

**Report of an Educational Psychology Internship at
Cabot College of Applied Arts, Technology and
Continuing Education, Including A Research Report on the
Effectiveness of the Canadian Adult Achievement Test
in Predicting College Grade Point Average for Mature Students.**

by

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ABSTRACT

This report provides an overview of an educational psychology internship at Cabot College of Applied Arts and Technology, and Continuing Education. The placement section addresses the setting, the goals and objectives, the implementation and evaluation of the internship, and the intern's personal reflections. The research component addresses the effectiveness of the Canadian Adult Achievement Test (CAAT) in predicting college grade point average for mature students. Results indicate that, for this population, scores obtained on the CAAT were poor predictors of GPA. Limitations of the current study and recommendations for future research are also discussed.

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CHAPTER 1

INTRODUCTION

One of the program options available for graduate students pursuing the Master of Education Degree in Educational Psychology at Memorial University of Newfoundland is participation in an internship. The internship consists of a twelve-week placement in an approved professional setting and is intended to permit the intern to gain further practical experience in the educational psychology field. In addition to the wide range of professional activities in which interns are typically expected to engage, they are also required to conduct a research study deemed appropriate to such a field placement. The study must be integrated into the internship experience and provide an opportunity for interns to systematically examine some aspect of their professional service.

The following criteria were developed by the Educational Psychology graduate program to establish the appropriateness and implementation of the internship:

1. It commences only after a satisfactory performance is achieved in an approved practicum.
2. It commences only after successful completion of all course work (including practicum) required for the degree program as defined by the University Calendar.
3. First consideration will be given to candidates who have had little experience in the working milieu which they will enter.

4. Interested students must submit and have approved by the Ethics Committee, a formal internship proposal, including among other points, a statement of professional goals and expectations for the internship.
5. An intern must be enrolled full-time during the time of his/her internship. He/she may not receive reimbursement for services rendered during the internship but will be eligible for fellowships and assistantships as provided by University regulations.

An internship at a post-secondary institution was considered most appropriate by this intern for the following reasons:

1. It would allow the intern to gain practical experience in assessment and counselling and to apply theoretical concepts learned during the formal part of the program.
2. It would provide opportunities for the intern to receive direct professional supervision in assessment, counselling and many other professional activities.
3. The intern would be given the opportunity to broaden his knowledge about the educational psychology profession so that he would be better able to direct his future career development.

4. A post-secondary placement would provide the intern with the opportunity to become familiar with test instruments designed specifically for adults, and to apply previously learned counselling techniques to the adult population.

The Internship Setting

Prior to choosing the internship setting, the following issues had to be considered by the intern:

1. The quality of professional supervision available at the internship setting.
2. The quality of learning opportunities and experiences likely to be available at the setting.
3. The relevancy to, and usefulness of, such experiences in the actual setting in which the intern ultimately expected to work.
4. The availability of time for full-time involvement of the intern for a minimum of twelve consecutive weeks.
5. Availability of a qualified supervisor on-site.
6. Ready access to a Faculty supervisor during the internship period.

Cabot College of Applied Arts and Technology was chosen as the setting for the internship. Cabot is well known both provincially and nationally as an educational training centre offering a variety of accredited programs which are recognized nationally. There

are approximately 3,500 full-time students, representing various age groups, attending Cabot in the Adult Basic Education, Trades, Technology, Medical Sciences, Business and Applied Arts, and Continuing and Community Education programs. The mission statement of Cabot College highlights a commitment to quality education. In the College Calendar (Cabot College 1995-1996) it states that the intent is: "To provide a broad range of educational opportunities of consistently high quality in response to the changing educational needs of the community" (p.10).

During the internship, the intern was affiliated with the Division of Student Services. This division of the college includes the several resource areas of Testing and Counselling Services, the Registrar's Office, Student Affairs, Financial Aid Services, Health Services, Library and Audio Visual Services, Sports and Recreation, and Office of the Dean. The intern's main duties included testing and counselling, but he also worked indirectly within the other resource areas.

Through the joint support of Dr. William Kennedy, Coordinator of the Educational Psychology graduate program at Memorial, and Mr. John Harnett, Educational Psychologist, Cabot College, the College Administration agreed to the placement of the intern for twelve consecutive weeks, April 29, 1996 to July 19, 1996. Although student enrollment could be expected to drop as low as 350 during this period of time, there was confidence that sufficient opportunity would be provided to meet all the internship objectives including the requirements for the internship.

Internship Goals

The ultimate goal for the internship was to gain further practical experience which would enhance the professional growth and development of the intern. To achieve this, a number of specific goals were identified and pursued. These included:

1. To become familiar with the programs and services provided by the college.
2. To become familiar with the duties and services provided by the educational psychologists in a post-secondary institution.
3. To administer and interpret a wide variety of psychological tests including aptitude, interest, achievement, intelligence, and diagnostic instruments.
4. To gain experience in offering personal and career counselling to students of Cabot and further develop knowledge of counselling theories and techniques.
5. To take part in any inservices, workshops or professional development meetings that may occur during the internship period.
6. To develop collaborative relationships and consult, where appropriate, with instructors, coordinators, and Deans, concerning individual students.
7. To develop an area of research focused on determining the effectiveness of the Canadian Adult Achievement Test (CAAT) in predicting college grade point average (GPA) for mature students. (For a complete description, see Chapter III).

Supervision and Evaluation of Intern

The responsibility for the supervision of the intern was shared by the Faculty of Education at Memorial University and the Division of Student Services at Cabot College.

The Field Supervisors had the following responsibilities:

1. To consult with the intern and his Faculty Supervisor during the period when his internship proposal was being developed.
2. To have primary responsibility for the on-going supervision of the intern's assessment and counselling activities.
3. To facilitate the intern's access to appropriate professional opportunities and to professional personnel at Cabot essential to a full and successful internship experience.
4. To meet with the intern and the Faculty Supervisor midway through the internship period to assess the intern's progress and determine any changes in the internship as needed.

Faculty of Education Supervisors

The Faculty of Education Supervisors were responsible for assisting the intern in the preparation of the internship proposal, including the research component. They collaborated and consulted with the Field Supervisors during the internship period; were

readily available for consultation both during and after the internship; and supervised the research project.

Supervisors

Faculty of Education Supervisors: (1) Dr. Dennis Sharpe, Cert. Ed. (Loughborough College), B.Ed., M.Ed. (Alberta), Ph.D. (Texas A&M); (2) Dr. William Kennedy, B.A. (St. Mary's), B.Ed. (Dalhousie), M.A. (St. Francis Xavier), Ph.D. (Alberta).

Field Supervisors: (1) Mr. John Harnett, B.A. (MUN), M.Ed. (MUN); (2) Ms. Brenda Newhook, B.Ed. (MUN), M.Ed. (MUN); and (3) Mr. David Touchings, B.Ed. (MUN), M.Ed. (MUN).

Supervision and evaluation were conducted in the following manner:

1. Regular meetings were held with the Field Supervisors to discuss the progress of the intern during the internship and to address and discuss any concerns the intern had.
2. During the fifth week of the internship, Dr. Kennedy met with Mr. Harnett and the intern to assess the intern's progress and discuss any concerns the intern was having.
3. The intern also met with Dr. Sharpe on several occasions throughout the internship period to discuss the developments of the research project the intern had undertaken.

CHAPTER II

DESCRIPTION OF ACTIVITIES

This section of the report describes the activities carried out by the intern for the internship period April 29, to July 19, 1996.

Psychoeducational Assessment

One of the major responsibilities of the educational psychologists on staff at Cabot is to provide psychodeducational assessments for students who have been referred for this service. Psychoeducational assessment may be defined as a process of ascertaining a student's academic strengths and weaknesses and, based upon these strengths and weaknesses, making recommendations conducive to the academic success of the student (Sattler, 1992).

During the internship, the intern conducted nine psychoeducational assessments. Four of these students were referred to the intern by the learning disability specialist, three were referred by teachers and staff of the college, and two were referred by one of the college counsellors.

Prior to administering an assessment, the intern would set up an interview with the student. The purpose of this initial interview was to establish rapport with the client and to obtain relevant background information which may be of use to the intern when analyzing the results of the assessment and making recommendations.

Following the interview, the nature of the referral determined which assessment tools the intern would administer. In cases where it was expected that a learning disability may exist, the intern would always administer an intelligence test and an achievement test. A discrepancy in scores obtained on both measures is considered the most valid indicator that a learning disability may exist (Lerner, 1995). The Wechsler Adult Intelligence Scale-Revised (WAIS-R) was the intelligence test employed in all cases. The intern used this instrument because of its excellent validity, high reliability, and good administration procedures (Sattler, 1992). The achievement tests used for the assessments included the Woodcock Johnson-Revised (WJ-R), the Wechsler Individual Achievement Test (WIAT), and the Canadian Adult Achievement Test (CAAT). The specific achievement measure depended on such factors as the scores and pattern of scores obtained on the WAIS-R, the nature of the referral, the age of the client and time constraints.

Throughout the internship, the intern also had to familiarize himself with the administration, scoring, and interpretation of several standardized tests for career counselling purposes. One such test included the General Aptitude Test Battery (GATB). Such aptitude tests are important because they have the potential to identify abilities of which a person may not be aware. They also encourage the development of special or potential abilities of an individual and provide information to assist a person in making educational and career decisions or other choices between competing alternatives. Given that many of the clients who sought career counselling services were unaware of their

abilities, the GATB proved to be a useful tool for such students.

The Self-Directed Search (SDS) is another assessment tool the intern administered during the internship. The SDS is an interest inventory which attempts to identify a person's interests and match such interests with specific occupations. Many of the intern's clients were not certain of the career they wished to pursue. The SDS proved an effective tool for these clients.

During the internship, the intern assumed responsibility for the administration, scoring, and interpretation of the Canadian Adult Achievement Test (CAAT). The CAAT is a battery of tests designed to measure the level of educational achievement among adults. Mature students applying to Cabot are required to write the CAAT. A mature student is one who: has not graduated from high school or who has graduated but did not achieve a 60% in their core Level III courses such as mathematics, language, literature and science. The purpose of administering this test is to determine whether prospective students might have the academic skills necessary to succeed in the program of their choice.

The intern was responsible for contacting prospective students and informing them of where and when the test would be written. Administration of the CAAT took place every second week. The intern administered the CAAT on five separate occasions to a total of 78 students.

Report Writing

After completing any of the assessments, the intern would score, interpret and write up a psychoeducational report. This report would include such things as identifying information, reason for referral, test results, interpretation and a summary with recommendations. A copy of these results were provided to the student or prospective student, and in cases where the student consented, a copy was provided for instructors.

Post-Assessment Interview

Once the intern wrote the psychoeducational report, he then scheduled a post-assessment interview with the student. The purpose of scheduling such an interview was to explain the results of the assessment to the student and to answer any questions. A common concern voiced by three clients during initial interview sessions, was a belief that their academic difficulties were attributable to intellectual deficiencies. However, scores obtained on the WAIS-R provided contrary evidence; these students were found to be of at least average intelligence. The intern ensured that the clients were aware of this fact during the post-assessment interview. These clients expressed relief upon hearing this information because they believed themselves to be slow learners who were not capable of mastering the school curricula. The intern also explained the differences between intelligence and achievement and provided an explanation as to why they may not be achieving at a level predicted by their respective IQ scores.

For those students who wrote the CAAT, it was not a normal policy of the College to conduct a post-assessment interview. However, if these students wished to meet with the intern and discuss the results of the assessment, the intern made himself available.

Individual Counselling

The major role of the counsellors on staff at Cabot College is to provide personal and career counselling to students who request this service. Although the intern's area of expertise is in assessment, he also assumed a counselling role during the internship. As stated earlier, there are two different types of educational psychologists working at Cabot; the learning disability specialist and the counsellor. Engaging in the counselling role allowed the intern to gain valuable practical experience in both domains.

During the internship, the intern counselled 10 clients for a total of 15 sessions. This number does not include telephone contact with students or prospective students. Six of these clients sought assistance in the area of career counselling. Issues included making "the right decision" regarding occupational training, the length of training programs, determining which schools offered specific programs, job prospects and annual income expected. Four of these clients had academic concerns that were not of a career nature. These included requests for peer tutors, re-read of examinations and questions about what to do in the case of academic dismissal. The following case example represents typical counselling sessions undertaken by this intern.

Case Example

"Jane," a twenty year old woman, was referred to the intern by a faculty member. During the initial counselling session, Jane expressed her concern that she was unable to decide upon a career path. She also informed the intern that she was eager to return to school and prepare for a career which would guarantee financial security. The intern spent time informing Jane about how the world of work has changed drastically over the past twenty years and that it is no longer likely that a person will spend his or her entire life in one occupation. The intern also informed Jane that he could provide her with information on which areas of work are predicted to be on the rise as we approach the year 2000. However, he felt it was important that Jane recognize the importance of having personal satisfaction with one's career. This issue was explored in depth with Jane. Throughout the counselling session, Jane repeatedly stated that she was unsure what type of career would best match her interests. The intern informed her of the various assessments that were available to assist in directing this search. The intern scheduled two more meetings with Jane; one to explore her interests and another to assess her aptitudes. After scoring the assessments, Jane was contacted to discuss the results. The interest inventory scores suggested that Jane's interests were very similar to those people employed as computer programmers. Aptitude assessment results suggested that Jane possessed the potential to succeed in science-based programs. Taken together, the results suggested that Jane could excel in and enjoy a career in computer science. Jane informed the intern that she had

considered enrolling in a computer course at the College but was not certain it was something she wanted to do. During this session, the intern also provided Jane with information on the job prospects for the next ten years. Such information indicated that computer programming is a career area which is expected to develop and expand. The intern also provided Jane with information on the computer programs offered at the College and explained the similarities and difference amongst each. The intern closed the session by extending to Jane the opportunity for further career counselling if needed.

Consultation

The educational psychologist's role as consultant is one that is gaining popularity in both practice and the literature (Barletta, 1995; Brown, 1993; Dougherty, 1992; Hall & Lin, 1994). Consultation may be defined as a relationship between two or more people that is characterized by advice giving (Umansky & Holloway, 1984). Its ultimate purpose, in an educational setting, is to benefit the student. In a consultative relationship, an educational psychologist may assume the role of consultant or consultee. The consultant is the person who offers advice, whereas the consultee seeks advice. During the internship, the intern assumed both a consultant and consultee role. As a consultant, the intern offered advice, provided requested information, and provided recommendations to students, instructors and parents. As a consultee, the intern requested information from various college personnel and sought the advice of the counsellors and learning disability

specialist on matters concerning the intern's clients. Case A portrays the intern as a consultant, whereas Case B portrays the intern as a consultee.

Case A

During the internship, "Ms. Doe", an instructor at the College, approached the intern for suggestions on how she could best meet the academic needs of one of her students, "Jack". Jack was experiencing academic difficulties with his program. She reported that he had significant reading and writing problems. The intern inquired about Jack's ability to respond orally to questions. Ms. Doe responded that he performed well on such tasks. Based on this information, the intern suggested alternate ways in which Ms. Doe could evaluate Jack, including oral testing rather than pen and paper testing, and/or using multiple choice tests as opposed to essay type tests. The intern also suggested that Jack be referred for a psychoeducational assessment to determine his academic strengths and needs.

Case B

On one occasion, a student inquired about living arrangements available in the surrounding area. The intern was unsure if the College provided students with housing assistance. The intern contacted the Student Services secretary who promptly provided him with an up-to-date list of boarding houses and apartments in St. John's. The intern

contacted the student and informed him that there was a boarding house list, and that he could pick up a copy at Student Services during daytime hours.

Workshops/Inservice Training/Conferences

During the internship, the intern had the opportunity to attend a number of training workshops, inservices and conferences which were held both on and off campus. A brief overview of these events is provided.

The Changing Work Dynamic Conference

This was a two day conference held at the Delta Hotel on May 8-9. It was sponsored by Human Resources Development Canada (HRDC). Career counsellors from HRDC and guidance counsellors from various schools and colleges in Newfoundland and Labrador were amongst those in attendance. During the two days, the intern attended and participated in the following sessions:

1. *“Choices CT (Career Transition for Adults)”*- This session provided an overview of “Choices”, a computer-based software package that supports self-awareness and assessment, career exploration and career decision making activities. The intern thought this software package to be an effective tool for career counselling with adults and high school students.

2. *"Where Has the Silver Platter Gone?"* - This session provided the intern with an overview of the services provided by *The Job Finding Club*, a local agency whose aim is to help people find employment. The intern found this session very informative and became aware of several ways which individuals can make themselves more employable. These included establishing job networks, searching for jobs through the Internet, writing resumes and cover letters which get noticed by potential employers, and the development of effective interview strategies.

3. *"Stem-Net as a Tool for Career and Labor Market Information"* - During this session the intern learned how to access relevant and timely career and labour market information through Stem-Net. The intern found this presentation to be very informative as many employers are using the Internet and Stem-Net when seeking employees. Searches can be made through CanWork, <http://freon.ingenia.com/-canworknet>; National Graduate Register, <http://ngr.schoolnet.ca/ngr/home>; The Riley Guide, <http://www.jobtrak.com/-jobguide/>; and NetJobs, http://www.ypn.com/mmbin/-genobject/news_money/jobs.

Post-Secondary Skills Workshop

On May 16, the intern attended and participated in the "Post-Secondary Skills Workshop". This was a one day workshop that has been held annually at Stella Maris Central High School in Trepassy since 1990. The purpose of this workshop is to prepare

prospective post-secondary students for the transition from a small town high school to a post-secondary institution in a larger urban centre. Mary Walsh-Doran, the guidance counsellor of Stella Maris, began conducting the workshop after it became apparent that a significant number of students from the town of Trepassy were returning home after an unsuccessful first year of college or university. The purpose of the workshop was to make students aware of some of the issues they may face when making this transition. Guidance counsellors and student advisors from Memorial University of Newfoundland, Cabot College, Marine Institute and Academy Canada were invited to speak on these issues and offer tips and strategies on how to effectively deal with them. Topics discussed during the workshop included study skills, dealing with test anxiety and stress, budgeting finances on a limited student loan and sharing housing with other students. During the workshop, the intern was responsible for facilitating and supervising discussion within a group of six students.

The intern believes that this type of workshop is very important, if not essential, for students who are transferring from a small community to attend university. The intern observed that many students were unaware of the cost of living away from home, the potential difficulties that may arise when living with other students, how to effectively manage money and the amount of commitment and study that must be undertaken when pursuing an education at the post-secondary level.

Learning Disabilities Inservice

On Monday, May 27, Mr. David Touchings provided a learning disabilities workshop for the instructors of Cabot College and Marine Institute. It was determined, from a needs assessment, that many instructors had little knowledge about the nature of learning disabilities, but were very interested in learning about this area. Topics discussed during the inservice were definitions, types, measurement and accommodations that can be made in instruction and evaluation. The instructors appeared very interested and asked many questions. Throughout the inservice, the intern was able to answer many of the questions the instructors posed and was able to contribute to the discussion and debate that ensued.

The intern believes that this workshop was beneficial to the instructors of the two colleges. Given that more students with learning disabilities are pursuing post-secondary studies than ever before, it is essential that they be aware of the needs of this group and how they, as instructors, can meet their needs.

The Woodcock-Johnson Workshop

The intern had the opportunity to attend a four day training workshop on the Woodcock-Johnson Psychoeducational Battery-Revised (WJ-R). The WJ-R is a comprehensive, individually administered set of 35 tests that assesses two areas of functioning, namely intellect (i.e. cognitive ability) and achievement. During this

workshop, the intern had the opportunity to practice administration, scoring and interpretation of the WJ-R. Upon completion of the training, the intern was provided with a certificate of participation.

This was a valuable workshop for the intern because, prior to this workshop, the only intelligence scales the intern had been familiar with were those of the Wechsler Series, including Wechsler Preschool and Primary Scale-Revised (WPPSI-R), Wechsler Intelligence Scale for Children-III (WISC-III), and the Wechsler Adult Intelligence Scale-Revised (WAIS-R). The intern believes the WJ-R to be an especially effective assessment tool because it consists of both an aptitude and achievement component, thereby allowing the administrator to make comparisons between two sets of scores that are normed on the same population, and thus increase the validity and reliability of the results. However, unlike the Wechsler tests which take approximately two hours to administer, the WJ-R may take two full days. Furthermore, administration of WJ-R is not as easy as that of the Wechsler series.

Reading

The intern read extensively throughout the internship period. Some of the readings arose out of concerns expressed by individual clients, other materials read arose out of the general interest of the intern. These readings included, but were not restricted to, the areas of assessment and assessment tools, career counselling techniques, substance abuse,

rape/sexual assault, job search skills, stress management and assessment techniques. For a complete list of books and articles read throughout the internship, see Appendix A.

Other Activities

As an intern practising within the Division of Student Services, other duties beyond assessment and counselling were assigned. These duties included answering student inquiries about financial aid, admission procedures, and general program information. The intern was also expected to attend regular staff meetings.

Review of the Objectives

Goal 1: To become familiar with the programs and services provided by the college.

This was accomplished through a one week of orientation to the college. During this time, the intern toured the Ridge Road, Prince Philip Drive and Parade Street Campuses, and spent an extensive amount of time reading the college calendar.

Goal 2: To become familiar with the duties and services provided by the educational psychologists in a post-secondary institution.

As stated earlier, Cabot currently has three educational psychologists on staff, two guidance counsellors and one learning disability specialist. The roles and duties of the

learning disability specialist are distinct from those of the counsellors. The learning disability specialist in the college system provides inservice to instructors and staff on the nature of learning disabilities, and diagnoses learning disabilities through the administration, scoring and interpretation of cognitive and achievement assessment batteries. The counsellors spend most of their time offering personal and career counselling to the students and staff of the college. During the internship, the intern spent roughly an equivalent amount of his time engaged in activities typical of the learning disability specialist as he did in those roles typical of the counsellors, hence receiving a wide variety of experiences typical of either type of educational psychologist working in a post-secondary setting.

Goal 3: To administer and interpret a wide variety of psychological tests including aptitude, interest, achievement, intelligence, and diagnostic instruments.

This was accomplished through the administration and interpretation of the Wechsler Adult Intelligence Scale-Revised (WAIS-R), the Woodcock Johnson-Revised (WJ-R), the Canadian Adult Achievement Test (CAAT), the General Aptitude Test Battery (GATB), the Strong Campbell Interest Inventory (SCII), and the Self-Directed Search (SDS).

Goal 4: To gain experience in offering personal and career counselling to students of Cabot and further develop knowledge of counselling theories and techniques.

This was accomplished through offering career counselling to six clients; offering personal counselling to four clients; supervision with the intern's field supervisor to discuss the counselling sessions; and extensive reading in the area of counselling theories and techniques.

Goal 5: To take part in any inservices, workshops, or professional development meetings that may occur during the internship period.

This was accomplished through attending a two day inservice on the nature, assessment, and diagnosis of learning disabilities; a two day conference on the labor market entitled "The Changing Work Dynamic"; a four day inservice training on the administration, scoring and interpretation of the Woodcock Johnson Revised (WJ-R); and through a one day workshop entitled "Post Secondary Skills Workshop".

Goal 6: To develop collaborative relationships and consult, where appropriate with instructors, coordinators, and Deans, concerning individual students.

This was accomplished through meetings with the field supervisors, instructors, and parents both prior to and after assessments and counselling sessions.

Goal 7: To develop an area of research focused on determining the effectiveness of the Canadian Adult Achievement Test (CAAT) in predicting college grade point average (GPA) for mature students. (For a complete description, see Chapter III).

This was accomplished through an initial research on the topic and presentation of a draft proposal; the collection of relevant data; analysis and interpretation of results of the data; regular consultation meetings with the faculty supervisor, Dr. Sharpe; and the compilation of a final research report with recommendations.

Conclusion

This Chapter has presented an overall description of the internship and the professional activities of the intern during this period. Overall, the intern believes that the 12 week internship was a valuable experience and that each of the seven major internship goals were met. It provided the intern with more experience in administering, scoring, and interpreting standardized tests, personal and career counselling, and consultation. More importantly, it provided the opportunity to gain experience working with the adult population in the capacity of an educational psychologist. Prior to this internship, the intern had worked primarily with students in the K-12 school system. Working with the adult population required the intern to become familiar with the assessment batteries and personal and career issues specific to this group and to develop different approaches when

working with adult learners.

Especially rewarding were the workshops and inservices attended throughout the internship period. These provided the intern with theoretical and practical knowledge that will be of great importance when he begins work in his chosen field. Likewise, the research project described in the following sections of this report was also a very worthwhile learning experience. Prior to the internship, the intern was not critical enough of standardized tests. The results of the research have made the intern question the emphasis that are placed on such tests and be more open to non-academic factors which may play an important role in determining academic success.

CHAPTER III

RESEARCH COMPONENT

Statement of Purpose

To fulfill the requirements for the internship in the educational psychology program at Memorial University of Newfoundland, one must undertake a research project appropriate to the particular internship setting. The intern decided to examine the effectiveness of the Canadian Adult Achievement Test (CAAT) in predicting college grade point average (GPA) for mature students.

Significance of the Study

Students applying to Cabot College are accepted into the school provided that they have graduated from high school and achieved an overall average of 60% with a mark of 60% or better in mathematics, language and literature. Those students who do not meet these criteria may write the CAAT test, provided that they are at least 19 years of age and have been out of school for at least one year. If the student demonstrates adequate proficiency on each of the subtests of the CAAT, the aforementioned criteria may be waived.

Since 1994, the community colleges in Newfoundland and Labrador have been administering the CAAT to mature students as a prerequisite for admission into all

programs. Acceptance into a program of the student's choice is determined largely by whether or not the student achieves the minimum stanine scores which the colleges deem appropriate for a particular program. A stanine score refers to a score between one and nine, with one being the lowest, five being average, and nine being the highest. The different community colleges in Newfoundland and Labrador do not employ a uniform set of criteria for specific programs. Cabot has established the following stanine requirements for its different programs:

1. Certificate Level Programs (all those less than one year in duration) require stanine scores of at least 4 on the Vocabulary, Reading Comprehension, Mathematics, and Language subtests of the CAAT.
2. Applied Arts Programs (example: Community Recreational Leadership, Secretarial Science, Food Administration and Graphic Arts) require stanine scores of at least five on the Vocabulary, Reading Comprehension, Mathematics, and Language subtests.
3. Technology Programs (example: Computer Studies, Engineering and Business Management Programs) require stanine scores of at least five on the Vocabulary, Reading Comprehension, and Language subtests, and at least seven on the Mathematics.

(For a complete description of the CAAT subtests, see Chapter IV).

Given that so much emphasis is placed upon the CAAT scores achieved by the prospective students, it is important to determine the validity of such a test in predicting success in terms of acceptable college grades, especially for the mature student population. Many of the mature students who are applying to the community colleges have been out of school for several years. Because these students have been out of school for a longer period of time than the younger students, knowledge of different concepts such as mathematical rules, necessary to do well on this test, are more likely to have been forgotten. Therefore, prospective younger students may have an unfair advantage over "older" or non-traditional college applicants when taking the CAAT. A potential, and unfortunate consequence, is that a low score obtained by an older applicant may result in their being denied acceptance into the college. If the CAAT scores are shown not to be a valid predictor of college GPA for this population, then it might be appropriate to abolish this tool for such purposes (or at least use it with caution) and that admission be based on other criteria.

The intern believed this was an important study to undertake after informal observations indicated that the majority of students writing the CAAT were unsuccessful in achieving the minimum scores which the college deems appropriate for the particular program for which the student was applying. In addition, the intern observed that, on the whole, younger students were performing better than older students on the CAAT. This latter finding may be developmentally normal however, as other researchers have found

similar results using other test instruments (Moffat, 1993; Zeidner, 1987).

Literature Review

Introduction

Throughout Canada and the United States, many students entering post-secondary institutions are required, amongst other things, to write an achievement or aptitude test as a prerequisite for gaining admittance into a given school. The purpose of such tests is for the student to demonstrate that he or she has the academic skills necessary to succeed in college; and scores on such tests are considered the best predictor of future grades in college.

However, several questions should be asked with respect to the use of such tests: How accurate are such tests in predicting grades? How much weight should be given to such tests? Are there other variables which may have an impact on grades? These are some of the questions that administrators should ask before making admissions decisions.

This literature review will trace the use of achievement and aptitude testing by colleges and universities since World War II, and point out some of the problems that exist when scores on such tests are used as the sole basis for making admissions decisions. Other variables which may have an effect on student's performance will also be discussed.

Purpose of Achievement Testing

The post-World War II years have brought a dramatic increase in the number of students entering post-secondary education in both Canada and the United States. The enactment of the Civil Rights legislation in the United States further swelled this population (Manaker, 1974; Cross, 1971). These new students presented a wide variation in their entering abilities. As a result, colleges and universities tended to respond by adjusting their requirements; lowering the ranges for an acceptable Scholastic Aptitude Test (SAT) and American College Test (ACT) scores, accepting students with high school grades below the 50th percentile, lowering the acceptable range for high school graduating averages and accepting minimum passing scores on the Graduate Equivalency Diploma (GED) test. The Carnegie Commission (1971) reports that this response initiated the era of open admissions policies in higher education and increased enrollment 124%. Although admissions sky rocketed, the attrition rate sky rocketed at an equal rate (Cross, 1976).

Likewise, during the past twenty years, community colleges across Newfoundland and Labrador have also accepted an increasing number of students. A high attrition rate has also been observed in many of these colleges. For example, Cabot College experienced an attrition rate of 24.3% for its daytime programs for the 1989-1990 academic year. Attrition was especially a problem in the Technical Programs at Westviking College where 40% of all students dropped out before completing their program (Sharpe & Spain, 1993).

The literature suggests that increasing numbers of students need to upgrade their basic academic skills before attempting college level courses. For example, Tennessee colleges found that 85% of its 1991 entering class needed remediation in mathematics and/or English (Allen & Bekew, 1992). Connecticut colleges reported that 71% needed basic mathematics and 45% basic English upgrading (Sturtz & McCarroll, 1993). Two of the reasons typically cited by Newfoundland students for high attrition rates are inadequate academic preparation and academic failure (Sharpe & Spain, 1993).

High attrition rates have important implications both for the academic institution and the students (Sharpe & Spain, 1993; Rowen, 1995). For institutions, the effects of attrition include inefficiencies in the use of resources, predominantly from reduced section sizes; and an undermining of the community's confidence in the college system in responding to students career goals and personal needs, which may in turn, hamper recruiting and future enrollment and have a detrimental affect on the morale of the faculty, students and staff. For students, attrition leads to financial losses from both tuition costs and foregone earnings as well as a negative impact on their self-concept and change in aspirations because of failure in achieving personal and academic goals. For reasons similar to these, Morante (1989) concludes that allowing students to enroll in a program for which they are unprepared is unethical.

The community colleges in Newfoundland and Labrador have responded to this issue by administering the CAAT to prospective mature students. The primary purpose of

an entrance assessment is to provide for the placement of students in programs and courses that are appropriate to their abilities, as well as their interests and aspirations (Rowen, 1995). Those students who do not achieve the acceptable scores on all subtests of the CAAT are encouraged by the administration to do basic academic upgrading before undertaking a post-secondary program at the college. The basis for this argument is that if these students do not demonstrate adequate proficiency in this test, it is unlikely that they will succeed in a post-secondary program. This prompts the question as to how accurately do scores obtained on such a measure determine grades achieved in college.

The community colleges in Canada began administering the CAAT to prospective mature students in 1994. No studies that evaluated its effectiveness in predicting grades in college are, as yet, available. However, numerous studies have examined the effectiveness of the Scholastic Aptitude Test (SAT) to predict grades in college. An aptitude test differs from an achievement test in that an aptitude test measures what a person has the potential to learn in the future, whereas an achievement test measures what an individual has learned in the past. However, Pigeon (1990) states that it is not possible to draw a distinction between the two, since what one has achieved academically in the past influences what one has the potential to learn in the future. Furthermore, Anastasi (1988) states that the distinction between achievement and aptitude tests is one of degree and that if an achievement test is used to predict future behavior, such as learning at the next level of instruction, it is in fact being used as an aptitude measure. Given this, it would seem

that the SAT and the CAAT, while unique assessment batteries, are used with a very similar intent.

Predictive Validity of Entrance Tests

Numerous studies have produced evidence to suggest that the SAT is a valid predictor of college grade point average (Allen, Woodard, & Jones, 1990; Baird, 1984; Chissom & Lanier, 1975; Houston, 1987; Kaplan, 1982; Spence, Pred, & Helmreich, 1989). Likewise, several studies have shown that the verbal and math scores on the SAT are also particularly good predictors of academic success (Houston, 1987; Payne, Goolsby, Evans, & Barton, 1990).

However, Morante (1987) states that using test scores to predict subsequent performance of students in various courses is highly problematic. He states that placements tests should not be used to predict future success in courses because they are not tests of capability. While tests like the SAT and the ACT are designed to select among the better students, the task of placement tests is to differentiate among the less proficient students. Therefore, the items on an admissions test and the items on a placement test are selected for different purposes. Furthermore, the designers of admissions tests are interested in knowing both the level of a student's proficiency and the speed at which the student can demonstrate that proficiency, because the combination of knowledge and quickness is important in predicting success in college. Admissions

tests are thus more closely aligned with aptitude tests, which assess how capable a prospective student is of learning. Placement tests should be used to measure proficiency, not aptitude or capability, and they should not be used to predict future success. Palmer (1987) supports this claim and states that the predictive validity of placement tests in terms of subsequent grades is highly questionable.

Several studies have found results which support the claims of Morante and Palmer. One such study was that of Mouw and Khanna (1993). They found the ability of any predictors, including entrance tests and high school rank, to predict college success was disappointingly low. They found that 30% of those students who “should” succeed leave on probation. Almost 50% of those students who were predicted failures, (and so would not usually be permitted) had either graduated or were on track to do so. They concluded by stating that those schools who use standardized test scores, and/or high school rank, should not be surprised or discouraged if a large number of the admitted students drop out or fail in their academic pursuits. Furthermore, admission boards must be willing to admit that they have denied admission to many who would have taken good advantage of the educational opportunity.

Of immediate interest is the SAT's validity for predicting success in college for specific populations. One such population is the older college student. When age is considered as a variable, an interesting result is observed. When Moffat (1993) tested to see the SAT's validity for older college students, he found that the SAT is a valid

predictor for students under age 30 years, but is not a valid predictor for students who wrote the SAT after age 30. In a similar study, Zeidner (1987) found aptitude test scores to be a poor predictor of first year cumulative GPA for students older than 30 years of age. In addition, Merante (1983) suggests that although standardized test results have been regarded as the best indicators of academic success, if a postponement of the college experience has been delayed by several years, age becomes the best predictor. He purports that for those students who go to college directly from high school, the younger the student is, the more likely he or she will be successful in college. If however, a student delays his or her entrance into college, the older student will perform better than the younger one.

Another variable that should be considered when examining the effects of SAT scores on college grades is gender. Recent research shows that the SAT systematically underestimates girls' ability to succeed in college, and suggests that this is because of a subtle, pervasive bias in the construction of this and most other standardized tests (American Association of University Women, 1988). The Educational Testing Service (ETS) published a study in 1984 that suggested that the test was biased against females. This study found that females' freshman grades were higher, and males' lower, than what would be predicted by their SAT scores. The American Association of University Women concluded from this study that the SAT is not a valid predictor of college performance, and admissions decisions based on SAT scores discriminated against females. This error

in grade prediction was found to be even higher for re-entry women according to an earlier ETS study showing that older women students had lower SATs and higher grades than both their male counterparts and younger, traditional students.

Rosser (1996) also notes that many entrance tests are contaminated by gender bias. She states that although women earn higher grades than men in both high school and college, men score an average of 61 points higher on the SAT. She declares that if the SAT predicted equally well for both women and men, the gap would reflect women's superior grade point averages and would favor women by 20 points, rather than men by 61. Behnke (1987, cited in Rosser, 1996) investigated the gender gap at Massachusetts Institute of Technology (MIT). She found that SAT scores underpredicted women's performance at MIT, even when she controlled for the courses the students took. The college academic records of women at MIT are consistently better than their SAT scores predicted. In response to this discovery, MIT has introduced a new method of SAT interpretation to their admissions process. Their new procedure takes into account the gender bias of the tests when evaluating female applicants.

The Misuse of Admissions Tests

The sole use of standardized tests to make admissions decisions presents other problems. Various researchers suggest that standardized tests can be misused. One misuse of such tests occurs when the error of measurement in test scores is ignored.

Gardener (1985) stated that it is a misuse of any test score or any observation to accept it as a fixed, unchanging index containing no error. It is inappropriate to assert or lead a user to believe that an individual's observed score gives his "true" performance on the general domain about which inferences are to be made. The best that can be done is to estimate experimentally the standard error of measurement and then use that value to set up a confidence interval within which one can state that the "true" score falls within the band with a specific probability of being wrong.

Fruen (1978) stated that another misuse of tests occurs when scores are not considered and interpreted in the full context of the various elements that characterize pupils, teachers, and the general educational environment involved. He maintains a test score represents only a sample from a limited domain and does not include a variety of factors that might influence that score. For example, in decisions determining admission to college, SAT scores should not be used in isolation. Fruen believes that such scores should be considered along with the pupil's high school record and other relevant data such as teacher's or supervisor's recommendations concerning motivation, leadership ability, creativity and involvement in extracurricular activities. All of these characteristics can then be evaluated against the student's socio-economic background, along with consideration of any social obstacles or unusual physical demands required by the student to reach his/her current educational level.

Multiple Measures

Armstrong (1991), supporting the work of Cohen and Friedlander (1989) stated that the use of multiple measures is essential to accurate and equitable placement. They found that, when using test scores alone, more students were denied entry into courses in which they would have succeeded. Using multiple measures enabled more students to gain entry.

Given the strong endorsement for using multiple measures, it is worth noting the factors that researchers and educators most commonly mention as complementing placement tests. Morante (1987) suggested, at the minimum, seven factors such as placement scores, other test information, high school data (including grades, level of courses and the time since they were taken), background information, age, student opinion and any additional testing should be considered. Hirsch (1987) and Hughes and Nelson (1991) strongly recommend writing samples if they are not included in the placement test. Personal goals and personal assessments are also seen to be part of comprehensive assessment for placement. Other information related to college study and attitude is considered helpful. This might include educational goals, importance of college to students, years out of school, number of credits planned, number of hours working, age, career skills and study skills, self-concept assessments, intellectual self-confidence, self-esteem, maturity, and motivation (Bray 1987, Cohen 1990, Armstrong 1991, Morante 1987, Hirsch 1987). Rowen (1995) also maintains that there is a strong belief, held by

many faculty members of the various community colleges across Canada, of a need to employ writing samples as part of the entry assessment process since many practitioners believe performance-based assessment, such as a writing samples test, to be superior to system-based standardized assessment.

Nisbet, Ruble and Schurr (1982) also recognize the importance of using more than one instrument in predicting college academic success for high-risk college students. They examined not only the effectiveness of the SAT and high school percentile rank in predicting college GPA, but also looked at what happens when other non-academic variables are considered. They found that including the Myers-Briggs Type Indicator (MBTI) and the Effective Study Test (EFST) increased the predictable GPA variance by approximately 11%. Particular measures significant in improving the prediction of GPA, and perhaps the explanation of the achievement, were the judgemental-perception scale of the MBTI and the reality orientation and examination behavior scales of the EFST.

In a similar study, Kanoy, Webster, and Latta (1989) examined the traditional predictors of college performance such as SAT scores and high school GPA and cognitive and psychological variables such as locus of control, academic self-concept and effort to predict the freshman-year GPA of college women expected to perform well (GPAs of 3.0 to 3.7) and those expected to perform in the 2.0 range. Multiple regression analyses were used to determine the best predictors of GPA for both groups. They found that for the group expected to do well in college, the high school GPA and academic self-concept

formed the most powerful model and predicted 56% of the variance in GPA. For the group with lower predicted GPAs, none of the traditional predictors were effective in predicting freshman year GPA. Two psychological variables, internal locus of control for achievement successes and amount of effort put into their work, accounted for 46% of the variance in GPA. The researchers state that the result of this study has important implications for college administrators. They believe that when making admission decisions for lower performing students, more consideration must be given to cognitive and psychological variables which may affect student achievement.

Characteristics of Adult Learners

Before making admission decisions, it is vital that administrators take into special consideration the characteristics of adult learners. The three characteristics which have received the most attention in the literature are adults' need for the acknowledgement and use of their experiences and prior knowledge, the differing way they go about learning, and their desire to be actively involved in the learning process (Kidd, 1973; Knowles, 1980; Brookfield, 1986; Merriam and Caffarella, 1991).

The comparatively richer life experiences and background of the adult has been cited by nearly all writers as a key factor in differentiating adult learners from children. Kidd (1973; cited in Caffarella & Barnett, 1994) notes that adults have more experiences, different experiences and are organized differently. As accumulated life experience

differentiate children from adults, they also differentiate one adult learner from another.

Life experiences and use of prior knowledge function in several ways. First, as Knowles (1980) has observed, adult learners become important resources for learning. They can call upon their past experiences and prior knowledge in formulating learning activities, as well as serve as resources for each other during learning events. Experiential learning activities, such as reflective journals, critical incidents, and portfolio development, can provide opportunities to introduce adult learners' past and current experiences into the context of learning events.

Second, the need to make sense out of one's life experiences and what one knows as a result of those experiences is often an incentive for adults to engage in the learning process in the first place. For example, adults are motivated to return to learning activities by examining what is happening in their lives, even though the content of those activities does not have a direct connection to what is going on in their life in the present. This is exemplified, for example, by women and men who return to school to upgrade or learn new job skills as a result of a divorce or having the last of their children become more independent.

Thirdly, in using and reflecting on their past experiences and prior knowledge, adults often both want and need to modify, transfer, and reintegrate what these experiences mean in terms of their values and beliefs, their storehouse of knowledge, and their skills and abilities (Mezirow, 1991).

Adults differ in their process of learning style from that of younger learners.

Caffarella and Barnett (1994) stated that adults tend to be more reflective and dialectical in their thinking, that is, they appear to be more tolerant of contradictions and ambiguities, and they engage in more problem solving. These suggested changes in ways of thinking for adults fit well with the notion that the assessment procedures for experiential learning, and more specifically developing portfolios, should have a reflective component built into the process.

Most adults prefer to be involved in the learning process versus being primarily passive recipients of knowledge (Knowles, 1980; Caffarella & Barrett, 1994). In their everyday lives, they are accustomed to setting their own goals and deciding what they want to do and how they want to do it. Therefore, they are more likely to assume that they have the responsibility for their own learning than are younger students and take an active role in the learning process.

Based on these findings, it is evident that adult learners, as a result of their past experiences, possess qualities different from those of young children. These qualities appear to have a positive effect upon attitudes towards learning. Therefore, it would be appropriate that this population compile a portfolio of experiences as an alternative or a supplement to the CAAT for satisfying college entrance requirements.

Canadian Adult Achievement Test (CAAT)

Because the CAAT is a relatively new achievement test, a literature search revealed no studies using the CAAT to predict college GPA. The only background data, developed by the Psychological Corporation (1988), reflects the various adult groups used to help determine the reliability and validity of the instrument. For a complete description of the CAAT, see Chapter IV.

Summary

The review of the literature has traced the use of achievement and aptitude testing as a rationale for the use of achievement testing at the post-secondary level. Problems that exist when scores on such tests are used as the sole basis for making admissions decisions were also discussed. Other variables which may have an effect on student achievement were outlined and should be considered in the admissions process.

Although many researchers have suggested that scores obtained on the SAT are highly predictive of grades achieved in college, there are many others who believe that such scores are poor predictors of college grades. The latter argue that making admission decisions based solely on standardized test scores ignores other important variables which may have an effect on grades obtained in college. One of these variables is the characteristics of the adult learner. Overall, adult learners have been cited to be particularly motivated to achieve, are more actively involved in the learning process and

bring to the learning environment a background of experiences. These are all characteristics which are likely to be conducive to success in a post-secondary program.

CHAPTER IV

RESEARCH METHODOLOGY AND RESULTS

Introduction

This chapter contains a description of the research component of the internship. An overview of the CAAT is provided, including a description of its subtests, and technical information such as the test's standardization, reliability and validity. The research questions for this study, the methodology by which these questions were answered and the results of the study are outlined.

The Canadian Adult Achievement Test

The CAAT is a battery of tests designed to measure the level of educational achievement among adults. It was published in 1986 to become the first achievement test geared towards Canadian adults. Since then, Levels A, B, and C have been administered as a screening, selection, and placement measure to tens of thousands of adults in both the public and private sectors (The Psychological Corporation, 1988). The test consists of items with adult content, and it may be used to assess the achievement of adults who have had varying amounts of formal education. Those students applying to Cabot College who have not completed Grade 12, or who have not obtained a 60% in their Level III core courses of math, literature and language are required to write the CAAT Form C, which is

devised for adults who have had at least eight years of schooling. Form C consists of the following subtests: Vocabulary, Reading Comprehension, Spelling, Number Operations, Problem Solving, Mechanical Reasoning, Language, and Science. Students at Cabot are required to write all subtests except Spelling, Mechanical Reasoning, and Science. There are two main reasons for not administering these three subtests. Firstly, the purpose of administering the CAAT is to determine the applicant's literacy and numeracy level, therefore these other tests do not apply, or at least not to the extent that the other five do. Secondly, although it typically takes mature applicants four hours to complete the five subtests which are currently administered, some students require additional time and others like to check their answers when completed. This imposes great time constraints on what can be completed in one day. Therefore, the counsellors at Cabot decided that Spelling, Mechanical Reasoning and Science subtests would not be administered.

The Vocabulary subtest is designed to assess the knowledge and understanding of words that are frequently encountered by adults in their work or daily activities. This subtest consists of 34 multiple-choice items and includes words sampled from applied or general vocabulary, from vocabulary of the physical and natural sciences, and from vocabulary of the social sciences.

The Reading Comprehension subtest is designed to measure the examinee's comprehension of written material. At Level C, the reading comprehension subtest consists of 50 multiple-choice questions. The reading passages include material of a

functional nature such as signs, advertisements and letters and material of an educational nature. Each passage is followed by a series of multiple-choice questions designed to test the examinee's ability not only to comprehend what is explicit in the material, but also to make inferences and to draw conclusions from what is given.

In order to obtain a valid measurement of the examinee's mathematics ability, it was found necessary to include the two subtests Number Operations and Problem Solving.

Although these two tests are administered and scored separately, the two scores are combined to yield a total Mathematics score. This total score represents the overall mathematics achievement of each person tested. The two subtests scores provide indications of relative strength in the two areas.

The Number Operations subtest is designed to assess concepts of number and computation. In Level C, the examinee chooses a response from among five answer choices. "Not Given" is an answer option for many problems in this subtest. The objectives measured include reading and writing numerals, interpreting fractions, factorization; ratios, proportion and percent; equations; and using zero as an operator. The examinee is asked to use addition, subtraction, multiplication, and division with whole numbers, fractions, and decimals to compute answers to number problems an adult is likely to encounter.

The Problem Solving subtest measures the examinee's ability to determine an outcome, to record and retrieve information, to use geometric concepts, and to measure.

Using whole numbers, decimals, percents, and fractions, the examinee is required to solve problems an adult is likely to encounter. In Level C, the examinee chooses a response from among five answer options. "Not Given" is an answer option for many of the problems.

The Language subtest, measured only at Level C, contains 54 items. The Language subtest is taken from *Stanford Test of Academic Skills (TASK)*, Level 1, Form E and Form F. It is designed to measure an examinee's functional knowledge and effective use of the English language. This subtest is organized into four parts: reference skills, language sensitivity, conventions, and paragraph arrangement. The reference skills section deals with the use of the dictionary and resource materials, such as an atlas, encyclopaedia, almanac, etc., as well as parts of a book and sections of a newspaper, as aids to finding various information. In the language sensitivity section, examinees are asked to determine which one of the four simple, compound, or complex sentences express a given idea in the most straightforward manner. The conventions section assesses several aspects of the usage conventions simultaneously by presenting short narrative passages with certain portions underlined. For each underlined portion, examinees are to determine whether there is an error in capitalization, grammar, or punctuation. The paragraph arrangement section requires examinees to order sentences in a paragraph so that the paragraph presents the intended idea properly.

Technical Information: Research and Development of the CAAT

Standardization

Because the CAAT is designed to assess the educational achievement of adults, it was considered necessary that adults, not school children, be used in the standardization program. However, despite the fact that much work is being done at the present time concerning the measurement of adult achievement, there are still no suitable criteria for defining the population of adults across Canada for whom CAAT would be appropriate. In the absence of such criteria, it was decided that the CAAT research would be conducted with a number of adult groups whose characteristics would define the "users" of this type of instrument. The CAAT norms are the result of collection of data from volunteer users. The purpose of the research program was to allow for a norm-referenced interpretation of CAAT scores, to equate the levels of the examination, and to establish the statistical reliability of the test for adults. The sample was drawn from lists for adult education and vocational programs in communities and schools, and from mailing lists for provincial and regional penal institutions. Level C was given to individuals who had completed one or more years of high school.

A total of 3927 adults were given the CAAT Form C. This consisted of 1603 males, 2243 females, and 81 who never stated their gender. Age characteristics of the adults included: 339 of the participants fell in the 36-40 age range (8.6%), 518 in the 31-

35 age range (13.2%), 671 in the 26-30 age range (17.1%), 587 in the 23-25 age range (14.9%) 1358 in the 18-22 age range (34.6%), and 454 (11.6%) did not give their age. The majority were of English heritage 2854 (72.7%), 368 were Indigenous People (9.8%), 338 were from other countries (8.6%), 229 were French (5.8%), and 138 (3.5%) did not respond to this question. When regional area was considered, 1558 (39.7) of the participants came from the Western provinces, 1507 (38.3%) were from the Atlantic provinces, 860 (21.9%) were from Ontario, and 2 (0.1%) were from Quebec. Language characteristics of the participants included: 3225 (82.1%) spoke English, 620 (15.8%) spoke a language other than English, and 2.1% never responded to this question. The breakdown of the level of education completed by adults participating in the CAAT research included: 13 (0.3%) had Grade 5 or less, 393 (10%) had completed Grades 6 to 8, 3292 (83.8%) had completed Grade 9 to 12, 110 (2.8%) had completed Grade 13, 119 (3.1%) did not respond to this question. Of those students who did complete High School, 1169 (29.8%) completed 1 to 2 years of study at a community college, 109 (2.8%) completed 3 to 4 years. Two hundred twenty seven (5.8%) had completed 1 to 3 years of university, 53 (1.3%) had completed a Bachelor's Degree and 11 (0.3%) had completed a Master's Degree.

Reliability

The reliability of a test is defined as the extent to which the test yields consistent results. Reliability is one indication of the confidence that may be placed in the scores obtained on that test.

One way in which error can enter into a score is from lack of internal consistency among the items. Kuder-Richardson Formula #20 (KR 20) was used to determine the internal consistency reliability of the CAAT scores. Table 1, presents subtest and total KR 20 reliability coefficients and standard deviations of the subtest scores in raw score units.

Table 1- Kuder-Richardson Formula # 20 Reliability Coefficients, Standard Errors of Measurements, and Related Data

	# of Items	N	Mean	SD	r_{tt}	SE_m
Vocabulary	34	3846	25.6	5.6	0.84	2.2
Reading Comprehension	50	3851	41.5	7.7	0.91	2.3
Spelling	32	3726	27.3	5.4	0.90	1.7
Number Operations	40	3704	29.2	8.3	0.92	2.4
Problem Solving	40	3645	25.5	8.6	0.91	2.6
Mechanical Reasoning	70	3617	46.6	11.7	0.91	3.5
Language	54	3548	41.9	8.4	0.90	2.7
Science	50	3518	39.1	8.0	0.90	2.6

Source: The Psychological Corporation (1988)

The standard error of measurement is a statistical estimate of how close an examinee's obtained raw score is to his or her theoretical "true" score. The standard error of measurement can be used to determine the degree to which the examinee's score might be expected to vary due to chance influences. By adding the standard error of measurement to, and subtracting it from, an examinee's raw score, there is about a 2-to-1 chance that the examinee's true score is included within that interval.

Validity

The validity of a test is defined as the degree to which the test measures what it is intended to measure. For achievement tests, the most critical aspect of validity is the extent to which the test content constitutes a representative sample of the skills, knowledge, and understanding that are the goals of instruction. The content validity of the CAAT can be evaluated through careful examination of the test content to determine whether it adequately measures those fundamental skills that are necessary for an adult to function in today's society. The objectives measured by each subtest of the CAAT Level C have already been outlined in this chapter. Since these objectives were written to reflect the content of adult education programs throughout Canada, the CAAT can be said to be valid for measuring these common objectives. Intercorrelations among the subtests of the CAAT Level C can be found in Table 2.

Table 2. Intercorrelations Among CAAT Level C Subtest Scores

Variable	Intercorrelations						
	2	3	4	5	6	7	8
1, Vocabulary	0.66	0.49	0.42	0.55	0.42	0.55	0.61
2. Reading Comprehension		0.56	0.49	0.57	0.32	0.62	0.58
3. Spelling			0.45	0.44	0.07	0.52	0.30
4. Number Operations				0.72	0.36	0.47	0.44
5. Problem Solving					0.49	0.56	0.55
6. Mechanical Reasoning						0.29	0.62
7. Language							0.60
8. Science							

Source: The Psychological Corporation (1988).

Research Questions

The intent of this study was to determine the effectiveness of the CAAT to accurately predict grades in college. It was also considered appropriate, based upon the review of literature, to examine the effects of age and gender on performance on the CAAT. Five research questions were therefore developed for this study.

With respect to adult students at Cabot College:

1. Do younger students aged under 25 score better on the CAAT than older students aged 25 or more?
2. Do males score significantly higher than females on the CAAT?
3. Does the interaction of age and gender have an effect on scores obtained on the CAAT?
4. Is there any relationship between GPA in college and CAAT scores?
5. What is the impact of age and gender on the relationship between GPA in college and CAAT scores.

Methodology

Procedures and Sample

In order to obtain the data necessary to complete this study, the intern was granted access to the CAAT scores of all students who wrote the CAAT and the grade reports of students who wrote the CAAT and who were admitted to Cabot on the basis of acceptable CAAT scores. This was accomplished through the preparation of a school consent form which was signed by Mr. Paul Facey, the head of Student Services at the College. (See Appendix B). Once this permission was granted, the intern began collecting the data relevant to the study.

To address research questions one through three, the intern randomly selected 50 students from a sample of 255 whom had previously written the CAAT. Students were

classified according to age and gender. Of the 50 students, 29 were younger than 25 years of age, 21 were 25 years of age or older. Twenty-eight of these students were male, 22 were female. The intern had originally planned on comparing students younger than 30 years of age with students 30 years of age and older. However, there were an insufficient number of students who were 30 years or older who had written the CAAT. Therefore, this comparison was not possible.

An analysis of variance was performed on the data in order to determine if there were any significant differences between scores on the CAAT between younger and older students and between males and females. An acceptance level of .05 was considered appropriate to check such differences.

To address research questions four and five, the intern randomly obtained the grades of 32 students who were admitted to Cabot on the basis of acceptable CAAT grades. Of these 32 students, 19 were male, 13 were female, 14 were younger than 25 years of age, 18 were 25 years of age or older. Correlation coefficients between the scaled scores on each of the subtests of the CAAT and college GPA were performed for the entire sample, both genders and each age group. Note that unlike the SAT, the CAAT does not yield an overall score. Therefore, a correlation study comparing an overall CAAT score with average in college was not possible.

Limitations

This study presents certain limitations which cannot be overlooked in this section of the report. As stated previously, the limited sample size and lack of information on previous educational attainment of the students, limit the validity and the reliability of the study's results. Therefore these results must be interpreted with caution. Also, because those students who were unsuccessful in passing the CAAT did not get admitted into Cabot, the intern was unable to obtain any data that would compare this group's scores on the CAAT with grades in college. Therefore, it is not possible to conclude that the CAAT is a poor predictor of grades in college for all mature students. The results can only be applied to those mature students who achieved the minimal acceptable scaled scores on the CAAT.

This sample size was limited due to two main reasons. Firstly, only a low percentage of students who wrote the CAAT were successful in obtaining the marks deemed as minimal by the college; and secondly, Cabot only began administering the CAAT in 1994. Given that many of Cabot's programs have wait lists extending beyond two years, many of those students who were successful in passing the CAAT had not yet been admitted into programs.

Results

Research Question 1: Do younger students aged under 25 score better on the CAAT than older students aged 25 or more?

Table 3. presents the mean and standard deviations of the scaled scores on each of the four subtests of the CAAT for both age groups. Students younger than 25 years of age scored higher, as a group, than students 25 years of age or more, on all subtests of the CAAT. However, some of the differences were only slight, especially on the Vocabulary subtest.

Table 3- Mean Scaled Scores with Standard Deviations on the CAAT Subtests by Age Group

Subtest	Age <25 (N=29)		Age ≥25 (N=21)		Total (N=50)	
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>
Vocabulary	724.07	30.64	720.70	32.35	722.69	31.06
Reading Comprehension	742.17	34.68	729.50	29.52	737.00	32.95
Mathematics	749.97	36.67	723.70	45.61	739.24	42.16
Language	692.52	30.72	678.60	35.82	686.84	33.26

An analysis of variance performed on the data indicated that the only significant difference ($p < .05$) between both groups occurred on the Mathematics subtest of the CAAT (See Table 4).

Table 4 - Analysis of Variance Summaries of CAAT Subtests Examining the Main Effects of Age

Subtest	SS	df	MS	F	Prob. of F
Vocabulary	134.346	1	134.346	.131	.719
Reading Comprehension	1900.862	1	1900.862	1.733	.195
Math	8165.896	1	8165.896	5.241	.027*
Language	2292.652	1	2292.652	2.143	.150

Note: * $p \leq .05$

It was therefore concluded that although the four subtests of the CAAT show increased scores for students under 25 years of age compared to older students, differences were significant for one, the Mathematics subtest.

Research Question 2: Do males score significantly higher than females on the CAAT?

Table 5 presents the means and standard deviations of the scaled scores on each of the four subtests of the CAAT for both males and females. Females, as a group, scored higher than males on all subtests of the CAAT, except for the Vocabulary subtest where scores for males and females were almost identical. The largest differences were in the areas of mathematics and language. However, an analysis of variance performed on the data revealed that none of these observed differences were significant (See Table 6). It was therefore concluded that there were no significant differences in scores based on

gender on any of the CAAT subtests.

Table 5 -Mean Scaled Scores with Standard Deviations on the CAAT Subtests by Gender

Subtest	Males (N=28)		Females (N=22)		Total (N=50)	
	Mean	SD	Mean	SD	Mean	SD
Vocabulary	722.61	27.47	722.88	38.43	722.69	31.06
Reading Comprehension	735.36	34.31	740.38	30.75	737.00	32.95
Mathematics	736.45	45.41	745.00	35.18	739.24	42.16
Language	683.58	35.07	693.56	29.04	686.84	33.26

Table 6 - Analysis of Variance Summaries of CAAT Subtests Examining the Main Effects of Gender

Subtest	SS	df	MS	F	Prob. of F
Vocabulary	1.865	1	1.865	.002	.966
Reading Comprehension	334.092	1	334.092	.305	.584
Mathematics	1013.445	1	1013.445	.650	.424
Language	1211.227	1	1211.227	1.132	.293

Research Question 3: Does the interaction of age and gender have an effect on scores obtained on the CAAT?

Table 7 presents a cross tabulation of the mean scaled CAAT subtest scores and standard deviations by age and gender. Females younger than 25 years of age scored

highest on the Vocabulary subtest whereas females 25 years of age and older scored the lowest on this subtest. Males younger than 25 years of age scored marginally higher on the Reading Comprehension and Mathematics subtests, whereas males 25 years of age and older scored the lowest on these subtests. On the Language subtest, the scores were similar for all groups except for males aged 25 or over who had much lower scores. In fact, the latter group had the lowest mean scores on each of the Reading Comprehension, Mathematics and Language subtests.

Table 7- Mean Scaled Scores with Standard Deviations on the CAAT Subtests by Age and Gender

Subtest	Males				Females				Total	
	Age (< 25)		Age (≥25)		Age (< 25)		Age (≥25)		Mean	SD
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Vocabulary	723.40	27.52	721.38	28.47	725.56	38.52	719.43	41.11	722.64	31.06
Reading Comprehension	742.30	34.21	724.69	32.91	741.89	37.82	738.43	21.20	737.02	32.95
Mathematics	753.25	35.33	710.62	48.26	742.67	40.68	748.00	29.48	739.23	42.16
Language	692.30	28.91	670.15	40.43	693.00	36.29	694.29	18.76	686.81	32.25

However, an analysis of variance did not reveal any significant differences based on gender and age group on any of the CAAT subtests (see Table 8). Only on the Mathematics subtest were the scores marginal in this respect ($p=.055$), confirming that males 25 and over were perhaps the least successful on this part of the CAAT. Overall though, the CAAT did not reveal any significant differences based on age and gender.

Table 8 - Analysis of Variance Summaries of CAAT Subtest Scores by Gender and Age Group

Scale	SS	df	MS	F	Prob. of F
Vocabulary	44.383	1	44.383	.043	.836
Reading Comprehension	525.473	1	525.473	.479	.492
Mathematics	6040.894	1	6040.894	3.877	.055
Language	1441.494	1	1441.494	1.347	.252

Research Question 4: Is there a relationship between GPA in college and CAAT scores?

Research Question 5: What is the impact of age and gender on the relationship between GPA in college and CAAT scores?

Table 9 presents the correlation coefficients between the scaled scores on the four subtests of the CAAT and college GPA taking age and gender into consideration. No significant positive correlations were found for the total sample. In fact, a significant negative correlation was observed between the Reading Comprehension subtest scores

and GPA. This result was also observed for the younger and male student populations.

These results suggests that, for these populations, lower scores on the Reading Comprehension subtest are associated with higher grades in college, or conversely, higher scores on this subtest are associated with lower grades in college.

Table 9 - Correlation Coefficients and Respective Probability Levels Between Scaled Scores on CAAT Subtests and College GPA by Age and Gender.

Subtest	Age in Years		Gender		Total	
	<25	≥ 25	Males	Females		
	r^2 (p.)	r^2 (p.)	r^2 (p.)	r^2 (p.)	r^2 (p.)	r^2 (p.)
Vocabulary	-.12 (.68)	-.10 (.68)	.11 (.64)	-.19 (.54)	-.05 (.75)	
Reading Comprehension	-.65 (.01*)	-.18 (.48)	-.54 (.02*)	-.29 (.34)	-.38 (.03*)	
Mathematics	.02 (.95)	.06 (.81)	.17 (.46)	.08 (.80)	.04 (.79)	
Language	.24 (.39)	.10 (.70)	.20 (.42)	-.15 (.62)	.16 (.39)	

Note: * $p \leq .05$

Overall, there appears to be very little relationship between GPA in college and CAAT scores with the exception of the Reading Comprehension subtest of the CAAT. A further analysis by age and gender revealed only significant relationships between GPA in college and scores of the under 25 year age group and for males on the Reading Comprehension CAAT subtest.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This research component addressed whether any age and/or gender differences existed in performance on the CAAT, and whether the CAAT was an effective assessment tool for predicting college GPA for mature students.

The results of this study suggest that the CAAT is a poor predictor of college GPA for the mature student population. Not only was there an absence of a significant positive correlation between the scaled scores achieved on the four subtests of the CAAT and overall GPA in the total sample, a significant negative correlation between Reading Comprehension and GPA was observed. A significant negative correlation between Reading Comprehension scores and overall average was also observed for younger students and males. These findings suggest that for these two specific populations, lower scores on the Reading Comprehension subtests are associated with higher overall averages in college or higher scores on the Reading Comprehension subtest are associated with lower overall averages in college. Based on these findings, it appears that the scores achieved on the CAAT test are not a good predictor of grades achieved in college. The results of this study are in accordance with the beliefs of Mouw and Khanna (1993) and Palmer (1987) who state that the predictive validity of entrance tests are questionable at best.

The results of the study also suggest that younger students score better than older students, but such scores are only significantly higher on the Mathematics subtest of the CAAT. However, it is not conclusive to say that this test is biased against older students. Because the intern was unable to obtain information on the level of education of each subject, this may have been a confounding variable which influenced this results. If the older students had less education than the younger students, this factor could have influenced the results, not age. Regardless, Zeidener (1987), Moffat (1993), and Merante (1993) state that results on standardized tests have poor predictive validity, particularly for the older student population. Given that these students have been out of school for a longer period of time than younger students, poorer results on tests of aptitude or achievement should perhaps be expected of older students.

The results of the study found no significant gender differences in scores obtained on the CAAT. Although females, as a group, scored higher than males on all subtests of the CAAT, the differences were not significant.

What is perhaps of more importance than the findings of the ability of the CAAT test to predict college GPA, is the immediate implications of scores achieved on the CAAT test itself. As stated earlier in this report, low scores on any subtest of the CAAT can result in a student being denied access into the program for which they are applying. If scores on the CAAT are a poor predictor of overall average in college, it is possible that there are students who may be denied access into a programs at Cabot in which they could

have met with success. This would support the claim of Mouw and Khanna (1993) who state that 50 percent of those students who were predicted to fail, based on entrance test scores actually succeed in college.

Being denied access into programs at the College may also have detrimental effects on the self-esteem of prospective students. Many of the mature students applying to Cabot have not completed high school and met with academic failure in the past. Failure to achieve the minimum scores deemed appropriate by the college may indirectly convey the meaning that these students are not capable of pursuing a post-secondary education. As the literature review suggests, this may certainly not be the case.

Recommendations

To those who enrol in the M.Ed. Program in Educational Psychology at Memorial University, the intern makes the following recommendations:

- 1. Serious consideration should be given to the valuable practical experience which may be obtained through a professionally supervised internship.**
- 2. Potential interns should choose an internship setting which most closely approximates the type of setting where they expect to be employed.**

Based upon the research results of this study, other recommendations include:

- 3. To address the limitations of this study, Cabot personnel should continue administering the CAAT to mature students but, at the same time, go back to the former method of admissions for mature students. Once an acceptable number of mature students who have written the CAAT test and completed a year of course work at Cabot, the study could be repeated to determine the effectiveness of the CAAT in predicting GPA for all mature students. If scores obtained on the CAAT are found to be a poor predictor of college GPA, then the instrument should no longer be used for this purpose.**

- 4. If this study is to be repeated, the level of previous educational attainment should be controlled for when comparing the performance of different age groups on the CAAT.**

- 5. Cabot personnel should continue administering the CAAT to mature students, but use the results for the purpose of informing students of their current level of academic proficiency.**

Although the CAAT may not be an effective tool for predicting college GPA, it is both a valid and reliable test, based on the data from The Psychological Corporation

(1988). By administering the CAAT to mature students and informing these students of their scores and the implications of these scores, the college can at least be assured that those students who wrote the test were made fully aware of their academic capabilities and readiness upon entry into the program. This would be especially appropriate for those individuals who score so poorly on the CAAT that the chances of them meeting with success in college would be very slim. Also, it could be used to recommend remedial courses of action in terms of academic upgrading prior to program entrance.

6. The administration and guidance counsellors at the community colleges interpret the CAAT scores of older mature students with extreme caution.

The results of this and other studies suggest that younger students, as a group, score higher than older students on admissions entrance tests. However, the literature suggests that for older students, aptitude and achievement tests are poor predictors of college GPA. Administration should keep this in mind when making admissions' decisions that are based solely on CAAT scores. In addition, career counsellors should inform these students of the poor predictive validity of the CAAT for this age group and dispel any false beliefs that these students may have about the meanings of CAAT scores.

7. Where possible, entry assessment should include multiple measures to increase the likelihood of accurate and fair admissions decisions.

8. At least one of these multiple measures include a non-traditional measure such as self-concept assessment, intellectual self-confidence, self-esteem, maturity, and motivation.

As stated in the literature review section of this report, the use of multiple measures is essential to accurate and equitable placement (Cohen & Friedlander, 1989). Other measures might include information related to college study and attitude such as educational goals, importance of college to students, years out of school, number of hours working, career and study skills. Self-concept assessments, intellectual self-confidence, self-esteem, maturity and motivation are also variables which are thought to be of extreme importance when making admissions decisions (Bray, 1987; Cohen, 1990; Armstrong, 1991; Morante, 1987; Hirsch, 1987).

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APPENDIX A

List of Books and Articles Read During the Internship

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APPENDIX B
School Consent Form

SCHOOL CONSENT FORM

Dear Mr. Facey:

My name is John Fowler and I am a graduate student in the Faculty of Education, Memorial University of Newfoundland. In May of this year, I am beginning an internship at Cabot College as a partial fulfilment of the Masters of Education Degree. During the internship, I am required to complete a research study. I have chosen to evaluate the effectiveness of the Canadian Adult Achievement Test (CAAT) in predicting college grades of mature students. Currently, mature students applying to Cabot are required to write the CAAT. Scores obtained on this measure may determine whether or not candidates get accepted into the programme for which they are applying. I would like to investigate whether CAAT scores are an accurate predictor of college GPA. More specifically, I want to determine if the correlation between the two scores is stronger for younger students than for mature students. Given that younger students have been out of school a shorter period of time than the more mature students, they are more likely to score higher on a standardized test of achievement. However, this does not necessarily suggest that they will achieve at a higher level in the program. I am hypothesizing that the younger students will score higher on the CAAT than the more mature students, but similar differences in GPA will not be observed. This study is significant because if acceptable CAAT scores are not accurately predicting college GPA for mature students, then some other measure should be used for facilitating placement of these applicants.

I am requesting your permission to have access to the files of those students who have been admitted to Cabot on the basis of acceptable CAAT scores. This is necessary in order to make the comparison between scores obtained on the CAAT and GPA. I am interested only in obtaining the students' CAAT scores, date of birth and GPA, and am requesting that all other identifying information be deleted from the files. Therefore, all data gathered in this study will be strictly confidential, and at no time will any individual be identified. Furthermore, all data will be destroyed upon completion of this study. This study has received the approval of the Faculty of Education's Ethics Review Committee. The results of this research will be made available to you upon request.

If you are in agreement with allowing my access to these files, please sign below. If you have any questions or concerns, please do not hesitate to contact me at 579-2520. If, at any time you wish to speak to a resource person not associated with the study, please contact Dr. Patricia Canning, Associate Dean, Research and Development. Thank you for your consideration of this request.

I _____ hereby allow _____ to have access to the academic files of students. I understand that all information is strictly confidential and no individual will be identified.