relationship between the performance of students in the Heavy Equipment Operation program and their age.

Test of Hypothesis 2 (Business Education)

The contingency table (Table 5) of observed frequencies shows the two levels of performance and the four age categories for Business Education students.

Table 5  
Overall Performance and Age for  
Students in Business Education

| Performance Level | 17-22    | 23-28    | 29-34   | > 34    |
|-------------------|----------|----------|---------|---------|
|                   | n=74     | n=31     | n=8     | n=8     |
| 1                 | 44 (.59) | 19 (.61) | 4 (.50) | 3 (.38) |
| 2                 | 30 (.41) | 12 (.39) | 4 (.50) | 5 (.62) |

$\chi^2 = 1.789; df = 3; Level\ of\ significance = 0.621 (p > .05)$

The Chi-square was calculated at 1.789 with 3 degrees of freedom. The level of significance was 0.621, thus supporting the null hypothesis that age and overall performance of students in Business Education were not significantly related.

Summary

In Heavy Equipment Operation and Business Education courses the age factor was not significantly related to students' overall performance.

Hypothesis 3

There is no significant relationship between the overall performance of the students and the type of experience they had prior to entering the program.

Test of Hypothesis 3 (Heavy Equipment Operation)

The type of work experience that students had prior to their vocational program is broken into three categories. Students with no work experience are classified under 'no experience' and the remainder are classified under 'indirect experience' or 'direct experience', depending on the type of work done. The results of the prior experience factor and students' overall performance in the Heavy Equipment Operation program are shown in Table 6.

Table 6

Overall Performance and Prior Experience of Students in Heavy Equipment Operation

| Performance Level | No Experience<br>n=75 | Indirect Experience<br>n=49 | Direct Experience<br>n=27 |
|-------------------|-----------------------|-----------------------------|---------------------------|
| 1                 | 14 (.19)              | 10 (.20)                    | 5 (.19)                   |
| 2                 | 61 (.81)              | 39 (.80)                    | 22 (.80)                  |

$\chi^2 = 0.679$ ;  $df = 2$ ; Level of significance = 0.967 ( $p > .05$ )

The Chi-square was calculated at 0.679 with 2 degrees of freedom. The significance level was greater than .05, thus supporting the null hypothesis. The insignificance of the  $\chi^2$  value is explained by the percentages shown in Table 6 (brackets). The cells in individual rows are almost identical. There is therefore no significant relationship between overall performance and prior experience for students in the Heavy Equipment Operation program.

#### Test of Hypothesis 3 (Business Education)

Table 7 shows the results when prior experience and overall performance of students in the Business Education program were tested.

The Chi-square was calculated at 5.071 with 2 degrees of freedom. The level of significance was 0.077, thus supporting the null hypothesis. However, Table 7 indicates that the relationship is close to significant levels. It is speculated that this is due to the 'no experience' column. Of the 38 students with no experience, 26 had a performance level of 1, which is in sharp contrast to the other two categories. It would appear that although overall performance and prior experience are not significantly related, there does appear to be some relationship between low performance and no experience.

Table 7

Overall Performance and Prior Experience  
of Students in Business Education

| Performance Level | No Experience | Indirect Experience | Direct Experience |
|-------------------|---------------|---------------------|-------------------|
|                   | n=38          | n=83                | n=10              |
| 1                 | 26 (.68)      | 40 (.48)            | 4 (.40)           |
| 2                 | 12 (.32)      | 43 (.52)            | 6 (.60)           |

$\chi^2 = 5.071$ ;  $df = 2$ ; Level of significance = 0.077 ( $p > .05$ )

Summary

In the Heavy Equipment Operation and Business Education programs the prior experience of students was not a significant factor. However, for the students in the Heavy Equipment Operation program the level of significance was 0.967, thus explaining the almost identical percentages in the cells of each row. It would appear that experience had no affect on performance. For Business Education students, performance and experience, although not statistically significant, had a level of 0.077. It appears that for the students in Business Education, no experience and low performance are positively correlated.

Hypothesis 4

There is no significant relationship between the overall performance of the students and their living accommodations, whether they lived at home or in a boarding accommodation, while enrolled in their program.



Test of Hypothesis 4 (Heavy Equipment Operation)

Whether students lived with their families while enrolled in the Heavy Equipment Operation program or lived in boarding houses away from home did not appear to be a significant factor. Table 8 shows the test results.

Table 8

Overall Performance and Accommodations of Students in Heavy Equipment Operation

| Performance Level | Home     | Away     |
|-------------------|----------|----------|
|                   | n=73     | n=78     |
| 1                 | 18 (.25) | 12 (.15) |
| 2                 | 35 (.75) | 66 (.85) |

$\chi^2 = 2.066$ ;  $df = 1$ ; Level of significance = 0.146 ( $p > .05$ )

The Chi-square was calculated at 2.066 with 1 degree of freedom. The level of significance was 0.146, thus supporting the null hypothesis. Therefore, for students in Heavy Equipment Operation, no significant relationship existed between students' accommodations and their performance.

Test of Hypothesis 4 (Business Education)

Table 9 indicates the test results of the accommodation factor and the overall performance of students in Business Education.

Table 9

Overall Performance and Accommodations of  
Students in Business Education

| Performance Level | Home     | Away    |
|-------------------|----------|---------|
|                   | n=107    | n=14    |
| 1                 | 61 (.57) | 9 (.64) |
| 2                 | 46 (.43) | 5 (.36) |

$\chi^2 = .387$ ;  $df = 1$ ; Level of significance = 0.541 ( $p > .05$ )

The Chi-square was calculated at .3876 with 1 degree of freedom. The level of significance was calculated to be 0.541, thus supporting the null hypothesis that no significant relationship existed between accommodations and overall performance in Business Education. However, for this test the number of students in the 'Away' column is considerably small when compared to the number in the 'Home' column. These numbers may affect the validity of the analysis.

#### Summary

Using the Chi-square value at the .05 level of significance, it was found that the accommodations factor was not significant for students in the Heavy Equipment Operation program or for the students in the Business Education program.

### Data Summary and Observations

The test results show that of the eight null hypotheses formally tested, only one was rejected. It was shown that a significant relationship existed between route of entry and student performance in Heavy Equipment Operation. The other null hypotheses were supported.

In addition to the four factors formally tested and discussed, other characteristics and trends have been highlighted by the data. The three most prominent are: (1) group performance; (2) grade-entry; and (3) sex.

In Hypothesis 1, where the overall performance of the separate groups is presented, it is clear that the BTSD group performed better than the other two, with the students from Basic Literacy having the lowest performance level. Since the grade-entry requirement for Heavy Equipment was Grade VIII, and 90% of the students from the Basic Literacy route entered at that level, there appears to be a relationship between grade-entry and performance. In Business Education, where the two groups had the same grade on entry, Grade XI, the results were not significant. However, the BTSD group did perform better than the public school group.

Inherent in the study also is the characteristic of sex. Although no hypotheses are stated regarding sex, as indicated earlier, one of the samples was male and the other was female. Disregarding the accommodations factor because the numbers for Business Education were unbalanced, the data

from the other three factors indicated a number of trends. For example, in Heavy Equipment Operation and its male sample, the route of entry factor proved significant, but not for the female sample in Business Education. Although this may have been due to the Basic Literacy entry route, other factors related to sex may have intervened. For the age factor, the percentage of men in Heavy Equipment Operation who performed at level 2 was much higher than that of the females in Business Education. This performance trend was also apparent for the experience factor. Also, in Business Education, the data for the experience factor suggests a relationship between low performance and no experience, but that same relationship does not exist for males in Heavy Equipment Operation.

This investigation of effects of selected factors on student success must be interpreted in light of the range and size of the sample used. Since the data for this study were gathered from two programs in one learning institution, it would be unwise to generalize from these test results and observations. However, these trends should be investigated further using data from more programs and a sample from a wider population.

## CHAPTER VI

### SUMMARY, DISCUSSION, AND RECOMMENDATIONS

The primary purpose of this study was to determine whether there were differences in performance in the vocational programs among the three groups of students that enrolled in them. In addition to this, another question was studied: What factors contributed to the success of students in these vocational programs? The factors selected for the study were: (1) route of entry; (2) student age, (3) prior experience, and (4) accommodations (whether living at home or boarding away from home).

To investigate these questions, two programs were selected from the Bay St. George Community College in Stephenville, Newfoundland. They were the Heavy Equipment Operation program and the Business Education program. All the necessary data for the study were extracted from the student files at the College.

The hypotheses were constructed for each program and suggested that there was no significant difference between success and any of these selected factors. The Chi-square test of significance was applied to each set of data and the results recorded. Significant levels lower than .05 were considered a rejection of the hypotheses; thereby suggesting that the results did not happen by chance alone.

However, the Chi-square test merely informs the experimenter whether the results are significant or not and offers no explanation for these results. In this study, some possible explanations are offered but the reader may interpret the results in other ways. The data and results may be analyzed further with the use of other testing instruments.

Three of the selected factors, age, prior experience, and accommodations, proved not to be significant for either of the programs. Also, for Business Education, route of entry was not statistically significant. In each of these cases the null hypothesis was supported.

The question of primary interest to the writer was whether the route of entry was a significant factor in determining the students' success. The entry routes were:

- (1) direct from public school;
- (2) from the BTSD program, having entered the BTSD program directly from the public school system;
- (2) from the BTSD program, having entered BTSD from the Basic Literacy program, after attending public school.

In the Heavy Equipment Operation program students entered from all three routes listed above. However, for Business Education only routes one and two were tested because the entry requirement was Grade XI and very few students from route three were able to progress to that level.

The route of entry factor proved to be significant in only one of the two programs chosen. In the Heavy Equipment Operation program, when overall performance and overall entry scores were tested, the results were significant at the .01 level. Since this program had a low entry requirement, thereby permitting entry by way of Basic Literacy, the significance may be due to the low academic background of this group of students. For Business Education the route of entry was not significantly related, thereby suggesting that the age and experience of BTSD students may have counterbalanced the superior academic background of the students from public school.

Tables 2 and 3 show that the students from BTSD had the highest performance scores, followed by public school and Basic Literacy in that order. The raw data indicate that 90% of the students from Basic Literacy entered their program with the minimum entry--Grade VIII. For BTSD and public school these percentages were 12 and 26%, respectively. This suggests that level of entry may be related to performance scores.

The test results also indicate that some differences may be due to the sex of the students. For Heavy Equipment Operation the Basic Literacy route may have had its effect, but of interest also is the comparison of performance between the students from BTSD and the students from public school in each program. In Heavy Equipment Operation, where the sample was 100% male, 90% of BTSD students and 77% of

public school students had a performance level of 2, whereas in Business Education where the sample was 98% female, these percentages were 49 and 35%, respectively. Since these results are from two different programs, generalizations are not recommended but these tests do suggest that further investigation is necessary.

The experience factor, although not significant at the .05 level, did produce interesting results. For the students in the Heavy Equipment Operation program prior experience was surprisingly a non-factor. The test results indicated near identical ratios within the columns and within the rows, thereby giving a significance level of 0.967. It had been speculated that students who were experienced truck drivers and heavy equipment operators would have a clear advantage over the inexperienced students, but the test results indicated that no such differences existed.

In Business Education the relationships were not significant but the speculation that inexperienced students would be at a disadvantage was verified. Sixty-eight per cent of the students with no experience had a performance score of 1, whereas for indirect and direct experience the percentages were 48 and 40%, respectively.

The test results for the experience factor indicated differences that may have been related to the sex of the students. These characteristics need further study to determine whether this is true for other programs and other populations.



The scope of this study is somewhat narrow in that the data come from only two programs in one community college. Furthermore, the only testing instrument used was the Chi-square test of significance. More definitive explanations may be revealed if test instruments such as multiple regression analysis and analysis of variance were applied to the data.

It is therefore recommended that a more extensive study be undertaken that will include more programs, more learning institutions, more students, and more factors. Also, the data should be subjected to more testing instruments that will more strongly indicate the effects and the magnitude of these effects on students' success.

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APPENDIX A

Letter of Request for Access to Student Files

21 Empire venue  
Stephenville, Newfoundland  
September 6, 1983

Vice President  
Bay St. George Community College  
Stephenville, Newfoundland

Dear Fred;

Reference our conversation regarding access to student file data, please consider this a request for permission to use the student data in order to conduct a study as part of the requirements for a Masters in Education degree.

The study I am considering deals with the Business Education and Heavy Equipment Operation courses. I propose to investigate whether certain factors are significantly related to student success in these courses. I hope the information gathered will be of some benefit to a number of your departments.

This work will be done during the evenings and on weekends and the security will need to be aware of my schedule.

I trust that this request is reasonable and I look for your usual cooperation in these matters.

Thank-you.

Yours truly,  
Riley Kendall







