Assessment Testing as a Predictor of Student Success in Adult Basic Education Mathematics Courses

by

Cindy Lou James
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Supervisor: Dr. Leslee Francis-Pelton

ABSTRACT

High attrition rates in ABE programs are a major concern for all adult educators. Accurate assessment and proper placement may be an effective strategy for reducing ABE attrition rates. A common approach to diagnosing the educational needs of ABE learners is standardized testing. The question is: Can standardized test scores predict student success in ABE courses? To answer this question, a research project was undertaken at the University College of the Cariboo to determine if the Canadian Achievement Test (CAT/2) could predict student success in ABE courses. The results from this study indicate that the CAT/2 mathematics sub-tests scores are potent predictors of student success in ABE mathematics courses. In addition, the findings from this project support the theory that coaching activities enhance students' performances on achievement tests. Moreover, the qualitative data collected during this project challenge the universal view that testing traumatizes the fragile ABE learner.

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Dedication

This thesis is dedicated to my parents, John and Blanche James, who have always supported me in all my endeavors (academic and otherwise).

Chapter One

Introduction

Background

Approximately 31% of Canadians age 20 and over, or 7.0 million people, have not completed high school (Statistics Canada, 1998b). The labour market and life prospects of nonsecondary graduates are quite dismal. Unemployment rates continue to be highest among nonsecondary graduates (Statistics Canada, 1998a). The nonsecondary graduates that do find employment often experience lengthy hours and low incomes, since most of them are in low-end jobs with little opportunity for advancement (Statistics Canada, 1993). As a result, nonsecondary graduates have a greater dependency on employment insurance, social assistance, and family allowances (Statistics Canada, 1993).

It is imperative to reduce significantly the pool of people without a high-school diploma or its equivalent, considering the social and economic costs to individual Canadians and to Canadian society. The purpose of Adult Basic Education (ABE) is to provide nonsecondary graduates with the credentials required for entering employment or for further educational opportunities by enhancing the adult learner's reading, writing, mathematical and logical-thinking skills; however, of the millions of people eligible to attend ABE programs, only a small percentage actually participate and even fewer complete these programs (Calamai, 1987; Cramer, 1982; Creative Research Group, 1987;

Merriam & Cunningham, 1989; Quigley, 1992; Rachal, Jackson, & Leonard, 1987; Statistics Canada, 1984).

As providers of ABE programs, post-secondary educational institutes need to focus on increasing the participation and completion rates for these programs. In fact, it is in their self-interest to increase participation rates. As Patricia Cross (1981) states in her book, *Adults as Learners: Increasing Participation and Facilitating Learning*:

> The more education people have, the more education they want, and the more they participate in further learning activities. Furthermore, there is the strong probability of an echo effect in rising educational attainment since the children of well-educated parents are also more likely to become well educated. Thus, education is addictive not only for individuals but also for entire societies. (p. 15)

Not only will the educational institutes benefit from a society that is committed to lifelong learning, so will Canada's economy. As Statistics Canada (1998a) reports, Canadians who continue to participate in educational activities throughout their life tend to be in a better position to keep pace with the increases in knowledge and technological change that characterize the current global economy.

To attract and retain the adult learner, post-secondary institutes must remove barriers and increase student success. Research into nonparticipation has found that barriers to education can be divided into three categories: situational, institutional and dispositional (Cross, 1981). Situational barriers are those arising from the circumstances of the potential learner such as cost, time or transportation problems, and home or job responsibilities including problems with child care. Institutional barriers consist of all those practices and procedures that discourage adults from participating in educational activities such as scheduling problems, lack of information, and excessive bureaucracy. Dispositional barriers are those related to prior experiences and self-perceptions of the learner such as low self-confidence, negative attitude to classes and low personal priority. Educators and governments can and are slowly removing some of the situational and institutional barriers. For instance, British Columbia post-secondary institutions began offering tuition-free ABE courses as of July 1998. At the institutional level, barriers are being removed by diversifying timetables in order to provide a variety of scheduling options and courses, enlarging or establishing on-campus child care facilities, providing more information in a variety of mediums, and simplifying admission/registration procedures. The dispositional barriers are more difficult to resolve.

To improve students' confidence levels and attitudes, educational institutes must increase students' success rates by providing students with the optimum conditions for succeeding in their post-secondary education endeavor. Critical to student success is careful diagnosis of educational needs of individual learners (Crandall, Lerche, & Marchilonis, 1984; Gravenberg & Rivers, 1987). Often mature students - students out of the educational system for at least two years - are not required to provide educational transcripts to enter ABE programs, nor do they have to undergo educational assessment. Unfortunately, without a transcript or some type of educational assessment, students may register in ABE courses for which they are unprepared academically. Such inaccurate placements may be one of the reasons so many students fail or do not complete ABE courses. An obvious solution to unsuitable placement is to provide educational assessments for potential ABE clientele. There is a range of educational assessment tools available, but standardized achievement tests seem to be the preferred tool used by the majority of educational institutes. This prompts the question: **Can student success in ABE courses be predicted by achievement test scores**?

As with all tests, students' performances on achievement tests may be influenced by a variety of factors. One of the biggest threats to obtaining accurate information about students' performances is test anxiety (Winzer & Grigg, 1992). High anxiety can cause poor performance and unfortunately the greatest anxiety-inducing situation in schools at every level is the "test" (Woolfolk, 1990). Indeed, standardized testing can be overwhelming, especially for potential ABE students who typically have not been successful in their previous educational endeavors. The majority of these people has had negative experiences in formal schooling and may be discouraged or intimidated by the testing procedure involved with standardized tests.

Other factors influencing the learner's performance may be a lack of test-taking skills and unfamiliarity with standardized achievement testing. However, participating in coaching activities can improve performance (Becker, 1990; Bond, 1989; DerSimonian & Laird, 1983; Kulik, Kulik & Bangert, 1984; Messick & Jungebult, 1981; Samson, 1985; Seaton, 1992; Vernon, 1954), and even small amounts of coaching time can result in significant improvement (Messick, 1982). Thus, to reduce anxiety levels, minimize the "threat" of the testing situation, and hone test-taking skills; educational institutes may want to provide students with the opportunity to participate in achievement test-taking tutorials. Hence, a second question arises: **Does participating in a test-taking tutorial affect ABE student performance on achievement tests in a college context?**

Purpose of Study

Currently, the University College of the Cariboo (UCC) College Preparation department does not have a specific placement process for adults registering in ABE courses. Therefore, the majority of adult learners self-select their ABE courses and levels at UCC. As a result, college preparation courses at UCC perpetually consist of a significant portion of academically under-prepared learners. To address this problem, the College Preparation department is considering an ABE placement procedure that would include assessment testing. Before incorporating testing in such a procedure, it seemed prudent to ascertain whether or not assessment testing could predict student success in ABE courses at UCC.

As the coordinator of the UCC Assessment Centre, I too had a vested interest in whether or not assessment testing properly placed students and hence increased students' chances of success. Consequently, in cooperation with the UCC College Preparation department, I initiated this research study with the primary objective of gathering data on assessment testing as a predicator of student success. This research also provided me with an opportune situation to collect information related to enhancing students' performances on assessment tests and to understanding the students' views of their assessment experiences. Thus, the main purpose of this research was to answer the following three questions:

- What is the predictive validity of the mathematics subtests of the Canadian Achievement Test – Second Edition (CAT/2)?
- Does participating in a coaching activity improve student performance on the CAT/2?
- What are the adult students' views of the assessment test-taking process?

Significance of Study

The results from this study have practical importance for educators and administrators working with ABE clientele. Adult Basic Education providers are capable of changing the structure and design of educational activities in order to ameliorate existing persistence and departure patterns. Hence, depending on this study's findings, ABE educators who are concerned about the educational, psychological and financial losses that result from attrition may decide to establish a placement process involving assessment testing. Even if the assessment test is not used for placement, institutes may decide to use the assessment as a tool to identify those students most likely to dropout. Such an early warning system could greatly improve the targeting of other retention initiatives to those that need it most and hence maximize the use of finite resources. Moreover, if the results of this study indicate coaching is effective, institutes such as UCC may decide to establish tutorials for all students required to write standardized entry assessment tests. Such activities should increase students' chances of gaining entry into their programs of choice. This would result in a "win-win" situation for institutes and prospective students since an admissions barrier for the students would be removed while institutes would increase their enrollments. In addition, this research may provide the basis for further research into assessment tests as placement devices for a variety of programs at UCC and other educational institutes.

Methodology

This study took place at the University College of the Cariboo, located in Kamloops, B.C.. The University College offers a variety of university, college and technical programs including comprehensive Adult Basic Education programs. The ABE programs offer Biology, Chemistry, Computing and General Science, English, Entrepreneurship, Mathematics, Physics, and Social Science courses to students who want to upgrade their education in order to apply for post-secondary programs and/or to obtain credit towards the ABE Provincial Diploma.

Data were collected from three classes of adult basic education mathematics courses during the 1998/99 academic year. The class identified as the experimental group participated in a test-taking tutorial, while the other two classes identified as the control group and the accelerated group did not. Scores from the mathematics sections of the Canadian Achievement Tests - Second Edition (CAT/2) and final course grades were collected from all three groups. The tutorial session with the experimental group was administered, tape-recorded and transcribed by myself. All the students were asked to submit written reflections on their test-taking experience. The objective of collecting these qualitative data was to determine the students' views of the test-taking experience.

Statistical analysis was used to determine: (a) if the CAT/2 scores of the students who successfully completed the Math 050 course (earned a final grade of 50% or higher) varied significantly from those who did not successfully complete this course (did not complete the course or earned a final grade lower than 50); (b) if a significant correlation existed between the students' CAT/2 scores and their final grades; and (c) if the performance of the assisted experimental group was significantly different than the performance of the unassisted control group. A prediction model for the dichotomous outcome (success or nonsuccess) also was created via the analysis. Inductive data analysis was used to construct assertions about the students' test taking experiences using the qualitative data (Lincoln & Guba, 1985). Nonparametric statistical analyses were employed to determine if any relationship existed between the students' views of the assessment process and their achievement on the assessment test or in their Math 050 course.

Limitations of Study

The limitations of this study mainly relate to its restricted generalization due to research design. To begin with, students could not be assigned randomly to the three different Math 050 classes due to conflicting schedules and timelines. Secondly, this study gathered data from UCC Math 050 courses and from the CAT/2 mathematics subtests only. Consequently, the results cannot be generalized to other ABE subject matter/courses, nor to other CAT/2 subtests or different assessment tests for obvious reasons. Moreover, since there are no standardized syllabi for ABE courses, the UCC Math 050 course may differ significantly from mathematics courses offered by other ABE providers and hence the transferability may be limited further. Finally, even though the sample demographics were representative of the UCC ABE population, it may not correspond to the demographic profiles of ABE clientele elsewhere.

Chapter Two

Literature Review

This literature review is divided into three subtopics that relate to the key themes of my research: 1) Attrition in ABE courses, 2) Assessment testing as a placement tool for ABE clientele, and 3) Efficacy of coaching for standardized tests.

Attrition in ABE Courses

Adult Basic Education studies estimate the attrition rates in ABE courses to be somewhere between 20 and 60 percent (Cain & Whalen, 1979; Quigley, 1992; Thomas, 1990). With such high rates, program attrition for ABE programs has become and is a major concern for adult educators. Unfortunately, attrition studies have revealed that there is no simple explanation or solution to this complex phenomenon.

Since dropouts are difficult to track, some earlier attrition studies relied upon instructors' views to establish why students dropped out. A survey by Mezirow, Darkenwald and Knox (1975) asked ABE instructors to rank five reasons for dropout. "Work schedule" was considered the most important, followed by "discouragement over lack of progress", and "child care." A 1976 study by Thomas (as cited in Thomas, 1990) found "health" reasons to be the major factor contributing to dropout, followed by "employment-related" reasons, "academic achievement", and "personal factors" according to the ABE instructors in her study.

More recent studies attempt to gather retention data from other sources such as student files and/or surveys of noncompleters. Studies that rely on student records usually focus on the demographic characteristics of the dropouts. For instance, Diekhoff and Diekhoff (1984) identified four demographic variables that were related to dropout in an adult literacy program: age, ethnic background, program goals, and family background. In contrast, Cramer (1982) concluded that there were no significant differences in demographic traits between dropouts and completers in her study of ABE students at Bowling Green State University. Meanwhile, in an effort to compare persisters with noncompleters, Semmons and Taylor (1997) tried to develop a demographic profile of the successful GED student, but due to the diverse characteristics of the sample, they were unable to establish such a description.

The results from studies that gather data directly from the dropouts tend to identify identical or similar reasons to those identified by instructors. For example, the results from the study by Cramer (1982) indicated dropouts "experienced conflicts with job and time of class and felt discouragement and lack of progress"(p. 1). Similarly, in a study of adult literacy programs in British Columbia, Thomas (1990) found among dropouts that work and family-related reasons dominated the causes for withdrawal. In a study of an urban worker education program, Perin and Greenberg (1994) also found personal and program-related issues were prominent reasons given for dropout. A three-year study by Malicky and Norman (1994) on participation and attrition in adult literacy programs in Alberta reported family problems and personal-psychology reasons, as well as learning problems as the most common reasons cited by the adult learners for not completing their studies. Still much of the research on attrition in ABE programs has produced inconclusive findings. A classic example of this is Bosma's (1988) two-year study involving 1407 ABE literacy students. In this study, Bosma investigated the degree of equivalence between the characteristics of dropouts and persisters in terms of six categories of variables: students' personal and demographic characteristics, initial goals, educational history and achievement, employment status, attitudes towards computers, and program of study. He identified 36 variables in these six categories and found that 17 were significant, but only accounted for 7.8% of the variance in attrition/persistence. As a result, he concluded that reasons for attrition are "unknown". Bosma cites the diverse sample and imposed definitional categories as explanations for his inconclusive results.

Some of these studies and many other ABE studies have determined that the reasons students dropout are similar to the reasons for nonparticipation (Boshier, 1973; Rachal et. al., 1987; Thomas, 1990). As mentioned in chapter one, studies that focus on adult education participation rates tend to identify barriers or deterrents to participation, and the majority of these barriers can be classified into three categories: situational, institutional and dispositional (Cross, 1981). The most commonly cited reasons classified as situational barriers are cost, time constraints, home and job responsibilities, lack of child care, poor transportation, and social disapproval (Barchi, 1992; Beder, 1990; CAAE/ICEA, 1982; Confederation College, 1987; Cross, 1981; Darkenwald & Valentine, 1985; Hayes, 1988; Hayes & Darkenwald, 1988; Henry & Basile, 1994; Human Resources Development Canada, 1994; Ministry of Advanced Education, Training & Technology, 1992; Rachal et. al., 1987; Rivers & Associates, 1992; Scanlan & Darkenwald, 1984). Scheduling problems, time requirements, lack of information, attendance policies, lack of course relevance, and excessive bureaucracy are the most commonly cited institutional barriers (Beder, 1990; CAAE/ICEA, 1982; Confederation College, 1987; Cross, 1981; Darkenwald & Valentine, 1985; Hayes, 1988; Henry & Basile, 1994; Human Resources Development Canada, 1994; Ministry of Advanced Education, Training & Technology, 1992; Rachal et. al., 1987; Rivers & Associates, 1992; Scanlan & Darkenwald, 1984).

A variety of dispositional barriers have been identified with the most prominent ones being lack of confidence, low personal priority, dislike for school, perceived effort, and negative past experiences with education (Beder, 1990; CAAE/ICEA, 1982; Confederation College, 1987; Cross, 1981; Darkenwald & Valentine, 1985; Hayes, 1988; Hayes & Darkenwald, 1988; Henry & Basile, 1994; Human Resources Development Canada, 1994; Ministry of Advanced Education, Training & Technology, 1992; Quigley, 1993; Rachal et. al., 1987; Rivers & Associates, 1992; Scanlan & Darkenwald, 1984). Cross (1981) found that in the survey research on nonparticipation that she reviewed, situational barriers were cited most frequently, followed by institutional barriers, and lastly by dispositional barriers.

One of the major concerns with attrition/nonparticipation studies is that they heavily rely upon survey data. Although well-designed surveys have definite strengths such as accuracy, generalizability, and convenience (Marshall & Rossman, 1999), they also have certain weaknesses. The most significant weakness pertinent to attrition/nonparticipation studies relates to the validity of survey data. When using surveys, researchers assume that the respondents can and will answer the questions accurately. However, if the surveys are utilized to ascertain people's opinions, attitudes or feelings, there is often a discrepancy between what people say during the interview and what they actually do (Gray & Guppy, 1999). In particular, researchers need to be cognizant of how social norms might affect the answers given. As Jackson (1988) states in his book on rules for survey design and analysis: "there is some question about the extent to which surveys reflect *ideal* behaviour as opposed to *real* behaviour" (p. 33). This is one reason Patricia Cross (1981) surmised that dispositional barriers were probably underestimated in the survey data she reviewed. As she explained, "it is far more acceptable to say that one is too busy to participate in learning activities or that they cost too much than it is to say that one is not interested in learning, is too old, or lacks ability" (Cross, 1981, p. 107). Similarly, the reasons for dropping out as cited by the adult learner must be interpreted with caution as students may provide what Garrison (1988) termed as "ego sustaining rationalizations" (p. 200) as to why they discontinued. Like the nonparticipant, the adult learner may be reluctant to share the true reason for dropping out such as lacking the ability, and hence provide an alternate reason that she/he presumes is more socially acceptable such as lack of time due to family responsibilities.

Limited generalization due to research methodologies is another major problem associated with attrition/nonparticipation studies. By their very nature, adult basic education courses and programs differ in duration, content, format, instruction, evaluation and outcomes. Such diversity is by far the major obstacle for transferability between studies. Variations in sampling methodologies and demographics also limit the possible generalizations. For instance, many studies incorporated random sampling, but logistical problems precluded random selection in numerous other studies. Moreover, in some cases the demographic profiles were unique to a program or to a geographical area. Lastly, some of these studies gathered the data from self or group administered questionnaires, others through mailed questionnaires, some by telephone survey and still others by interviews. Each of these approaches has a distinctive set of advantages and disadvantages that affect their level of accuracy and reliability (Marshall & Rossman, 1999), which in turn may affect the generalizability of the results. Most studies tried to compensate for differences in methodologies by controlling the confounding variables, but due to the complexity of the issue, this proved to be extremely difficult. Consequently, it is difficult to extrapolate any information other than very basic generalizations from many of these studies.

The definition of "dropout" and the subsequent modes of measurement also pose a problem when interpreting the results from attrition studies. In most cases, dropout was measured according to whether or not students received a final grade in a course or program. Unfortunately, by employing this definition many studies did not account for learners who temporarily withdrew, or transferred to another program or a different educational institute. The effect of omitting this germane data is unknown. However, not all studies adopted the "final grade" definition. Some defined "dropout" as not persisting to a second semester and therefore measured attrition by comparing attendance records in first and second semesters. Other longitudinal studies measured completion over many semesters and hence were able to compensate for temporary withdrawals and to some degree for transfers. Needless to say, the lack of consensus on the definition and measurement of "dropout" adds to the perplexity of the attrition issue.

Faults aside, these studies have provided valuable information that precipitated positive changes in adult basic education and laid the groundwork for developing theories that endeavor to explain and/or predict attrition in adult education. One of the more well known conceptual frameworks for explaining adult attrition rates is the "congruence" model developed by Boshier (1973). He theorized that if incongruities develop for the adult learner that result in anxiety, then dropout is likely to occur. Although this model has limited generalizability since it was based on a sample of university continuing education students, results from other studies have provided data to support the theory. For instance, a study of adult learners enrolled in ABE English and mathematics courses by Garrison (1985) concluded that learners "with lower scholastic ability, lower self-confidence, and greater socioeconomic change may set unrealistic goals for themselves and have unrealistic expectations of the program resulting in an incongruence leading to dropout" (p. 36). Darkenwald and Gavin (1987) reported similar findings in their study of adult students enrolled in high school equivalency preparation classes. In this study the researchers found dropouts exhibited a greater degree of discrepancy between their initial expectations and actual experiences in the classroom social environment. Moreover, Malicky and Norman (1994) summarized their study of adult literacy programs as follows: "From a theoretical perspective, the results of this study reaffirm the view of program participation and persistence as multi-faceted in nature and involving the interactions of individuals and their environment" (p. 154). In contrast, another study of adult learners participating in ABE mathematics classes by Garrison (1987) revealed that the incongruency variables were poor predictors of dropout and hence Garrison questioned the adequacy and generalizability of Boshier's congruence model. Nonetheless, he noted that the limited sample size and the design of his 1987 study may have resulted in the anomalous finding and recommended further research before discounting or confirming Boshier's congruency theory.

Based on these studies, it is apparent that attrition in ABE programs is a multivariate phenomenon that is extremely difficult to explain or predict. However, the majority of these findings substantiate the importance of providing accurate placement for adult learners to avoid incongruities and thus increase the probability of retaining the students. Moreover, many other studies have shown that early contact including an evaluation of high-risk students has a positive impact on student success and retention (Arruza & Daniel, 1987; Barchi, 1992; Groves & Groves, 1981; Jackson-Mayer, 1987; Noel, Levitz, & Kaufmann, 1982). The dilemma for educational institutes is to determine what method(s) of assessment will most accurately evaluate students' skills and thus facilitate appropriate placement for students entering adult basic education courses, without discouraging or in extreme cases demoralizing the adult learner.

Assessment Testing as a Placement Tool for ABE Clientele

One of the most common approaches to diagnosing the educational needs of ABE learners for placement is to administer a battery of tests. Some of the most widely used tests for ABE programs are the Adult Basic Learning Examination (ABLE), the Canadian Achievement Test (CAT), the Canadian Adult Achievement Test (CAAT), the Differential Aptitude Test (DAT), the Tests of Adult Basic Education (TABE), the Wide Range Achievement Test (WRAT), and domestic tests designed by the individual institutes (Brand, 1995; Crandall et. al., 1984; Ehringhaus, 1991; Jones, 1989; Nurss, 1989; Stricht, 1990; Venezky, Bristow & Sabatini, 1997). Considering the impact of assessment testing, it is crucial that the assessment tests accurately predict student success in ABE programs, and that the testing process does not become a deterrent to continuing in a program. Hence, assessing the appropriateness and quality of standardized tests for ABE placement is a consequential issue that should generate much research.

When selecting a suitable assessment/placement tool, each educational institute should consider the content, administrative time, validity, reliability and cost. The University College of the Cariboo chose an achievement test as the principle assessment tool because "achievement tests are based on school curricula, [hence] they measure the kind of literacy and numeracy skills expected in academic programs." (Jones, 1989, p. 221). The University College of the Cariboo selected the Canadian Achievement Test - Second Edition (CAT/2) from all the other achievement tests for the following reasons:

the CAT/2 was constructed in British Columbia by Canadian educators and thus the test questions focus on Canadian content; it was normed on a Canadian school population in 1992; it is used widely among Canadian colleges; it is relatively easy to administer and score; and it is fairly inexpensive.

Once an assessment tool has been chosen, the educational institute must perform follow-up testing to validate the tool. The predictive validity of a test refers to how valid or accurate a test is at predicting some future behavior of learners (Stricht, 1990). A great deal of research has been completed to determine the predictive validity of standardized tests such as the American College Test (ACT), the General Equivalency Test (GED), the Graduate Management Admissions Test (GMAT), the Graduate Record Examination (GRE), the Law Schools Admissions Test (LSAT), the Medical Colleges Admissions Test (MCAT), and the Scholastic Aptitude Test (SAT) with significant variations in the results (Educational Research Service, 1981; Hughes & Nelson; 1991; Rounds & Andersen, 1985). Research on the predictive validity of standardized tests such as the ABLE, CAAT, CAT, DAT and TABE is limited. These instruments have been the subject of reviews and critiques that analyze their strengths and weakness, and studies that compare the various testing instruments or evaluate instruction and/or learning using pre-test and post-test scores (Farr, Moon & Williams, 1986; Frager, 1991; Stricht, 1990; Taylor, 1990); however, research on their predictive validity is a fairly recent phenomenon.

Results from the few studies that have evaluated the predictive validity of adult education assessment tests vary somewhat due to the differences in research design. Nevertheless, each study has revealed the existence of some type of relationship between performance on the assessment test and student success or completion. For example, Grulick (1987) examined the reliability and validity of a domestic entrance exam at Florence-Darlington Technical College, the TEC-MAT, and compared its predictive validity with that of the Scholastic Aptitude Test - Math (SAT-M), the Career Planning Program (CPP) test, and the Test of Adult Basic Education (TABE). The correlation between the students' first quarter GPA and their scores on both the TEC-MAT test and the SAT-M was significant. A significant correlation also was discovered between the students' mathematics course grades at the end of their first quarter and their scores on the TEC-MAT test and the SAT-M. Insufficient data for the TABE was cited as the main reason that the TABE did not demonstrate a significant correlation in this study. In comparison, Dirkx and Jha (1994) tried to differentiate between completing and noncompleting students by testing two prediction models using demographic data and the TABE reading and mathematics scores. They found that a prediction model that utilizes the participant's age and their TABE reading and mathematics scores could successfully predict sample completers.

Wilson and Wright (1993) decided to examine the relationship between scores on standardized tests and students' GPA and course grades from a different angle. In their study, they determined that GPA and course grades could serve as reliable predictors of Differential Aptitude Test (DAT) performance. Since this correlation was significant, the reverse also is true. However, the sample in this study was grade 11 students, therefore the results cannot be generalized to an adult population.

Venezky, Bristow and Sabatini (1997) also examined the use of standardized tests for placement from a different perspective. The investigators used a variety of measures to evaluate how the TABE and several other literacy tests could predict actual placement in ABE and GED classes that resulted from a pre-established placement procedure, which they accepted as optimal. They found that the TABE locator test was a more effective predictor of actual placement than any of the full TABE tests or other literacy tests, and at least as effective as the TABE Total Reading. Since the TABE locator test only requires 37 minutes to administer and the full TABE test battery requires three hours to administer, Venezky et. al. concluded that lengthy testing procedures were not necessary for placement.

Obviously more research on using standardized tests for ABE program placement is required. Besides investigating the predictive validity of these tests, new studies need to focus on the impact of assessment testing on the fragile ABE clientele, as many educators are concerned that the assessment testing process may deter ABE clientele. Coaching for the test may be one way to minimize the trauma of the testing process.

Efficacy of Coaching for Standardized Tests

The proliferation of coaching activities for standardized tests is only natural considering the extensive usage of standardized tests for making important educational decisions such as admissions to and placement in programs offered by post-secondary institutes. The public has access to a selection of coaching activities and materials for almost all of the predominate standardized tests in North America such as the American College Test (ACT), the General Equivalency Test (GED), the Graduate Management Admissions Test (GMAT), the Graduate Record Examination (GRE), the Law Schools Admissions Test (LSAT), the Medical Colleges Admissions Test (MCAT), the Scholastic Aptitude Test (SAT), and the Test of English as a Second Language (TOEFL). The coaching activities range from independent study using workbooks and study guides, some of which are produced and marketed by the testing agencies that design the standardized test, to structured test-preparation classes offered by private agencies and/or private and public educational institutes endeavouring to increase enrollments. Consequently, a massive amount of research focusing on the efficacy of coaching for standardized tests has been generated. The results from these studies are inconsistent, and hence the efficacy issue is steeped in controversy.

The majority of the variability in the results can be attributed to the diverse research methodologies employed by the various studies. One of the fundamental differences in the methodologies is the definition and/or classification of "coaching activities" adopted by the studies. The term coaching, in general, encompasses a wide variety of test preparation activities undertaken by students to improve test scores. Vernon (1954), in one of the first reviews of research pertaining to the efficacy of coaching activities, described coaching as the process "where students are told the right answer and are given hints on how to improve their performance" (p. 271). He distinguished between practice which involved writing practice tests, and coaching as previously described, and between practice or coaching with the identical test, with parallel forms and with other similar material. Antastasi (1981) classified coaching programs into three levels of training intervention: 1) short test-taking orientation and practice sessions; 2) longer coaching programs that include intensive practice with sample test questions; and 3) instruction in broad cognitive skills. Kulik, Kulik and Bangert (1984), in a meta-analytic synthesis of results from 40 studies on the effects of practice on aptitude and achievement tests scores, used six variables to describe the coaching activities. The first variable classified the programs into the three levels described by Antastasi. The second variable categorized the activities by the length of the coaching activities. The next four variables related to the presence of the following in the coaching activities: training in test-taking strategies, anxiety-reduction exercises, actual practice on test items and direct content teaching. Becker (1990), in her meta-analysis of 48 studies investigating the efficacy of coaching on SAT scores, classified coaching activities based on their purpose: coaching for content and ability areas measured by the test, coaching to reduce test anxiety and increase familiarity with the mechanics of the test taking process, and coaching to improve test-taking skills and answer-selection strategies. To date, there is no universal definition and/or classification of coaching activities for research purposes.

Research design, a major component of methodology, also varied immensely from one study to another. Some studies were designed with experimental and control groups, others did not include comparison groups. In many studies the subjects were randomly assigned to experimental and control groups, but just as many studies did not involve random samples. More indepth studies used a pretest/posttest design while others used posttest designs only. The pretest/posttest design involved administering a pretest prior to the coaching, followed by a posttest after the coaching activities. The posttest design did not include the administration of a pretest. Moreover, a variety of measurements and statistical analysis for collecting and reporting the data were utilized in the various coaching studies. In addition, significant variations existed in sample sizes and subject characteristics such as level of abilities, age, gender, ethnic background and family income. The majority of the studies tried to control these confounding variables, but their success at doing so and the omission of any one of these variables from the statistical analysis are more reasons why the effectiveness of coaching activities on standardized test scores is such a controversial topic.

In addition to differences in research methodology, the inherent variability in human behaviour may be another factor responsible for some of the study variance. Such components as motivation (importance of performance to the participant), growth and development (between pretests and posttests, and differences between subjects), and state of mind (having a "good" day vs. a "bad" day, or high test anxiety vs. low test anxiety) are variables that are difficult, if not impossible, to measure and hence to control. As an example, the College Entrance Examination Board (as cited in Dyer, 1987) collected data on thousands of students who took the SAT in the spring of their junior year and repeated it in the fall of their senior year. Approximately 1 in 20 showed a score increase of 100 points or more and approximately 1 in 50 students showed a decrease of 100 points or more on the SAT scale (from 200 to 800). The cause of these dramatic changes is unknown, but there is a high probability that the students' motivation, growth and development, and state of mind had a major impact.

Needless to say, studying the effectiveness of coaching activities on standardized test scores is complicated. The inter-relationship among the characteristics of the studies is multifarious and in some cases precludes accurate assessment of coaching efficacy. Nonetheless, the research has lead to some conclusions and even some consensus on specific trends. Vernon (1954) concluded that "the presence or absence of previous test experience does make a difference" (p. 280). DerSimonian and Laird (1983), in their quantitative analysis of published results on the effects of coaching programs on SAT scores, concluded "that the data did support a positive effect of coaching on SAT scores" (p. 1). Samson (1985), in his quantitative synthesis of studies that investigated the effects of coaching on achievement test performance, concluded that "programs of training in test-taking skills produced, on average, significant improvements in students scores on achievement tests" (p. 265). The meta-analytic synthesis by Kulik, Kulik and Bangert (1984) showed that students could raise their scores on aptitude and achievement tests by participating in specific coaching activities.

The specific trends that have been discovered by the various research projects are as follows:

- A relationship seems to exist between the time spent participating in coaching activities and test scores (Bangert-Drowns, Kulik & Kulik, 1983; Kulik, Kulik & Bangert, 1984; Messick & Jungebult, 1981; Powers, 1985; Samson, 1985). This relationship is best described by a logarithmic equation, with scores increasing with time and eventually leveling off. The coefficients of the equation vary with the type of standardized tests (aptitude, achievement or intelligence tests) and with the type of coaching activity. One explanation for the latter variance is that the length of the coaching activity relates to the method of coaching. Longer coaching periods (10 weeks or more) tend to focus on content items and cognitive skills whereas short-term coaching periods tend to focus on test-taking strategies (Ornstein, 1993). Hence, a multiple effect of time and type of activity adds to the complexity of the reporting issue.
- Demographic variables such as age, gender, ethnic background and socioeconomic level of the students tend to yield no significant difference (Samson, 1985; Scholes & Lain, 1997; Vernon, 1954). Not all studies concur with this trend. The results from a study by Evans and Pike (1973) determined females benefited less than males from instruction for three mathematics item formats. Moreover Messick and Jungebult (1981) found the students in coached groups tended to come from families with higher incomes.

- Higher ability students tend to gain more from coaching activities that involve practice tests than lower ability students (Kulik, Kulik & Bangert, 1984; Vernon, 1954).
- Scores on nonverbal and spatial subtests such as mathematics tests tend to show greater improvement due to coaching activities than scores on verbal subtests (Becker, 1990; Bond, 1989; Messick & Jungebult, 1981; Vernon ,1954).
- Students who are coached using practice tests that are identical to the standardized test show greater improvements than students who are coached using practice tests that are parallel to the standardized test (Kulik, Kulik & Bangert, 1984).
- The size of the gains from coaching that involved practice tests is influenced by the number of practice tests taken (Eakins, Green & Bushell, 1976; Kulik, Kulik & Bangert, 1984).
- The effect of coaching activities seems to vary with the type of standardized tests and/or the type of coaching activity. Kulik, Kulik and Bangert (1984) found coaching activities that involved teaching relevant test-taking skills and information had different effects on the SAT than on other aptitude tests. Powers (1985) concluded that the GRE was not susceptible to coaching of any form. However, due to the relatively small numbers of examinees in his study, Powers acknowledged that "the findings may deserve replication" (p. 134). Rainey (1996) concluded that the ACT scores for students who participated in coaching courses were not significantly higher than nonparticipants. In contrast, Seaton (1992) found there were significant gains in ACT scores by students who participated in a test preparation seminar. However the type of coaching activity may not be the reason for the contrasting results. The more

likely causes are the existence of sample bias in both studies and variations in methodology between the two studies. Lastly, Samson (1985) found no significant differences among the different types of coaching activities and their effects on achievement test scores.

Although these trends identify to some degree cause and effect relationships, the exact cause and its effect is extremely difficult to quantify due to the multitude of confounding factors and their complex interrelationships. As Messick stated "It is not a question of whether coaching works or not, but of how much student time and effort devoted to what kinds of coaching experience yield what level of score improvement" (as cited in Green, 1981, p. 11).

The most common measurement used to describe the effect of coaching activities on test scores is the effect size *(ES)* expressed in terms of standard deviation units. It is defined as the difference between average test scores of the experimental and control groups, divided by the common within-population standard deviation (Cohen, 1988). The method of calculating the *ES* varied from study to study depending on the design of the study and the data collected. A summary of the effect size from six major studies is presented in TABLE 1.

TABLE 1

The Effect of Coaching Activities on Standardized Tests.

Study	Description	Type of Test	Average Effect Size
Bangert-Drowns, Kulik, and Kulik (1983)	Meta-Analysis of 30 studies	Achievement Tests	0.25
Becker (1990)	Meta-Analysis of 48 studies	Scholastic Aptitude Test (SAT)	0.373
DerSimonian and Laird (1983)	Meta-Analysis of 22 studies	Scholastic Aptitude Test (SAT)	0.10
Kulik, Bangert-Drowns, and Kulik (1984)	Meta-Analysis of 38 studies	Aptitude Tests	0.33
Samson (1985)	Meta-Analysis of 24 studies	Achievement Tests	0.33
Scruggs, White and Bennion (1986)	Meta-Analysis of 24 studies	Achievement Tests	0.10

For the achievement tests, the average effect size ranged from 0.10 to 0.33. In more familiar terms, these standard deviations indicate the gain from coaching was approximately equal to one month in grade level for an *ES* = 0.10 and 3.3 months in grade level for an *ES* = 0.33. For the aptitude test such as the SAT, the gains in scores ranged from 0.10 to 0.373. The 0.10 value equates to 10 points on the SAT scale (from 200 to 800) and the average effect size of 0.373 equates to 37.3 points on the SAT scale. Another method to interpret the effect size for the SAT is to convert the points to number of items correct. An eight point difference corresponds to one more item correct on the SAT (Dyer, 1987). Thus a 10-point gain is equivalent to approximately one more correct item and a 37.3 point gain is equivalent to approximately five more correct items.

How significant are these gains? Statistically, an *ES* = 0.25 or greater is considered to be significant, although 0.25 relates to a small effect (Cohen, 1988). In terms of their impact on educational decision making, it is doubtful that a gain of 1 to 3 months in grade level on an achievement test would have a significant impact on the majority of students. Only the borderline students may benefit from these gains attributed to coaching. The same can be said about improvements in scholastic aptitude tests scores. Overall, the educational significance that should be attached to the results is debatable. As DerSimonian and Laird (1983) state "the size of the effect which can be attributed safely to coaching is too small to have much attraction either for individual examinees or for educators" (p. 15).

In summary, it seems that coaching activities do affect standardized test scores, but because of the multitude of variables involved, it is difficult to determine the magnitude of the effect and its exact cause. Studies that have calculated an average effect, find the effect is quite small, albeit in many cases statistically significant. Moreover, because of the extreme variance in studies, it is impossible to generalize the results from any one study to situations involving other coaching activities and/or other standardized tests. Therefore, additional studies are needed to support the existing conclusions and to pursue questions that thus far have not been answered. One such question is: What are the effects of coaching on Canadian standardized test scores? So far there are very few such studies and to my knowledge none that have investigated the effects of coaching on the Canadian Achievement Tests (CAT) scores. Another question that needs further investigation is: Does coaching reduce the validity of standardized tests? The purpose of a standardized test is to measure broad abilities and ascertain whether an individual has acquired the skills and knowledge pre-requisite for success in the criterion situation such as post-secondary schooling. Coaching may improve test performance, but does this correspond to an improvement in criterion behaviour? A final question that needs to be investigated is: What are the students' perceptions of the assessment process? Very little qualitative data of this sort has been gathered, yet this information could be very useful as there may be intrinsic benefits to coaching that thus far have not been measured such as creating positive attitudes, lowering anxiety levels and increasing self-confidence.

As the literature review reveals, the issue of assessment testing as a predictor of student success in adult basic education is convoluted and controversial. The issue of attrition/retention in adult education has been surveyed and analyzed for decades and yet it is still difficult to isolate the exact factors that predispose persistence. It is even more arduous to design an accurate prediction model that can be applied consistently across ABE populations. Research into assessment testing as a placement tool for ABE courses is in its infancy and hence is lacking in both depth and detail. Meanwhile, the issue of coaching for standardized tests has generated an overwhelming amount of research, and yet many questions still remain unanswered as specified in the previous paragraph. This study attempted to fill some of the gaps in the existing research identified in this literature review.

Chapter Three

Methods and Procedures

Design of Study

This applied correlational research also had an experimental component. Aside from investigating the relationship between achievement test scores and student success, I endeavored to determine the effect tutorials have on achievement test-taking performance. In addition, interpretive methodology was used to arrive at the constructions of students' views of the testing-taking process (Guba & Lincoln, 1989; Lincoln & Guba, 1985). Since the students participated actively in the development and revision of their views and my constructions of the test-taking process, this research also fits into the category of participatory action research (Elden & Levin, 1991; Grundy, 1987; Lincoln & Guba, 1985). The primary data sources were:

- achievement test scores on the two mathematics sections of the Canadian Achievement Tests-Second Edition,
- the final percentages in the ABE mathematics courses,
- students' written reflections on their test-taking experiences,
- tape recording of the tutorial and its transcript.

This study was approved by the University of Victoria and the University College of the Cariboo Ethics Committees. A copy of the signed ethic forms for both institutions are located in Appendix A.

Location and Setting

The mathematics adult basic education courses were taught on the main campus of the University College of the Cariboo. Three classes of Math 050, roughly equivalent to the British Columbia High School Introductory Mathematics 11, participated in the study. The experimental and control group had the same instructor to ensure consistent teaching styles and grading systems. Each group received 84 hours of instructions over a four-month semester starting January 4, 1999. The accelerated group had a different instructor and format in that this group received 70 hours of instruction over a seven-week period starting January 4, 1999. The structure for all three of these classes were based on traditional teaching practices of lecture mixed with students-instructor question/answer sessions and deskwork.

My initial contact to recruit the students occurred on the first day of classes. During this session, I provided an overview of the research project, a description of their role in the study, a timeline for the project, and the consent forms for the students to complete. A copy of the consent form is supplied in Appendix B. The testing session occurred during the subsequent regular class period for each of the three groups. The control and accelerated groups wrote the mathematics subtests of the Canadian Achievement Test - Second Edition (CAT/2) and completed the written reflections during the first 90 minutes of a two-hour period. The experimental group participated in a 30 minute test-taking tutorial, then wrote the mathematics subtests of the CAT/2, and lastly completed their written reflections of the entire assessment experience. These activities took the entire two-hour block for the experimental group.

Project Participants

Seventy-one adults participated in this study, which was conducted during the winter semester of 1998/99. The adult students ranged in age from 17 to 52 with an average age of 25. There was a fairly even distribution of males (48%) to females (52%). However, there were some notable demographic differences between the groups. The average age for the accelerated group was 24 with 67% female and 33% male. In comparison, the control group consisted of 38% females and 62% males with an average age of 23. Meanwhile, the experimental group was 50% female and 50% male with an average age of 29. Nonetheless, the total sample was representative of the adult population participating in ABE courses at UCC during the same time frame. The main reason most of the students were enrolled in the ABE mathematics course was to upgrade their education in order to apply for post-secondary programs and/or to obtain credit towards the ABE Provincial Diploma.

The instructors of the Math 050 courses were full-time faculty members of the University College's College Preparation program. The instructor for the accelerated group had a Bachelor of Education degree and over 16 years of experience teaching college preparation courses at UCC. The instructor of the control and experimental group possessed a Bachelor of Science and a Master of Education degree, and had been teaching college preparation courses at UCC for over 22 years. I instructed the test-taking tutorial. My background and experience include a Bachelor's degree in Secondary Education (Mathematics major), three years of teaching at high schools in Alberta, British Columbia, and Ontario, and eleven years of instruction combined with seven years of various administrative roles at the post-secondary level.

Instruments

The assessment tools used in this study were the Canadian Achievement Tests - second edition (CAT/2) and the Canadian Achievement Locator Test 2, both of which are published by the Canadian Test Centre. The CAT/2 is a series of tests designed to measure achievement in the basic skills taught in schools across Canada. Educational objectives found in provincial and district curriculum guides, published textbooks, and major reading series were used to create the items for the CAT/2 (Canadian Test Centre, 1992). Unit tests, assignments, midterm exams and final exams created by the ABE instructors were the other educational material used in this study to evaluate the students' achievement in Math 050.

There are eight levels of the CAT/2 related to grade ranges. The CAT/2 - level 18 that is related to the grade ranges of 8.0 through 10.2 (Canadian Test Centre, 1992) was used for this study. The CAT/2 - level 18 contains eight tests in five content areas: reading, spelling, language, study skills and mathematics. This study focused on the mathematics content area and utilized the associated tests: Test 7 - Mathematics Concepts and Applications and Test 8 - Mathematics Computation. Test 7 measures a student's ability to apply mathematical concepts related to numeration, number theory, data interpretation, basic algebra, measurement, logical reasoning and basic geometry (Canadian Test Centre, 1992). It consists of 45 multiple-choice questions that the students have 35 minutes to complete. Test 8 measures a student's ability to add, subtract, multiply, and divide whole numbers, decimals, fractions and integers, and to solve problems involving percents, exponents and algebraic operations (Canadian Test Centre, 1992). Test 8 consists of 40 multiple-choice questions that the students have 30 minutes to complete. The reliability coefficient (KR20) of the CAT/2 mathematics subtests is 0.94 (Canadian Test Centre, 1992).

The Canadian Achievement Locator Test 2 consists of two components, English and Mathematics, and is designed to aid in selecting the appropriate test level for students. For this study, the students completed the mathematics component only which consists of 20 multiple choice questions. The Locator Test 2 was used as a practice test during the tutorial session to familiarize students with the mechanics of CAT/2 test taking.

Data Collection and Analysis

For the statistical analysis, student scores for correct answers on the CAT/2 Tests 7 and 8 were collected and converted to scale-scores to calculate combined mathematics scale-scores. Conversion tables used to convert the number-correct scores to scale-scores were obtained from the Canadian Test Centre's Technical Bulletin (Canadian Test Centre, 1992). A one-directional t-test was performed to determine if the CAT/2 scale-scores of the students who successfully completed the course were significantly higher than those who did not successfully complete the course. To develop a prediction model based on the binary response variable (successful completion vs. unsuccessful completion) and a continuous predictor variable (CAT/2 scale-scores), logistic regression analysis (Hosmer & Lemeshow, 1989; Montgomery & Peck, 1992) was employed. Using linear regression analysis, the CAT/2 combined mathematics scores of the completers were compared to their final course percentages collected at the end of each course to determine if a significant relationship existed between these two variables. The combined scale-scores on the achievement tests were averaged for the experimental and control groups. A one-directional t-test was used to determine if the scores achieved by the assisted experimental group of Math 050 were significantly higher than the scores achieved by the unassisted control group. In an effort to quantify the effect of the coaching activity, the effect size (*ES*) was also calculated.

For the interpretive analysis, I reviewed the transcripts of the tape-recorded tutorial and read the students' written reflections to create my initial description of the students' views of the test-taking experience. While reviewing the transcript, I tried to identify what test-taking skills the students lacked and how the students benefited from participating in the test-taking tutorial. While reviewing the reflections, I tried to summarize in tabular form the test-taking experiences for both the assisted group and the unassisted groups. Using the tables, I compared and contrasted the experiences by the assisted group versus the nonassisted groups to identify similarities and differences. The integration of my analyses incorporated diagramming techniques as outlined by Strauss (1987). In terms of participatory action research, the goal of this analysis was to help the students learn how to better control the test-taking process by constructing, testing and improving theories about the process through researcher and student collaboration (Elden & Levin, 1991).

To establish credibility, I adhered to the credibility criteria associated with constructivist inquiry (Guba & Lincoln, 1989). These are defined under the headings of prolonged engagement, persistent observation, peer debriefing, negative case analysis, and member check. My contact with the students was not substantial in terms of actual face-to-face interaction, but it was continuous over the semester. Peer debriefing played a significant role in my interpretation process as I "tested out the findings with someone who had no contractual interest in the situation"(Guba & Lincoln, 1989, p. 237). Specifically, I engaged a *disinterested* peer, the Learning Specialist at UCC, to edit my draft versions of the constructions and provide feedback on my assumptions. I incorporated her comments and suggestions in my new constructions. Negative case analysis focused on students' views that differ from the majority. Finally, as a part of the member checks process, the students were encouraged on several occasions to verify my constructions. They were given ample opportunity "to correct errors of fact or errors of interpretation…(and)...to offer additional information" (Guba & Lincoln, 1989, p. 239).

Timeline for the Study

Data collection for all three of the Math 050 groups began the first week in the winter semester of the 1998/99 academic year (January 4, 1999). Preceding the CAT/2 examination, the experimental group participated in a tutorial that lasted approximately 30 minutes. Then, I administered and scored the CAT/2-tests 7 and 8 for each of the three groups. Proceeding the examination, each student was asked to write a reflection of their test-taking experience. I transcribed the tape-recording of the tutorial and the written reflections and then scrutinized the transcripts. Once I had created my initial constructions based on the qualitative data, and I had reviewed them with my disinterested peer, the students were interviewed in groups to verify my constructions. During the follow-up interviews, the students augmented my initial summaries, then approved of my final constructions. Final grades were collected from the instructor at the end of the semester. Once the grades were recorded, statistical analysis of these grades and the achievement test scores was performed. Data collection and the initial analysis were completed by June of 1999.

Chapter Four

Results

Predicting Student Success based on Achievement Test Scores

Comparison of CAT/2 Achievement of the Successful Students versus the Unsuccessful Students.

Of the 71 students who participated in the assessment process of this study during the first two days of classes, only 41 students completed Math 050, resulting in combined attrition rate of 42% for all three groups. Of the 41 students who completed Math 050, only 2 students failed (earned a final grade lower than 50%) and both of these were in the control group, hence the successful completion rate for all three groups was 55%. A summary of the attrition and success rates as well as some demographics are presented in TABLE 2.

TABLE 2

Attrition and Success Rates, and Demographics of Study Groups.

Statistics	Accelerated	Control	Experimental	Total
Sample size (n)	**27**	**24**	**20**	**71**
Females	18 (67%)	9 (38%)	10 (50%)	**37 (52%)**
Males	9 (33%)	15 (63)%	10 (50%)	**34 (48%)**
Average Age	24.1	22.5	28.7	**24.9**
Completers	17	12	12	**41**
NonCompleters	10	12	8	**30**
Attrition Rate	**37%**	**50%**	**40%**	**42%**
Successful Students	17	10	12	**39**
Unsuccessful Students	10	14	8	**32**
Success Rate	**63%**	**45%**	**60%**	**55%**

To determine if the CAT/2 results for the students who successfully completed Math 050 (earned a final grade of 50% or higher) differed from the students that did not successfully complete Math 050 (earned a final grade less than 50% or did not complete the course), a one-directional t-test comparing the CAT/2 combined mathematics scale-score means for the successful students and the unsuccessful students was performed. TABLE 3 summarizes the statistical analysis for each group.

TABLE 3

Comparison of CAT/2 Achievement of the Successful Students vs. the Unsuccessful Students.

Statistics	**Accelerated**		**Control**		**Experimental**	
Sample size (n)	**27**		**24**		**20**	
Success Rate	**63%**		**45%**		**60%**	
	Successful Students	*Unsuccessful Students*	*Successful Students*	*Unsuccessful Students*	*Successful Students*	*Unsuccessful Students*
Mean	608.88	562.75	596.75	539.75	623.67	562.88
Variance	4314.83	4556.51	3838.74	1651.91	4169.70	3073.13
Observations	17	10	10	14	12	8
Pooled Variance	4401.84		2546.52		3743.25	
Hypothesized Mean Difference	0		0		0	
Alpha	0.05		0.05		0.05	
df	25		22		18	
t Statistic	1.74		2.72		2.18	
P(one-directional)	**0.047**		**0.006**		**0.022**	
t critical	1.71		1.72		1.73	

As indicated in TABLE 3, for all three groups, the CAT/2 combined score means for the students who successfully completed the course were significantly higher than the mean scores for those who did not successfully complete the course ($p > 0.05$).

Logistic Regression Analysis of CAT/2 Achievement of the Successful Students versus the Unsuccessful Students.

In an effort to graph the relationship between the CAT/ 2 mathematics scale-scores and success versus nonsuccess, I assigned a successful outcome (student passed Math 050) a value of one and an unsuccessful outcome (student failed or did not complete Math 050) a value of zero. The resulting graphs of this binary outcome coding system are presented in FIGURES 1 - 3.

FIGURE 1. Success/Nonsuccess as a function of CAT/2 Combined Math Scores.

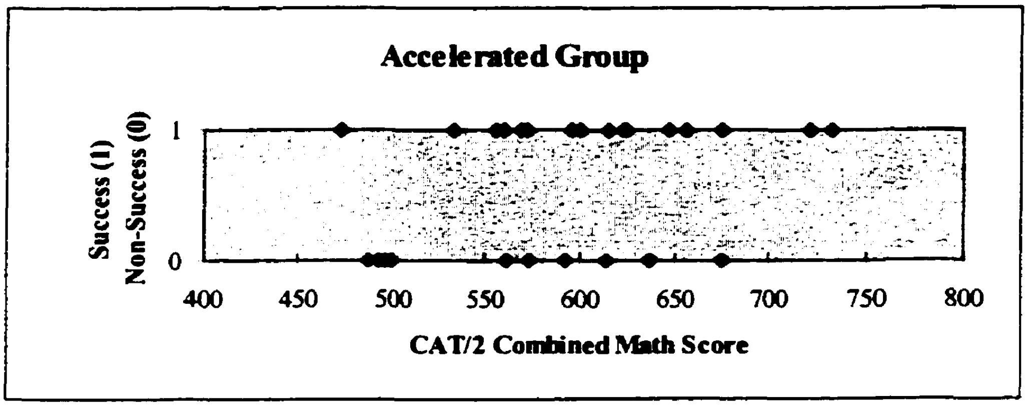


FIGURE 2. Success/Nonsuccess as a function of CAT/2 Combined Math Scores.

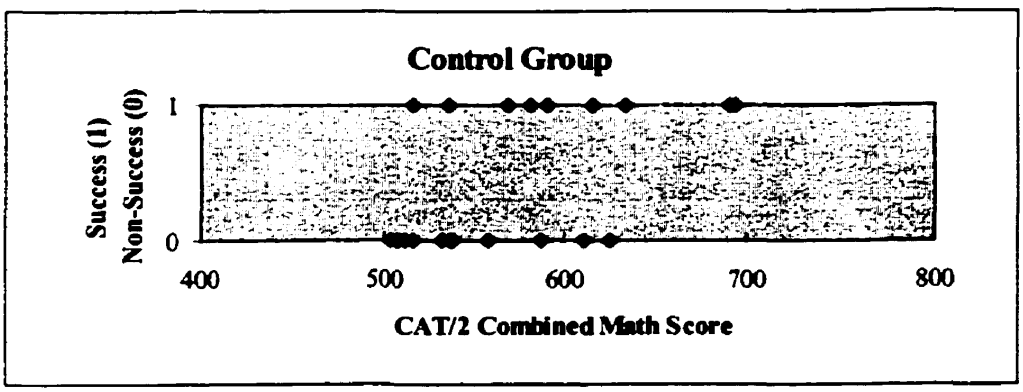
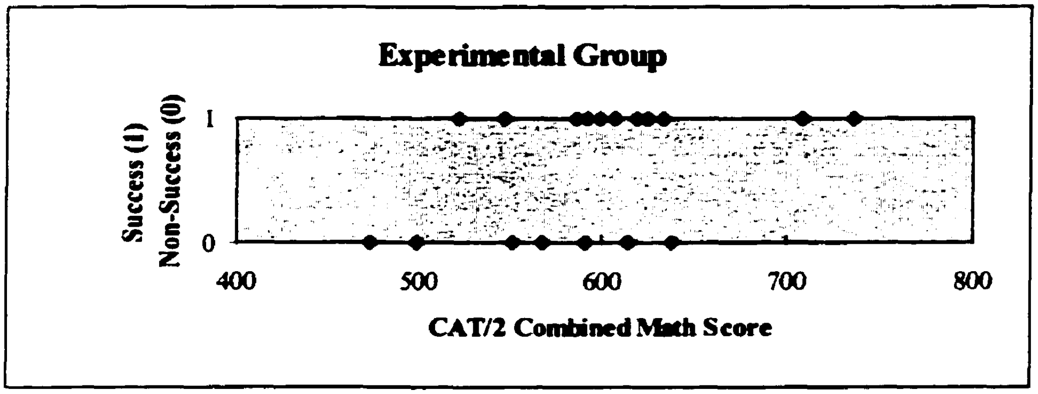


FIGURE 3. Success/Nonsuccess as a function of CAT/2 Combined Math Scores.



All three graphs resembled an S shape curve that is common to logistic functions. Hence, in an effort to model the resulting functions with their dichotomous outcomes (success versus nonsuccess), logit analysis was employed. The results of the logit analysis are summarized in TABLES 4 - 6.

TABLE 4

Logistic Regression Classification Table – Accelerated Group[a]

		Predicted		
Observed	n	*Success*	*Non-Success*	Percentage Correct
Success	17	15	2	88.2%
NonSuccess	10	6	4	40.0%
			Overall Percentage:	**70.4%**
			p-value:	**0.079**

[a] The cut value is 0.50

TABLE 5

Logistic Regression Classification Table – Control Group[a]

		Predicted		
Observed	n	*Success*	*NonSuccess*	Percentage Correct
Success	14	11	3	78.6%
NonSuccess	10	4	6	60.0%
			Overall Percentage:	**70.8%**
			p-value:	**0.010**

[a] The cut value is 0.50

TABLE 6

Logistic Regression Classification Table – Experimental Group[a]

		Predicted		
Observed	n	*Success*	*Non-Success*	Percentage Correct
Success	12	10	2	83.3%
NonSuccess	8	3	5	62.5%
			Overall Percentage:	**75.0%**
			p-value:	**0.029**

[a] The cut value is 0.50

As the results indicate, these models correctly predicted student success (or nonsuccess) for 70% of the students in the accelerated group, 71% of students in the control group and 75% of the students in the experimental group. The relationship between the response variable (success or nonsuccess) and the CAT/2 combined mathematics scale-scores was significant for both the control and experimental groups.

Linear Regression Analysis of CAT/2 results and Math 050 Final Grades

Further investigation into the relationship between the students' CAT/2 combined mathematics scale-scores and their Math 050 final course percentages involved using linear regression analysis on the data from the subsets of students who completed the course for each group. The scatterplots of Math 050 Final Grades as a function of CAT/2 combined mathematics scores for each group are presented in FIGURE 4 - 6.

FIGURE 4. Math 050 Final Grades as a function of CAT/2 Combined Math Scores.

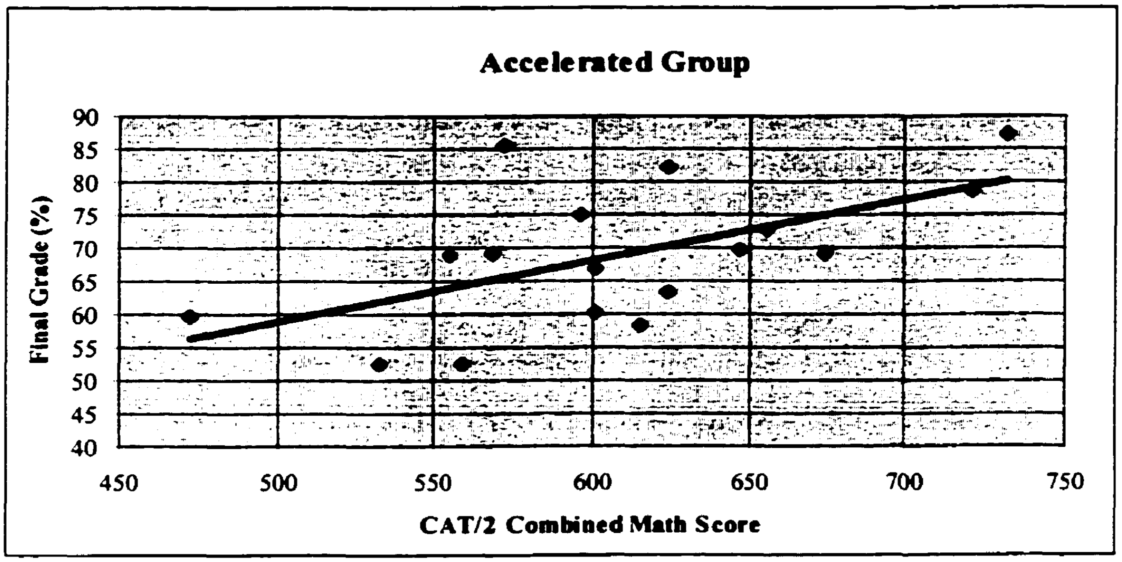


FIGURE 5. Math 050 Final Grades as a function of CAT/2 Combined Math Scores.

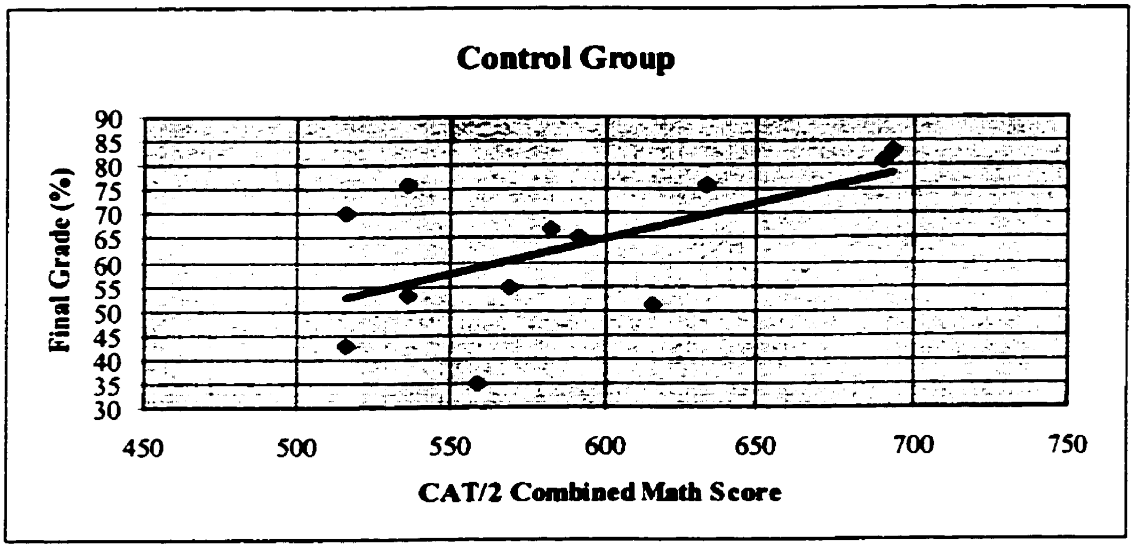
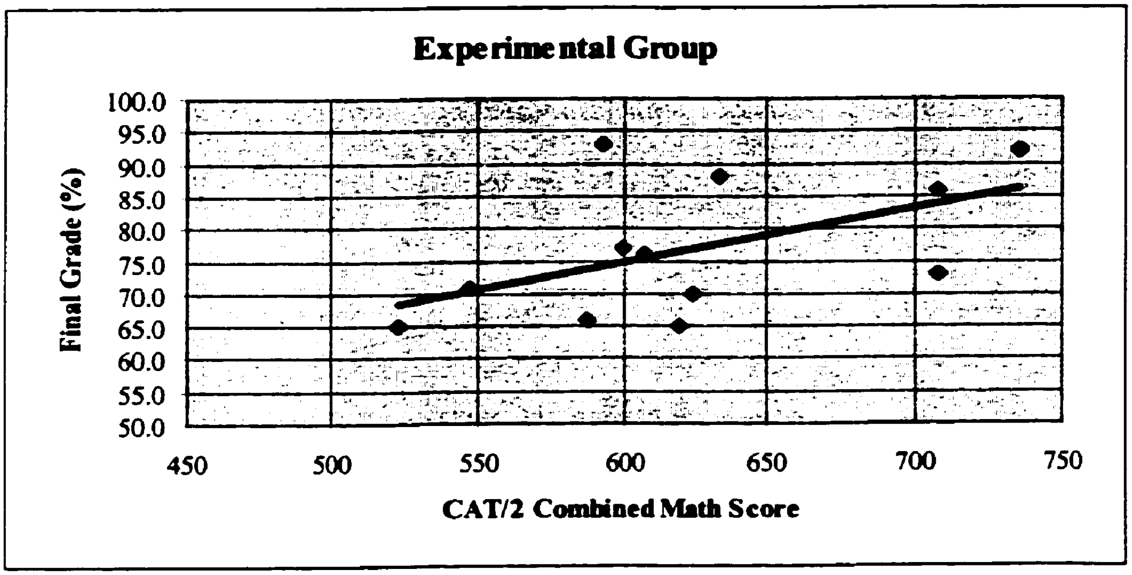


FIGURE 6. Math 050 Final Grade as a function of CAT/2 Combined Math Scores.



According to Pearson's coefficient, a moderate, positive linear relationship existed between CAT/2 scores and final grades for all three groups. Based on the correlation coefficient, approximately 33% of the variability in the students' final grades was predictable from the variability in the CAT/2 combined mathematics scores for the accelerated and the control groups, but only 26% for the experimental group. To determine if the linear relationship between the students' final grades and the CAT/2 combined mathematics scale-scores was significant, an F-test was applied as a part of the regression analysis. The results of the regression analysis are summarized in TABLE 7.

TABLE 7

Linear Regression Analysis of CAT/2 Results and Math 050 Final Grades.

Statistics	Accelerated	Control	Experimental
Sample size	17	12	12
Pearson's Coefficient (r)	0.5723	0.5715	0.5187
Correlation Coefficient (r^2)	0.3277	0.3266	0.2691
Regression Coefficient - Slope (b)	0.0919	0.1441	0.0837
Regression Coefficient - Intercept (a)	12.982	-21.662	24.642
F-value	7.3116	4.8505	3.6817
p-value	**0.01633**	**0.05223**	**0.0840**

As indicated in TABLE 7, the linear relationship was significant for the accelerated group, questionable for the control group, and not significant for the experimental group.

Effect of Coaching on CAT/2 Achievement Testing Performance

A one-directional t-test was used to determine if the scores achieved by the Math 050 experimental group that participated in a tutorial prior to the assessment testing were significantly higher than the scores achieved by the Math 050 control group that did not participate in any coaching activities prior to the assessment testing. At the 0.05 level of significance, there was sufficient evidence to conclude the CAT/2 combined mathematics scale-score mean for the experimental group was greater than the mean for the control group. The summarized data from this analysis is given in TABLE 8.

TABLE 8

Comparison of CAT/2 Achievement of the Control Group vs. the Experimental Group.

Statistics	Experimental	Control
Mean	599.35	563.5
Variance	4479.87	3259.83
Observations	20	24
Pooled Variance	3811.75	
Hypothesized Mean Difference	0	
Alpha	0.05	
df	42	
t Statistic	1.92	
P(T<= t)	**0.031**	
t critical	1.682	

The effect size *(ES)* was also calculated to measure the effect that the coaching activity had on the students' CAT/2 performance. To calculate the effect size, the difference between the average test scores of the experimental and control groups was divided by the pooled standard deviation. The equation and its resulting value are as follows: $ES = \frac{599.35 - 563.5}{\sqrt{3811.75}} = 0.58$ This calculated value is a significant effect size.

Students' Views of the Assessment Process

Although all students were asked to complete the written reflection, only seventy percent (19 out of 27) of the students in the accelerated group, eighty-three percent (20 out of 24) of the students in the control group and eighty percent (16 out of 20) of the students in the experimental group completed the reflections. While reviewing the written reflections for all three groups, I found the comments could be categorized as *Positive, Negative and Neutral* in nature. Comments that indicated that the testing experience was useful and that the test itself was well designed or fair were classified as positive. Comments that indicated that the testing experience was more stressful than useful and that the test itself was poorly designed rather than fair were classified as negative. Comments that were neither positive nor negative in nature were classified as neutral comments. Once the comments were categorized as positive, negative, or neutral, further analysis revealed seven re-occurring themes which I identified as follows: *Time, Test Difficulty, Test Design, Purpose of Test, Test Anxiety, Effort and Tutorials*. During the follow-up interviews, all three groups agreed with my category and theme constructions, as did my disinterested peer. To present my constructions, I tabularized the comments based on the categories and the themes for each group in TABLE C.1 - C.3 (refer to Appendix C). To avoid any interpretation error, the comments appear verbatim in these tables.

General Trends

The majority of the comments involving a *time* theme were negative as many students were not comfortable with being timed and felt they did not have enough time to complete the subtests, especially subtest #7. One student's comment seems to summarize their frustration with being timed: "I understand the need to time tests, but is it completely necessary to make things difficult." Nonetheless, several students indicated that the time given was sufficient.

Comments on the *test's level of difficulty* were mainly positive. The majority of the students found the questions to be somewhere between easy and challenging. The negative comments tended to focus on the students' math skills being somewhat "rusty" since they had been away from school for sometime. Consequently, these students found the test to be quite difficult because of their lack of exposure to the material.

There were almost as many positive as there were negative comments about the *design of the test*. On the positive side, students thought it was a "good test" that was easy to understand. During the follow-up interviews, students were asked to elaborate on the "good test" comment. Their responses were as follows: "not too easy, not too hard", "had to think, but it wasn't beyond my abilities", "painless", and "good level." On the negative side, students questioned the validity of multiple choice tests, explained the difficulties involved with using a separate answer sheet, and indicated that they should have been permitted to use a calculator.

Comments relating the *purpose of the test* were mainly positive. Many students felt that the testing experience was worthwhile because it "refreshed" their memories and helped them identify their strengths and weaknesses in mathematics. However, several students felt it would have been more useful if it was administered after they had an opportunity to review the material, and in one case the student felt it was useless and should not have been administered at all.

Comments referring to *test anxiety* were all classified as negative. Not knowing what to expect, being rushed, inadequate math background, returning to school after a lengthy departure, and negative reactions to tests in general summarize the content of these comments.

Comments on *effort* were classified as neutral. In all three groups, at least one student pointed out that he/she may not have performed to their potential simply because the test did not contribute to their evaluation.

The majority of the comments on the *tutorial* were positive, but there were a few negative comments too. In most cases the students felt that the tutorial was beneficial; however, they felt it may have been even more effective if there had been increased interaction between the students and the facilitator, and if the tutorial had focused on the subject matter rather than test-taking skills.

Statistical Analysis

Nonparametric statistical analyses were performed to determine if any relationships existed between the types of comments and the students' CAT/2 combined math scores and/or their achievement in Math 050. As mentioned earlier, 55 students completed the written reflections. Their comments were categorized as positive, negative and neutral in nature and then grouped according to the seven re-occurring themes: Time, Test Difficulty, Test Design, Purpose of Test, Test Anxiety, Effort and Tutorials. To include all the subjects in the comment analysis, I created another category, *no comment*, for students who did not complete the reflection. Hence, the resulting categories that were used for statistical analysis are as follows:

- Comments relating to the students' feelings about their testing experiences (4 categories) – *Negative, Neutral/No Comment, Positive and Mixed* (the student provided two or more comments that differed in type);
- Comments relating to the students' view of the assessment tool (7 categories) – *Design, Difficulty, No Comment, Purpose, Time, Test Anxiety, and Mixed* (the student provided two or more comments that differed in type).

CAT/2 Combined Scale-scores and Comments

A graphic presentation of the mean and two standard deviations of the CAT/2 scale-score by comment category are presented as error-plots in FIGURES 7-12.

FIGURE 7. Error-Plot of Testing Experience Comments.

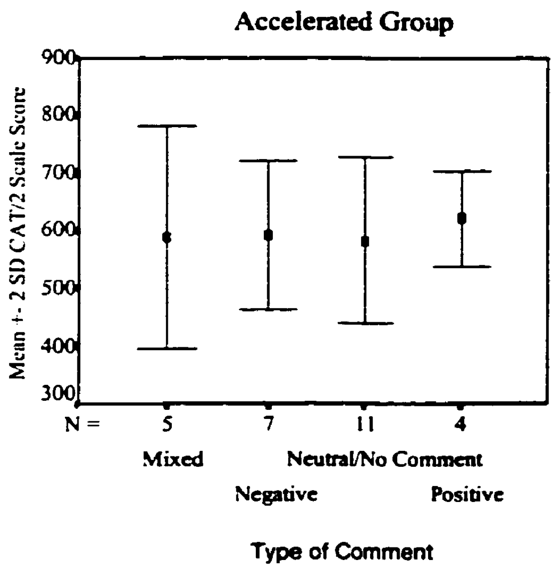


FIGURE 8. Error-Plot of Assessment Tool Comments.

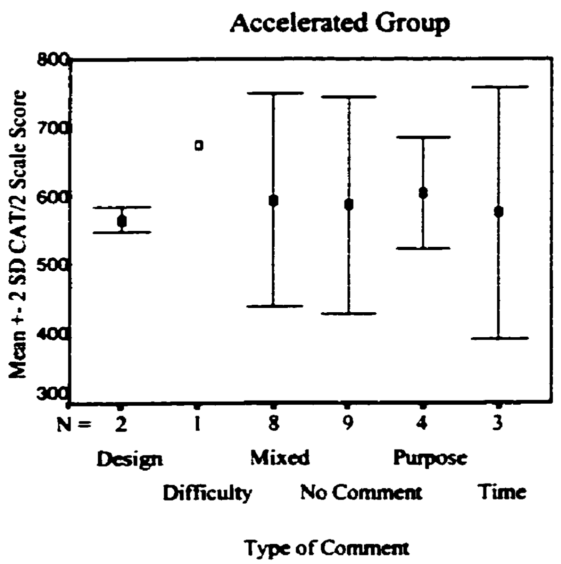


FIGURE 9. Error-Plot of Testing Experience Comments.

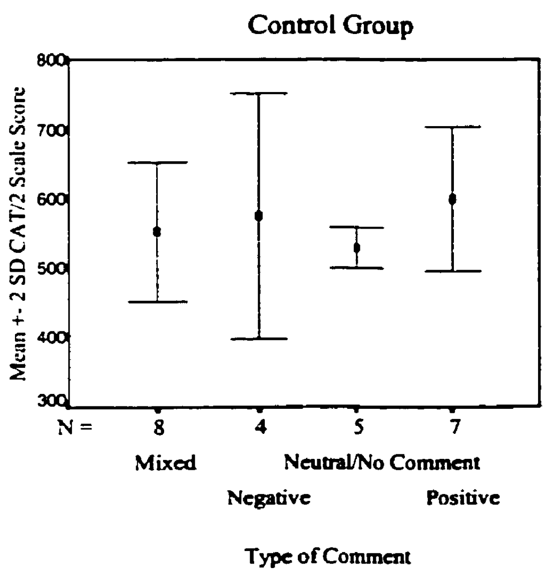


FIGURE 10. Error-Plot of Assessment Tool Comments.

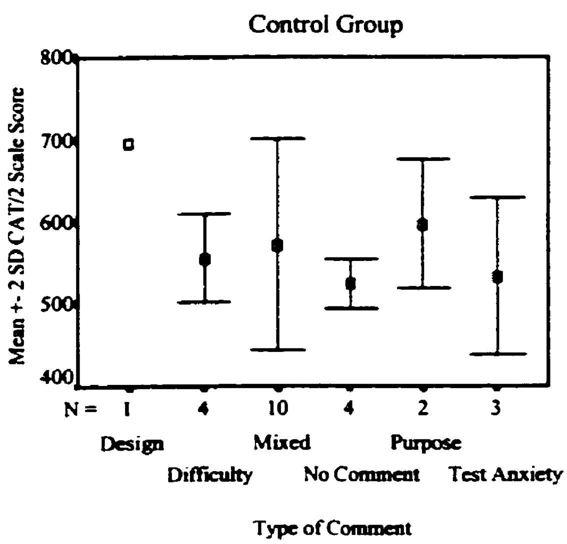


FIGURE 11. Error-Plot of Testing Experience Comments.

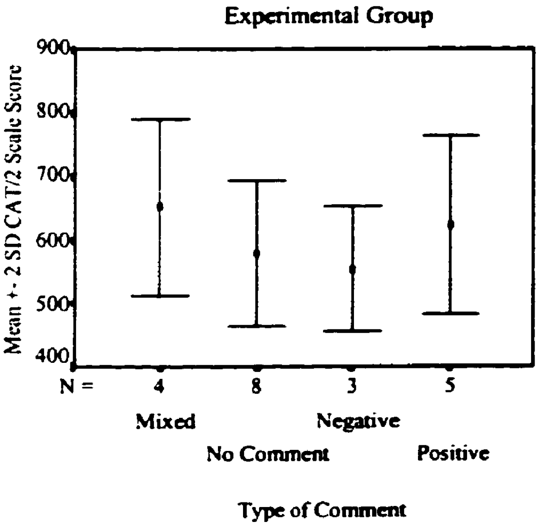
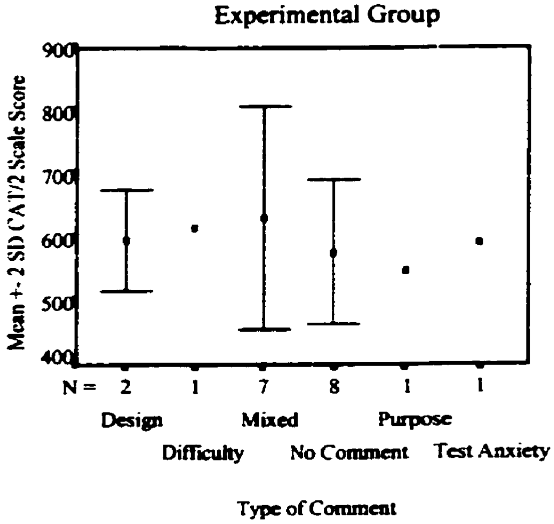


FIGURE 12. Error-Plot of Assessment Tool Comments.



The graphs seem to indicate no relationships exist between the CAT/2 combined scale-scores and the type of comments. To test this supposition, I employed the Kruskal Wallis test for both sets of comments. The summary results of the analysis are presented in TABLES 9 and 10.

TABLE 9

Kruskal Wallis Test of CAT/2 Score vs. Comments relating to the Testing Experience.

Type of Comment	Accelerated N	Accelerated Mean Rank	Control N	Control Mean Rank	Experimental N	Experimental Mean Rank
Negative	7	14.14	4	11.63	3	6.33
Neutral/No Comment	11	12.91	5	8.70	8	9.25
Mixed	5	12.60	8	11.25	4	14.25
Positive	4	18.50	7	17.14	5	12.00
Total	27		24		20	
Chi-Square	1.651		4.779		3.777	
p-value	**0.648**		**0.189**		**0.287**	

TABLE 10

Kruskal Wallis Test of CAT/2 Score vs. Comments relating to the Assessment Tool.

Type of Comment	Accelerated N	Accelerated Mean Rank	Control N	Control Mean Rank	Experimental N	Experimental Mean Rank
Design	2	9.5	1	24	2	11.00
Difficulty	1	24	4	12.88	1	13.00
Mixed	8	14.13	10	13.30	7	12.43
No Comment	9	13.67	4	8.25	8	9.25
Purpose	4	15.75	2	18	1	4.00
Test Anxiety			3	7.5	1	10.00
Time	3	12				
Total	27		24		20	
Chi-Square	2.633		6.948		2.510	
p-value	**0.756**		**0.225**		**0.775**	

The results confirm that no relationships exist between the CAT/2 scores and comments relating to the students' feelings about their testing experience or their view of the assessment tool.

Final Achievement in Math 050 and Comments

The bar graphs in FIGURES 13 – 18 present the type of comments by the proportion of successful and nonsuccessful students for each group:

FIGURE 13: Testing Experience Comments by Proportion of Successful/Non Successful Students.

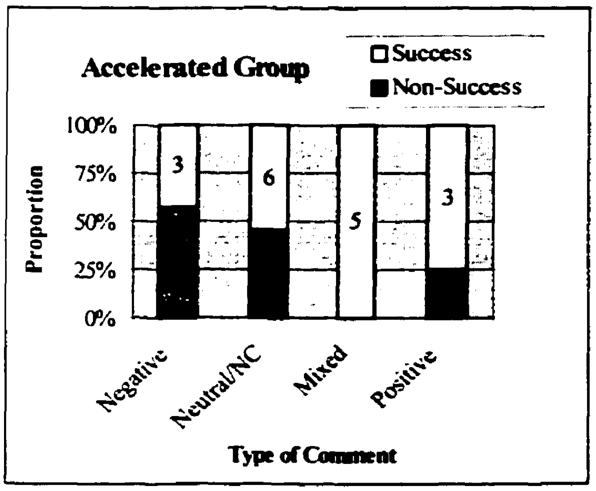


FIGURE 14. Assessment Tool Comments by Proportion of Successful/Non Successful Students.

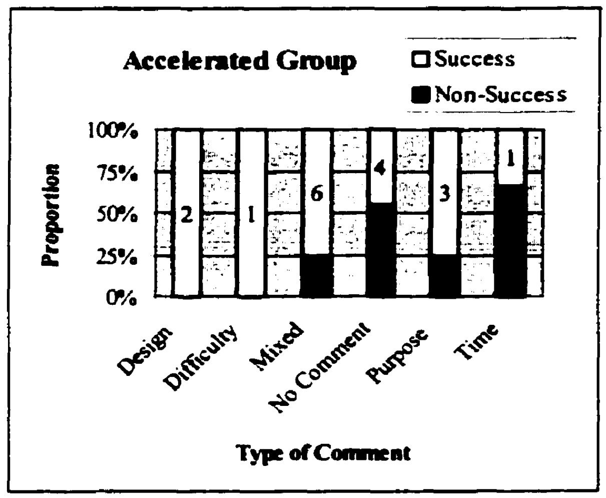


FIGURE 15. Testing Experience Comments by Proportion of Successful/Non Successful Students.

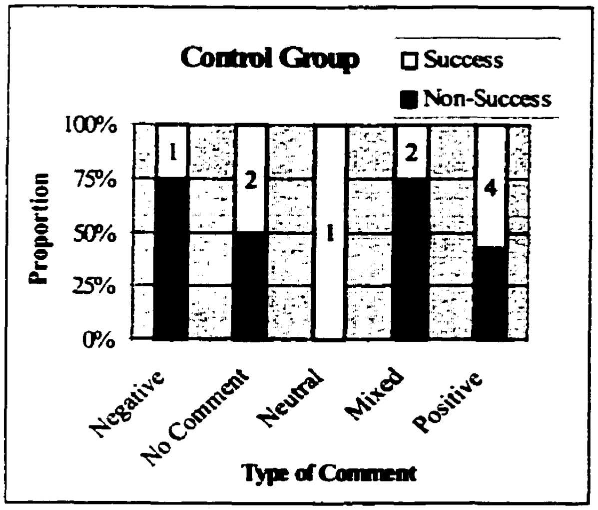


FIGURE 16. Assessment Tool Comments by Proportion of Successful/Non Successful Students

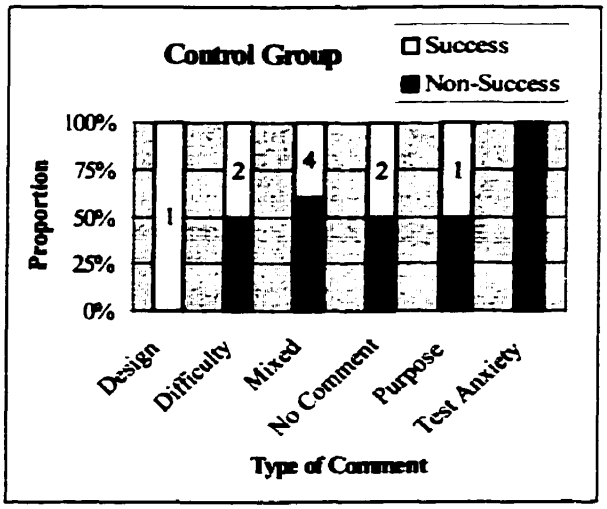


FIGURE 17. Testing Experience Comments by Proportion of Successful/Non Successful Students.

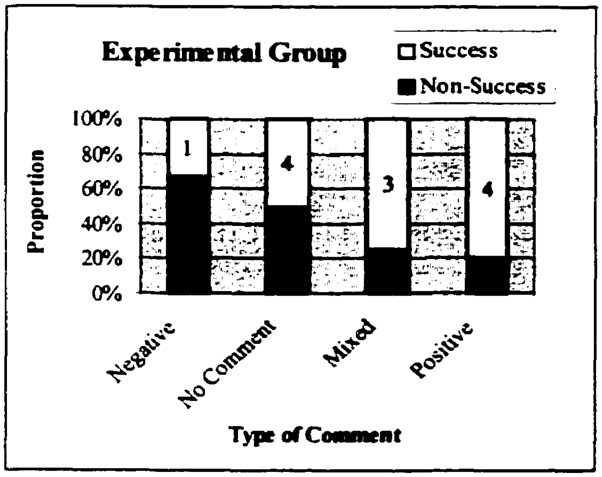
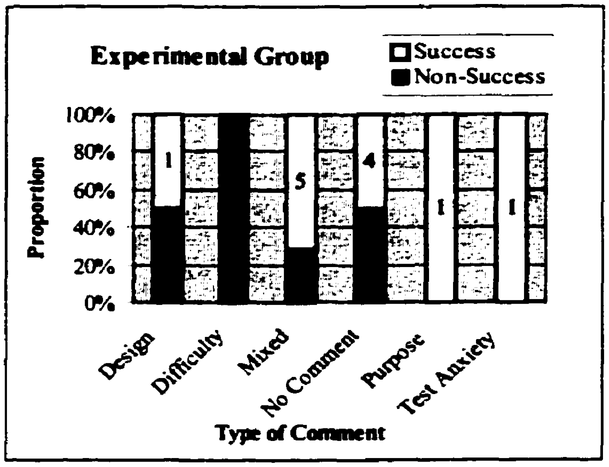


FIGURE 18. Assessment Tool Comments by Proportion of Successful/Non Successful Students.



These bar graphs seem to indicate that no relationships exist between the dichotomous outcomes (success and nonsuccess) and the type of comments. To test this deduction, I employed the log-linear likelihood ratio test (g-test). The summary results of the analysis are presented in TABLES 11 and 12.

TABLE 11

Likelihood Ratio Test of Final Achievement in Math 050 vs. Comments relating to the Testing Experience.

Type of Comment	**Accelerated Non-Success**	**Accelerated Success**	**Control Non-Success**	**Control Success**	**Experimental NonSuccess**	**Experimental Success**
Negative	4	3	3	1	2	1
Neutral/No Comment	5	6	2	3	4	4
Mixed		5	6	2	1	3
Positive	1	3	3	4	1	4
Total	10	17	14	10	8	12
Likelihood Ratio	6.377		2.814		2.508	
p-value	**.095**		**0.421**		**0.474**	

TABLE 12

Likelihood Ratio Test of Final Achievement in Math 050 vs. Comments relating to the Assessment Tool

Type of Comment	Accelerated Non-Success	Accelerated Success	Control Non-Success	Control Success	Experimental NonSuccess	Experimental Success
Design		2			1	1
Difficulty		1	2	2	1	
Mixed	2	6	6	4	2	5
No Comment	5	4	2	2	4	4
Purpose	1	3	1	1		1
Test Anxiety			3			1
Time	2	1				
Total	10	17	14	10	8	12
Likelihood Ratio	5.914		5.278		4.682	
p-value	**0.315**		**0.383**		**0.456**	

The results verify that no relationships exist between the dichotomous outcome (success/nonsuccess) and comments relating to the students' feelings about their testing experiences or their views of the assessment tool.

Chapter Five

Discussion

The main purpose of this research was to gather information about assessment testing as a predictor of student success in Adult Basic Education mathematics courses. To accomplish this purpose three research objectives were undertaken: (a) to determine the predictive validity of the Mathematics subtests of the Canadian Achievement Test – Second Edition, (b) to assess the impact of coaching on students' performances on the CAT/2, and (c) to investigate students' views of the assessment process.

As the results from the t-tests for all three groups and from the logistic regression for the control and experimental groups indicate, students' scores on the CAT/2 Mathematics subtests were statistically significant predictors of student success in Math 050. Considering all the possible variables affecting student persistence or nonpersistence in ABE courses, having a single measure that predicted the success/nonsuccess for 70%, 71% and 75% of the students in the accelerated, control and experimental groups, respectively, of Math 050 is astounding. However, the results from the logistic regression for the accelerated group were not significant. The conflicting results may be due to the small sample sizes and to confounding variables that could not be controlled in this study. Specifically, the accelerated group had a different instructor and fewer hours of instruction over a shorter time period as compared to the other two groups.

The results from the linear regression analyses also indicate it may be possible to predict final grades for students that complete Math 050 using test scores since this study revealed a moderate, positive relationship between students' CAT/2 combined mathematics scores and their final grades in Math 050. Oddly enough, the linear relationship was determined to be significant for the accelerated group, but not for the control or the experimental group. The variability in these results is most likely due to the smaller sample sizes of the subsets taken from the original data. As well, the conflicting results may be related to the accelerated group having a different instructor and timeline. To determine the true strength of this relationship, this study needs to be repeated with larger sample sizes and if possible, greater control of the confounding variables.

Some strength is given to the hypothesis that coaching improves students' performances on the CAT/2 mathematics subtests. Both the t-test and the effect size verified the experimental group's performance on the CAT/2 subtests was better than that of the control group. Moreover, the effect size calculated in this study, 0.58, was much greater than any value reported in the cited meta-analysis studies (refer to TABLE 1). However, because there was no pre-test data and because random assignment was not possible, the quantitative results must be interpreted with extreme caution as there are no assurances that the groups were equivalent prior to the coaching activity.

In terms of the qualitative data, it appears that most students felt a tutorial prior to the assessment testing was or would have been beneficial. Interestingly enough, the volume of comments relating to time, both positive and negative, was much greater for the control group than the experimental group. A possible explanation for this difference is that the experimental group was given a thorough explanation of the necessity of timing for standardized exams while the control group was not. In addition, the experimental group was instructed during the tutorial to pace themselves because of the time constraint; hence, they knew what to expect and how to manage the time restraint. Consequently, participating in the tutorial may have diminished the time issue for the experimental group. The control group also made more comments relating to test anxiety than did the experimental group. It is possible that participating in the tutorial prior to the examination may have reduced the anxiety for the students in the experimental group. Certainly, there could be other explanations for these differences, and only future studies can confirm or refute these suppositions.

Although the t-test and the effect size indicate the experimental group's performance on the CAT/2 was significantly better than that of the control group's, the regression analysis revealed an interesting trend. For both the logistic regression and the linear regression, the control group exhibited a better fit in terms of the regression analysis than did the experimental group. One plausible explanation is that the CAT/2 scores for the experimental group were falsely inflated by the tutorial and hence not indicative of the students' true abilities. However, considering the duration of the tutorial for this study and the results from other coaching studies, many other factors could be contributing to these differences. Consequently more data must be gathered to test this conjecture.

If this study was to be repeated, the students and the facilitator agreed that the following changes to the tutorial would be beneficial. First, the time allotted must be at least one hour or longer. This would provide the facilitator with more time to elicit responses from the students, review the test-taking suggestions by analyzing random questions on the locator test, and allow time for increased interaction between the students and the facilitator. Second, the minimum time lapse between the tutorial and the examination should be at least one day. This would provide the students with an opportunity to absorb the material presented in the tutorial. Third, the tutorial should focus more on the subject matter than the test-taking strategies. Such a tutorial may decrease the anxiety levels of students and hence improve their performance and diminish the trauma of the assessment testing process.

Comments made by the students in their written reflections provided some valuable insight into the students' views of the assessment process. Overall, students did not seem to find the assessment testing experience to be as devastating as many educators/administrators might have expected. Indeed, many participants described it as a worthwhile learning experience. However, a significant number of the participants had no comment or were neutral to the whole experience. Moreover, some participants clearly found the assessment experience stressful and even discouraging. It is true that motivation may have influenced the qualitative results and hence the written reflections have to be interpreted with some caution. Students' opinions may have differed significantly if they knew their performance on the assessment test would have had a major impact on their educational studies.

According to the nonparametric analysis, no relationships existed between the type of comments and the CAT/2 combined scale-scores and/or the students' achievement in Math 050. However, there may be several reasons related to the design of this study that could explain why no relationships were discovered. Most importantly, the classification of the comments by type and by group created extremely small subgroups used in the nonparametric statistical analysis. In several instances, the subgroups consisted of only one value and the largest subgroup consisted of just eleven values. Hence, the analysis of these data is questionable. Another reason no relationships were discovered may be due to the interpretation of the raw data. Even though the majority of the students participated in the construction of the categories and themes, I may have misinterpreted numerous comments by those students who did not participate in the review sessions. Specifically the students that withdrew within the first 3 weeks of Math 050 would not have participated in the follow-up interviews and hence their input was not included in these results. Therefore, if this study were repeated, I would highly recommend a more structured approach to eliciting student responses. Namely, I would have the students complete a questionnaire at the end of the assessment process. Specifically, I would ask the students to state whether participating in the assessment testing process was a positive, negative or neutral experience. In addition, I would include some simple yes/no questions such as: Was the time allotted sufficient? Did you like the multiple-choice format of the test or would you prefer a different format? Was participating in the tutorial worthwhile? These structure questions plus any additional comments would increase the accuracy of the interpretation, and hence the reliability of the qualitative data.

Besides answering the specified questions, the data from this study revealed one other significant issue: Math 050 classes at the University College of the Cariboo appear to suffer from high attrition rates. As mentioned earlier, of the seventy-one students that wrote the CAT/2 assessment at the beginning of the semester, only forty-one completed their studies. This combined attrition rate of 42% is consistent with the reported ABE attrition rates from other studies (Cain & Whalen, 1979; Quigley, 1992; Thomas, 1990). Addressing the high attrition rate is not a simple process. As the literature review revealed, high attrition rates in ABE programs are a result of a multitude of variables. Students' situations such as family and job responsibilities, and finances can prevent them from completing their studies. Institutional practices such as poor scheduling and a lack of support also may lead to high attrition rates. As well, dispositional factors such as low motivation and little or no support from family and friends also may precipitate students dropping out of ABE courses. Consequently, ABE providers such as UCC must continue to identify the variables contributing to the high attrition rates and search for solutions to the attrition problem. In hindsight, this project may have been able to gather more attrition data if it had included a follow-up survey of the noncompleters to ascertain their activities after dropping out of the course and their reasons for not completing the course. A survey of the completers also may have provided some valuable information.

Hence, I would strongly recommend that any future student success research at UCC include some type of follow-up survey. Moreover, I would encourage the College Preparation department at UCC to initiate a research project that specifically investigates the attrition/retention situation in all their ABE courses.

Conclusion

A report on the future needs of learners in the British Columbia College System by Ted James (1999) strongly recommended "that colleges incorporate a greater institutional responsibility for ensuring that learners are successful in their endeavors" (p. 76). Endemic to efforts of retention and success in ABE programs is the issue of ABE assessment/placement practices. As Patricia Cross states:

> We have no more right to expect a student without reading skills to be an effective learner than we do to expect a carpenter without a hammer to be effective at pounding nails. (as cited in Noel, Levitz, Saluri & Associates, 1985, p. 14)

Since adults enter ABE programs with varying levels of basic academic skills, most ABE providers would agree that accurate assessment and proper placement is a fundamental strategy for handling the dilemma of under-prepared learners. By embracing this strategy, educational institutes will be demonstrating that they are interested in learning as much as they possibly can about their potential students and their needs, and that they are trying to maximize the likelihood of success for each student. The results from this study provide empirical evidence that supports the incorporation of assessment testing in any ABE placement process. Such assessment testing has the potential to mitigate student attrition by anticipating which potential students are at a high risk of not completing their academic studies and thus providing the institutes with an a priori opportunity to intervene.

Throughout my discussion, I have endeavored to identify weaknesses in this study that preclude any attempt to draw firm conclusions and broad generalizations. As mentioned, the major weaknesses are its limited generalization due to research design and the possible error in interpreting the qualitative data. Consequently, it is crucial these results be validated by future studies before any final inferences are drawn. Specifically, the logistic regression model must be tested; the coaching experiment needs to be repeated with a pre-test/post-test design; and more qualitative data relating to the students' views of the process must be collected by studies that preferably incorporate the aforementioned refinements. Furthermore, to increase the generalizability, future studies should incorporate random sampling from more ABE courses/programs offered by a variety of educational institutes in other geographical areas. As well, comparison studies involving other assessment tests need to be completed to determine whether or not the CAT/2 mathematics subtests are the best assessment tool for predicting student success in ABE mathematics course at the University College of the Cariboo and elsewhere. Moreover, it is crucial that attrition/retention prediction models similar to the logistic regression models formulated in this study be developed by individual campuses for localized used. There is no doubt that the issue of assessment testing as a predictor of student success will continue to generate an abundance of research activities. It is my hope that this study will be a source of valuable information for such future projects.

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Appendix A

Ethics Forms

University of Victoria
Human Research Ethics Committee

CERTIFICATE OF APPROVAL

Principal Investigators	Department/School	Supervisor
Cindy James Graduate Student	SNSC	Dr. L. Francis-Pelton

Co-investigator(s):
N/A

Title: **Assessment Testing and Student Success in Adult Basic Education Course**

Project No.	Start Date	End Date	Approval Date
359-98	11 Jan 1999	10 Jan 00	06 Jan 1999

Certification

This is to certify that the University of Victoria Ethics Review Committee on Research and Other Activities Involving Human Subjects has examined the research proposal and concludes that, in all respects, the proposed research meets appropriate standards of ethics as outlined by the University of Victoria Research Regulations Involving Human Subjects.

J. Howard Brunt,
Acting Associate Vice-President, Research

This Certificate of Approval is valid for the above term provided there is no change in the procedures. Extensions/minor amendments may be granted upon receipt of "Request for Continuing Review or Amendment of an Approved Project" form.

Office of Research Administration
Room 424, Business & Economics Building
P.O. Box 1700,
Victoria, BC V8W 2Y2

Tel: (250)721-7968
Fax: (250)721-8960
Email: [illegible]@uvic.ca

THE UNIVERSITY OF VICTORIA
HUMAN RESEARCH ETHICS COMMITTEE

REQUEST FOR ETHICAL REVIEW

RECEIVED
DEC - 8 1998
OFFICE OF VICE-PRESIDENT RESEARCH

HANDWRITTEN APPLICATIONS WILL BE RETURNED IMMEDIATELY
SUBMIT ONE(1) ORIGINAL AND THREE(3) COPIES

Principal Investigator: Cindy James   Department/School: Social & Natural Sciences/University of Victoria

Tel Local: 250-828-5471 (work)   250-372-8220 (home)

Faculty/Staff ( )   Graduate Student (x)   Undergraduate Student ( )

Student Supervisor: Dr. Leslee Francis-Pelton   Supervisor Tel Local: 7794

Mail Correspondence and/or Approval to   Department/School ( )   Home (x)(Provide address below)

Home Address:(include postal code)   Home Tel Number/Fax/E-mail:

1434 Mt. Dufferin Drive
Kamloops, B.C.
V2E 1S1

(250) 372 - 8220
cjames @ cariboo.bc.ca

Co-Investigator(s)(Name, position[eg., grad student] and department)
(Identify those collecting raw data, others [eg., Grad supervisor, committee] are to be listed under section 7)

1.   5.
2.   6.
3.   7.
4.   8.

SHORT TITLE OF PROJECT: Assessment Testing and Student Success in Adult Basic Education Courses
(NO MORE THAN 10 WORDS)

Proposed Start Date: January 4, 1999   Proposed End Date: April 30, 2000
(NOTE: Start Date should be no sooner than 4 to 6 weeks from time of submitting application form)

SHORT SUBMISSIONS

( )   Observation in public settings without intervention (i.e., no test, interviews or questionnaires).
Complete and submit the original plus three copies of pages 1, 2 and 3 of this form

SIGNATURES

Signature of Graduate Supervisor indicates that a) the proposal has been approved by the graduate students committee and, b) the supervisor agrees to undertake to respect and abide by the statements of protection of confidentiality of data and anonymity agreed to by subjects/participants in the Letter of Informed Consent.

Cindy James
Principal Investigator
Date: Nov. 9/98

Supervisor L. Francis-Pelton
Date: Nov 30/98

Chair/Director or Dean
Date: Dec. 8, 1998

When Chair/Director is the Principal Investigator, signature of Dean is required.

For Office of Research Administration Use Only   APPROVAL NUMBER: 359-98

Jan 6 1999
Committee Chair Signature   Start Date: JAN. 11/99   End Date: JAN. 10/00

7Aug96

1. KEYWORDS

Provide four (4) keywords, and a location of where the research will take place, that describe this project. (Keywords are for a database that will enable us to search by topic and location.)

1. **Adult Basic Education**
2. **Assessment Testing**
3. **Student Success**
4. **Coaching**

Location (i.e.,City, Province, Country): **Kamloops, B.C., Canada**

2. SUMMARY OF PURPOSE AND OBJECTIVES OF PROJECT

Brief but complete description **IN LAY LANGUAGE** of the purpose and objectives of the project.
USE NO MORE THAN THIS PAGE

Approximately 35 % of Canadians age 15 and over, or 7.9 million people, have not completed high school (Statistics Canada, 1998). It is imperative to reduce significantly the pool of people without a high school diploma or its equivalent, considering the social and economic costs to individual Canadians and to Canadian society. The purpose of Adult Basic Education (ABE) is to provide the non-secondary graduates with the credentials required for entering employment or for further educational opportunities by enhancing the adult learner's reading, writing, mathematical and logical-thinking skills. However, of the millions of people eligible to attend ABE programs, only a small percentage actually participate and even fewer complete these programs (Calamai, 1987; Merriam & Cunningham, 1989; Quigley, 1992; Rachal, Jackson, & Leonard, 1987; Statistics Canada, 1984).

As providers of ABE programs, post-secondary educational institutes such as the University College of the Cariboo need to focus on increasing the participation and completion rates for these programs. To attract and retain the adult learner, post-secondary institutes must remove barriers and increase student success. One of the most difficult barriers to remove is students' lack of confidence. To increase students' confidence levels, institutes must provide the students with the optimum conditions for succeeding in their post-secondary educational endeavors. Accurate placement, especially in ABE programs, is a crucial component to future success. To ensure correct placement, educational institutes need to provide careful diagnosis of educational needs of adult learners. There are a range of educational assessment tools available to determine educational requirements and appropriate placement, but the one most commonly used by UCC and other Canadian educational institutes is the Canadian Achievement Tests - Second Edition (CAT/2). This prompts the first question: Can student success in ABE courses be predicted by CAT/2 scores?

As with all tests, students' performance on achievement tests may be influenced by a variety of factors. One of the biggest threats to obtaining accurate information about students' performances is test anxiety (Wimer & Grigg, 1992; Woolfolk, 1990). Indeed, standardized testing can be overwhelming, especially for potential ABE students who typically have not been successful in their previous educational endeavors. The majority of these people have had negative experiences in formal schooling and may be discouraged or intimidated by the testing procedure involved with standardized tests. Other factors influencing the adult learner's performance may be a lack of test-taking skills and unfamiliarity with the mechanics of standardized achievement testing. However, participating in coaching activities can improve performance (Becker, 1990; Bond, 1989; DerSimonian & Laird, 1983; Kulik et. al., 1984; Messick & Jungeblut, 1981; Samson, 1985; Seaton, 1992; Vernon, 1954), and even small amounts of coaching time can result in significant improvement (Messick, 1982). Thus, to reduce anxiety levels, minimize the "threat" of the testing situation and hone test-taking skills, educational institutes may want to provide students with the opportunity to participate in standardized test-taking tutorials. Hence, a second question is generated: Does participating in a test-taking tutorial affect students' performances on achievement tests and/or alter their perceptions of the assessment process?

The <u>purpose</u> of this research project is to investigate the relationship between achievement test scores and final grades, the effect tutorials have on achievement test-taking performance, and to gather qualitative data that may provide insights into the students' views of the assessment test-taking process. Depending on the outcomes, significant changes to the assessment test-taking process may be implemented at UCC and other educational institutes. In addition, this research may provide the foundation for further research into assessment testing as screening devices for other programs at UCC as well as other post-secondary institutes.

The specific <u>objectives</u> of this research are to answer the following questions:

- **Is there a relationship between student scores on mathematics achievement tests and their final grades in mathematics Adult Basic Education (ABE) courses?**
- **Do students who receive a test-taking tutorial with direct supervisory assistance achieve higher scores on mathematics achievement tests than students with no tutorial experience?**
- **What test-taking skills do adult learners lack and how does participating in a tutorial benefit the adult learner?**
- **What are students' views of the assessment test-taking process and do the views of students who participate in a tutorial differ from the views of students who do not participate in a tutorial?**

3. **SUMMARY OF METHODOLOGY AND PROCEDURES.**

Brief but complete description **IN LAY LANGUAGE** of the methodology and procedures.
USE NO MORE THAN ONE PAGE
(NOTE: If your study involves deception, you must also complete the "Deception Form")

Methodology

Data will be collected from four classes of mathematics adult basic education (level 50) courses during the 1998/99 academic year. One of the classes (identified as the experimental group in this proposal) will participate in a test-taking tutorial, while the other three classes (identified as the control group, the accelerated group, and the self-paced group in this proposal) will not. Scores from the mathematics sections of the Canadian Achievement Tests - second edition, and final course grades will be collected from all four groups. The tutorial session with the experimental group will be tape-recorded and transcribed by myself. All the students will submit written reflections on their test-taking experience. The objective of collecting these qualitative data is to determine the students' views of the test-taking experience and compare the views of the assisted students with the unassisted students.

Statistical analysis will determine if a correlation exists between the students' scores on the mathematics sections of the achievement test and their final grades, and if the performance of the assisted experimental group are significantly different than the performance of the unassisted control group. Inductive data analysis will be used to construct assertions about the students' test taking experiences using the qualitative data (Lincoln & Guba, 1985).

Procedure

Data collection will begin the first week of the winter semester of the 1998/99 academic year (January-April of 1999). Preceding the CAT/2 examination, the experimental group will participate in a tutorial that is expected to last approximately 30 minutes. Then, I will administer and score the CAT/2-tests 7 & 8 for each of the four groups. After the examination, each student will be asked to write a reflection of their test-taking experience. I will transcribe the tape-recording of the tutorial and read the students' reflections immediately. Once I have created my initial constructions based on the transcription and reflections, and I have reviewed them with Hazel Trego, Assessment Centre Learning Specialist, the students will be interviewed in groups to verify my constructions. Final grades will be collected from the instructors at the end of the semester. Once the grades are recorded, statistical analysis of these grades and the achievement test grades will be performed. Data collection and analysis are scheduled to be completed by June 1999. A summary of the results will be ready by September 1999. The completion date for my Master's thesis is tentatively set for April 2000.

4. **DESCRIPTION OF POPULATION**

a) How many subjects/participants will be used?

Approximately 110 students will participate in this study. The experimental and control groups in the regular Math 50 sections should consist of 30 students per group. The accelerated group of Math 50 should have approximately 30 students and the self-paced Math 50 group should have approximately 20 students.

b) Who is being recruited and what are the criteria for their selection?
All the students enrolled in Math 50 sections that start in January of 1999 are being recruited.

c) If Focus Groups are being used, how many groups and how many subjects/participants will be in each group?

5. **HOW ARE THE SUBJECTS/PARTICIPANTS BEING RECRUITED?**

( ) By Letter (enclose a copy)

( ) By Telephone (If yes, complete Appendix II, "Telephone Contact Form)

( ) Advertisement, Poster or Flyer (enclose a copy)

( ) If a focus group is involved, and if their selection and/or recruitment differs from the above, provide details.

My initial contact will take place within the Math 50 classrooms during the first week of the Winter semester.

6. **PROJECT DETAILS**

a) Where will the project be conducted?

Main Campus of the University College of the Cariboo, Kamloops, B.C.

b) Research in Other Countries. For research that is to be conducted in other countries, indicate how the research will conform to the laws and customs of that country.

Not Applicable

c) Will the subjects/participants have any problems giving informed consent on their own behalf? (Consider physical or mental condition, age, language, institutionalization, incarceration, or other barriers)

I do not foresee any problems.

d) If the subjects/participants are not competent to give fully informed consent, who is empowered to give consent on their behalf?
I do not believe this is applicable to my research.

e) What is known about the risks and benefits of the proposed research?
In my opinion, there are no risks involved for the students who participate in the study. However, the students will benefit from experiencing the Achievement testing-taking process first hand, especially those that may have to write the CAT/2 or an equivalent assessment test in the future to obtain admittance to another post-secondary program offered by UCC or a different educational institute.

f) What discomfort, inconvenience, or incapacity, if any, are the subjects/participants likely to experience as a result of the procedures?
The achievement examination will last 65 minutes. The students may suffer some stress during this time, but I hope to alleviate this prior to the examination by explaining the purpose of my research and emphasizing that their test scores will not be recorded in their student files nor used as a part of the course evaluation.

g) If monetary or other compensation is to be offered the subjects/participants, provide details of amounts, payment schedules, and other relevant details.
Not Applicable.

h) How much time will a subject/participant have to dedicate to the project?
I will require approximately 3 hours from the students in the experimental group that participate in the tutorial, and approximately 2.5 hours from the students in the control groups that do not participate in the tutorial.

7. **DATA**

a) Who will have access to the data other than the principal investigator and co-investigators? (ie supervisors, graduate supervisory committee members, if applicable)
I will be the only person with access to the raw data that identifies the students. My committee members, Dr. Leslee Francis-Pelton, Dr. Jim Vance, and Dr. John Anderson, and UCC's Learning Specialist, Hazel Trego, will have access to the coded data only.

b) How will confidentiality of the data be maintained?
Each participant will be assigned a coded identification value. Transcripts and data tables presenting the scores, percentages and summaries will identify students by the coded value only. The student's name and/or their UCC student number will never appear in any published form. All raw data will be stored in a locked filing cabinet in my office at UCC.

c) What are the plans for future use of the raw data (beyond that described in this protocol?) Who will have the right to retain or dispose of the data? How and when will the data be destroyed?
Coded data and data summations will be published in my Master's Thesis, and possibly subsequent journal articles. Summarized data will be presented to various UCC administrators and faculty. I will destroy the raw data one year after the completion of my Master's program, which is tentatively scheduled for April 2000. The raw achievement test scores, final grades, and handwritten reflections will be shredded, and the audio tape of the tutorial will be erased.

d) Will any data that identify individuals be available to persons other than the principal investigator and co-investigators or to persons/agencies outside the University?
No

e) Detail any plans for feedback (debriefing) to the subjects/participants.
The students will be interviewed in groups to verify my constructions of their perceptions of the assessment testing process several times throughout the semester until my constructions meet with the students' approval.

The University College of the Cariboo Ethics Committee
For Research and Other Studies Involving Human Subjects

Certificate of Approval

PRINCIPAL INVESTIGATOR	DEPARTMENT	
Cindy James	Assessment Centre	[redacted]

INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT

The University College of the Cariboo

CO-INVESTIGATORS

SPONSORING AGENCIES

[redacted]

APPROVAL DATE	TERM (YEARS)	AMENDED
December 10, 1998	3 Years	

CERTIFICATION

The protocol describing the above-named project has been reviewed by the Committee and the experimental procedures were found to be acceptable on ethical grounds for research involving human subjects.

Jeff McLaughlin
Chair, Research Ethics Committee

This Certificate of Approval is valid for the above term provided there is no change in the experimental procedures.

g:/ethics/certaprv.frm Sept. 1994

The University College of the Cariboo Ethics Committee
For Research and Other Studies Involving Human Subjects

REQUEST FOR ETHICAL REVIEW

(Please supply 9 copies to the Committee Secretary)

Protocol Number: ________ (office use only)

1 Principal Investigator (or faculty advisor) Cindy James	3 UCC Department Assessment Centre	4 Phone Number 828-5471
2 Student or Co-Investigator(s)	5 Granting Agency	6 Project Period January 4, 1999 to April 30, 2000
7 Title of Project Assessment Testing and Student Success in Adult Basic Education Courses		

**ALL INFORMATION REQUESTED IN THIS FORM MUST BE TYPEWRITTEN IN THE SPACE PROVIDED.
IF ADDITIONAL SPACE IS REQUIRED, PLEASE USE BOX 36.**

☑ Identify institution, agency, or community group involved in your research: University of Victoria
Note: If your study involves deception, you must also complete the deception form (Form #5).

Note: IF THE PROJECT IS LIMITED TO ONE OF THE FOLLOWING, PLEASE CHECK THE APPROPRIATE BOX AND COMPLETE AND SUBMIT ONLY PAGE 1 AND 2 OF THIS FORM:

- ☐ observation without intervention. (i.e. no tests, interviews or questionnaires)
- ☐ interviews of professionals in the fields of law or business (not Education) in which no invasion of an individual's personal privacy or possible jeopardy of employment status is involved. (Summarize interview/questionnaire content in item #12 or attach a copy).
- ☐ UCC course or programme evaluation.
- ☐ modification of existing approved protocol # : indicate changes only and submit copies of any revised attachments.

8 Describe the project, including purpose and potential benefits. It is essential to use the minimum of technical language.

Purpose: This research is designed to answer the following questions:

- Is there a relationship between student scores on mathematics achievement tests and their final grades in mathematics Adult Basic Education (ABE) courses?
- Do students who receive a test-taking tutorial with direct supervisory assistance achieve higher scores on mathematics achievement tests than students with no tutorial experience?
- What test-taking skills do adult learners lack and how does participating in a tutorial benefit the adult learner?
- What are students' views of the assessment test-taking process and do the views of students who participate in a tutorial differ from the views of students who do not participate in a tutorial?

Potential Benefits:

The results of this research may be beneficial to all Canadian Educational Institutes, especially those that are trying to establish a student placement system for Adult Basic Education (ABE) programs as is the case for the University College of the Cariboo. Depending on the results, the achievement tests may be adopted as an assessment tool for placing incoming students into the appropriate ABE courses at UCC, and test-taking tutorials may be established for all students required to write achievement tests to enter UCC programs. In addition, this research may provide the foundation for further research into assessment tests as screening devices for other UCC programs.

SIGNATURES

9 Principal Investigator (or faculty advisor): Cindy James Dec. 1/98 Date	10 Student or Co-Investigator(s) (if applicable; give title) __________ Date	11 UCC Department Chair or Dean 12/1/98 Date

12 Summary of Methodology and procedures. If research is conducted by telephone, complete the *Telephone Contact Form* (Form #4).

Methodology

Data will be collected from four classes of mathematics adult basic education (level 50) courses during the 1998/99 academic year. One of the classes (identified as the experimental group in this proposal) will participate in a test-taking tutorial, while the other three classes (identified as the control group, the accelerated group, and the self-paced group in this proposal) will not. Scores from the mathematics sections of the Canadian Achievement Tests - second edition, and final course grades will be collected from all four groups. The tutorial session with the experimental group will be tape-recorded and transcribed by myself. All the students will submit written reflections on their test-taking experience. The objective of collecting these qualitative data is to determine the students' views of the test-taking experience and compare the views of the assisted students with the unassisted students.

Statistical analysis will determine if a correlation exists between the students' scores on the mathematics sections of the achievement test and their final grades, and if the performance of the assisted experimental group are significantly different than the performance of the unassisted control group. Inductive data analysis will be used to construct assertions about the students' test taking experiences using the qualitative data (Lincoln & Guba, 1985).

Procedure

Data collection will begin the first week of the winter semester of the 1998/99 academic year (January-April of 1999). Preceding the CAT/2 examination, the experimental group will participate in a tutorial that is expected to last approximately 30 minutes. Then, I will administer and score the CAT/2-tests 7 & 8 for each of the four groups. After the examination, each student will be asked to write a reflection of their test-taking experience. I will transcribe the tape-recording of the tutorial and read the students' reflections immediately. Once I have created my initial constructions based on the transcription and reflections, and I have reviewed them with Hazel Trego, Assessment Centre Learning Specialist, the students will be interviewed in groups to verify my constructions. Final grades will be collected from the instructors at the end of the semester. Once the grades are recorded, statistical analysis of these grades and the achievement test grades will be performed. For the statistical analysis, student scores for correct answers on the CAT/2 Tests 7 and 8, will be collected and converted to scale-scores to calculate a combined mathematics scale-score. Using regression analysis, these combined scores will be compared to the final course percentages collected at the end of each semester to determine if a relationship exists between the two variables. The combined scale-scores on the achievement tests will be averaged for the experimental and control groups. A t-test will be used to determine if the scores achieved by the assisted experimental group of Math 50 are significantly higher than the scores achieved by the unassisted control group. Data collection and analysis are scheduled to be completed by June of 1999. A summary of the results will be ready by September 1999. The completion date for my Master's thesis is tentatively set for April 2000.

DESCRIPTION OF POPULATION

13 How many subjects will be used in total? Of these, how many in the control group(s)?

Approximately 110 students will participate in this study. The experimental and control groups in the regular Math 50 sections should consist of 30 students per group. The accelerated group of Math 50 should have approximately 30 students and the self-paced Math 50 group should have approximately 20 students.

14 Who is being recruited and what are the criteria for their selection?

All the students enrolled in Math 50 sections that start in January of 1999 are being recruited.

15 What subjects will be excluded from participation? None
16 How are the subjects being recruited? (If initial contact is by letter or if a recruitment notice is to be posted, attach a copy.) UCC Ethics Committee - Human Subjects discourages initial contact by telephone. However, researchers who use telephone contact need to complete the *Telephone Contact Form* (Form #4). My initial contact will take place within the classroom.
17 If controls are involved, and if their selection and/or recruitment differs from #14 - 16, provide details. Same as above.

PROJECT DETAILS

18 Where will the project be conducted? Main Campus of the University College of the Cariboo.
19 Who will actually conduct the study? Cindy James
20 Will the group of subjects have any problems giving informed consent on their own behalf? Consider physical or mental condition, age, language, or other barriers. I do not foresee any problems.
21 If the subjects are not competent to give fully informed consent, who will consent on their behalf? What measures will be taken to inform and obtain the consent of the subject inasmuch as that is possible? (See also Form #2) I do not believe this is applicable to my research.
22 What is known about the risks and benefits of the proposed research? Do you have additional opinions on this issue? In my opinion, there are no risks involved for the students who participate in the study. However, the students will benefit from experiencing the Achievement testing-taking process first hand, especially those that may have to write the CAT/2 or an equivalent assessment test in the future to obtain admittance to another post-secondary program offered by UCC or a different educational institute.

23 What discomfort or incapacity are the subjects likely to endure as a result of the experimental procedures?

The achievement examination will last 65 minutes. The students may suffer some stress during this time, but I hope to alleviate this prior to the examination by explaining the purpose of my research and emphasizing that their test scores will not be recorded in their student files nor used as a part of the course evaluation. Any student who may suffer from severe test-anxiety will be directed to the counselling office for assistance (Office A122, phone number: 828-5023).

24 If monetary or other compensation is to be offered to the subjects, provide details of amounts and payment schedules.

Not Applicable

25 How much time will a subject have to dedicate to the project?

I will require approximately 3 hours from the students in the experimental group that participate in the tutorial. (20 minutes for initial meeting and signing of the consent form, 30 minutes for the tutorial, 70 minutes for the exam, 15 minutes for the reflection, 15-45 minutes for the follow-up interviews)

26 How much time will a member of the control group (if any) have to dedicate to the project?

I will require approximately 2.5 hours from the students in the control groups that do not participate in the tutorial. (20 minutes for initial meeting and signing of the consent form, 70 minutes for the exam, 15 minutes for the reflection, 15-45 minutes for the follow-up interviews)

DATA

27 Who will have access to the data?

I will be the only person with access to the raw data that identifies the students. My Master's committee members, Dr. Leslee Francis-Pelton, Dr. Jim Vance, and Dr. John Anderson, and UCC's Learning Specialist, Hazel Trego, will have access to the coded data only.

28 How will confidentiality of the data be maintained?

Each participant will be assigned a coded identification value. Transcripts and data tables presenting the scores, percentages and summaries will identify students by the coded value only. The student's name and/or their UCC student number will never appear in any published form. All raw data will be stored in a locked filing cabinet in my office located in the UCC Assessment Centre.

29 What are the plans for the future use of the data (beyond that described in this protocol)? How and when will the data be destroyed?

Coded data and data summations will be published in my Master's Thesis, and possibly subsequent journal articles. Summarized data will be presented to various UCC administrators and faculty. I will destroy the raw data one year after the completion of my Master's program, which is tentatively scheduled for April 2000. The raw achievement test scores, final grades, and handwritten reflections will be shredded, and the audio tape of the tutorial will be erased.

30 Will any data which identifies individuals be available to persons or agencies outside the Research group? If yes, then how do you propose to comply with SSHRC guidelines (Sections VI & VII)?

No

31 Will your project use: (check) ☐ Questionnaires (submit a copy) ☐ Interviews (submit a sample of questions) ☐ Observations (submit a brief description) ☒ Tests (submit a brief description) ☐ Review of personal records, including medical

INFORMED CONSENT

32 Who will consent? (check) ☒ Subject ☐ Parent/Guardian ☐ Agency Official(s) In the case of projects carried out at other institutions, the Committee requires written proof that agency consent has been received. Please specify below: ☐ Research carried out in a hospital – approval of hospital research or ethics committee. ☐ Research carried out in a school – approval of School Board and/or Principal. (Exact requirements depend on individual school boards: check with them.) ☐ Research carried out in a Provincial Health Agency (Name of contact person and title). ☐ Other. Specify:
33 Written subject consent (Form #1 or one of your own) is required in all cases other than questionnaires <u>which are completed by the subject</u>. (See item #34 for questionnaire consent requirements.) Please check each item in the following list to ensure that the written consent form attached contains all necessary items. If your research involves contact by telephone, you need not fill out this section. a. ☒ Title of project b. ☒ Identification of investigators (including a telephone number) c. ☒ Brief but complete description IN NONTECHNICAL LANGUAGE of the purpose of the project <u>and</u> of all procedures to be carried out in which the subjects are involved. d. ☒ Assurance that identity of the subject will be kept confidential and description of how this will be accomplished. e. ☒ Statement of the total amount of time that will be required of a subject. f. ☐ Details of monetary or other compensation, if any, to be offered to subjects. g. ☒ An offer to answer any inquiries concerning the procedures to ensure that they are fully understood by the subject and to provide debriefing, if appropriate. h. ☒ A statement of the subject's right to refuse to participate or withdraw at any time and a statement that withdrawal or refusal to participate will not jeopardize further treatment, medical care or influence class standing as applicable. NOTE: This statement must also appear on letters of initial contact. i. ☒ A place for signature of subject CONSENTING to participate in the research project, investigation or study. j. ☒ A statement acknowledging receipt of a copy of the consent form including all attachments. k. ☐ Parental consent forms must contain a statement of choice providing an option for refusal to participate. (e.g. "I consent/I do not consent to my child's participation in this study." (Form #2) l. ☒ Signature of a witness.

34 Questionnaires should contain an introductory paragraph which includes the following information. Please check each item in the following list before submission of this form to insure that the introduction contains all necessary items.

- a. ☐ Title of Project.
- b. ☐ Identification of investigators (including a telephone number).
- c. ☐ A brief summary that indicates the purpose of the project.
- d. ☐ The benefits to be derived.
- e. ☐ A full description of the procedures to be carried out in which the subjects are involved.
- f. ☐ A statement of the subject's right to refuse to participate or withdraw at any time without jeopardizing further treatment, medical care or class standing as applicable. NOTE: This statement must also appear on explanatory letters involving questionnaires.
- g. ☐ The amount of time required of the subject must be stated.
- h. ☐ The statement that if the questionnaire is completed it will be assumed that consent has been given.
- i. ☐ Assurance that identity of the subject will be kept confidential and description of how this will be accomplished.
- j. ☐ For surveys circulated by mail submit a copy of the explanatory letter as well as a copy of the questionnaire.

ATTACHMENTS

35 Check items attached to this submission, if applicable, incomplete submissions will not be reviewed.

- a. ☐ Letter of initial contact (item 16)
- b. ☐ Advertisement for volunteer subjects (item 16)
- c. ☒ Subject consent form (Form #1, see item 33)
- d. ☒ Subject feedback form (Form #3)
- e. ☐ Control group consent form (if different from c above)
- f. ☐ Parent/guardian consent form (if different from c above) (Form #2)
- g. ☐ Agency consent (item 32) (letter of consent)
- h. ☐ Questionnaires, tests, interviews, etc. (item 31)
- i. ☐ Explanatory letter with questionnaire (item 34)
- j. ☐ Description of debriefing if deception is involved
- k. ☐ Deception Form (Form #5)
- l. ☐ Telephone Form (Form #4)
- m. ☒ Other. Specify: References

ADDITIONAL INFORMATION

36 Use this space to provide information which you feel will be helpful to the ethics committee OR to continue any item for which sufficient space was not available.

Background Information

Approximately 35 % of Canadians age 15 and over, or 7.9 million people, have not completed high school (Statistics Canada, 1990). It is imperative to reduce significantly the pool of people without a high school diploma or its equivalent, considering the social and economic costs to individual Canadians and to Canadian society. The purpose of Adult Basic Education (ABE) is to provide the non-secondary graduates with the credentials required for entering employment or for further educational opportunities by enhancing the adult learner's reading, writing, mathematical and logical-thinking skills. However, of the millions of people eligible to attend ABE programs, only a small percentage actually participate and even fewer complete these programs (Calamai, 1987; Merriam & Cunningham, 1989; Quigley, 1992; Rachal, Jackson, & Leonard, 1987; Statistics Canada, 1984).

As providers of ABE programs, post-secondary educational institutes such as the University College of the Cariboo need to focus on increasing the participation and completion rates for these programs. To attract and retain the adult learner, UCC must remove barriers and increase student success. One of the most difficult barriers to remove is students' lack of confidence. To increase students' confidence levels, UCC must provide the students with the optimum conditions for succeeding in their post-secondary educational endeavors. Accurate placement, especially in ABE programs, is a crucial component to future success. To ensure correct placement, UCC needs to provide careful diagnosis of educational needs of adult learners. There are a range of educational assessment tools available to determine educational requirements and appropriate placement, but the one most commonly used by UCC is the Canadian Achievement Tests - Second Edition (CAT/2). This prompts the first question: Can student success in ABE courses be predicted by CAT/2 scores?

As with all tests, students' performance on achievement tests may be influenced by a variety of factors. One of the biggest threats to obtaining accurate information about students' performances is test anxiety (Wimmer & Grigg, 1992; Woolfolk, 1990). Indeed, standardized testing can be overwhelming, especially for potential ABE students who typically have not been successful in their previous educational endeavors. The majority of these people have had negative experiences in formal schooling and may be discouraged or intimidated by the testing procedure involved with standardized tests. Other factors influencing the adult learner's performance may be a lack of test-taking skills and unfamiliarity with the mechanics of standardized achievement testing. However, participating in coaching activities can improve performance (Becker, 1990; Bond, 1989; DerSimonian & Laird, 1983; Kulik et. al., 1984; Messick & Jungeblut, 1981; Samson, 1985; Seaton, 1992; Vernon, 1954), and even small amounts of coaching time can result in significant improvement (Messick, 1982). Thus, to reduce anxiety levels, minimize the "threat" of the testing situation and hone test-taking skills, UCC may want to provide students with the opportunity to participate in CAT/2 test-taking tutorials. Hence, a second question is generated: Does participating in a test-taking tutorial affect students' performances on achievement tests and/or alter their perceptions of the assessment process?

This research project will investigating both the relationship between achievement test scores and final grades, and the effect tutorials have on achievement test-taking performance. In addition, the qualitative data gathered will provide insights into the students' views of the assessment test-taking process. Depending on the outcomes, significant changes to the assessment test-taking process may be implemented at UCC. First, if there is a correlation between achievement scores and course grades, then the achievement test may be adopted as an assessment tool for placing incoming students into the appropriate ABE courses, thereby improving the students' chances of success. Secondly, if students who receive assistance perform better on the achievement tests and these students still succeed in their courses, the Assessment Centre may establish optional tutorials for all students required to write the CAT/2. Hence, students who may perform poorly on the achievement test, due to test anxiety and/or unfamiliarity with the achievement test-taking format, should improve their performance by attending the tutorial and thereby increase their chances of gaining entry into their programs of choice. This would result in a "win-win" situation for UCC and perspective students since an admissions barrier for the students would be removed while UCC would increase its enrollment. Thirdly, other concerns expressed by the students in their comments and suggestions will be evaluated and any reasonable modifications may be implemented by the Assessment Centre to improve the assessment testing process for all those involved. Finally, this research may provide the foundation for further research into assessment tests as screening devices for other UCC programs.

THE UNIVERSITY COLLEGE
OF THE CARIBOO
Assessment Centre

Assessment Testing and Student Success in ABE Courses
Research Project
by Cindy James

Observation Data

There will be two sources of observational data collected during this project. First, the tutorial session with the experimental Math 50 group will be tape-recorded and transcribed by myself. Secondly, students in all four classes will submit written reflections on their test-taking experience. The objective of collecting these qualitative data is to determine the students' views of the test-taking experience and compare the views of the assisted students with the unassisted students.

To interpret these data, I will review the transcript of the tape-recorded tutorial and read the students' written reflections to create my initial description of the students' views of the test-taking experience. While reviewing the transcripts, I will try to identify what test-taking skills the adult learners lack and how they benefit from participating in the test-taking tutorial. While reviewing the reflections, I will try to summarize in tabular form the test-taking experiences for both the assisted group and unassisted groups. Using the table, I will compare and contrast the experiences by the assisted group versus the non-assisted groups to identify similarities and differences.

Hazel Trego, Assessment Centre Learning Specialist, will edit my draft versions of the constructions and provide feedback on my assumptions. I will incorporate her comments and suggestions in any new constructions. In addition, the students will review and verify my constructions during a short follow-up interview (approximately 15 minutes). If my assumptions are not verified by the students, I will gather more information from the students, re-write my constructions and have the students verify the new constructions during a second follow-up interview. If necessary, I will repeat this process once more for a total of three follow-up interviews.

THE UNIVERSITY COLLEGE
OF THE CARIBOO
Assessment Centre

Assessment Testing and Student Success in ABE Courses

Research Project
by Cindy James

Testing Instruments

The educational material used in this study will include the Canadian Achievement Tests - second edition and the Canadian Achievement Locator Test 2, both of which were created by the Canadian Test Centre. The Canadian Achievement Tests - second edition (CAT/2) is a series of tests designed to measure achievement in the basic skills taught in schools across Canada. Educational objectives found in provincial and district curriculum guides, published textbooks, and major reading series are used to create the items for the CAT/2. There are eight levels of the CAT/2 related to grade ranges. The CAT/2 - level 18 which is related to the grade ranges of 8.0 through 10.2 will be used for this study. The CAT/2 - level 18 contains eight tests in five content areas: reading, spelling, language, study skills and mathematics.

This study will focus on the mathematics content area and will utilize the associated tests: Test 7 - Mathematics Concepts and Applications, and Test 8 - Mathematics Computation. Test 7 measures a student's ability to apply mathematical concepts related to numeration, number theory, data interpretation, basic algebra, measurement, logical reasoning and basic geometry. It consists of 45 multiple choice questions in which the students have 35 minutes to complete. Test 8 measures a student's ability to add, subtract, multiply, and divide whole numbers, decimals, fractions and integers, and to solve problems involving percents, exponents and algebraic operations. Test 8 consists of 40 multiple choice questions in which the students have 30 minutes to complete.

The Canadian Achievement Locator Test 2 is designed to aid in selecting the appropriate test level for students. In this study, the Locator Test 2 will be used as a practice test during the tutorial session to familiarize students with the mechanics of CAT/2 test-taking. Math 50 unit tests, assignments, mid-term exams and final exams created by the ABE instructors will be the other educational material used in this study.

THE UNIVERSITY COLLEGE
OF THE CARIBOO
Assessment Centre

Assessment Testing and Student Success in ABE Courses

Research Project

by Cindy James

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Appendix B

Consent Form

THE UNIVERSITY COLLEGE OF THE CARIBOO Form #1

Informed Consent by Subjects to Participate in a Research Project or Experiment

Note: The University College and those conducting this project subscribe to the ethical conduct of research and to the protection at all times of the interests, comfort, and safety of subjects. This form and the information it contains are given to you for your own protection and full understanding of the procedures, risks and benefits involved.

Having been asked by **Cindy James, Coordinator of the Assessment Centre**, Division of Student Development, The University College of the Cariboo, telephone number **828-5471**, to participate in a research project entitled: **Assessment Testing and Student Success in Adult Basic Education Courses** encompassing the following purpose and procedures and time commitment:

- The **purpose** of this research is three-fold. The first goal is to determine if student success in ABE courses can be predicted by achievement test scores. The second goal is to determine if students performance on achievement tests improve by participating in a test-taking tutorial with direct supervisory assistance. The third goal is to gain a better understanding of the students' experiences with assessment testing.
- The **procedure** is as follows: During the initial contact you will be given an overview of the research project, a description of your role in the study and a timeline for the project. Preceding the Canadian Achievement Tests (CAT/2) examination, your class or another group of Math 50 will participate in a tutorial that is expected to last approximately 30 minutes. I will tape-record the tutorial in order to gather information on your views of the achievement test-taking process. Then, you will write the CAT/2-tests 7 & 8 which will take 65 minutes. After the examination, you will be asked to write a reflection of your test-taking experience. I expect this will take approximately 5 to 10 minutes. I will transcribe the tape-recording of the tutorial and read your reflections. Based on the transcriptions and reflections, I will created my initial constructions of your views of the test-taking process. Then I will interview yourself and the other students to verify my constructions. Final grades will be collected from your instructor at the end of the semester. Once the grades are recorded, statistical analysis of these grades and the achievement test grades will be performed.
- Total **time commitment** is estimated to be 3 hours for students who participate in the tutorial and 2.5 hours for students who do not participate in the tutorial.

I understand the procedures to be used on this project and the personal risks to me in taking part.
I understand that I may refuse to participate or withdraw my participation in part or all of this project at any time without consequence. Any data collected from me prior to my withdrawal from the study will be destroyed. If I am apart of the group that participates in the tutorial, any comments I made will be deleted from the transcript. My involvement or non-involvement in this project is in no way related to my employment contract or to my status as a patient or student.
I also understand that I may ask any questions or register any complaint I might have about the project with either the chief researcher named above or with **Susie Safford**, **Dean of the Division of Student Development**, The University College of the Cariboo. PHONE: **250-828-5292**
or with **Dr. Leslee Francis-Pelton**, **Graduate Supervisor** for **Cindy James' Masters Degree, Faculty of Education**, University of Victoria. PHONE: **250-721-7794**

Informed Consent by Subjects to Participate in a Research Project or Experiment

Form #1
Page 2

Confidentiality will be maintained, as specified below, when the findings from this study are shared with various UCC administrators and faculty, and published in the researcher's Master's Thesis and subsequent journal articles. Copies of the results of this study, upon its completion, may be obtained by contacting: **Cindy James**.

I agree to participate in this study by **participating in the tutorial, writing the achievement tests, completing a personal reflection of the test-taking experience, and/or reviewing the conclusions constructed by the researcher**, as described above, during the period: **1998/99 academic year at the main campus of the University College of the Cariboo in my Math 50 class.**

NAME (Please print): ______________________________

STUDENT NUMBER: ______________

ADDRESS: ______________________________

AGE: ______________ GENDER: ☐ Male ☐ Female

REASON FOR TAKING THIS COURSE: ______________________________

____

HAVE YOU TAKEN A CAT/2 - LEVEL 18 TEST IN THE PAST YEAR? ☐ Yes ☐ No

IF YES, WHERE, WHEN and WHY DID YOU WRITE IT?: ______________________________

____

I have read and understood the above information regarding this project and voluntarily agree to participate in the project. I understand that my identity and any information obtained will be kept confidential through the process of coding. **The researcher will be the only person with access to the raw data. Each participant will be assigned a code. Data tables presenting the scores, percentages and summaries will identify students by the coded value only. The student's name and/or their UCC student number will never appear in any published form. The data will be stored in a locked file cabinet in the researcher's office until it is destroyed one year from the date of completion of the researcher's Masters program which is tentatively scheduled for April 2000. The raw achievement test scores, final grades, and handwritten reflections will be shredded, and the audio tape will be erased.**

I have received a copy of this consent form and a subject feedback form.

SIGNATURE: ______________ WITNESS: ______________

DATE: ______________

Appendix C

Construction Tables

TABLE C.1

Accelerated Group –Written Reflections.

Positive Comments	Negative Comments	Neutral Comments
Time: ◆ I don't have a problem with being timed, but I know some people who get so nervous that they "go blank" and don't do as well as they could. ***Test Difficulty:*** ◆ Some of the questions were quite easy, and some of them I had forgotten how to do. ◆ It wasn't as hard as I thought it might be, only time consuming. ◆ I found this test suprisingly easy. I will interested to find out my mark (or how I would have done) (sic). ◆ I found it fairly simple but I was pretty slow as I have been out of practice for a few years. ***Purpose of Test:*** ◆ It's a good chance for me to review math because I have not use math long time. I did learn all of them before but I forget a lot. It seems that it makes me recall some of them (sic).	***Time:*** ◆ Test 7 Mathematics - You need more time. ● Test is reasonable in length although section 7 should allow more time. ◆ I think that I could of used more time (35 min.) on the first test. ◆ I was rushed. ◆ I think that we should have gotten more time to work on the sections. ● I think that it is not enough time for test 7. ◆ I don't really like the idea of it being timed. ◆ I understand the need to time tests, but is it completely necessary to make things difficult. ***Test Design:*** ◆ I wonder if multiple choice is a true reflection of ability. Several questions, I would have gotten wrong if had gone with my first answer, but re-calculated when I found it wasn't a choice.	***Test Difficulty:*** ◆ Fair to challenging questions. ***Test Design:*** ◆ I found nothing wrong with this test. ◆ Test 8 Mathematics - was easier than test 7 ◆ To me, the problem solving seems more difficult than the actual math. Test 7 was way harder than test 8. ***Effort:*** ◆ Because this doesn't effect me at all I didn't maybe put in as much effort as I normally would have. ***Miscellaneous:*** ● No comment.

Positive Comments	Negative Comments	Neutral Comments
◆ I feel it can be used as a useful tool in preparation for study habits, once a person is working through their studies. ◆ It is a good refreshment test.	◆ Hate filling in dot marks. (find it distracting, but also find all multiple choice tests distracting). ◆ I am not in favor of test that use separate pages to mark in answers (sic). ***Purpose of Test:*** ◆ It was okay. The only thing I feel about it is. If it is used to grade someone level of learning it isn't quite fair because if you've been out of school for a while you forget abit but give a quick lesson and you got it all back. I think one should have a quick review before going into it (sic). ◆ The one thing that is hard to understand is how you can graph people when all someone might need is a little refreshing in math. And the course may not have really taught them they just had to remember what they had forgotten. ◆ I took this test last August, and at this point I am not sure if I'm ready for this class. ***Test Anxiety:*** ◆ Found that not knowing what to expect on the exam (eg: examples) increased my anxiety. Test anxiety for me on this test around 6.0 or 7.0 (scale out of 10), but I had a better environment then my group (wrote half in assess-centre).	

TABLE C.2

Control Group –Written Reflections.

Positive Comments	Negative Comments	Neutral Comments
Time:	***Time:***	***Time:***
◆ The right amount of time was definitely allotted.	◆ I thought we got too much time. I didn't think we needed as much as we got.	◆ The first part I took too long in figuring.
◆ Time given was almost perfect both times. I finished the second section and had only a few left on the first.	◆ Did not complete the first test due to shortage of time.	***Test Difficulty:***
	◆ After being out of practice for a while the time limits seem short.	◆ I found the second test a lot easier to work with.
Test Difficulty:		
◆ I thought that most of it was pretty basic, but their was a few questions I did have to guess at, and hopefully I will learn how to do it later in the course (sic).	◆ Dislike timed tests. Feel pressure when racing with the clock. I always panic and never complete.	◆ Challenging.
		Effort:
◆ I found some parts easier to do than others, but I completed everything.	● I miss understood the time limits on the first part of this test.	◆ I didn't find it very hard, but I also didn't give it all that I could have done. I knew that it wasn't for any marks. So I didn't take it too seriously.
	Test Difficulty:	
◆ All in all it was all right.	◆ Had some difficulties in a few questions - or misunderstood the units.	
◆ I found this test to tease my brain. Some of the test, I knew, but could not recall.		***Purpose of Test:***
	◆ The second part was a little harder.	
◆ Some questions I found challenging but most were easy.	***Test Design:***	◆ I feel if we get results fast enough we will know where we should be in College Prep Course.
◆ It was O.K.	◆ I just wished I could have used my calculator.	
◆ It wasnt so bad (sic).	◆ The timed part about the test should be stressed because a person must wrk quickly in order to awnser all the question (sic).	
◆ Overall, fun afternoon.		

Positive Comments	Negative Comments	Neutral Comments
♦ It was fairly simple. *Test Design:* ♦ It was very easy to follow and the directions were clear. ♦ Over all though it's a good variety of questions. ♦ First part was basically common sense and no real problem. *Purpose of Test:* ♦ The CAT test to me was a good way for myself to find out where abouts I stand in passing my Math course. Also allowing it to take control of my brain for an hour was good practice to begin the course. It tested a lot of the abilities we should know and hopefully understand or will. ♦ It will be nice to see what will change at the end of the semester. What areas I have improved in and what areas I still need to work on. ♦ The CAT test helped me remember math I had forgotten. ♦ Great idea - glad I took it, because it gives me an idea of where my math skills are at. Can't wait to see the results. ♦ It was a little wierd taking a test this soon, but it was good in a way just to see where my math skills are and what I need to work on. Definitely fractions.	*Test Anxiety:* ♦ I believe my limited knowledge in Math makes me nervous about any math test. The fact that this test is going to tell me where I stand overall concerns me and makes me wish I had listened in grade school. The different levels of questions makes it hard to believe you are at a good standing amongst your peers if you don't do well. Overall I found the test very stressful and humbling. ♦ It is probably not very accurate because most of the class is a little rusty in most math operations. Given that we have not had any istruction as of yet, only 2nd class (sic). ♦ After two years away from school and mathematics I felt quite aprehensive about writing a test, some questions were pretty basic, but some of the more complex ones stumped me, and I soon became deterred which I feel affected my work. A small refresher course would have helped me some, I feel (sic).	

TABLE C.3

Experimental Group – Written Reflections.

Positive Comments	Negative Comments	Neutral Comments
Test Difficulty: ◆ No problems. ◆ OK. *Test Design:* ◆ Good test. ◆ Good test. ◆ I think that the test is a good test. *Purpose of Test:* ◆ This gave me a good chance to refresh my brain of for the year. To introduce my math skills and warm them up. It seemed that I could of done a higher level but this was a good start. Thank you. ◆ I think that this test right at the beginning of a semester is a good thing for the purpose of the teacher to know where each student stands, and for which sections to spend more time on. I also think that if we wrote this test a week from now we all would do better at it. ◆ The test has given me an adequate idea of where I stand, and might be recomendable as a mandatory part of the Math 050 course (sic).	*Time:* ◆ The first test didn't allow enough time. ● I do not like having a time limit. *Test Difficulty:* ● It's was hard because school just started. I'm rusty on my math. I haven't been in school for a few years now. *Test Design:* ◆ Let us use calcalators (sic). ◆ Easy to lose your place on answer sheet. *Purpose of Test:* ◆ I though the test was unnecessary. Why do people need to know how well I do in math. I can say personally I'm not the smartest person and I don't need to be reminded of that (sic). *Test Anxiety:* ◆ The end of this test I just guessed. I got flustered at people walking out that I just gave up.	*Test Design:* ◆ I noticed there were a lot of A's for the right answers and more than the usual none of the above. *Effort:* ◆ Because this test doesn't really count for anything it is hard to honestly say you put in the best effort possible.

Positive Comments	Negative Comments	Neutral Comments
Tutorial: ◆ Teacher was extremely helpful with exam writing tips. ◆ Like the tutorial it helped. I wish I could of had it when I took the CAT test. ◆ Tutorial was helpful, did not feel I needed pre-test. ◆ Many years since I took this kind of test so tutorial very helpful. Also "locator" test helped to give me a feel for the best way to find answer. Hint about figuring out the answer first and also omit illogical answers were helpful. ◆ I did find it easier to do the test after having a tutorial.	● I found this test to be quite stressful because I came to class today knowing nothing about it. ◆ I get very nervous and try to rush when being timed. So I don't get a clear picture of the question and can make mistakes because of that. *Tutorial:* ◆ Other than that the tutorial needs to be a slightly bit more involved more interaction from the class would also be helpful. I think people are afraid to ask questions for the fear of feeling stupid or dumb. Teachers need to make students feel like their questions are valid. ● I felt a little patronized when I was taught how to fill in dots on a multiple choice exam. I am not a lab rat!	

Appendix D

Transcript of Tutorial

Transcript of Tutorial

Researcher: Standardized tests, some of you have taken the CAT already. Standardized tests basically, there are aptitude standardize tests and achievement standardized tests. They try to measure what you are *able to do.* That is the purpose of these tests. Achievement tests specifically looks at what you *can do now.* That's what we are interested in what you are able to do right now. That is what the Canadian Achievement Test is, a standardized achievement test. It measures *basic academic skills* in reading, spelling, language skills, study skills and mathematics. We are just going to look at the mathematics component. The objective in testing is to obtain an accurate measurement of your ability, basically. But, sometimes there are things that interfere with that measurement. And that could be that you are just not use of writing a standardized test or you suffer from test anxiety. Any here getting a little anxious yet?

Student: Well not yet!

Researcher: Not yet?

Student: But I do when it comes to the test.

Researcher: Yesterday I had a student that said she just couldn't write the test. She was going white...true test anxiety. So that really effects your performance...so I don't get a true measure of how you are doing on the test. That is why, in a lot of cases, some of these standardized tests offer coaching programs, and a lot of institutes offer coaching programs for the test before you write it. So what they are trying to do in the coaching programs is to prepare you with test-taking skills. So that you are ready when you come in; you know what to expect and you can just go write the test. Because it is very intimidating when you come in, there is all this paper work to fill out, and you've got to bubble this in and bubble that in, so by the time you get through just the paper work part before the test you are already frazzled. So what the coaching programs do is try to help you so when you do come in you know what to expect, and you are ready. There are a lot of programs...GED, anybody tried to write that or looked at writing it? Huge manuals, preparation manuals for that. In fact, UCC offers a course to prepare you for the GED. The LPI is another test we administer here and there are preparation manuals for that. Have you heard of the SAT, Scholastic Aptitude Test...done in the States? Just about all the colleges require students to write that one. A massive amount of material, practice tests, preparatory material and coaching programs for the SAT. In fact, it is quite a controversy in the States about the number of coaching programs. So like I said a secondary purpose of my research is to see if a coaching program for the CAT would benefit students like yourselves.

So again, Standardized Test means we have to give the test under standard conditions that it was administered to everyone else. Basically...it usually involves timing. Does that unnerve you a bit? I had a comment about that yesterday...they didn't like it at all.
So the CAT/2 is a standardized test: you are only going to write two of the subtests. They are all multiple choice and they are timed. So basically after going through all the preparatory material for standardized tests, the recommendations are as follows:.

Number 1, Arrive early with necessary material. You do not want to come in late. Have you done that before?

Student: Oh yeah!

Researcher: We have a lot of students that register for tests off campus. They register through the internet or whatever. They have never been to the Assessment Centre.
So Saturday morning 10 minutes before the test they are running around looking for the Assessment centre. You don't want to be doing that. That makes you more hyped-up.

Student: I don't know, I like that rush!

Researcher: Oh you like that adrenaline rush. Well, I still wouldn't recommend arriving late because you need to start on time. But good point, good point you made.
Bring your necessary material. How about not having your calculator with you and things like that? Find out what you need to bring to the test and make sure you bring it. Picture ID for example, if someone doesn't have it, I can't let them write the test. And that is not a good thing. Make sure you know what you need to bring and be here on time for the test. In fact, a lot of people will bring two calculators to a test.

When you are getting the instructions for writing the test, of course, listen very carefully and if you have any questions ask them. That's fine, take the time then, not during the test to ask the questions. Make sure you listen carefully, you understand what you have to do and how to do it. If you have any questions ask then, it is pretty straight forward, but a lot of people won't and then they are not sure how they should be filling in the answers.

With a timed test like this, you really need to pace yourself and I guess with any test if you only have an hour to write it, you need to make sure you pace yourself. Um...watching the clock. I always make sure I have my own watch with me because you never know if the clocks are working or if the testing room will even have a clock. I don't know if you noticed...this room doesn't even have a clock. I just noticed that. Prime example of why you should bring a watch. Um...usually the invigilator will state the time, after so much time has elapsed: 15 minutes, half an hour something like that. Make sure you have your own watch.

For math questions, especially multiple choice questions, this is something that is recommended by a variety of programs, is that for math questions if they are multiple choice questions, work out the answer by yourself, then look for the multiple choice answer. So just work it out as if it was a long answer question first. Solve it yourself, then go find the answer. Don't try and go look at the answers and go oh that looks like the right answer. It is much better to work it out long hand as if it were a long answer question.

In some cases you may be able to solve the question by the process of elimination. For example if I gave you the math question something like 22 times negative 333, what would you know about the answer?

Student: It should be negative.

Student: No positives

Researcher: It would be negative, so if there were any positive answers there, you know they're not right. So the process of elimination can be used especially in math. It's so easy to look at it and go that's not logical. If you were looking for a weight, it couldn't be negative either. There are so many answers that are unreasonable.

Work through the questions you can do, leave any questions that you get stuck on. Then come back to them if you have time. Go through the questions you can do first, then come back to the ones you couldn't do if you have time.

One thing that often catches students, is that... make sure when you are working with standardized tests, they usually have separate answer sheets, make sure you are filling in the right section that matches with the right section of the answer sheet. A number of times I have had students filling in their English subtest and they are doing it in the math subtest answer section. Well if that happens, and you don't catch that, all those answers could be wrong. And then they find out they've done that and they get really flustered. I don't think that helps. Make sure you're matching up the questions with the answer sheet.

And the last recommendation I have for you is double-check your answers at the end of the testing session if time permits. So you can go back and check on your answers. Caution with that, if you are sitting there and going hum... is that right, go with your first instinct, it's usually right. But if it is a clear miscalculation or error then make the change. Usually your first instinct is right.

Do you have any questions about any of those? You've probably heard most of this. Have any of you taken the Master Student course or something along that line?

Student: Yes

Student: Uh-huh

Researcher: All of this is covered in Master student. And actually all of these recommendations came from the Canadian Test Centre that produces the CAT/2. So those are the hints and the ideas to follow. But I still think the best way to prepare for any test is to do a practice test. And that is what I am going to let you do today, a practice run with what's called the CAT/2 Locator Test. It is just a little mini-test that is suppose to help us place you so we can decide if you should write a level 17, 18, or 19. We haven't found it works that well doing that but I think it will be a great little practice test. That is what we are going to do today, just a little dry run with the locator test. So I will just hand out the answer sheet and if you could just put your name in there. We're only going to do the math portion of it. And this again is just for practice, we are not scoring it or anything like that. Just want you to get an idea of what it looks like it. And this looks very much like the answer sheet you will get for the CAT/2. It does differ a little bit as there are more tests on the CAT/2 answer sheet. But basically that is the answer sheet and we are only going to do the math section. Now I will hand out the locator test. For the math section of the locator test, there are a total of 25 multiple choice questions we are going to work through, uh only 20 multiple choice questions. These are on page 3 of the locator test. Let's just go through the example question. Pretty straightforward sample question: find the answer of 1 plus 1. It is?

Student: Four, hah, hah.

Student: Nine.

Researcher: I hope you would pick 2 and if you don't then I think I better talk to you after this session. And that would be the letter b so on the sample part of your answer sheet you would just circle in the letter b. So you just fill in the dot like that (showed the students on the chalkboard how to fill in the dot). O.K. ? Now if you happen to make a mistake, and you decide letter d is the correct answer, then I would ask you to cross this out and then circle in the letter d. (showed the students on the board)

Student: Do we use pencil or pen?

Researcher: Pen or pencil is fine. Now if you go and have another second thought, no it was letter b, 1 plus 1 is two, then cross this out and circle this again. Sometimes students put an arrow to the answer. (showed the students on the board) Make sure you have only one answer and it is clearly identified. If there are two answers, I'm not sure which one is the true answer I will not mark it.

So basically we are going to go through this, you start on question 21, do the calculation. I will hand out scrap paper so please don't write in the booklet. And we are going to time this, I will give you 15 minutes for it. Ah, that will be too much, let's do 10 minutes. Let's put you under a bit of pressure, 10 minutes and we will see how you are doing. So you're on page 3, you start at question 21, answer sheet on the math portion, no calculators.

Student: Groan.

Student: Oh no.

Student: Ugh.

Researcher: No calculators...nice try and you have 10 minutes, are you ready?

Student: NO.

Researcher: You're not ready, O.K. ? Now during this because it is a practice test, you can ask me questions. O.K. begin

(Timer started. There were two questions during the practice tests, but the tape recorder did not pick up the conversation as both students spoke very quietly. One student asked for clarification on the wording of a question and the other student wanted to know if there was a correct answer to a question. This student was convinced there was an error with the examination. The timer signaled the end of the ten minutes, and most students had completed the practice test within this time period.)

Researcher: So ten minutes looks like it wasn't such a bad time. Most of you are finished. So how did it go?

Student: Fine.

Student: No problem.

Student: Easy.

Student: Good.

Researcher: So do you think you're O.K. with starting the CAT/2 test then? You know how to fill in the dot. The test will be similar but more involved as you have two separate tests with 85 questions. So it will take longer. Any questions? Any questions about the locator test, about writing the test, about anything I said in the tutorial? Are you ready then to write the CAT/2 test?

Student: Can we take a break?

Researcher: Yes we can take a five-minute break, and when you come back we will write the CAT/2 test. O.K.? Great!

End of tutorial.