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# MODELLING STUDENT LEARNING EXPERIENCES
## A Study of the Relationships Between Components of Student Involvement and Educational Outcomes With the Prospect of Improving Achievement in Québec Cégeps

Jacqueline Thibault Giard

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## ABSTRACT

**MODELLING STUDENT LEARNING EXPERIENCES**
**A Study of the Relationships Between**
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Jacqueline Thibault Giard, Ph.D.
Concordia University, 1994

Educators in Québec share a deep concern for the large numbers of students who fail to reach educational goals, leaving the system without having completed a given cycle, or not meeting expected standards, in spite of having obtained a diploma. This study, performed in the framework of educational technology, focusses on student involvement as a comprehensive construct mediating relationships between student characteristics and educational outcomes.

Systems methods were applied to redefine student involvement in the context of Cégeps. A French-language instrument for the assessment of the selected variables, the *Questionnaire sur la qualité de l'expérience d'apprentissage (QEA)*, was designed and validated.

An original contribution to the development of a theory was made by redefining student involvement as a threefold construct comprising (1) early commitments, (2) active participation in college activities and (3) externally grounded self-assessment behaviours.

The general hypothesis was that student characteristics are associated with involvement behaviours, that components of student involvement influence one another, and that student involvement variables influence the attainment of educational outcomes. Hierarchical analysis methods were applied to test the hypotheses relating student characteristics and student involvement variables to educational outcomes.

Results confirm that this extended definition for student involvement is operational and that it provides a plausible explanation for how differently involved students reach different levels of attainment. Students' prior performance in secondary school, value attributed to learning, and encouragement from parents were found positively associated with student involvement, while spending a lot of time on work for pay proved to be negatively associated with the same variable. Time on task, grade expectancies and instruction on study skills were identified as exerting significant influence on the level of participation in college activities, which in turn increases the levels of progress and satisfaction reported by students. It was also established that academic performance and persistence in college could be predicted from some preliminary and self-assessment variables, as well as from study comportment, but neither was found directly related to total participation in college activities. The model was thus partly confirmed, and partly modified, and implications were derived. It is believed that this study can help Cégeps to become better learning communities.

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# CHAPTER 1

# CONTEXT AND PROBLEM

## 1.1 Introduction

Educators in Québec share a deep concern for the large numbers of students who fail to reach the goals set for each level of the school system. Problems are identified with every section of the educational roads that channel students from preschool to graduate school. They are expressed mostly in terms of students leaving the system without having completed a given cycle, or students not meeting expected standards, in spite of having obtained a diploma.

While the goal of primary school is to bring all children to an elementary level of mastery of language, mathematics and intellectual skills, the goal of the secondary level is to provide all pupils with a basic education, as certified by a *Diplôme d'études secondaires (DES)* in the general sector or in one of the professional programmes. Completing both cycles requires 11 years and attending school is compulsory until the age of 16. However, large numbers of students leave school without this diploma. According to recent statistics, the probability of obtaining a DES in 1991-1992 was 70%[1]. Additionally, even among some high school graduates, serious gaps in language, mathematics and basic

[1] Source: Ministère de l'Éducation. (1993). *Principales statistiques sur l'éducation préscolaire et l'enseignement primaire et secondaire.* Québec: Gouvernement du Québec, Canada.

intellectual skills are detected, which makes them underprepared for work or for higher studies.

The role of short cycle colleges is to prepare students to enter a programme in university or start a career as a technician, by providing them with a *Diplôme d'études collégiales (DEC)* in one of the general or technical programmes. Again, graduation rates float around 65%. The problem repeats itself at university whence too many students drop out before obtaining a degree or in the course of graduate studies. The concern is not just with the Québec school system; similar issues arise across Canada (Gomme & Gilbert, 1984; Gilbert & Auger, 1987; Gilbert et al., 1989; Sheinin, 1989; Sheridan, 1990), and the United States, as confirmed by the research literature.

Although agreements are not easily reached, multiple parties engage in the quest for solutions which might alleviate these problems and lead to improved educational results. In looking for solutions, one may look at teachers, administrators, students, curricula, methods, material, equipment, etc. This piecemeal approach, often inspired by one's own allegiance, most of the time results in partial solutions. This research project has chosen to address the broad areas of educational processes and outcomes in college education from a broader systemic point of view. More specifically, it seeks to understand and explain the nature of the interactions that take place between the student and the college environment during enrollment in a Cégep[2] program, and how these are related to the attainment of educational goals. It is hoped that this study, conducted within the framework of educational technology, bring new insights into problems of

[2] The name C.E.G.E.P. stands for *Collège d'enseignement général et professionnel.*

underachievement in college.

## 1.2 The Cégep System

In most countries, the school system is comprised of three levels, each of which is instantiated in a distinct type of schools: elementary or grade school, secondary or high school, and post-secondary or tertiary schools most often named colleges or universities. In that respect, the Québec school system is unique with its two consecutive post-secondary sub-levels: short-cycle college, or Cégep level, and university level. Graduation from one of the provincial Cégeps is required for admission to all Québec government-sponsored universities.

The first Cégeps were created in 1967, following recommendations from the *Rapport Parent* (1964) which stressed the urgent necessity to raise the level of education in Québec. Official objectives were to open access to higher education to a larger part of the population, and provide quality education to this new population of students.

> *... assurer au plus grand nombre possible d'étudiants qui en ont les aptitudes la possibilité de poursuivre des études plus longues et de meilleure qualité; cultiver l'intérêt et la motivation chez les étudiants, pour diminuer le nombre des échecs et des abandons prématurés; favoriser une meilleure orientation des étudiants selon leurs goûts et leurs aptitudes; hausser le niveau des études supérieures et de l'enseignement professionnel; uniformiser le passage des études secondaires aux études supérieures et mieux préparer les étudiants à entreprendre ces dernières.* (*Rapport Parent*, p. 269)

Like Community Colleges in the U.S., Cégeps are comprehensive, offering three-year vocational/technical terminal diplomas along with two-year academic transfer programmes[3].

Cégeps appear to have been fairly successful with regard to the first objective: within their 7 pre-university and some 130 technical programmes leading to a DEC, they welcome in the regular sector some 160 000[4] students, which represents 90% of all secondary school graduates and approximately 60% of this age group. In addition to that, some 70 000[5] adults are enrolling yearly in continuing education programmes, to complete studies undertaken at an earlier age, update their skills or recycle to another work area. Overall, the objective related to accessibility and democratization of education seems to have been well responded to by the creation of 47 public Cégeps which provide free schooling up to the doors of the university. This is corroborated by Saguenay-Lac-St-Jean research team ECOBES (Veillette et al., 1993), who however add in a more reserved tone: "*Par contre, il est généralement admis aussi que l'égalité des chances en matière d'accès à l'éducation supérieure n'est pas encore acquise pour tous les segments de la population; on estime plutôt que les clivages socio-économiques déjà repérés à l'échelle du Québec en ce qui concerne les années 1970 ... ne sont pas totalement disparus*" (p. 39).

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3 Graduates with a technical diploma may also transfer to some university programmes, providing they meet prequisites.

4 Source: *Ministère de l'Enseignement supérieur et de la Science, Direction générale de l'enseignement collégial, fichier SIGDEC.* (1993a). These figures are for 1991 and include students enrolled in all public and private institutions, throughout all programmes.

5 *Ibidem.*

Whether Cégeps have succeeded as well with regard to expectations of quality is more controversial. Performance indicators reveal average combined failure and drop out rates from courses and programmes around 35%, with graduation rates falling as low as 25% in some programmes; a large number of students take more time than allocated to complete their courses, often after having reoriented; and the knowledge and know-how of some students with a diploma seem to fall short of what employers and universities expect.

Upon the opening of the 1992 Parliamentary Session, *Madame Lucienne Robillard*, then *Ministre de l'Enseignement supérieur et de la Science*, announced that the future of the Cégep system would be submitted to public discussion in the Parliamentary Commission on Education in the fall.

> ***Parce que, après 25 ans***[6] *d'un régime remarquablement stable, il est normal qu'on veuille* ***faire le point*** *et identifier les ajustements qui s'imposent...*
>
> ***Parce que*** *... les collèges sont de plus en plus clairement* ***au coeur des enjeux de qualification*** *que doit assumer le Québec...*
>
> ***Parce que,*** *... en l'absence de pratiques d'évaluation communes,* ***des perplexités et des doutes*** *ont fait leur chemin dans l'opinion publique ... nourris par des chiffres inquiétants concernant les taux de diplomation, la durée des études et la fréquentation des programmes d'études techniques... (Ministère de l'Enseignement supérieur et de la Science, 1993b, p. 5.)*

This national meeting, where 219 *mémoires* were presented and 109 groups or

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[6] Emphasis by the authors.

organizations convened, is now over and directions for change are already being implemented. Cégeps have been confirmed in their original mission, but research and community service have been recognized as activities in which institutions may now legally choose to engage; among other changes, substantial modifications to the *Règlement sur le régime pédagogique du collégial,* now identified as *Règlement sur le régime des études collégiales,* will transform the core curriculum; additionally, pre-university and technical programmes will be revised progressively, the former remaining under close control of the Ministry, while the contents of the latter shift almost totally under local responsibility; teacher training will be emphasized, evaluation will be built into the system, and new funding will be injected into providing entering students with more appropriate counselling and support services. But how to make sure that the "new Cégep" will be more effective and efficient than the former? How to avoid the status quo? Now more than ever seemed the right time to take a look at the learning and development opportunities offered to Cégep students and how they take advantage of these.

### 1.3 Problem Context

Whether one level of a national school system can be revised in isolation from the other levels of the same system and whether the Parliamentary hearings and subsequent reform will be anything more than a huge political exercise remains to be seen. But the very decision to convene such a meeting was a symptom in itself: Cégeps have an "image problem" and at least part of this problem can be traced to the lower than expected graduation rates and the poor mastery of Cégep level knowledge and skills of graduating students. According to the Conseil des collèges (1992), it is estimated that most jobs to be created until year 2000 will ask for higher levels of education than before, with two

out of three jobs requiring a Cégep level diploma and one out of two, a university degree.

While 33% of Cégep students will never get a DEC, only one out of three students will obtain it in the prescribed period of time (two years for pre-university programmes and three for technical programmes). After extended periods of observation (eight years), graduation rates climb to 71% in pre-university programmes and 62% in technical programmes. Graduation rates are lower for males, regardless of age, language and across all programmes (Lévesque & Pageau, 1990).

Solutions have been searched for in studies bearing on learning difficulties and how to prevent, diagnose and correct them. Practices such as the implementation of learning centers, peer tutoring, special help programmes have been experimented with and evaluated, with seemingly little evidence of positive effects on student performance and persistence. In September 1992, the period within which one may now cancel enrollment in a course was limited to four instead of eight weeks. The reform has brought additional rules pertaining to course failures: students who have failed five courses (seven in technical programmes) will temporarily be charged a certain fee for further courses. It is too soon to measure the effects of these new policies. The objective is to progressively increase graduation rates, but a good number of teachers fear that this will only result in increasing failure and drop out rates.

While some effort has been directed towards assessing the effect of "work for pay" on academic performance (Vigneault, 1993), trying to evaluate the actual worktask assigned

to students (Collège de Limoilou, 1988), or looking for differential factors between low- and high-achieving students (Larose & Roy, 1990, 1991, 1992, 1993), there is practically no evidence concerning how actively students use the facilities and opportunities made available to them.

A large project conducted at the ministerial level (Lévesque & Pageau, 1990) has studied the evolution of three successive cohorts of students (1980, 1983, 1986), linking persistence to age, sex, language, previous schooling and programme in Cégep. Extracting descriptive statistics on persistence, dropout, graduation rates and length of studies, from a huge file (CHESCO) containing records for over 1.1 million students enrolled in Cégeps between 1979 and 1988, this study provided a profile of the clientèle relative to the variables above. Notwithstanding these results, this project did not go beyond the descriptive level.

Colleges, and of course Cégeps, are politically accountable for the resources and facilities, services and opportunities they provide for promoting student learning and development. On the other hand, students are ideally accountable, to themselves and to the collectivity, for the amount and quality of effort they invest in their own learning and development, particularly in using the college resources.

Over the past years, Cégeps have made an honest effort to improve, following Walter James' example with the British Open University in not merely trying to do things efficiently, but in trying to find the right things to do. However, they may not have been as successful in this endeavour as they might have deserved to be, partly due to the lack

of guidance in performing these changes and assessing their effects. Universities in Québec have not devoted much attention to this new level of studies that should have been catered for by educational systems research. This thesis is a move toward filling this gap.

### 1.4 Statement of the Problem

Stated simply, the problem for the Cégep system is that too many students leave without a diploma or without having mastered college level knowledge and skills to a satisfying degree. From the point of view of educational technology, the problem translates into how possible avenues of intervention can be identified.

Although willing to take action, Cégeps lack both knowledge and understanding of the situation in terms of causes and effects; moreover, there is a lack of reliable instruments that would enable them to tackle the problem. They have few indications about the quality of their students' learning experiences, they do not know exactly how students take advantage of the activities, facilities, and opportunities offered, nor why students do or do not. On the other hand, students receive little diagnostic information concerning the adequacy of their behaviours, or how they measure up to expectancies, except from grades and occasional comments from their teachers. Consequently, there is a high degree of uncertainty regarding potential directions for improvement.

Put succinctly, in order to reach educational objectives, students must (1) work, (2) persist, and (3) succeed. There is some kind of logical forward chaining among these three elements. The basic requirement seems to be for students to invest themselves in

work, study and college life, but this alone will not suffice. Students have to remain in college long enough so they learn and develop, are awarded a diploma and graduate.

But things are not that simple. Persistence is not the result of a decision that is taken once and for all. On the contrary, it is questioned everytime students receive information on how they are doing and compare it against their objectives. A student may decide to quit for a host of different reasons: course failures, amount of work required, level of difficulty, lack of financial resources, vocational re-orientation, health problems, simple boredom, to name but the reasons most frequently identified by students, on forms they are asked to complete prior to dropping out. In that perspective, one may invoke a backward chaining between the same variables, performance assessment undoubtedly inducing decisions concerning involvement and persistence. Simultaneously, one must take into account the large number of variables linked with student personal characteristics and college environment, which also intervene in this process.

How to explain the mechanisms, the dynamics of these variables interacting both before students enter and while they are attending college? What student characteristics make a difference? Which educational opportunities? In how many ways can educational outcomes be reached?

A search for solutions could bring one to look at the institution or at the student, for both have responsibilities in the process. Inquiring simultaneously into what a college offers and what the student does with those offerings, seems a better strategy, considering that "students are the ultimate managers of their own learning and un-learning." (Boyd &

Mitchell, 1992, p. 26)

### 1.5 Purpose of the Study

Persistence and performance in college have been the subject of research in other post-secondary settings, particularly in the United States, and results have shown them to be significantly related to a large number of variables. But the educational context in Cégeps is different enough from that which prevails in other educational systems to preclude a blind application of results accumulated for colleges and universities elsewhere. Students are younger, they enroll at approximately 17 years of age, with only 11 years of previous schooling; a large majority are first generation students; programmes are shorter, transfer programmes are but two years; the core curriculum was inherited from the now extinct *cours classique* and there is no consensus on the place that should be occupied by general education, nor on what *formation fondamentale* really amounts to; moreover, there is a shortage of reliable French-language tools and instruments that could be used to collect data about the student population.

The problem of underachievement in Cégeps will not be solved in one study. We proposed to bring a contribution by conducting a research project modelled around the following guiding questions:

- What does student involvement mean in the context of Québec Cégeps, or rather, how much of what it means in other situations is relevant to the situation under study?
- What are the relationships between student characteristics, student involvement,

and important educational outcomes?

- Can student involvement be used as a predictor for educational outcomes?

- What is the relative importance of variables which can be associated with student involvement and achievement? Which are controllable?

In the literature, "student involvement" is defined as an activity requiring both physical and psychological energy and by means of which students learn (Astin, 1984). Other researchers use a somewhat more operational definition; for assessment purposes, student involvement is defined as the amount and quality of effort students invest in their own learning (Pace, 1984; Lehman, 1991).

The general purpose of the study was to establish if and how student involvement can be related to educational outcomes in Cégep. It was hypothesized that there are significant relationships between student pre-college characteristics, student involvement in college and student persistence and achievement.

In order to reach this goal, a project in three phases was designed. The first phase consisted in redefining student involvement in the context of Cégeps, representing selected variables and relationships in a hypothesized model, and designing an instrument to assess the variables of interest. This was accomplished through the application of systems methods and with help from teachers and students involved in this educational situation.

The second step consisted of exploring the metric properties of the previously designed

instrument and formulating recommendations for the revised version. Descriptive statistics, item and factor analysis techniques were used for that purpose.

The last but central operation aimed at studying the relationships between variables, in order to validate the hypotheses. Multiple regression and multivariate methods were used to that end, and implications were derived from the results.

The outcomes of this research are many. A new definition of student involvement was proposed, a model of student experiences was conjectured, and an instrument was designed to assess relationships between variables included in this model. Significant relationships between student characteristics, student involvement and college outcomes were identified. Implications for the improvement of educational processes in college were derived. By examining student involvement and achievement, the present study put forward a contribution to the field of educational technology, while simultaneously attempting to respond to some of the important practical questions raised about college education today.

### 1.6 The Educational Technology Perspective

The present project, focussing on the quality of student involvement and its relationship to persistence and achievement, is supported by a conception of educational technology that is concerned with methods to promote initiative and responsibility of the learner in the learning process. The development of models, processes and tools to make Cégep education more efficient, the design of programmes and environments that better support students, and the generation of knowledge on which organisational and administrative

decisions may be based, represent potentially fruitful areas to apply and extend the principles and practices of educational technology.

Educational technology is a field of study that encompasses a large variety of educational concerns, and definitions vary somewhat depending on the perspective adopted by their author. According to the Council of Europe (1975), two main definitions have emerged through the years. The first defines educational technology in terms of apparatus, media and various types of equipment and materials. The other describes it as a systematic approach to educational problems, in hope of discovering possible courses of action. Opting for the second definition, the Association for Educational Communications and Technology (1977) defines it as "a theory about how problems in human learning are identified and solved" (p. 132). Mitchell (1979) moves in the same direction, arguing that educational technology "is concerned with more than the instruments, techniques or technological tools of education, and should rather be considered a problem oriented systems approach to structuring environments for learning".

The same author explains that, having evolved over the years, educational technology "now provides a multidisciplinary framework for synthesizing knowledge about how to improve human learning". It has gradually moved away from the "interventionist paradigm aimed at establishing normative criteria and methods intended to help learners meet fixed objectives, toward a cybernetic and systemic perspective where the learner is considered to be a self-regulated system which depends on feedback to gradually model and modify his or her own behaviour" (Mitchell, 1987).

Educational cybernetics offers principles and techniques that can be very helpful in designing educational systems. Boyd (1982b, 1992) proposes seven key concepts and a protocol which, when used together to model a situation, can produce substantial benefits.

Although consistent with research in psychology and education, educational technology can bring a new perspective on problems related to learning environments. The literature on student persistence and achievement in college opens doors to practical interventions. Although colleges can indeed design interventions purporting to enhance student involvement, this research argues that decisions and actions originate from within the student and that therefore, promoting autonomy and responsibility in the learner are essential features of any system designed to support learners in effective and efficient ways.

It is an assumption of this research that educational technology, with its references to systems theory and cybernetics, has a substantial contribution to bring to the study of problems in college, in providing knowledge, tools and techniques that will lead to better understanding of why students behave the way they do, and better prediction of the paths they are likely to follow. Then maybe they can be helped, or help themselves, in becoming autonomous and responsible individuals working their own personal way toward the attainment of educational goals.

# CHAPTER 2

# SURVEY OF RELEVANT RESEARCH

## 2.1 The Review Process

The purpose of this research project being to explain the relationships between many important variables interacting in higher education, an enormous body of research was likely to be relevant. Under the broad label of educational research, this area has been tackled by education in its various branches including educational technology, but also by psychology, sociology and even computer science, to name but a few. The main body of research has been produced in the United States, but results are also available from Canada, and to a lesser degree because of major dissimilarities between higher education systems, Britain, France and other countries as well.

For this very reason however, educational researchers have felt the need to periodically analyze and synthesize results accumulated thus far (Corey, 1936; Jacob, 1957; Feldman & Newcomb, 1969; Chickering, 1969; Spaeth & Greeley, 1970; Withey, 1971; Solmon & Taubman, 1973; Astin, 1977, 1993; Bowen, 1977; Pace, 1979; cited in Pascarella & Terenzini 1991). Pascarella & Terenzini (1991) explain that the impetus for their latest book stemmed largely from the confluence of three trends: the growth of a large and significant body of additional evidence on the impact of college; theoretical, analytical and methodological contributions that have moved inquiry on college impact in new and

productive directions; and recent external pressures for accountability in terms of the various benefits attributable to college attendance. This comprehensive work which covers American research from the sixties through the eighties, was the starting point of the present review.

A wide variety of other sources were also consulted. An ERIC search on CD ROM conducted using persistence, academic performance, achievement, and learning as descriptors to generate the field of research, and two-year and community colleges to circumscribe it, yielded over 200 titles. Dissertation Abstracts also suggested recent theses pertaining to the subject, five of which provided useful theoretical or methodological material. Current journals reviewed from 1990 to the present, and which provided most of the references were the following:

The Journal of Higher Education

The Canadian Journal of Higher Education

Review of Educational Research

Journal of College Student Development

American Educational Research Journal.

Higher Education Abstracts were also scanned, and provided some additional material.

Yearly directories for funded Cégep research projects, published by the ministerial *Programme d'aide à la recherche sur l'enseignement et l'apprentissage (PAREA)*, also permitted the identification of recent reports pertaining to the problem under study. A branching search based on citations in all the preceding sources, also led to the discovery of other useful articles and books, the one closest to the topic - and the end - of this study, being

Astin's "What Matters in College?" (1993). This combination of work and studies from various sources drew a rather detailed map of the present state of knowledge on college education, out of which it was possible to extract the information needed for this study.

## 2.2 Structure of the Review

Research on college education generally falls in one of three areas: studies bearing on learning, teaching and other educational interventions; curriculum and programme evaluation studies; and studies on the structure, organization and development of institutions. This review explores studies from the first of these areas, which is by far the most voluminous, within a sub-area labeled "college impact" by Pascarella & Terenzini (1991).

In the literature pertaining to college impact, in spite of differences in vocabulary, variables are generally identified as belonging to one of three sets: student characteristics, college environment processes, and educational outcomes. This classification is more or less a result of the methods that are generally used in this area: most projects aim at studying effects of college processes on educational outcomes, after having controlled for student characteristics. This traditional Input-Output model was not by itself privileged in the present research, which had chosen instead to consider the problem within a feedback-dominated cybernetic model. However, the main purpose in conducting this review was to determine if and how the hypothesized model was supported by prior research. This is why it appeared convenient to structure the results of this review according to the sets of variables identified above.

The core questions that guided this review were the following: Which student characteristics and college environment variables exert a significant influence on which educational outcomes? Among these, which are relevant to the situation under study? Should other variables also be included?

The material in this chapter was organized after the same pattern. Student characteristics are dealt with first; then college environment variables are reviewed and educational outcomes are discussed last. The general model hypothesized at the conclusion of this research review is presented at the end of the chapter.

### 2.3 Student Characteristics

Scanning the literature reveals that a first category is comprised of demographic, social and economic features: age, gender, language, religion, race, ethnicity and citizenship; family socio-economic status, including career, income, degrees obtained; employment and marital status are other variables included in most studies, both to describe the sample and control for their idiosyncratic effects on various dependent variables. These demographic characteristics which specify who the students are, have been found related, at varying degrees, to most educational outcomes. Since they are inputs or givens in any educational situation, and can generally not be acted upon, they are more interesting from a sociological or political, rather than from an educational point of view. Ministries and other social agents should consider it their duty to see that proper studies are conducted so disparities are signalled and taken into account; then, resources can be allocated so that the probability for equal opportunities is increased.

Other student characteristics found significantly related to the same outcomes are of a more academic or psychological nature. They include: academic aptitudes, choice of courses and majors, and prior achievement; personality traits, locus of control, self-esteem, and leadership; aspirations, career choice, grade expectations, and goal commitment. From an educational point of view, these characteristics are more interesting than the former because they can probably be acted upon, in earlier school life and right up to college, so that favorable conditions are in place when a student undertakes higher studies.

In their synthesis of research on college impact, Pascarella & Terenzini (1991) present detailed estimates of net, long-term, between- and within-college, as well as conditional effects of college processes on educational outcomes. Their survey covers some 2600 pieces of research conducted in the late sixties through the eighties. Student characteristics that were controlled for in one, several or most research projects, depending on the research design, add up to a long list which includes as most frequently retained: age, gender, race, religion and religiosity; socio-economic status, family history, residential status and geographical origin; job and employment characteristics, income, marital status and number of children; aging, history and period effects; pre-college skills and traits, academic, verbal and mathematical ability and aptitude, prior achievement, educational, degree and career aspirations, intelligence; locus of control, self-esteem, health, and values.

Astin (1977, 1985, 1993) who produced some of the most influential work in this area, has put forward the well-known Input-Environment-Outcome model (I-E-O), where student

characteristics are fed into the first component. The rather extended definition he adopts for student input characteristics (all that is known about the student at point of entrance in college), leads him to include in this category all the data that can be collected via pre-tests, questionnaires on student expectations and predictions about college outcomes, and factual data from records and files. Student characteristics retained in his latest study (Astin, 1993), were assessed by means of 146 measures.

In the past few years, several research projects pertaining to this *problématique* have also been conducted within the Cégep network. Two researchers at *Cégep de Sainte-Foy* published the results of a study aimed at testing an explanatory model of integration into college level studies, for groups of at-risk versus high-achieving first-year students. Building on the work of previous researchers including those referred to above, and looking for factors explaining student success, Larose and Roy (1992) take into account, besides gender and choice of major, social and vocational pre-college attainments, self-concept, student perceptions of the teaching and non-teaching body in college, and adaptation to college. They observe that most of these variables are associated with academic success.

> *Les élèves à risque présentent des dispositions personnelles, des acquis liés à l'orientation et des acquis sociaux moins favorables que ceux d'un groupe d'élèves forts; ... ils ont des perceptions plus négatives d'eux-mêmes que les élèves forts; ... la qualité de leurs expériences scolaires et institutionnelles est moindre; ... plusieurs des composantes du modèle sont associées à la réussite scolaire des nouveaux arrivants.* (Abstract)

Following a longitudinal study designed after Astin's I-E-O model, and aimed at studying relationships between student characteristics and performance, Terrill & Ducharme (1993) trace a sociographic profile of Cégep students. Working with a sample of over 50 000 subjects drawn from 45 geographically distributed institutions including 4 anglophone colleges, the Cégep population is described according to: age, gender, language, citizenship and geographical origin; reason for attending college, degree aspiration, preferred place for study, time on study tasks, encouragement received, location of residence and distance to Cégep; parents' marital status, level of schooling and income; student income, source of income and nature of expenses, financial security, domestic tasks and leisure. Age, gender, time spent on study and time spent on work for pay are reported as having the most significant relationships with academic success in Cégep.

In another socio-geographical study focused on the Saguenay-Lac-St-Jean region, three Cégep researchers recently demonstrated that gender, social origin and geographical location of residence are important determinants of access to Cégep and to a Cégep diploma. Their findings led Veillette et al. (1993) to conclude, along with Massot, that the decision to engage in higher studies results from the interaction of several personal, academic and social variables. "*La décision de poursuivre des études 'repose sur la prise en considération simultanée de paramètres conjoncturels (les résultats scolaires) et de paramètres prévisionnels (les bénéfices anticipés), lesquels engendrent une structure complexe (interactionnelle) s'ils sont mis en relation avec des paramètres antérieurs à l'action (le niveau culturel familial)*'." (p. 40)

This survey confirmed the importance of including student characteristics in research on college outcomes. Whatever the independent educational variable one proposes to study, one is always confronted with the extent to which change can be attributed to this variable itself or to other competing factors. As concluded by Pascarella & Terenzini (1991), "student background characteristics ... are not merely the best predictors of many of the outcomes associated with college; they are also a major determinant of whether or not one attends college and, if so, the type of college attended and the extent and quality of involvement in different academic and social experiences during college" (p. 658). For this reason, student characteristics qualify as confounding variables, that is, variables that have an effect on both independent and dependent variables. Randomized designs being very difficult to obtain in field settings, sophisticated statistical methods have been elaborated in order to control for the effect of these confounding variables. This methodological approach is further explained by Astin (1993):

> The problem in "natural experiments" ... is that input characteristics are correlated with environmental characteristics. In "true" experiments, the random assignment of subjects to environments (treatments) eliminates such correlations. Controlling for input characteristics by statistical means (multiple regression) thus serves to remove any correlation between inputs and environments. Basically, we are attempting to simulate through the use of sophisticated multivariate statistics the results that we would obtain if we were able to assign students at random to different environments. (p. 93)

This brief review of research involving student characteristics confirmed the selection of

variables made at the outset of this research. Considering the socio-demographic characteristics of the educational milieu under study, age, gender, language, residence, job and family status, and parents' level of schooling were retained to provide the demographic information needed. As the study was concerned with academic performance, it was necessary to control for prior achievement in secondary school. In view of the fact that most students in the sample would be young and fresh out of secondary school, and probably still living with their parents, encouragement from parents also appeared relevant. The current local and widespread debate, relating academic performance in college to whether or not students have made a preliminary choice of career, confirmed the decision to include value attributed to prior learning, study and career goals, and commitment to these goals, as well as a few pre-college choices, namely, choice of programme, reason for attending college and intention after graduation.

This restricted set of student inputs appeared sufficient to characterize what Lewin (1935) has referred to as their "life space", that is, the social and physical conditions which determine both the boundaries within which an individual evolves and the actions in which he engages. As put by Lewin, determining the position of an individual within his life space is a prerequisite for understanding his behaviour.

For reasons that will be explained further, only a subset of the variables selected at that point were included in the analyses. Other student behaviours occurring after entrance in college were identified as related to the next category labelled "college processes".

## 2.4 College Environment

In the present nonexperimental research design, college environment processes were the equivalent of the "treatment" variables found in experimental designs. According to Astin (1993), a first group of variables are institutional, faculty and peer group, and organizational characteristics. They are often referred to as between-college characteristics, because they represent the differential influences students may be submitted to in different institutions. Since the present project was conducted in a single institution, these variables were not included in the research design. However, they would have to be taken into account in a multi-institutional study.

But, as noted by Astin (1993), once a group of students enrolls at a given institution, individuals may have quite different environmental experiences because of the many choices they have to make. A second group of within-college variables are then to be considered. They are generally associated with the different interventions designed to support learning and development through curricular, and extra- or co-curricular activities. Most research projects scanned in this review focussed on one of these as independent variable. To illustrate not the amount but the variety of this research, here are a few examples of such studies: on academic advising (Metzner, 1989); on mentoring (Jacobi, 1991); on lecturing (Schonwetter, 1993); on developmental programmes (Dwinell & Wigbee, 1991; Menec, 1992; Poe, 1991); on retention programmes (Levin & Levin, 1991); on cooperative methods (Desforges, 1991); on career counselling (Healy, 1991); on computer-aided learning (Mitchell, 1977, 1982, 1984; Mitchell & Dalkir, 1986; Boyd, 1982a; Boyd & al., 1984); on admission policies (Lavin & Hyllegard, 1992). Most educational processes appear to have been the subject of research investigating into how college

environments might be designed to enhance the attainment of educational outcomes.

Student involvement is a different type of variable pertaining to college environment that has also attracted considerable research attention over the past 20 years. It is a comprehensive variable which allows the researcher to come to grips with the college environment as an integrated whole, because its definition can be made to encompass as many interactions between student and environment as one cares to include. In the remainder of this section, the notion of student involvement as it emerges from current research is presented first. It is followed by considerations on the assessment of this variable.

### 2.4.1 The Notion of Student Involvement

"Student involvement" and "quality of effort" are the two labels used in the literature, to refer to this area of student comportment. The first was put forward by Astin and the second by Pace, in their respective quest for understanding how educational outcomes are reached in college.

Astin (1984) defines student involvement as "the amount of physiological and psychological energy that the student devotes to the academic experience." This conception is based on the premise that both the institution and the student have critical roles to assume, the former in providing students with a diversified and appropriate set of activities for learning and development, the latter for making sure that he or she actually profits by every opportunity provided.

Astin's (1985) theory of student involvement rests on the five following postulates: (1) Involvement requires investment of psychological and physical energy in tasks, people and activities; (2) Involvement is a continuous concept; (3) Involvement has both quantitative and qualitative features; (4) The amount of learning and development is directly proportional to the quality and quantity of involvement; (5) The educational effectiveness of any policy or practice is related to its capacity to induce student involvement.

The first three of these propositions are relatively straightforward. Although the notion of psychological energy is not defined, it has been used by numerous other researchers as an heuristic for studying student involvement. Considering student involvement as a continuous concept with both quantitative and qualitative aspects is congruent with intuition. Student involvement is not a quality that is either present or absent; instead, different students can be observed to be more or less involved, depending on how actively and deeply they engage themselves in the pursuit of educational objectives. The corollary is that if one is to assess involvement, quantitative as well as qualitative indicators will have to be used.

The last two propositions are less obvious, for a number of counter-examples can be raised in connection with each. It is not uncommon to notice students who engage but superficially, at least to the observer's eye, in proposed activities, and yet perform satisfactorily and reach standards more easily than apparently more involved fellow students. Conversely, teachers generally acknowledge that deep involvement in studies do not necessarily result in learning and development for all students, at least as attested

to by course grades. Other variables intervene in this situation, e.g. general ability, aptitudes, motivation, learning style, and other explanations are invoked to account for the amount of learning and development.

In that perspective, Entwistle's (1988) model of student learners constitutes a challenging rival explanation. His theory is that students generally fall in one of three categories with respect to their global goals for a course or programme: (1) those who want to acquire surface knowledge and skills which they can reproduce as needed; (2) those who really want to construct their own understanding of the subject in depth, and (3) the game players who would do anything at all to beat the system and get needed good or pass marks. As analyzed by Boyd & Mitchell (1992), "These are a direct reflection of how the learner sees the teacher. If the learner sees the teacher as an opponent, gaming is appropriate. If the learner sees the teacher as just a source of useful facts and skills, then, surface learning is appropriate. If learners see a teacher as a mentor who will help them re-create their identities then deep learning is called for" (p. 25). Because Entwistle's model places the student at the heart of the learning process, it appears to be endowed with considerable explanatory power.

Similar questions can be raised in connection with the last proposition. Let us consider the learning assessment policy in a college. Although the policy's capacity to induce student involvement may be limited, its educational effectiveness will be high if it succeeds in promoting and regulating sound practices in student learning assessment, while taking into account all the differences existing between evaluation situations. No educational policy will be effective if it does not succeed in rallying all involved parties

- and not only students - around shared goals and into concerted action. A basic cybernetic law which states that "every good regulator of a system must have a requisite variety model of the system to be regulated" (Conant & Ashby, 1970) appears a more appropriate criterion for evaluating the educational effectiveness of policies and practices, than the proposition mentioned above.

According to Pascarella & Terenzini (1991), "Astin's (1985) conception [of student involvement] occupies something of a middle ground between psychological and sociological explanations of student change", but the same authors question whether Astin's propositions constitute a theory, at least as defined by Kerlinger (1986, p.9) to be "a set of interrelated constructs, definitions, and propositions that present a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting the phenomena". It is contended that they offer "a general dynamic, rather than any detailed, systemic description of the behaviours being predicted, the variables presumed to influence them, the mechanisms by which those variables relate to and influence one another, or the precise nature of the process by which growth occurs" (p.51). Nevertheless, Astin's (1985) concept of student involvement and its effects on educational outcomes have attracted a lot of attention from administration in higher education and guided most research in this area.

Instead of referring to "physiological and psychological energy", Pace (1984) bases his conception of involvement on the time and effort required from students in order for them to learn and develop. His central construct is "quality of effort", which he defines as "the amount, scope and quality of effort students put in taking advantage of the

opportunities offered to them by the college".

Building on Astin's work, research projects conducted at over 200 colleges and universities (Pace, 1989), among which at Santa Barbara City College (Friedlander, 1990), have shown that students behave in very different ways in the amount and quality of their involvement in taking advantage of the learning opportunities available in college. These studies produced evidence that differences in type or area of involvement lead to different outcomes, and that the greater the level of student involvement in one particular area, the greater the progress students feel they have made toward achieving related educational objectives. For example, those who use the library as a resource and research tool are more likely to report progress in learning independently, than those who use it as a quiet place to study; those who spend more time on writing feel they can write more clearly and effectively; those who have more contacts with students who differ from them report greater progress toward becoming aware of different philosophies, cultures, and ways of life, and toward understanding and getting along with different kinds of people. (Pace, 1984; Lehman, 1991; Friedlander & MacDougall, 1992).

Research findings have led Pace to conclude that "...granted the importance of all the elements that influence who goes where to college, once the student gets there what counts most is not who they are or where they are but what they do" (p. 44).

### 2.4.2 The Assessment of Student Involvement

The assessment of student involvement has been the subject of intensive research in the past decade. In his recent book, Astin (1993) uses 57 measures of involvement, grouped

under five headings: academic involvement, involvement with faculty and peers, involvement in work, and other forms of involvement.

Pace's concept of quality of effort was developed into a questionnaire designed for four-year colleges and universities. The College Student Experiences Questionnaire (CSEQ) was elaborated in 1979 and revised in 1983, 1986 and 1990. This instrument measures the quality of effort college students invest in their education by means of 14 scales which cluster into three factors: academic and intellectual experiences, personal and interpersonal experiences, and group opportunities.

This basic idea was later adapted to community colleges, and a new questionnaire, the Community College Student Experiences Questionnaire, (CCSEQ) was designed for that purpose by Friedlander, Pace and Lehman (Lehman, 1991). In both instruments, the construct "quality of effort" is measured by determining how often during the current year students have engaged in a variety of activities related to the use of college facilities in order to learn and grow.

Neither instrument could be used readily in the present situation, not only because of the language difference, but mainly because of the differences between educational situations. The CSEQ was designed for universities and senior colleges, where entering students are generally older than Cégep students, have completed their professional orientation, and spend four years or more to get a bachelor's degree, most of the time residing on campus where they are provided with numerous academic and social activities.

The second instrument was closer to the situation under study. As noted by Lehman (1991), the original mission of community colleges was to provide vocational education to students who would not seek further education, and general education to students who planned to transfer to a four-year college or university. In addition, they now provide courses for remedial education, community service programmes and continuing education.

The existence of community colleges can be traced back to the 1860s, when foundations were laid for low cost college level institutions supported by federal funds and oriented toward vocational education. These democratic institutions rapidly gained favor: in 1982, there were 1200 community colleges, approximately 75% of which were public and 25% private, welcoming altogether 4,8 million students.

Similarities between community colleges and Cégeps are obvious: both open access to post-secondary education to large numbers of young and adult students; both offer a wide variety of two- and three-year transfer and vocational programmes, as well as continuing education and community service programmes; and students seem to encounter similar problems on their way to the diploma.

Notwithstanding these similarities, an even greater number of differences can be identified with respect to the clientèle and the curriculum. While an overwhelming majority of students come to Cégep right after graduating from high school, choosing a college in their closest environment, residing minutes from the campus and often still in their parents' home, community college students are generally older, work full or part

time, often have family responsibilities, and commute to a college they attend on a part-time basis. Additionally, while both types of institutions reflect the predominant racial and linguistic characteristics of their respective population, Cégeps are rather homogeneous with respect to language and race, whereas community colleges are described as multi-ethnic and multi-cultural (Lehman, 1991).

Regarding curriculum structure, Cégeps offer a true-core curriculum comprising 12 courses out of a total of 28 in pre-university programmes and approximately 42 in technical programmes, while in community colleges, the core curriculum is much less important. Lastly, the population of Cégep pre-university programmes accounts for some 50% of the total enrollment, whereas transfer education now represents a "rapidly declining part of what community colleges do" (Astin, 1993).

Other instruments have also been designed for the assessment of constructs close to student involvement and quality of effort. The questionnaires developed by Carrier (1991) measure some of the variables included in this research, (distance, expected results, motivation) but others are specific to adults studying in a distance education system (level of schooling, support from family and employer). The central construct is tutor utilization, which intersects only in a minor fashion with the construct of student involvement. As for the numerous tests used by Larose & Roy (1992), they assess the variables present in their explanatory model (academic, orientation and social learning, perception of self, perceived quality of the teaching and non-teaching environments, study habits, peer network, institutional commitment and other parameters). Although closer to the situation under study than the Carrier instruments, these tests did not fit

exactly the situation under study. In spite of these differences, all the instruments mentioned above have inspired at varying degrees, the design of the questionnaire needed in this research.

### 2.4.3 Summary

Summarizing the research reported above on student involvement (SI), we note the following:

1. SI is **defined** in the literature as a variable representing the amount of energy or effort students put in taking advantage of the opportunities offered to them by the college. It refers to a set of behaviours students exhibit at different levels while studying in college.

2. SI is **assessed** by means of questionnaires where students are asked to report how much time they have invested in the different activities offered in the college environment.

3. SI has been found **related** to a large number of cognitive and affective variables connected to achievement and academic performance in college.

From the start, this research was concerned with whether student involvement might be better defined within the context of cybernetic theory, that is, if the student were considered a feedback system which generates his own activities in order to detect and control specific stimuli in the environment. "Intrinsic mechanisms have been shown to be better modelled and analyzed by means of closed-loop sensory-feedback models, than by open-loop analyses of the relationships between extrinsic events and observed

responses." (Smith & Smith, 1966)

This survey of the notions of student involvement and quality of effort produced evidence confirming their relevance to the study of problems of underachievement. However, as a construct, "student involvement" appears to arise not so much from theoretical foundations as from practical educational considerations, which entails that it must be partly redefined for the different educational contexts in which it is applied. The research also revealed that none of the existing instruments could be used in the Québec situation, but that their contents and structure could guide the development of a new instrument. A reconstruction of the definition of student involvement for the Québec Cégep, starting from the research on student involvement of Astin and that on quality of effort by Pace and Lehman, and using the principles and techniques advocated in educational technology, is a central part of what was accomplished in this study.

## 2.5 College Outcomes

Various scholars, in taking stock of results accumulated by generations of researchers, have been concerned with the issue of how to classify college outcomes (Astin, 1973; Ewell, 1984; Jacobi, Astin, & Ayala, 1987). However artificial the separation of outcomes into discrete categories, some categorization is necessary when one wants to design studies bearing on educational results. Among different attempts, Astin's (1973) taxonomy has proved to be both useful and influential. This researcher suggests that college outcomes be classified according to type of outcome (cognitive or affective), type of data (psychological or behavioral) and time span (before, during or after college). This taxonomy elaborated decades ago has guided most work in this area.

Starting from Astin's categories, Pascarella & Terenzini (1991) organized the results of their comprehensive survey into nine chapters loosely addressing the categories of the above taxonomy. The acquisition of subject matter knowledge and academic skills, as well as of general cognitive competencies and skills obviously fell into the cognitive-psychological cell. Psychosocial development, values and attitudes generally fell in the affective-psychological cell. Educational attainment and economic returns corresponded to the cognitive-behavioral domain. However, moral development, career development and quality of life after college were more difficult to classify as they appeared to fit into more than one category.

In his latest publication, Astin (1993) reports using this taxonomy to organize his findings on 82 outcome measures into the broad following areas: personality and self-concept, attitudes, values and beliefs, satisfaction, patterns of behaviour, academic and cognitive development and career development.

In view of the objectives of this project, this research chose to study one outcome of a cognitive nature, academic performance, and one outcome related to the affective domain, persistence.

### 2.5.1 Academic Performance

As noted by Astin (1993), "academic achievement is surely the most researched topic in higher education". Several measures are available for its study and assessment. Course grades and the grade point average, scores on standardized tests administered at admission or later, and self-reports of growth and development are generally accepted

as adequate for institutional research purposes.

**Students' Grades Versus Self-Reports**

Although students' grades do not provide complete information about achievement in college, Astin reports that they tend to be considered as the best available indicator of how well students have adapted and responded to the demands of the programme and college in which they were enrolled. Colleges grant diplomas on the basis of grades obtained, and universities, although using other criteria, admit college graduates essentially on scores computed from grades.

In his latest book, Astin (1993) writes that "hundreds of studies using various measurements and methodologies have yielded strikingly similar results: college grade point average (GPA) can be predicted with modest accuracy (multiple correlation around .55) from admissions information. The two most potent predictors are the student's high school GPA and scores on college admissions tests, grades almost always [carrying] more weight than tests". (p. 187)

Pascarella & Terenzini (1991) argue that there are possible problems of reliability and validity with student self-reports. However, they report that Baird (1976), and Dumont & Troelstrup (1980) provide evidence indicating that self-reports have moderate positive correlations ($r = .25$ to $r = .65$) with more "objective" measures of knowledge. On the other hand, these measures are often found to correlate but moderately with each other (Astin, 1993).

Astin's whole theory of student involvement rests on research designs where standardized test results are regressed on scores obtained through self-reports. The external validity of students' self-reports, as well as their internal consistency, were demonstrated by Pace (1985) in connection with the College Students Experiences Questionnaire.

Claims have been made in the literature for the reliability of the human as instrument for collecting data. Lincoln & Guba (1985), after having noted that "classical anthropology utilized virtually no other instrument, and [that] much of that tradition has been maintained in modern sociology, at least the branch that continues to rely heavily on field studies", cite a 1955 study by Campbell, in which he "discovered that ranking of [ten submarine] crews on morale by land-based informants at the squadron headquarters correlated 0.9 with the crew's own rankings." (p. 193)

Recent research has established that educational attainment as measured by grades is influenced by student characteristics, institutional characteristics and college experiences. Although heavily dependent on personal ability and aptitudes, academic performance is also influenced by several other factors such as motivation, organization, study habits and quality of effort. Additionally, there are important factors more within the influence of institutional interventions, instruction on academic skills, advising and counselling, comprehensive support services and, to a lesser degrees, remedial or developmental programmes. These have strong effects especially during the freshman year. (Pascarella & Terenzini, 1991).

As reviewed in the preceding section, student involvement has been found to exert an influence on most aspects of the undergraduate student's cognitive development. As reported by Pascarella & Terenzini (1991), researchers working within the same conceptual frame have concluded that student involvement as defined is a key determinant of several outcomes of education. "Not surprisingly perhaps, a substantial body of evidence exists to suggest that the greater the student's involvement in academic work or in the academic experience of college, the greater his or her level of knowledge acquisition. This evidence is consistent whether extent of involvement is measured at the class level or in terms of broader-based types of involvement" (p. 98).

Astin (1993) also points to several involvement variables which can be associated with the student's grade point average, after the effects of inputs and environment are controlled. Acting as a tutor for other students, number of hours per week spent on academic tasks and talking with faculty outside class, giving presentations in class, among others, seem to have a positive influence on college grade point average. On the other hand, receiving tutoring, number of hours per week spent on partying, working full-time or watching television are all negatively associated with academic performance in college.

The same longitudinal study also made use of student self-reports of their growth in knowledge and intellectual skills. Although acknowledging that this type of measurement is not as valid as actual pre- and post-test measures, Astin (1993) states that recent studies have indicated that self-reports of gains do "have some modest validity when compared against actual pretest-postest changes in performance". He also underlines that

there is no real alternative to this mode for collecting data about intellectual change, in view of the high costs and impracticality of administering tests for institutional research.

In their search for the variables which are most importantly related to academic performance, Terrill & Ducharme (1993) find that the number of hours spent on study each week is significantly associated with performance during the first term in college, after having controlled for performance in secondary school. They also find time spent on work for pay negatively associated with success in college.

The above results are all mutually corroborating. They confirm that studying relationships with academic performance using the GPA is a most frequent undertaking in research on higher studies, and that academic performance has been found related to numerous student involvement behaviours. They also confirm that self-reports are being widely used to assess growth and intellectual development, as a practical necessity. Therefore, and for reasons that will be elaborated on in Chapter 4, in the context of this thesis research, self-reported progress was considered as part of the student involvement process, and its relationship with academic performance as assessed by the GPA was explored.

### 2.5.2 Student Persistence

Research pertaining to student persistence is abundant and manifold. This research is not merely of theoretical interest. The successful retention of students offers at least three benefits: the student will be able to collect the rewards that a college degree entails; the institution will continue to receive the income associated with the student's attendance,

and society will profit from the skills of students having become more productive.

In their last review on how college affects students, Pascarella & Terenzini (1991) classify the numerous theories and models related to persistence which have emerged since the 1960's, under the labels "developmental" or "college impact". The first, arising from developmental psychology for the most part, address the "nature, structure and processes of individual human growth", while the second, originating from the work of educational researchers, focus on the "environmental or sociological origins of student change".

In the first category, persistence in college has traditionally been studied as a function of personality. Such were the approaches developed through Perry's (1970, 1981) Scheme of Intellectual and Ethical Development and Kohlberg's (1969, 1984) Theory of Moral Development, which were the most prominent among cognitive-structural theories put together in the 70s. These theories posit a series of stages, through which individuals have to go in the developmental process; these stages are both hierarchical and irreversible.

Other developmental models emphasize types, or distinctive but relatively stable individual differences. Individuals can then be categorized into groups based on distinctive characteristics pertaining to the ways in which they perceive their world or respond to conditions in it. These models have led to the development of instruments that are used to identify individual types, the best known of which are probably Witkin's Cognitive Style Test (1962, 1976), Kolb's (1976, 1984) Learning Style Inventory and the Myers-Briggs Type Indicator (1980).

As noted by Stage (1989), the above strategies can be described to take either a psychological or a sociological orientation. The former focus on micro-level development, which assumes that students progress through a sequence of psychological stages, with greater development contributing to greater persistence. The latter focus on macro-level aggregation of students into demographic groups to observe how constellations of traits and structural variables covary with persistence.

As for the approaches labelled "college impact", they are described as focussing less on intra-individual development than on the environmental origins of student change. According to Pascarella & Terenzini (1991), these models tend to be more eclectic and to identify sets of variables that are presumed to exert an influence on one or more aspects of student change. These models also specify and provide for the interaction of student and environmental characteristics within the organizational context. Whereas developmental models concentrate attention on outcomes, or the nature of student change, college impact models focus more on the sources of change.

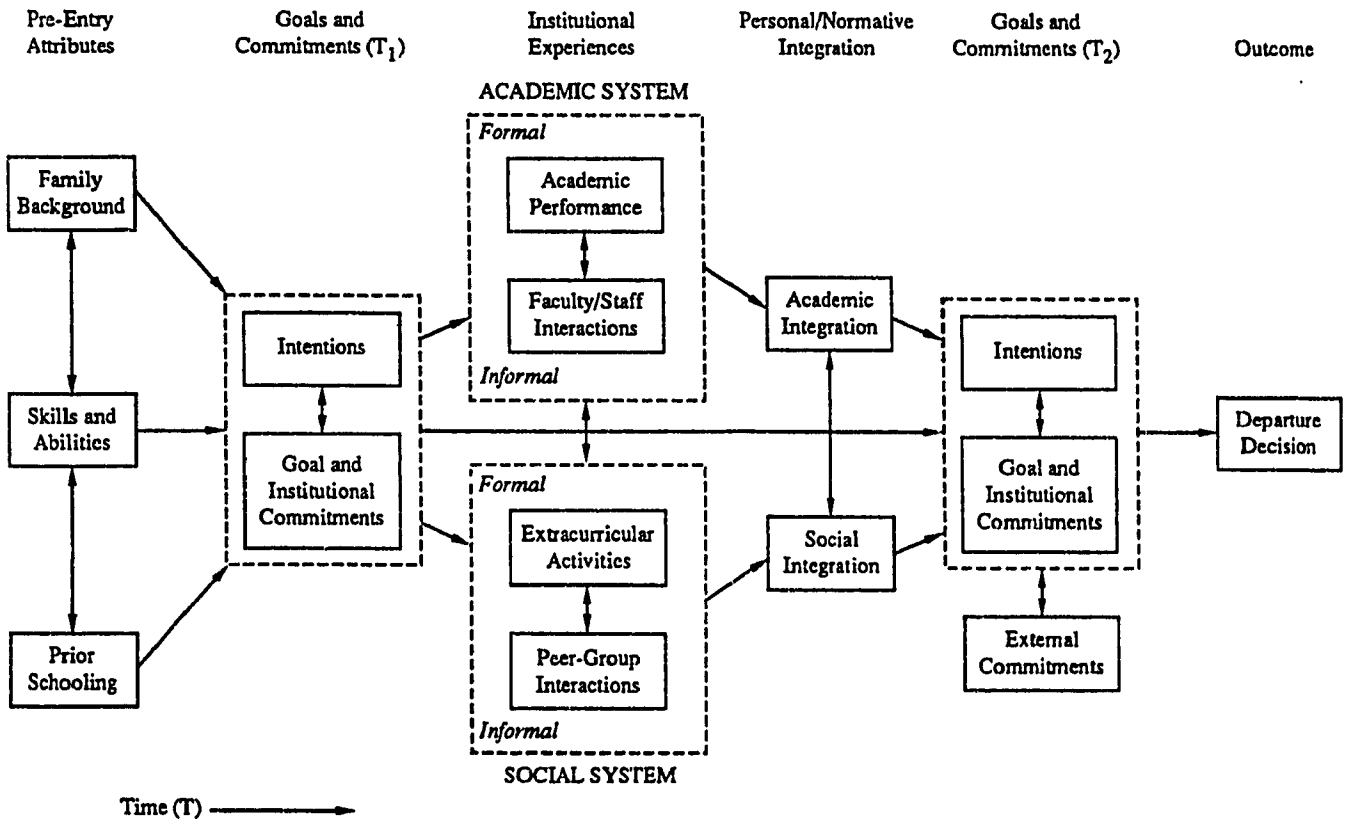
Spady (1970), then professor of sociology at the Ontario Institute for the Study of Education, proposed a theoretical model seeking to explain the dropout process in higher education, in reference to Durkheim's theory of suicide. He recommended that, in the future, research focus on the interactions between student attributes and the demands imposed on students by various sources.

The most prominent contribution to the research on college impact is Tinto's (1975, 1987) Theory of Student Departure. As illustrated in Figure 1, this theory seeks to explain the

college student attrition process. Starting from the work of Spady (1970), Tinto poses that students enter college with varying patterns of personal characteristics, academic preparation and predispositions with respect to college attendance and institutional goals which influence behaviours at entrance in college. Interactions with individuals and groups subsequently modify these behaviours and underlying motives, satisfying

**Figure 1**

**Tinto's Model of Institutional Departure**[7]




7 (Source: Tinto (1987). *Leaving College.* Chicago: University of Chicago Press, p. 114. All rights reserved. Used by permission)

interactions leading to greater integration to the system, and negative interactions potentially leading to a departure decision. Tinto argues that college integration is the important mediating variable between students' backgrounds (prior performances, demographic information, family background) and persistence. In the Tinto model, student's initial goal and institutional commitments (respectively, the amount students value an undergraduate degree, and the amount they value their particular institution) influence their integration into the academic and social life of college. As explained by Pascarella & Terenzini (1991), students' integration is based on the congruence between their commitments and activities, on the one hand, and the college's academic and social opportunities and feedback, on the other. Students' integration influence their subsequent commitments, which ultimately determine their decision to remain in school. Integration exists when students can establish a niche for themselves within the college community.

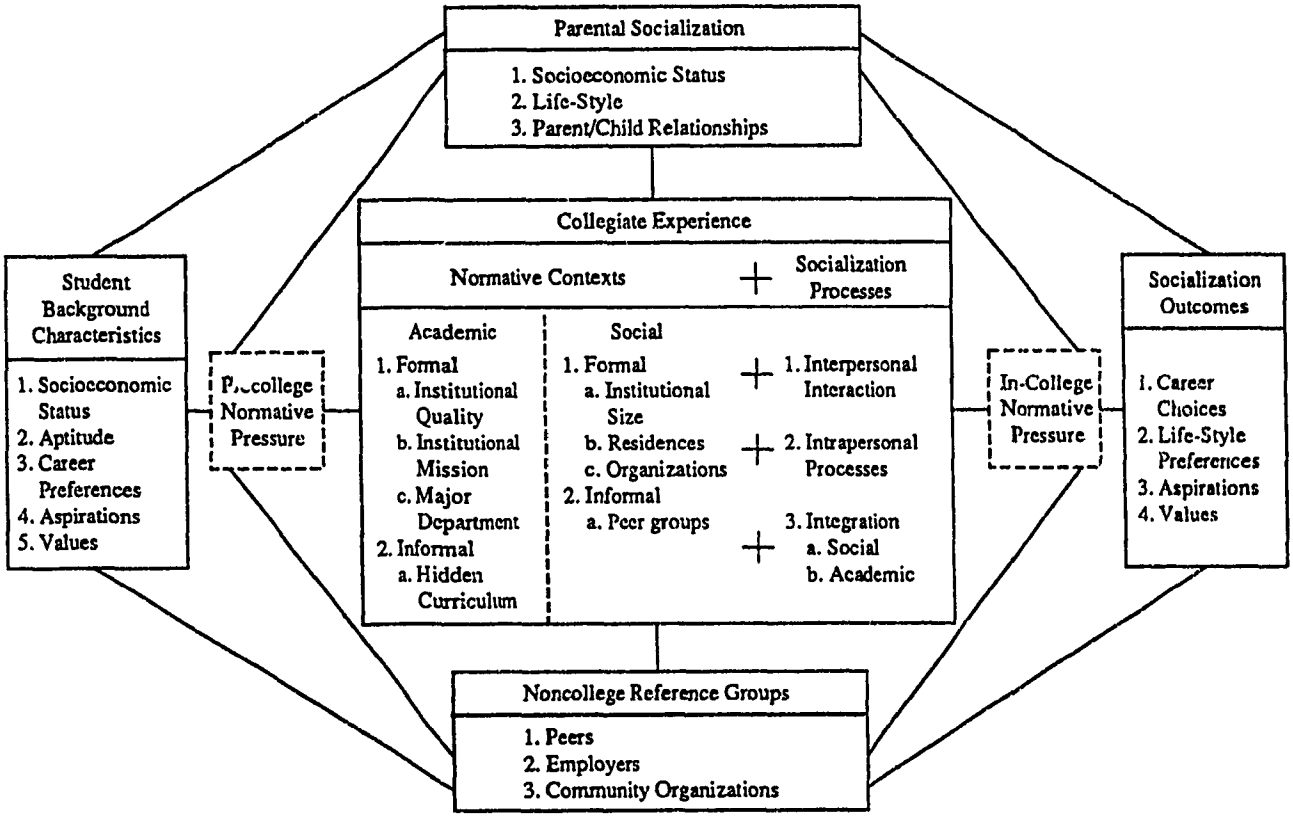
More recently, Weidman (1989) proposed a Model of Undergraduate Socialization purporting to integrate both psychological and socio-structural influences on student change. As illustrated in Figure 2, this model gives particular attention to noncognitive changes, such as those involving career choices, life-style preferences, values and aspirations.

Weidman's model is somewhat more explicit than the others reviewed above in its explanation of the process of undergraduate socialization. Not unlike the others, Weidman hypothesizes that students bring with them a set of background characteristics, but also in addition to these, pressures to conform deriving from parents and other sources of influence in the student's environment. These variables shape as well as

constrain students' choices, thereby influencing the process of socialization that brings a student to decisions about whether to maintain or change values, attitudes and aspirations held prior to attending college.

**Figure 2**

**Weidman's Conceptual Model of Undergraduate Socialization**[8]




8 (Source: Weidman (1989). Undergraduate Socialization. In j. Smart (ed.), *Higher Education: A Handbook of Theory and Research* (Vol. 5). New York: Agathon Press. All rights reserved. Used by permission.)

Because of its recent introduction, this model has not been applied much to this day and its validity is yet to be confirmed. However, both Tinto's and Weidman's representations seem to model closely enough some of the characteristics of the Cégep environment, the first in focussing on value attributed to a college education to explain integration into college, and the second in including career preferences and interactions with parents to account for socialization.

According to Tierney (1992), Tinto has worked in the tradition of early researchers, by asking two central questions: 1) What are those bonding mechanisms that integrate students into the life of the institution? and 2) How might postsecondary institutions and students theoretically be conceived? Tinto's research was pivotal in refocusing the field on understanding persistence to be the product of the interaction between students and their experience in the college environment. As noted by Stage (1990), few would question today that students' commitment, academic and social integration are crucial to their academic success.

Scores of researchers have endorsed Tinto's basic explanations and have concentrated on testing whether the model holds up under scrutiny when different characteristics are analyzed. Among others, Pascarella & Terenzini (1979, 1980, 1983), Bean (1980, 1985), Stage (1989, 1990) have made substantial progress in measuring integration, and testing its impact on persistence. Institutional commitment, goal commitment and integration are generally measured with Likert scales that ask students to rate the extent to which they agree with statements describing basic goals, values and ideals of a university. Rozovsky (1990) describes this as identifying the extent to which students "think like faculty."

Despite improvements in predicting student persistence with these scales, Brower (1992) contends they neglect the "second half" of the interaction between students and their environment: how students shape and modify their college environment by engaging in specific activities and by pursuing their own goals and tasks. While the integration **concept** was developed to explore the dynamic interactions between students and colleges, the integration **instruments** measure only the extent to which students agree with a set of goals, values and ideals of the university, a process that might more accurately be called "conformity". Student performance also depends on how they establish a niche in the university, based in part on their own perceptions, goals, choices and actions.

The "second half" of the integration concept, then, describes how students shape their effective environment through their goals, expectations, choices and actions. More concretely, students shape their experience of college by, for example, choosing their own educational paths (majors, classes, study habits and locations, and performance standards) within acceptable parameters, as well as by developing their own living habits and routines. Again consistent with Tinto's concept of integration (but differing in how it has been measured), the process of integration *is not one of finding a fit between* the person and the environment. Instead, students shape their environment by choosing to pursue their own tasks and goals while their environment shapes them through its norms, expectations and opportunities.

For this interactive process to unfold, Brower (1992) concludes it is necessary for an institution to offer options to students. Students may drop out of college because their

goals and tasks do not fit the opportunities offered by their institution. This same author suggests we observe students from the moment they graduate from high school, pursuing different goals and tasks, becoming involved with different aspects of the institution, making different schedules and evaluating their performance using different standards. Students who find a congruence between their own goals and tasks and the opportunities and feedback from the environment are likely to remain in school.

In order to capture students' goals, Brower (1992) suggests asking them to list their "life tasks", that is, the problems and situations with respect to college life that they see themselves working on and devoting energy to solving. These predominances represent what Brower calls the "second half" of the integration concept proposed by Tinto to explain and predict student persistence.

Other researchers also stress the importance of students' personal objectives. Stage (1989) finds that different types of students pursue different outcomes in college, based on personal goals and educational objectives. Students interested in becoming certified in college, that is, using college as a means to earn a degree and get a job, are most likely to remain in school when their academic integration is high and when they highly value their particular college. In contrast, for students interested in gaining skills to help others (to prepare for community service, for instance) the decision to remain in school is influenced by the amount they value their goal of graduating. Additionally, Stage notes that compensatory relationships exist between students' integration into their academic and social life, and between the effects of these variables on persistence: as the level of social integration increases, the positive influence of academic integration on persistence

becomes less pronounced. It is suggested that these compensatory relationships describe how different students use different combinations of college experiences to enable them to remain in school.

Stark et al. (1989) report that students' academic successes are largely influenced by their personally held academic goals and expectations. They argue that students' goals and expectations must form the basis of an assessment of academic skills, abilities, and performances. Furthermore, a large literature exists on how self and other expectations influence performance, the most consistent finding being that we live up or down to the expectations set for us.

Bean and Metzner (1985) put forward a model of the attrition process for nontraditional undergraduate students that was derived from an extensive review of related literature. Nontraditional students are defined as follows: older than 24, not living on the campus, or a part-time student, or some combination of these three factors. These students are found not greatly influenced by the social environment of the institution and chiefly concerned with the institution's academic offerings, especially courses, certification and credit. Using the above model as a starting point, Metzner (1989) has found perceived quality of academic advising to have a significant effect on freshman attrition in a large urban university.

Following in the same direction, Carrier (1991) refers to the work of Spady, Tinto, Bean and Metzner as well as several others, to develop and test a model of the influence of tutor utilization on three variables related to student achievement in post-secondary

distance education. His general conclusion is that:

> if a tutor's tasks are perceived as useful - and more intensive telephone contacts are made during a particular course - higher levels of satisfaction from personal academic goals will result, better academic results will be achieved and the probability of persistence until the end of the course will increase. (p. v)

Tinto himself is the first to acknowledge that adult students and nontraditional students generally, may not fit the schema so well, and that individual differences are not easily integrated into the model. In a recent review on college attrition, Tinto (1988) writes:

> Though it has long been recognized that the process of student departure is longitudinal, researchers have in fact done very little to explore the temporal dimensions of that process. ... Past research has implicitly assumed that the process of student departure is essentially invariant over the course of a student career. (p. 438)

When reviewing the research on high-school withdrawal behaviour, Finn (1989) makes a similar point, arguing that it is time for researchers to view a student's decision to drop out as the culmination of a developmental process that begins in very early grades.

### 2.5.3 Summary

A brief summary of the research on student persistence in college can be made as follows:

1. The **importance** of the problem of student attrition in college is evidenced by the amount, variety and quality of research on the subject.

2. Student persistence is generally **defined** as the product of the interaction between the student and the environment.

3. Student persistence is partly **explained** by various constructs, namely: personality, developmental stages (Perry; Kholberg); background and characteristic traits (Witkin; Kolb; Myers-Briggs); involvement (Astin) and quality of effort (Pace); academic and social integration (Tinto); socialization (Weidman); personal goals, educational objectives, expectations (Stage; Stark, Shaw & Lowther); life task predominance (Brower); perceived quality of academic advising (Metzner).

4. Most of the models and theories used to explain and predict persistence are related through their central construct. Astin's Student involvement, Pace's Quality of effort, Tinto's Integration, Weidman's Socialization and Brower's Life task predominance are all different terms designating a somewhat similar process comprising variables that influence student achievement and persistence. This makes them **complementary rather than competing** attempts at improving student persistence.

This research was not investigating into persistence *per se*. The review of literature provided evidence that student retention is a concern of prevailing importance for educators and researchers in the American college system. It also confirmed that studying persistence in connection with student involvement was supported by previous research.

## 2.6 Hypothesized Model

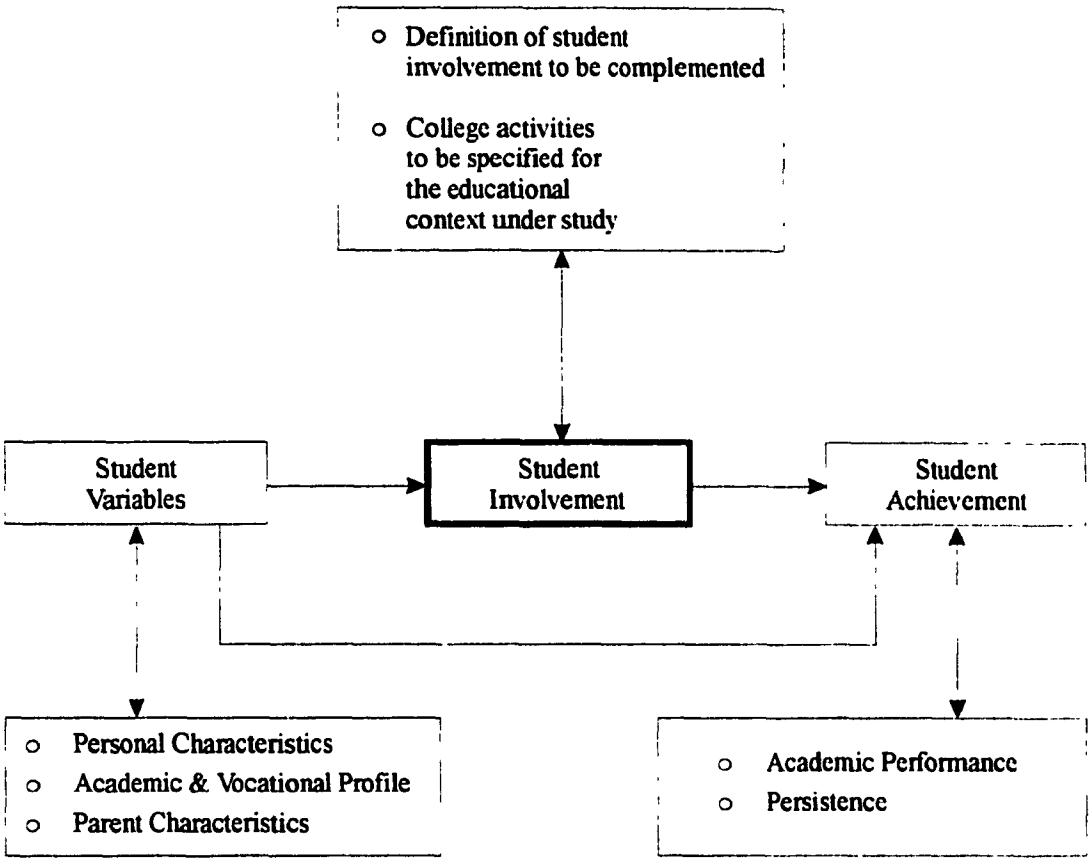
Considering the enormous body of research on the variables included in this study, this review cannot pretend to be exhaustive. However it reflects the great social and educational concerns for meaningful college experiences and the need for further rigourous efforts in this area. By providing an overview of current findings, it opens valuable insights into what happens to students in college, as a result of the interplay of variables related to who students are and what they do while in college. It also suggests that the factors which may influence student involvement and the attainment of educational goals depend on a complex pattern of interactions between numerous personal and environmental characteristics.

The purpose of this research project was not to challenge any of the reviewed theories and models but to complement current findings, and to submit to the test of experimental data, a hypothesized model supported by existing research and intended to explain the inter-relationships occurring between a specific set of variables, in the educational situation prevailing in Québec Cégeps.

Figure 3 presents the general model that was elaborated as a result of the review of literature. It illustrates that the purpose of the study was to explore and assess the hypothesized relationships between some student personal, academic, vocational, and parent characteristics, student involvement as redefined, and academic performance and persistence in college. This general model, developed at the end of the review of literature, was elaborated later in the study, following the redefinition of the construct of student involvement in the framework provided by educational technology.

**Figure 3**

**General Model of Student Experiences in Cégep**



# CHAPTER 3

# METHOD

In the preceding chapters, the nature, purpose and context of the study were explained, followed by a survey of relevant literature. This chapter describes and justifies the methodological approach used to conduct the study.

The project was divided into the three following components: 1) modelling student involvement in the context of Cégeps and designing an instrument for the assessment of student involvement and other variables; 2) assessing the validity and reliability of this instrument; 3) exploring the relationships between variables included in the model. The operationalization of each component required a different methodological approach. For the sake of clarity, this chapter presents the method used for each component successively. Deontology concerns are reported in the last section.

## 3.1 Phase 1: Modelling Student Involvement and Designing an Instrument

The review of prior research revealed how student involvement was defined and assessed in the context of American four-year and community colleges, mostly through the work of Astin (1970, 1984, 1985, 1993), Pace (1979, 1982, 1984, 1989) and Lehman (1991). Other researchers produced evidence that numerous interacting variables need to

be taken into consideration when one wants to model how students reach educational goals in college. Putting results together led to a general model which the present study proposed to complete in more detail and validate in the context of Cégeps. This model represented student involvement as a comprehensive variable mediating relationships between student characteristics and achievement-oriented variables.

In view of the objectives of this project, it was necessary to start by focussing on the main construct of "student involvement", to determine its real content and meaning in the current educational context and how it could be operationalized and assessed.

### 3.1.1 Purpose

The purpose of this first component of the study was to provide an instrument for the assessment of student involvement. This required, as a preliminary step, redefining the construct of student involvement in the context of Cégeps and completing the model based on existing theory, to represent the redefined construct and the variables of interest. Only then could a questionnaire be designed, to assess student involvement and the other variables present in the model.

### 3.1.2 Design

It was obvious from the outset that traditional modes of inquiry could not provide the proper framework needed here. While acknowledging that these have "served us remarkably well in solving well-structured technological problems", Churchman (1968) points out that they "are inadequate for dealing with the imprecisely structured human problems we face today". When dealing with objects as complex as human systems,

Churchman suggests we consider "that everything interacts with everything else, thus invalidating the traditional reduction of problems into separate subproblems; that the observer cannot be objective, thus necessitating the development and utilization of an observer-inclusive epistemology; ... [and] that current cross-cultural and culturally specific measures of performance are semantically impoverished".

These reflections by Churchman exerted a significant influence on the methodological choices made in this study. They confirmed that a new instrument adapted to the language and culture of Cégep students was necessary before any assessment of student involvement in this environment was attempted. The decision to refer to actors in the system, in order to generate knowledge about the system seemed inescapable. Lastly, it appeared desirable to include as many variables as necessary to ensure a complete and reliable model of the situation under study.

The concern was with meeting the needs of learners, educators and society as well. The challenge was to reduce the discrepancy between what is and what would be required, for a particular group of people, at a particular point in time, in order to increase the probability of systems reaching their goals. Under these conditions, the systems approach, which involves problem solving from the systems' point of view, appeared appropriate. It was applied in Phase 1 and throughout the project.

Among alternative modes of inquiry, the systems approach has been applied consistently and successfully in educational technology research. Kaufman (1972) uses it for educational systems planning and needs assessment; Mitchell (1974, 1975, 1980, 1984)

applies it to demonstrate the role of positive and negative feedback in education, and to provide a model of learning for educational cybernetics; Sharma (1980) bases his interventions in the field of non-formal education on this approach. Boyd (1982a, 1982b, 1992), Boyd & Mitchell (1992), Boyd et al. (1984) apply systems concepts in the education of educational technologists; in the design of intelligent computer-assisted learning systems; to analyze levels of educational communication and control; and to promote computer-mediated collaborative research. The systems approach has also been used for the clarification of a concept: Checkland (1981) reports a process where soft systems ideas were applied as a means of rigourously examining a human activity system referred to as "terotechnology".

The systemic approach applied here was one where researcher, teachers and students collaborated as parts of the observed system. This required working in an inductive manner, starting from results of prior research, and information provided by actual actors in the Cégep system. This approach was operationalized by creating inquiry groups whose mission was to assist the researcher in modelling the Cégep student system, with the purpose of redefining the construct of student involvement within this context.

Group A comprised five teachers, three women and two men. Experienced teachers were solicited by the researcher, on the basis of their concern for and involvement in student support. Also considered was the programme to which they were actually committed and the discipline they were teaching. Altogether, they covered the three families of programmes dispensed in the pre-university sector throughout the Cégep network (*Sciences de la nature, Sciences humaines, Arts et lettres*). Five disciplines were represented:

Art, Biology, French, Mathematics and Philosophy. Formed at the very beginning of the study, this group assisted the researcher in redefining the construct, designing the model and elaborating a draft version of the questionnaire.

Group B comprised 12 students, seven young women and five men, who were selected progressively in view of the design of the model, and the validation of the assessment instrument. These students were recruited by means of an advertisement published in the college weekly bulletin, the *Cégep-Inter*, asking for student research assistants and promising a small fee. A total of 30 students registered at the Employment Center. Candidacies were examined and purposive sampling techniques as put forward by Lincoln and Guba (1985) were applied. Starting with a small kernel of four students coming from different pre-university programmes, new subjects were selected serially, that is, no new subject was selected until all previous ones had been selected and tapped for information. Each subsequent subject was chosen so as to complement earlier units, with the purpose of including maximum variation in the sample, through the selection of deviant, extreme and critical cases as well as typical ones. Attention was paid to continously adjusting and readjusting the focus of the group, as salient aspects of the situation emerged. The process was repeated until redundancy was achieved and no new or significant information could be added profitably. Some of the students from Group B later served as research assistants for the administration of the questionnaire.

### 3.1.3 Procedure

The systems modelling procedure applied in this process was adapted from Boyd's (1992) Modelling Scheme for the cybernetic modelling of a learning sub-system. The steps of this

procedure can be summed up as follows:

(1) Identify the aims and ownership of the focal system being modelled.

(2) Map and analyse the context of the focal system.

(3) Diagram the internal structure of the focal system.

(4) Describe and analyze the operation and dynamic behaviour of the focal system.

(5) Tracing back the history of negotiations and commitments, and re-interpretation ventures, make a prognosis for the focal system's future.

(6) Prescribe and share your prescriptions with other stake holders.

The process included, in chronological order, individual interviews with teachers and students from both inquiry groups, meetings with Groups A and B for an informal validation of the model and questionnaire, and a pilot test of the questionnaire with Group B.

### 3.1.4 Articulation Between Inquiry Groups (Phase 1) and Instrument Validation (Phase 2)

Interviews and group meetings were conducted with the help of a simple protocol (Appendix A) elaborated after Boyd's (1992) Modelling Scheme. In individual interviews, teachers and students were asked questions which ultimately yielded the required information. The use of this protocol helped steer the inquiry groups away from mere personal insights and toward the production of a quite elaborate description of the learning situation in Cégeps.

The inquiry groups developed explicit knowledge about the involvement of Cégep

students and its importance for progress. However this reflective knowledge needed to be validated by wider sampling and compared with the results of other studies in order to achieve credibility and to become the basis for further research. Consequently, the variables identified in the groups were operationalized as sets of questions in the survey instrument. Items from other instruments identified through prior research (Pace's CSEQ, 1989; Lehman's CCSEQ, 1991; Carrier, 1991; Larose & Roy, 1992) were fed into the process as information relevant to the construction of the new instrument. The validation and modelling tasks *per se* were then performed by this researcher. The resulting definition, model and questionnaire were confronted with perceptions of inquiry group members in group meetings. Data collected through individual interviews and group meetings were recorded in writing and used to complete the model under design.

The pilot test was conducted on the draft version of the questionnaire ($QEA_{Draft}$). Students were first given the same instructions that were to be given later to the sample of students in the study. Then they were asked to complete the questionnaire without asking for further information. The last part of the meeting was devoted to a discussion of the questionnaire, taking all items successively. Students were asked whether they (1) understood the questions, (2) considered the questions meaningful and worth asking, (3) felt uncomfortable with some questions, (4) would eliminate any questions, and (5) would like to add other questions.

The objective of the pilot test was to validate the formulation of the questions, the length of administration, and to modify the questionnaire according to the students' reactions. No statistical analyses were performed at that point. Results of the pilot test served to

eliminate 16 items from $QEA_{Draft}$ and add 2 new items. While the draft version contained 174 items, the resulting pilot version ($QEA_{Exp}$) contained 160.

### 3.1.5 Results

The results of the first phase of the study are presented and discussed in Chapter 4. The definition and hypothesized model of student involvement can be found in Chapter 4, while the experimental version of the questionnaire $QEA_{Exp.}$ is reproduced in Appendix B.

## 3.2 Phase 2: Exploring the Properties of the Instrument

While information had been gathered and structured for the design of the model and questionnaire in Phase 1, the data collection in Phase 2 provided all the quantitative data to be used in the rest of the study. In the second phase, this data served to assess the metric properties of the questionnaire. In Phase 3, it was used to validate the research hypotheses.

### 3.2.1 Purpose

The second part of the study was concerned with establishing the value of the questionnaire as an instrument to assess several variables. Its specific purpose was to evaluate the validity and reliability of the different sections of the questionnaire. Operations included selecting a sample and controlling its validity, administering the questionnaire and performing item and factor analysis on the different sections of the questionnaire. Recommendations for revision of the questionnaire were formulated.

### 3.2.2 Design

The target population in this study was the population of students enrolled in pre-university programmes, in public francophone Cégeps. The reasons for restraining the study to this population were numerous.

The Québec school system now comprises 47 public Cégeps, 42 of which are francophone. Educational research projects that include the use of written instruments must necessarily opt for one language sector or the other. The researcher's career having been connected with the French-speaking system for several years, the choice of conducting the research in this sector was straightforward. The researcher was also aware that, whereas anglophone Cégeps may, and in fact do use instruments designed for similar populations in the rest of Canada or the United States, when appropriate, there is a shortage of experimentally validated instruments for supporting student development and research in francophone institutions.

The necessity to limit the study to public Cégeps was obvious. Private institutions are fundamentally different from public institutions in many ways. In 1991, there were 53 private[9] and 48 public college-level institutions.[10] The total enrollment in private institutions was then 19 943, and 141 300 in public institutions. The average enrollment in private institutions was therefore computed to be of the order of 375, while that in

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9 Out of the 53, 25 are labelled *Collèges privés déclarés d'intérêt public (DIP)*, and 28 are *Collèges privés sous permis (SP)*. All statistics in the current section are for 1991, and were extracted from: Ministère de l'Enseignement supérieur et de la Science (1993a).

10 Not counting 11 *écoles gouvernementales* endowed with very specific missions. Out of the 48 institutions, 46 were Cégeps.

public institutions was more around 2 900, with local enrollments ranging from 900 to over 6 000. It follows that public colleges are generally much larger institutions than private ones.

Additionally, out of the 25 private DEC-granting institutions, 9 offer only technical programmes in one or a few areas of specialization, e.g. electronics, business or fashion industry; 7 others privilege pre-university programmes and try to select students with a strong academic background; and only 9 offer both types of programmes, but they do not generally present the mix of technical and pre-university programmes that characterizes public institutions and does create a different educational ambiance. It would probably have been quite difficult to draw conclusions from data gathered in such different environments.

The decision to restrict the study to pre-university programmes was a methodological choice not inspired by lack of interest for this other part of the Cégep clientèle, but rather a constraint that imposed itself as more realistic in an exploratory research project. In order to be able to expect significant results from a correlational study, the population and sample must present a certain homogeneity on research related variables. Experimental data showed that 89% of pre-university students in the sample were planning to transfer to university and statistics[11] show that 86% do so. On the other hand, a majority of technical programme students plan to enter the work market immediately after obtaining their *Diplôme d'études collégiales (DEC)* while some 19% complete courses required for transfer to university. This difference in goals and

[11] Ibidem.

vocational profile, combined to the differences in curriculum and learning activities, made it impossible to consider both types of programmes in a first study. However, results established in this research do provide an invitation to extend the inquiry to this remaining 45% of the Cégep population enrolled in technical programmes.

Sample size was also an issue in the design of this project. In correlational studies, the size of the sample can be determined after estimating the probable size of the correlation likely to be obtained, based on previous research (Borg and Gall, 1989). In her study of the psychometric value of the CCSEQ, Lehman (1991), working with a sample size of 1801 students from 11 colleges, produces results where correlations as low as .11 are significant at the .0001 level.

According to Borg and Gall (1989), the level of statistical significance of a correlation coefficient is determined in large part by the number of cases upon which the correlation is based. For example, with 22 cases, a product-moment coefficient of .54 is needed to be significant at the .01 level. If 100 cases are available, however, a correlation of .25 is significant at this same level, and with 1 000 cases, a correlation of only .08 is significant at the .01 level.

Garrett (1966) (as cited in Borg & Gall, 1989) produces a table where correlations of .15 obtained from a sample of 300, are considered significant at the .01 level. Considering the above, it appeared reasonable to set the significance level at .01 in the final model and work with a sample of at least 300 students. To guard against problems caused by attrition, missing subjects, missing data and other possible disturbances, it was decided

to pre-select 21 groups of students, thus aiming at a theoretical total sample size of approximately 420 subjects.

The approach used to test the validity and reliability of the questionnaire was as generally applied in social science (Kerlinger, 1986, Sax, 1980). Content and construct validity were assessed using several formal and less formal means. Elements of existing instruments assessing the same variables were adapted and integrated into the questionnaire (Sax, 1980). The questionnaire was submitted to expert judgment by college teachers who were members of the focus groups and by a systems approach expert. A pilot test was conducted to validate the formulation of the questions and the length of administration of the questionnaire (Amundsen, 1988; Carrier, 1991). Item analysis was applied to assess the reliability of the scales formed to assess student involvement (Kerlinger, 1986; Lehman, 1991). Factor analysis using principal components and orthogonal rotation (Harman, 1967; Mulaik, 1972; Tabachnick & Fidell, 1983) were performed to ascertain that each dimension aimed at was properly measured by the corresponding scale.

Principal Components Analysis (PCA) was preferred over Factor Analysis (FA) for this first study, following advice from Tabachnick & Fidell (1983) : "Most researchers begin their analysis using PCA extraction and Varimax rotation. Then, from the results, they estimate the rank of the observed matrix, the number of factors, and subsequently experiment with different extraction and rotation methods". As FA solutions have lower dimensionality than corresponding PCA solutions, PCA was chosen over FA so that oversimplifications would be avoided. Varimax was chosen over alternative rotation

methods as the most commonly used.

More details concerning the design and procedures used in this part of the study are presented in Section 3.2.5 and also in Chapter 5.

### 3.2.3 Sample

**External Sample Validity**

Establishing the external validity of a sample is required in order to determine the population to which results may be generalized. In order to keep the research design simple, the sample was drawn from the population of pre-university programmes in one institution, namely *Collège de Sherbrooke*. Questions that arise in such a situation are: Is this sample representative of the available population of that college? Is it also representative of the target population? External sample validity will be demonstrated here in two steps: by comparing sample and populations across a few variables, and by comparing the same sets across institutional characteristics.

**Comparison Across Demographic and Academic Variables**

As advocated by Borg and Gall (1989), since simple random sampling was not performed, data were gathered about the experimentally accessible and the target populations, to assess the external validity of the sample. Comparative data for the sample, available and target populations for the year 1992-1993 were not easily obtained. Data for age, gender, language and programme of enrollment were available for both the sample and the total population of Cégeps, but locally, no statistics were available for age or language. In spite of this, control of the external sample validity by comparison of

sample and populations across these four variables was performed, where possible, using $\chi^2$. As usual, this statistic was computed in order to determine if frequency distributions varied significantly from each other. Results presented in Table 1 show that the three sets were homogeneous with respect to gender, and presumably with respect to language, for anyone familiar with this institution would readily acknowledge that its population is almost uniformly French-speaking.

**Table 1**[12]

**Comparison of Sample and Populations Across a Few Variables**

| Variables | | Sample (N = 389) | | Available Population (N = 2 538) | | Total Population (N = 61 872) | |
|---|---|---|---|---|---|---|---|
| Name | Categories | n | % | n | % | n | % |
| AGE | 17 and less | 109 | 28.02 | N.A. | N.A. | 23 946 | 38.70 |
| | 18-19 | 240 | 61.70 | | | 29517 | 47.70 |
| | 20 and up | 40 | 10.28 | | | 8409 | 13.60 |
| GENDER | F | 237 | 60.93 | 1 456 | 57.37 | 34 587 | 55.90 |
| | M | 152 | 39.07 | 1 082 | 42.63 | 27 285 | 44.10 |
| LANGUAGE | French | 378 | 97.42 | N.A. | N.A. | 59 180 | 95.65 |
| | Other | 10 | 2.58 | | | 2 692 | 3.85 |
| PROGRAM | Sc. de la nature | 135 | 34.70 | 593 | 23.37 | 17 596 | 28.44 |
| | Sc. humaines | 216 | 55.53 | 1 645 | 64.81 | 36 519 | 59.02 |
| | Arts et lettres | 38 | 9.77 | 300 | 11.82 | 7 757 | 12.54 |

A statistically significant difference on age was detected between the sample and the total population of Cégeps ($\chi^2 = 30.52$, $p \leq .001$); the sample contained fewer students aged 17 and under, than the total population did. This difference could be accounted for by the date at which measurements were taken. Official statistics for the total population were

12 Source: Ibidem, plus experimental data.

computed at point of entrance in Cégep (September 1992), whereas survey data was collected in April 1993, when a good number of students had turned one year older. Although statistically significant, this difference was of no consequence for by that time, the whole population was also older.

There was also an over-representation in the sample, of students from one programme family, namely *Sciences de la nature*, resulting in an under-representation of students in *Sciences humaines*. This bias was introduced by the withdrawal of two *Sciences humaines* groups from the experiment, towards the end of the data collection period, as explained further in this chapter.

Variables in Table 1 were not extremely critical to this research: language was not entered in the analyses for lack of variance among students on this variable; age did not enter the regression models; and gender was not retained in the final model. It would have been interesting to obtain statistics on other variables related more closely to the research problem, namely on performance, persistence or graduation. But it takes a long time before official statistics of this type can be published. The latest available at the time this report was written, were for the 1989 cohort, and could not confidently be compared with corresponding figures for the 1993 sample. Moreover, statistics do not always refer to the same parameters as those used in sample or population data, and when this is the case, comparisons are simply not possible. Considering that matching samples on demographic variables is not the only method for controlling external validity, it was concluded that the sample, available and target population were reasonably homogeneous with respect to age, gender, language and programme of enrollment, and the verification of the

external validity of the sample was pursued by other means.

**Comparisons Across Structural Characteristics**

As acknowledged by Borg & Gall (1989), although drawing a sample from the total population is the ideal method, drawing a sample from an accessible and appropriate population is common pratice in educational research. Generalizing results to the target population then requires two inferential leaps: from sample to available population, and from there to the target population.

In this case, the first leap presented no problem, because of the sampling procedures used. Cluster sampling methods were applied, with the class section, or group, as the unit of sampling. These stable groups comprise approximately 25 students showing different levels of ability and preparedness for college studies, enrolled in the same program, and at the same level. They are formed before the beginning of the year, using official secondary school and ministerial data, and are believed to be equivalent. One class section for a particular course, e.g. Calculus 103, will comprise all the students in one group, and occasionally, one or a few students from another programme or level. Cluster sampling is sometimes said to be less accurate than simple random sampling because of multiple sampling errors, one at each stage, that is, in the selection of groups and individuals. But since groups were chosen across all families of programmes, and since there were no reasons to suspect that groups might not be equivalent, it was assumed that the sample was representative of the population of pre-university programmes at *Collège de Sherbrooke.*

The leap from available population to target population was made by comparing both across structural characteristics, which is recognized a far more appropriate method for establishing external validity in several educational research situations (Amundsen, 1988). *Collège de Sherbrooke* was created on May 15, 1968, only a few months after the first 12 Cégeps created in 1967. Most institutions resulted from the concatenation of several post-secondary institutions: *collèges classiques*, nursing schools, normal schools, technical institutes, etc., and *Collège de Sherbrooke* was by no means an exception. Since its beginning, this institution has been characterized by a steady growth in population and programmes, growing from 1 300 students and 10 programmes, to 5 900 students and 22 programmes, 6 of which are transfer and 16 are vocational, plus approximately 6 000 students at *l'Education des adultes*. Being the only francophone Cégep in a radius of 75 km, it is known as a regional institution and draws 85% of its clientèle from this area. Its 23 acre campus comprises five pavilions and one residence. Table 2 reports numbers which confirm that the development of *Collège de Sherbrooke* has followed the same curve as that of the whole Cégep network.

The largest increases occurred between 1967 and 1972, a period during which 44 of the now 47[13] Cégeps were created. Substantial increases were also observed between 1972 and 1977, while the ten years that followed were much more stable in that respect. Enrollments have been going up again in the last period, and the trend was maintained as 10 000 new "places" were added in 1993.

[13] Collège Marie-Victorin was incorporated as a public Cégep in 1993.

**Table 2**

**Enrollment in Cégep Network and Collège de Sherbrooke (1967 - 1991)**

| Year | Cégep Network | | Collège de Sherbrooke | |
|---|---|---|---|---|
| | Number of Students | Increase | Number of Students | Increase |
| 1967 | 14 077 | | 1363[14] | |
| 1972 | 85 247 | 505% | 3301 | 142% |
| 1977 | 118 340 | 39% | 4316 | 31% |
| 1982 | 131 384 | 11% | 4460 | 2% |
| 1987 | 132 098 | 0.5% | 4628 | 3% |
| 1991 | 136 977 | 4% | 5191 | 12% |

Except for size, the characteristics of Collège de Sherbrooke are congruent with those of all Cégeps in the network. All public Cégeps, by definition, offer pre-university and technical programmes. The seven pre-university programmes are the following: *Sciences de la santé, Sciences pures et appliquées, Sciences humaines, Arts plastiques, Musique, Lettres et Langues*. The first three cluster into *Sciences de la nature*, while the last three form the *Arts et Lettres* programme family. All programmes are offered in larger colleges, while smaller institutions offer only a subset. Programme goals and structure, course objectives and contents, and general admission requirements are determined at the ministerial level. Cégeps have a few options concerning courses, most of them being pre-determined by the core curriculum or by university prerequisites. They also choose the sequence according to which courses will be offered, and set local admission requirements into specific programmes.

Applications for enrollment are treated by a few large regional agencies named *Service*

[14] Note: Collège de Sherbrooke was created in 1968.

*régional d'admission de ...* (*Montréal*, in the case of *Collège de Sherbrooke*). Individual records are analyzed using the same criteria and rules, and enrollments are completed in one to four rounds.

The organizational and instructional structures of Cégeps are also congruent. They all offer a similar variety of services: learning support center, media center, sports center, community service and services for the handicapped. More than half offer residential services.

In spite of its limitations, this sample appeared to be representative of the total population of pre-university students in francophone Cégeps, thus warranting the generalizability of results to this population. However, further research should be conducted to determine up to what point results established in this study apply to Cégeps with a smaller enrollment, a multi-ethnic clientele, or Cégeps located in different geographical and cultural environments.

**Internal Sample Validity**

Internal sample validity was controlled with respect to research objectives and assumptions. The purpose of the research being to explain the dynamics of how student characteristics are associated with student involvement, and how educational outcomes are influenced in turn by these variables, it was important that the sample contain exemplars for the whole spectrum of involvement, from blunt disengagement to deep engagement. By selecting whole groups totalling a large number of students, coming from four different programmes where teachers, teaching methods, motivations and

abilities vary, the odds were high that all types and levels of involvement would be represented.

The research was based on the assumption that teachers would cooperate with the research process, and that students would lend themselves voluntarily to the data collection. All teachers responded positively to the invitation to participate in the data collection, except two teachers who signalled that their groups had already participated in several surveys previously during the same term. Among all the students who were sitting in class on the days when the test was administered, only four chose to withdraw. After data had been collected, only three answer sheets were discarded for not having been completed according to instructions. The completion rate for the total number of items on the remaining 389 answer sheets was above 99%.

Responses to the questionnaire, in numbers and percent, can be found in Appendix C. Information gathered by means of some items in Sections 1 and 2 was used to describe the sample.

Students were rather young, with a mean age around 18.7 years. The sample contained 20% more women than men, and more than 97% had French as first language. As for residence, 60% were still living with their parents, while 29% lived in an apartment, alone or with friends; only 4% had established their quarters in the residence on campus. Over 80% of the students lived 30 minutes or less away from the Cégep, for an average travel time of 23 minutes.

While 45% of the students did not have a job, over 50% worked between 1 and 20 hours a week and nearly 5% estimated that working affected the time they spent on study, which corresponded roughly to the percentage of students working more than 20 hours a week. Since students were young, it was no surprise that 96% had no family responsibilities.

Students were predominantly first generation as far as their parents' level of education was concerned: 40% of the mothers were said to have a college level diploma and 20% a university degree; the corresponding statistics for fathers were 47% and 34%. These statistics could be reversed for the next generation of students, if the numbers of women enrolled in Cégeps continue to rise.

Only 57% of the students who were in their second term expected to graduate after the prescribed four terms. Approximately 85% of the students expected to get a final grade point average between 70% and 90%. Enrolling in a specific programme in university was the main reason for attending Cégep for 59% of the students, while 30% had yet to choose a programme. A total of 81% of the students were still planning to transfer to university after graduation, while 8% were planning to enroll in another Cégep programme and 5% intended to work.

In summary, the internal validity of the sample appeared warranted by its size and by the congruency between its characteristics and the objectives and assumptions of the research.

### 3.2.4 Materials

The instrument under scrutiny in this part of the study was the experimental version of the *Questionnaire sur la qualité de l'expérience d'apprentissage* ($QEA_{Exp}$). It is partly described in the last section of Chapter 4 and throughout Chapter 5.

### 3.2.5 Procedure

The Assistant Deans of the two families of programmes were contacted and granted permission to solicit teachers for class time. All teachers were reached by the researcher by phone: they were given explanations about the project and the sampling procedures and asked whether they might be able to allocate class time for the administration of the questionnaire.

The researcher offered to make the experience more than just answering another questionnaire. Collaborating teachers and students were given explanations about the structure of the instrument and how data would be processed. Most were highly interested in the project and asked to be informed about the results.

A first schedule was established, but several appointments had to be cancelled because of a five-day student strike. Appointments were rescheduled and all selected groups were visited but the last two. As it was getting late in the term, two teachers, sensing they were running out of time, asked that their group be excused from the data collection. Since data had already been gathered from nearly 400 subjects in 19 groups, their request was accepted. An additional reason for accepting it was the importance of collecting data

from all groups in a relatively short period of time, so experimental conditions would be identical for all groups. This accounted for the under-representation of the *Sciences humaines* programme in the sample.

The questionnaire was administered to a total of 392 students enrolled in pre-university programmes at *Collège de Sherbrooke,* towards the end of the 1993 Spring term, between April 5 and 20. This was in accordance with Lehman (1991) who recommends quality of effort be assessed in class during the eleventh or twelfth week, if on a semester system. Computerized answer sheets were used for technical as well as ecological reasons. Three answer sheets were eliminated before the scanning took place, because they had not been completed according to instructions. This left 389 subjects in the sample.

Students took from 30 to 50 minutes to fill in the answer sheet, for an average time of approximately 45 minutes. All teachers and students reacted very collaboratively, although the length of the questionnaire was an issue that came up frequently. This was noted in view of a further revision of the questionnaire. Several student assistants who had previously participated in the pilot test helped with the administration of the questionnaire. They all attended a one and a half hour training session for that purpose.

### 3.2.6 Analysis

The information gathered through the administration of the questionnaire in Phase 2 was scanned by a scanner coupled with a computer, which generated an ASCII type data matrix. This file was recorded in the Systat 5.02 Statistical Program for Windows. Additional data concerning course grades and other parameters were imported from

institutional records as soon as available. All quantitative analyses were performed with Systat; the Testat Module was used for item analysis. Reference books by Systat Inc. (1992) were useful in the design and interpretation of analyses.

Descriptive statistics including frequencies, means, standard deviations and coefficients of skewness and kurtosis were computed for all items in each scale of the questionnaire. The results of these analyses were used to determine if the distribution of each item could be considered approximately normal and meeting the assumptions of correlations to be computed.

Inter-item correlations were then computed for all $QEA_{Exp.}$ items. Reliability coefficients were calculated for the $QEA_{Exp.}$ item subgroups. Item-total correlation coefficients and the change in coefficient alpha (Cronbach, 1951) if each item were deleted, were examined for each $QEA_{Exp.}$ activity measure.

Factor analyses were performed separately for each activity measure, to assess whether each measure was unidimensional, thus justifying the use of a single score to represent the group of items. The number of factors for each analysis was determined on the basis of the eigenvalues obtained from principal components analysis, using the Kaiser criterion. Orthogonal rotation was used to extract the factors. The fit of the solution was based on the loading of the items. Based on all the statistical evidence, a decision was taken about the appropriateness of forming a scale from each group of items.

### 3.2.7 Results

Analyses confirmed the validity and reliability of the $QEA_{Exp.}$ as an instrument for the assessment of the variables in the model. Modifications to the instrument were also suggested. Results are reported in detail in Chapter 5 of this thesis.

## 3.3 Phase 3: Validating the Hypothesized Model

The validity and reliability of the questionnaire having been assessed in Phase 2, the model describing relationships between student characteristics, student involvement and educational outcomes, and the underlying hypotheses, could then be submitted to testing.

### 3.3.1 Purpose

The purpose of this last part of the research was to study the relationships between the variables included in the model of student involvement, in order to establish the validity of the hypotheses.

### 3.3.2 Design

Relationships among variables may be studied at different levels. Simple correlation coefficients reveal the existence and importance of a relationship, without providing information as to the direction of the relationship. When a model is postulated and a direction for the relationships between variables is hypothesized, coefficients obtained through simple or multiple regression or multivariate methods provide a mathematical model which allows dependent variables to be "predicted" or "explained" by a combination of independent variables. When analysis of effects is sought, causal models are hypothesized and appropriate techniques, e.g. path analysis, are applied on

correlational data, to assess direct, indirect and total effects between exogenous and endogenous variables. If relationships are reflexive, the causal model is said to be non-recursive, and other techniques, e.g. structural modelling, are applied. It is up to the researcher to choose the appropriate method, depending on the situation under study, the nature of relationships, the type of data and the purpose of the research. But as argued forcefully by all experts on research methods, adequate specification of a model is the basic requirement for sound research results.

According to Pedhazur (1982), specification errors occur when relevant variables are omitted from the hypothesized model, when irrelevant variables are included, or when linear or additive models are postulated where non-linear or non-additive models would have been more appropriate. These errors affect results adversely, most often through introducing bias in the estimation of coefficients or altering the efficiency of significance tests.

The area of research from which this study originated did not appear to be presenting yet the theoretical foundations on which a causal model could be based. Additionally, researchers report how difficult it is to identify the direction of effects in research connected with the study of college outcomes in general, and with student involvement in particular. Is it informal interactions with faculty which help students obtain higher grades, or do students who get higher grades develop easier contact with their instructors? Are involved students more satisfied, or does satisfaction cause students to engage more deeply in their studies?

The effect of causal feedback loops can be countered if longitudinal data reflecting the causal ordering of variables in the model are collected. But the design of this study could not provide this type of data, thus rendering even more hazardous the assumption of unidirectional causal effects. The presence of a feedback loop connecting outputs back to inputs in the student system suggested that a non-recursive model might perhaps account more appropriately for effects in the situation under study.

For the reasons reported above, the framework within which this last part of the study operated was that provided by multiple regression and hierarchical analysis. This approach can be used when the researcher can posit an explicit logical order among independent variables, which was the case in this study. Basically, this procedure consists in a set of multiple regression analyses, each containing one more variable than its predecessor. Knowing that the relationship between two variables may be spurious, that is, due to common causes, each variable is entered only after other variables that may be a source of spurious relationship has been entered. "This leads to an ordering of the variables that reflects their presumed causal priority - ideally, no independent variable entering later should be a presumptive cause of an independent variable that has been entered earlier" (Cohen & Cohen, 1983, p. 120).

Hierarchical analysis was preferred over stepwise analysis, in which variables are entered or removed in steps, but according to an empirically rather than causally determined order of entry. Hierarchical analysis is referred to as one of the most useful tools for extracting information from a data set. In the absence of a fully specified causal model, hierarchical procedures appear to provide the safest framework for extracting as much

causal inference as the data will allow, without going so far as to compute direct and indirect effects. (Cohen & Cohen, 1983)

Three sets of variables were included in this study, respectively concerning who students are, what students do while in Cégep, and what they achieve.

The first set of variables served to describe and identify who the students are. They included demographic and academic data, as well as data concerning their prior learning, vocational profile, goal commitment and type of support provided to them by their parents. These variables were considered as givens, or independent variables in the study. They were assessed in the first part of the questionnaire, except for prior performance which was extracted from student records.

The second set of variables, used to define and assess the mediating variable student involvement, served to identify what students actually do soon after entering college, and later during the term. As explained in Chapter 4, student involvement, having been defined as a threefold construct, encompassed three subgroups of variables, the assessment of which was the central focus of the questionnaire.

The third set of variables, considered as dependent variables in this study, concerned what students achieve, in terms of persistence and academic performance. For the purpose of this study, measures for these variables were extracted from student records.

### 3.3.3 General and Specific Hypotheses

One general and five specific hypotheses were tested in this study. The general hypothesis was formulated as follows:

**General Hypothesis**

There is a general flow of influence from what students are, to what students do, through to what they achieve while in Cégep.

This general hypothesis which set the tone of the whole study, was detailed into five specific hypotheses.

**H1 :** Student characteristics are associated in a statistically significant manner with student involvement variables.

**H2 :** Preliminary involvement[15] and participation in college activities[15] exert a statistically significant, positive influence on estimated progress[15].

**H3 :** Preliminary involvement and participation in college activities exert a statistically significant, positive influence on student satisfaction.

**H4 :** Student involvement has a statistically significant, positive influence on academic performance in college.

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[15]The operational definition given in this study for each of these variables is formulated in Chapter 4.

**H5 :** Student involvement has a statistically significant, positive influence on persistence in college.

### 3.3.4 Instrument

As explained previously, the *Questionnaire sur la qualité de l'expérience d'apprentissage* ($QEA_{Exp.}$) was designed in the first phase of this project. Its validity and reliability were explored in the second phase. It was the instrument used in the third phase of the research, to assess student involvement and the other variables included in the hypothesized model. It is described in detail in Chapters 4 and 5.

### 3.3.5 Procedure

A first operation consisted in exploring the data, in order to verify if assumptions underlying regression methods were met. Subsequently, multiple regression and multivariate methods including analysis of variance and discriminant function analysis were performed to study relationships between variables and demonstrate their hierarchical organization in the model. The purpose of this research project was to validate a correlational model about which inferences were made concerning influences between independent, mediating and outcome variables.

This approach was legitimate for, as asserted by several researchers (Cohen & Cohen, 1983; Pascarella, 1991; Pedhazur, 1982; Astin, 1990, 1993), causation can manifest itself in correlation, and in any case, this is practically all that can be done with nonexperimental data.

However, "the epistemology of causation, and of the scientific method more generally, [being] at present in a productive state of near chaos" (Cook & Campbell, 1979, p. 10), no attempt was made to clarify the specific meaning that would be attributed to this concept, beyond what James et al. (1982) qualify as an "inductive inference based on the presumption that parameters describing causal relationships between variables observed in the past, will continue to hold in the future" (p. 19).

### 3.3.6 Results

Phase 3 of the project began as soon as preliminary analysis outputs were available. Results are presented and discussed in Chapter 6.

## 3.4 Deontology Issues

Deontology issues were carefully handled. Verbal information was given to teachers and student research assistants. The latter received a small amount of money for their work. Fees varied between 30 $ and 150 $ for each student, depending on the number of hours worked.

Due to the requirement for individual academic data, answer sheets asked for student matriculation numbers. However, names were not asked for, thus making it virtually impossible for student assistants to identify respondents from their answer sheets. Confidentiality was insured by the fact that nobody but the researcher had access to the raw data. This report was written carefully in order to make it impossible to relate results to individuals or class sections.

A cover sheet on the questionnaire provided subjects with all the relevant information about research objectives and procedures, and the use of collected data and results. Additional information was offered verbally, in order to make sure that all students understood they were free to participate or withdraw from the data collection. In conformity with the rules and regulations enforced in the Province of Québec (1985) concerning access to personal information, and ethical guidelines applied at Concordia University (1992), all participating students signed a form attesting that they had read the information concerning the research project, and were willing to participate. (Appendix D). Access to institutional records was granted to the researcher by the College Secretary General because deontology requirements had been satisfactorily handled, and because the research appeared likely to yield results that would be beneficial to the development of both the institution and its students.

# CHAPTER 4

# MODELLING STUDENT INVOLVEMENT AND DESIGNING AN INSTRUMENT

The main purpose of Phase I was to provide an instrument for the needs of the study. Prior to this, it was necessary to redefine the construct of student involvement in the present educational context, and elaborate in further detail, the model sketched at the end of the review of research. Only then could a questionnaire be designed to assess student involvement as well as other variables.

This chapter presents and discusses the results obtained in this first phase of the study. The method applied for interviews with Inquiry Groups A and B was described in Chapter 3. The present chapter reports how a definition of student involvement gradually emerged from the modelling exercise conducted with teachers and students by means of an interview protocol. How the questionnaire was designed to collect data for testing the hypothesized model is explained in the last section of the chapter.

## 4.1 Understanding Student Involvement

When students graduate from secondary school to Cégep, they leave a structured environment where for 11 years, they were required, told, convinced or induced into doing things, to enter an environment where new learning opportunities are made available to them and where they will have to make crucial choices regarding

programmes, courses and activities, and set their own objectives, hopefully in accordance with programme and institutional goals. Moreover, even if a student makes all the "right" choices, nothing will happen automatically in terms of learning and development: the student has to choose also to involve personally in the numerous activities within his or her reach. In college much more so than in high school, the initiative to action is the student's, and the institution is faced with the problem of how to ease the transition between the two educational systems, so that students gradually manifest more autonomous and responsible behaviours, and become involved in their own learning.

Chapter 2 presented an overview of prior research on student involvement and related concepts. This was used as a starting point in attempting to complement the notion of student involvement in the context of Cégeps, using systems methodology. In a nutshell, research on student involvement makes four points, with respect to what student involvement is, how it is assessed, which outcomes are influenced by it, and how it may be enhanced.

(1) Student involvement is defined by Astin (1984) as the amount of physical and psychological energy a student invests in his own learning. "Students learn by becoming involved". This laconic statement posits student involvement as the means for students to reach the general goal of learning presumably aimed at. Pace (1984) defines involvement in terms of amount and quality of time spent on task. "All learning and development require an investment of time and effort by the students." The construct "quality of effort" addresses both the frequency and quality of the effort students put into taking advantage of the opportunities for development offered by the college.

(2) Astin assesses student involvement through separate measures generally referring to how student time is spent. Pace (1979, 1983, 1989) and Lehman (1991) assess quality of effort by means of scales in questionnaires "based on the premise that the construct quality of effort is present in the educational experiences of college students and quality of effort can be measured by asking students to report the frequency with which they engage in a range of college activities" (Lehman, 1991, p. 15).

(3) A considerable amount of research conclude, along with Astin, that student involvement is related to most educational outcomes pertaining to the development of attitudes and values, subject matter competence, psychosocial development and more general educational attainment (Pascarella & Terenzini, 1991). In conclusion to his work, Pace states that quality of effort was found to be "the best predictor of students' progress toward attainment of important educational goals".

(4) For the enhancement of student involvement, research relies heavily on institutional interventions, practices and policies. "The challenge facing community college educators is to design policies and practices that will encourage students to invest their time and effort in desired learning activities" (Friedlander & MacDougall, 1991, p. 4).

Student involvement is presented as the "amount of physical and psychological energy", or the "amount and quality of effort" a student invests in his own education. While "physical energy" is a familiar concept in the sense that if one is dead tired, one cannot give high-quality attention to anything, its psychological equivalent is less readily understood. The same can be said about quality, which is always more problematic to

assess than quantity. Although energy and effort are constructs that cannot be easily assessed, time serves as a common denominator for both. This research argues that time committed appears to provide an appropriate measure for one aspect of student involvement, but that other measures (level of expectancies, motivation, re-evaluations, etc.) are needed to provide more complete information about other quantitative and qualitative aspects of involvement.

Student involvement as defined is assessed by asking students to report the amount of time spent on different college activities. It follows that, when a student declares not having spent any time on particular activities related to one area, then the quality of his or her effort in this area is assumed to be extremely low. But students may have good reasons not to engage in particular activities. They may have found other activities that suit their styles and preferences better; they may have decided to concentrate very deeply on a subset of activities and ignore others; they may have already mastered the skills aimed at; or they may be supplied with sources of higher quality, such as when one has access to a university library instead of a Cégep library, etc. There may not be anything wrong with students not getting involved in particular activities, as long as this behaviour results from a rational, deliberate and enlightened choice, and quality of effort cannot automatically be assumed to be nonexistent without appropriate verification. Thus, it might be a good idea to make place in questionnaires for other activities students may engage into, for instance by adding open questions such as: Describe what you do instead of the above? or: Have you replaced or added to the above items?

Lastly, defining student involvement as mere participation in college activities appeared

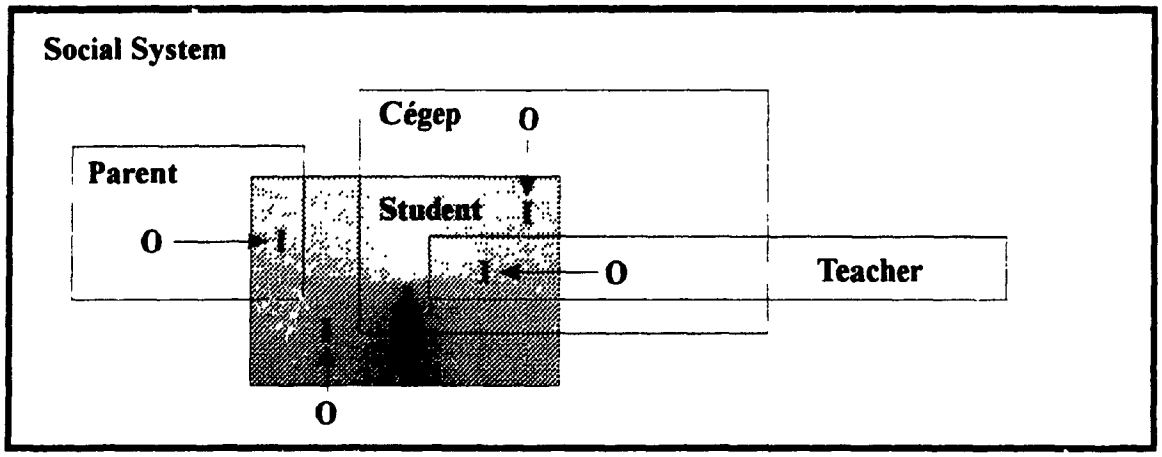
to proceed from a narrow perspective on college student behaviours, ignoring both how students come to engage in these activities and how they subsequently react to results obtained. This is why it appeared important at the outset of this research to not only conduct a thorough analysis of the activities, facilities and opportunities which are proposed to students in the Cégep environment, but also to develop a more extensive definition of student involvement by including behaviours that are manifested before and after engaging in these activities.

### 4.2 Modelling the Cégep Student System

A systemic perspective having appeared appropriate in the present situation, modelling the Cégep student was undertaken, in order to posit student involvement within this model. Boyd's (1992) principles for modelling cybernetic systems provided the dominant methodological paradigm for this operation. Churchman's (1968) five basic considerations (objectives, environment, resources, components and management) were thus taken into account, in combination with the procedure suggested by Schoderbek & al. (1985) for modelling and representing a social system.

As most often is the case in modelling social systems, this exercise required several levels of inclusion of systems and subsystems. Society was chosen as the first-order system, while other systems were modelled as intersecting subsystems. The focal system, the student, was represented as intersecting with the Cégep, teacher and parent systems. Relationships with the focal system were represented by arrows symbolizing system outputs transmitted as inputs to the student system. Figure 4 illustrates the inclusion of systems described above, as well as some of their interrelationships.

**Figure 4 : Student System and Related Systems**




This diagram offers a simplified representation of the situation, for other systems (e.g. peers, friends, machines, information) and relationships could also have been represented as components of this model. Thus, it will be remarked that the zone of influence of the student system is not completely represented in this diagram, in particular, the influence it exerts through its outputs to intersecting sub-systems and to the environment. The boundary set for the focal system was determined by the range and scope of the tasks students are required or expected to perform as Cégep students, in order to reach their goals. This provided for the inclusion of all the activities, opportunities and events particular students may or may not engage in as a Cégep students, and decisions they may or may not take, as variables in the system. Excluded were any other activities not connected to the attainment of college goals. A time boundary corresponding to the period of enrollment in Cégep was chosen, but space and people boundaries were pushed back as far as possible, to preserve sufficient integrity so that meaningful predictions regarding educational outcomes could be made within the system.

**Goals and Aspirations**

The major goal of Cégep students enrolled in pre-university programmes is often assumed to be: getting a diploma that will open the doors of university programmes. Data collected further in the research confirmed this assumption. When asked to identify their main reason for coming to college, 89% of the students in the sample checked enrolling in an already chosen university programme (59%) or keeping all doors open in university (30%) as their main reason. The remaining 11% chose other reasons including: keeping busy while more jobs became available (3%), polishing present skills (1%) and other reasons (7%) which, although not detailed, may have included following friends, pleasing parents, doing something while looking for a more precise objective, etc. At the end of their second term, 81% of the students still intended to seek admission in university, while 8% intended to enroll in another programme in college. Other students mentioned entering the labor market (5%) while the rest (6%) chose other, which, though not detailed, may have included joining an organization (e.g. Army, International Development), or travelling, raising a family, etc.

These reasons for coming to college and intentions after graduation represented the goals that were chosen by students, negotiated with them or imposed upon them. Shorter-term goals concerning grades, making friends, enjoying oneself could also be identified, as well as long-term aspirations related to specific areas of cognitive, affective, personal, social, and economic development. The principle of primacy (verifying whether students abandon stated goals in favor of other nonstated goals, Churchman, 1968) suggested that there may be discrepancies between stated and real objectives, for it is common experience to witness students who do not engage on the high road to university, thus

knowingly sacrificing stated goals to other goals that are, consciously or not, the real goals pursued. In the context of this study, questions were posed concerning the overall influence of goals on student involvement. The nature of the real goals pursued by apparently uninvolved students was left to further research.

**Environment**

The social, parent, teacher and college systems are all part of the student system's environment, for they lie largely outside the students' control, while at the same time shaping his performance.

When Cégeps were created more than 25 years ago, their official *r ission* was to provide high quality college level instruction to a larger proportion of young and adult people in Québec. In doing this, society expressed expectancies regarding accessibility and quality. Implicitly, students are expected to develop the knowledge and skills that will enable them to become the skilled technicians or university students assumed to be needed for the social system to function well. They are also expected to graduate within two or three years, depending on whether they are planning to transfer to university or not. In this respect, these expectancies constitute the main input of the social system to the student system. Additional inputs are financial resources that support Cégep operations and individual students who meet specific requirements.

The Cégep system provides students with opportunities and constraints. Opportunities come under the form of curricula, programmes and courses; persons, among which are teachers, professional and other staff, as well as other students; services, namely teaching,

counselling and advising; facilities, of cultural, artistic or recreational nature; financial, health and residential assistance; and an enormous choice of places, material and equipment.

The college system also provides constraints. Like all social systems, Cégeps are subjected to societal and legal norms. Constraints from the ministerial level come mainly under the form of the *Loi des collèges*, promulgated in 1967 and modified in 1993. The *Règlement sur le Régime des études collégiales* (RREC) constitutes the other official document ruling action in Cégeps. Other constraints are provided by local institutional and departmental politics, rules and procedures that shape the Cégep environment and give each institution its special characteristics. Still other constraints come from the labor contracts of teachers, professional and staff personnel. More subtle constraints come from the limitations of competences in human resources as well as gaps in students' prior learning. There are also material constraints such as those imposed by available space and equipment, budget constraints, etc.

Colleges provide information about the system, both prior to admission and after enrollment and entrance, so that students are made aware of the contents and structure of the Cégep system they are a part of. They also provide information concerning the performance of the student: grades, reports of standing, credits earned, which connect outputs to inputs in the student system and exert some kind of external control over the student.

Inputs from parents consist primarily in who they are, the level of schooling they have

reached, the education they have provided their children since birth, the financial and psychological support they provide their offspring, the examples they set, which have far more influence than words. Literature reports concerns about the socioeconomic status of parents and whether students are living with or away from their parents' home while in college. In the present educational context, parental influence was considered important and it was attempted to single out their role in connection with student involvement.

Outputs from the environment become either serial input to the student sytem, that is, input required for the student system to operate, or probable input, or resources, that students may decide or not to consider as useful to their own system.

**Resources**

Resources as defined include all the means available to the student for the execution of the activities necessary for goal realization. They are the students own and can be changed and used to their own advantage. Among resources readily available to students are material and financial resources, which they may decide to augment by applying for a job, scholarship or loan. Time is also an important resource students have to learn to manage. Friends, both within and outside the college environment, can also be considered a valuable resource. But the probably most significant resources are the opportunities offered by the college environment. The college system makes available to students an *embarras de richesse* which they can take advantage of, or not. These means are within students' reach, from entrance in college, and all along the way, to assist in the attainment of selected educational objectives.

However, student resources should not be considered a static but a dynamic and evolving attribute. As students develop and grow, their own resources will be amplified, making them more competent as students and more likely to reach their goals. Conversely, if development does not accrue and resources are not increased, students will inevitably find themselves incapable of coping with the challenge, and will thus be gradually deterred from their projected course. This illustrates the existence and influence of powerful positive feedback loops operating in this system (Mitchell, 1974) as deviation-amplifying functions.

**Inputs**

The first inputs into the student system consist of who the student is: they include demographic characteristics such as age, gender, ethnicity, language, socioeconomic status. These inputs are givens: they cannot be altered by the educative process and they affect the basic operation of the system.

Aside from demographic characteristics, the psychostructure of the student, that is, all the traits that largely determine how individuals think and act, are also basic inputs to the student system. Levels of ability and aptitude, cognitive style, previously acquired knowledge and skills, attitudes toward learning, commitment, value system, are sources from which the student will draw the motivation and drive necessary to enter into action, select appropriate behaviours and hopefully, attain expected levels of performance.

Additional inputs come from intersecting subsystems: society, parents and most importantly, the college system with its own subsystems, among which peers and

teachers have been found the most influential. Some of this input affects the operation of the student system. Such are admission requirements and enrollment procedures that cannot be bypassed if one is to become a Cégep student. Other inputs are resources students may decide to accept as input to their own system, and take advantage of in a great many ways. Student involvement undoubtedly has to do with how much of the resources students are going to allow as input to their system.

**Process**

Students engage in processes that aim at transforming the various inputs into desired outputs and outcomes. These can be partitioned into several academic and non-academic activities.

Among the first are a number of decisions a student has to take. Assuming that the decision to go on with studies and seek admission in a particular institution have been taken, the student must choose a program and select courses. Additional choices concern assessing financial needs and deciding to apply for a job and accept a job offer or not; to go on living with parents if at all possible, or alternately to live at the college residence, rent a room, an apartment or choose another arrangement. These decisions are crucial in that they considerably affect the time that will be spent later on student tasks.

Once these decisions have been reached, regardless of whether or not a student had any real choice, students are expected to engage in the learning and development opportunities that are made available to them by the Cégep system. In an attempt to understand student involvement, teachers and students were asked to identify the broad

areas that characterize student voluntary activity in Cégep. The list thus generated included:

- attending classes, laboratories, training sessions;
- studying, solving exercises, problems;
- doing a lot of reading and writing;
- meeting with teachers after or outside class;
- interacting with other students, regarding coursework or not;
- using facilities: library, audio-visual departement, learning resource center, sports center;
- enrolling in personal development, study skills workshops;
- seeking help whenever needed, from teachers, professionals, peers;
- providing help, engaging into peer tutoring, community service;
- attending movies, plays, conferences, or participating in creative art;
- participating in workshops on art, hobbies, crafts;
- joining sports teams, clubs, organizations;
- participating in student life, attending meetings, being elected student representative;
- engaging in leisure and fun activities, or just plain doing nothing;
- playing games.

The formal process in the student system corresponds to what students should be doing with respect to these opportunities. How much they actually do is one measure of their involvement.

### Outputs

Desired outputs from the student system are many; knowledge and skills, growth and development, obtaining a diploma are probably the most often referred to. The relative efficiency of student systems can be measured as percentage ratios of these outputs to inputs, the objective being to maximize this kind of output. A second type of less desired but potentially profitable output, such as failures, dropping out of courses, may be either fed back into the student system and used to continue along, as is done when one profits or learns from one's failures, or they may constitute a third kind of output and disposed of as waste, the objective being to minimize this type of output. As the student is a subsystem of the Cégep, the output from the student system is part of the Cégep system output.

### Control

It was mentioned above how outputs are connected back to inputs by loops in the environment. This models the external control exerted on the student, namely by the college, teachers or parents. Examples are when students are awarded credits for courses, grades on their papers, or comments from their parents on good or poor results. Students can use the same or other information to assess their own performance and take decisions to maintain or modify their course of action, thus demonstrating control from within the student system.

Boyd (1993), defines control as "whatever arrangements lead to a higher probability of desired outcomes or performance - more effectively, reliably and efficiently than would be the case without the arrangements." In the present situation, control refers to what

students do to plan and regulate their performance. It was investigated in this study by trying to find out about what means are taken to reach objectives, what measures of performance are applied, how the attainment of objectives is assessed, and whether plans are subjected to periodic review and reevaluation.

One can easily recall different students who appeared to be equally involved in their studies, devoting approximately the same "time and energy" to college activities, yet evolving in different ways. Spending time and energy on college activities are necessary but insufficient conditions toward success: by using information provided by tests, exams, grades, comments from teachers and peers, verbal and non-verbal reactions to their behaviours, truly involved students also engage periodically in the assessment of the progress made toward educational objectives.

When fed back into the system as input, this information can help students compare their performance with their objectives, which will enable them to take other decisions. If the gap is small, they will be tempted to persist; if the gap is too large, they may quit. Persistence is seen as the outcome of a decision taken after some performance output has been compared with an input objective. This feedback loop is likely to lead to other decisions as well, namely to increase or reduce the amount of engagement in particular activities.

### 4.3 Redefining Student Involvement

These considerations led to the redefinition of student involvement as:

> **a complex process by means of which students allocate resources into planning, participating in and controlling their college experiences.**

Prior research defines student involvement as a unitary construct equated either to the "amount of energy" (Astin) or the "quality of effort" (Pace, Lehman) a student invests in his own learning. Additionally, external control such as may be provided by institutional politics, procedures and practices is heavily depended upon to enhance student involvement. The definition put forward in this study complements these quantitative and qualitative aspects of student involvement with other considerations related to control functions in the student system. Thus, student involvement is seen as a threefold construct referring to different types of behaviours students manifest as they navigate through college. This conception aims at acknowledging students as managers of their own involvement. It also suggests that educational interventions be directed toward enhancing early commitments and reflective assessments as well as active participation in college activities.

In order to fully describe student involvement, one must take into account:

. the amount of **planning** students do prior to and while participating in college activities;

. the amount of **time** students spend on task, how often they enter into such actions and what the duration of their engagement is;

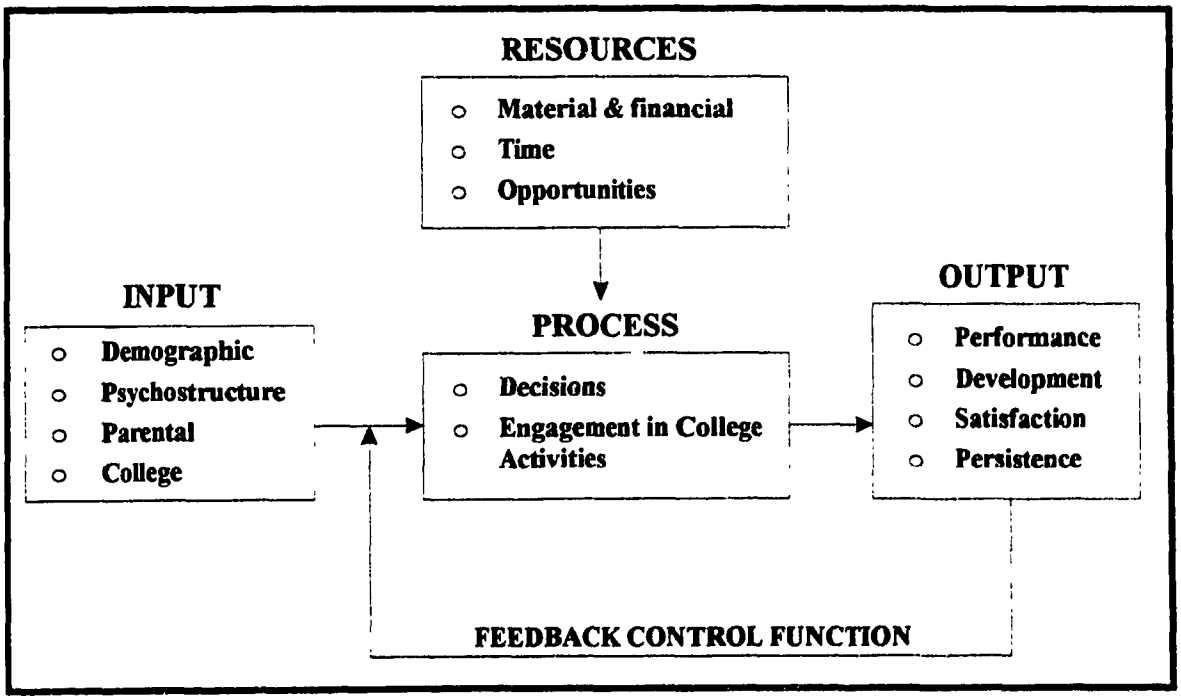
. the **variety** of activities they engage into;

. the **intensity** with which they engage into student tasks, the quality of their participation;

. the degree of **control** students have over the whole involvement process, that is, whether students do things out of their own free will or because they were required to; whether they set their own targets and use available information to assess how close they are to reaching them, at what rate they are progressing and if anything should be changed to increase the probability of attaining them more rapidly or efficiently.

The three middle elements are interpreted as being part of the process function in the student system, whereas the first and last refer to a kind of meta-involvement related to the control function. Figure 5 illustrates the results of modelling the student system.

**Figure 5 : Cégep Student System**



The kinetics of student involvement can be described ideally as follows. Using available inputs and resources, students, having in mind the goals and objectives pursued, take decisions about what their particular needs are, how much time they are going to invest, in which activities, and how deeply. These decisions are not necessarily taken in that order, but nevertheless, they have to be dealt with at one point of another, either before or in the course of action. Students then engage into purposeful actions and interactions with opportunities offered by wider systems, predominantly the Cégep system, in order to reach their goals. Interpreting information provided by several sources including their own actions, students compare their performance with their and others' aims, goals and expectations, and take regulatory action to allocate or reallocate resources among different activities.

### 4.4 Operationalizing Student Involvement and Other Variables

The model outlined at the end of the review of research could now be elaborated into a more detailed model relating inputs and resources to student involvement, and educational outcomes. Decisions had to be taken at this point as to what was relevant to include in the model, which was bound to include many variables and relationships. The rule followed in selecting the variables that were to be included in the system was as advised by Schoderbek et al. (1985): to start with a few and gradually enlarge their number until the factors brought in appeared to make no tangible difference in the results.

#### 4.4.1 Student Characteristics

As reported previously, student input variables were selected as a result of the review

of related literature and the analysis of the current educational context. Demographic characteristics included age, gender, language, residence, job and family status. Psychostructural traits included prior achievement, reason invoked to enroll in selected programme, value attributed to learning, and study and career goals and commitment. Parental influence was characterized by level of schooling and amount of psychological support and encouragement provided to the student.

### 4.4.2 Student Involvement

Manifestations of involvement related to the process function in the student were operationalized for assessment purposes as follows. Frequency, variety and intensity dimensions were assessed by means of various measures related to activities presented by the college environment. It was reported above how teachers and students were interviewed to identify the broad areas that compose the college environment and the specific activities in which students are required or expected to engage. The results of this inquiry served as a basis for determining the components of student participation in college activities. The fifteen areas identified to begin with were grouped into nine categories labelled "College Activities". These were: (1) Courses and Class Activities, (2) Independent Study and Coursework, (3) Writing Activities, (4) Interactions with Teachers and (5) with Peers, (6) Artistic and Cultural Activities, (7) Media Center Facilities, (8) Clubs, Sports and Student Organizations, and (9) Seeking Help. Individual scores were attributed for involvement in each of these college activities, thus forming a nine component vector[16]. Component values were added into a scalar number, to form a total

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[16] Item analysis performed later in the study suggested that Seeking Help had not been properly assessed in the questionnaire, so this component was not included in the final model, nor in the vector assessing involvement in specific college activities.

score for participation in college activities, as practiced by other researchers (Pace, 1983, 1989; Lehman, 1991). Depending on whether components are orthogonal or not, other existing mathematical formulae for computing the length of a vector could prove more accurate for assessing how far from a starting point involvement has taken a student, but this path was not investigated in this study.

Manifestations of involvement related to the control function in the student system were operationalized in the following way. Early commitments were investigated first. The time aspect was further assessed by inquiring about the total amount of time a student was spending weekly on the college campus, attending classes, labs and other course and non course related activities. Expectancies concerning course grades were assessed by asking students what grade point average they were expecting at the end of the current term. Students were also asked whether or not they had chosen a teacher as role model, and how much instruction on study skills had been sought. Both appeared as consistent with but often overlooked by prior research. The main reason for retaining these variables pertained to concerns about identity development specific to this study, and current discussions in the Cégep system, regarding the teachability and transferability of study skills. Measures obtained for these last variables were not integrated into the vector assessing involvement in other college activities, because of their preliminary nature and also because of differences in the formulation of items used to collect these data.

The control aspect of student involvement was further explored through questions which assess whether students are attempting to orient themselves: How are my actual grades comparing with the grades I was expecting? How much progress have I made? Should

I have decided to engage into higher studies? Was this college the right place for me? Where do I go from here? Since these items which referred to self-assessment procedures appeared to imply some awareness of performance results, they were integrated to the last group of student involvement variables, under the labels "Progress" and "Satisfaction".

This operationalization of student involvement presents both similarities and differences with other uses of this notion in the literature. They are summed up in the following lines.[17]

Pace's CSEQ (revised 1986 edition) can be said to comprise seven sections. The background information covers student characteristics (5 items), programme, major and study objectives (6 items), residence (2 items), parents' education and financial support (2 items) time spent on job and on study (2 items). Quality of effort is assessed through 142 items grouped under College Activities (14 scales), Conversations (18 items) and Reading/Writing (4 items). Opinions About College and the college environment comprise 11 items, and the questionnaire closes on a last section where students are asked to report estimates of gains (21 items).

The structure of the CCSEQ proposed by Pace, Friedlander and Lehman (Lehman, 1991) is similar. The three preliminary sections include 5 items on student characteristics, 11

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17 The construction of a comparative table was attempted to present these similarities and differences. However, since variables are referred to under different names, and subsumed under different grouping titles, resulting tables were either unclear or did not provide equitable treatment for the original contribution of each approach and instrument.

items on programme, course and objectives, and 4 items related to job and time use. Quality of effort is assessed through 83 items forming 12 scales grouped under College Activities. Students are then asked to report their estimates of gains on 23 items, and opinions on the college environment are investigated through 7 items.

In spite of differences in item contents and formulation, Pace's and Lehman's questionnaires overlap on nine College Activities scales, labeled: Library; Faculty; Courses; Art, Music & Theater; Athletics; Clubs & Sports; Writing; Student Acquaintances; and Science activities. Activities unique to the CSEQ are: Student Union; Personal Experiences; Dormitory and Fraternity; Topics and Information in Conversations with students. Activities unique to the CCSEQ are: Vocational skills; Counselling and Career Planning; and Learning & Study skills.

In his most recent work intended to detect which student characteristics and environmental variables make a difference in college education, Astin (1993) collects data by means of 146 student input characteristics, 192 environmental measures, and 82 measures of educational outcomes. These data were gathered through pre-test and follow-up questionnaires administered at entrance in college and after graduation; standardized tests administered at admission and later; and also from institutional records.

Grouped under environmental variables, one finds 135 measures that are known at the student's point of entry in college, distributed in the following way: institutional characteristics (16 measures), curricular requirements (15 measures), faculty environment

(34 measures), place of residence, financial aid and choice of major (35 measures). The 57 remaining variables assess student involvement in five areas: academic work (22 measures), interactions with faculty (6 measures), interactions with the peer group (14 measures), work (4 measures) and miscellaneous nonacademic activities (11 measures).

In Pace et al.'s work, the focus is on developing a valid and reliable instrument for the assessment of quality of student effort. Both the CSEQ and the CCSEQ open up on a few background and curriculum items, and close on estimates of gains and opinions about the college environment. However, the main section of both questionnaires is on student effort, for the assessment of which, scales are carefully developed. Results establish first-order correlations between participation in college activities and self-reported gains. In most of Astin's work, the focus is on the study of relationships between variables present in the college educational situation. Measures of student and college environment characteristics are entered separately in the regression analyses, and no attempt is made toward grouping items into scales. Results reported in the longitudinal study published in 1993 rest largely on 82 regressions in which the effects of environmental measures on educational outcomes are assessed, after having controlled for student input characteristics. Extensive educational implications are derived from the results.

The options taken in this study were to (1) develop a more comprehensive notion of student involvement encompassing aspects from both process and control functions in the student system, and (2) explore relationships between student characteristics, student involvement as redefined and a limited set of educational outcomes. Accordingly, the *Questionnaire sur l'expérience d'apprentissage (QEA)* was designed so as to collect data on

the student's psycho-structure and parental influence, along with demographic characteristics. Value attributed to learning, commitment to clear study and career goals, parents' level of schooling, and encouragement received from parents are new variables that were carefully assessed by means of scales in the first sections of the questionnaire. The three components of student involvement were assessed differently: preliminary involvement was assessed by means of separate measures, participation in college activities was assessed by means of scales, while progress and satisfaction were assessed in additional sections of the questionnaire. Scales developed for the assessment of participation in college activities were labeled : Class, Independent Study, Writing, Interactions with Teachers, Interactions with Peers, Media Center, Artistic and Cultural, Clubs, Sports and Organizations, and Seeking Help. Items were formulated following the modelling exercise performed with the inquiry groups. The structure of the questionnaire and the response format, as well as measurement by means of scales were inspired by Pace et al.'s work. The term "student involvement" itself was inspired by Astin's work, as well as the comprehensiveness of topics covered by items, and measurement by means of separate items. Other instruments (Carrier, Larose & Roy), provided much minor contributions. Overlaps between the QEA and all the other instruments reviewed above are due to similarities between educational situations.

Notwithstanding their importance, institutional characteristics were not investigated other than through educational opportunities, because this was a single-institution study. They would obviously need to be taken into account, should a multi-institutional study be undertaken. Programme of enrollment was however used as a grouping variable in several analyses.

It is argued here that the hypothesized model constituted an adequate schematic representation of the situation to meet the requirements of this research, in view of its purpose and of the level of resources available.

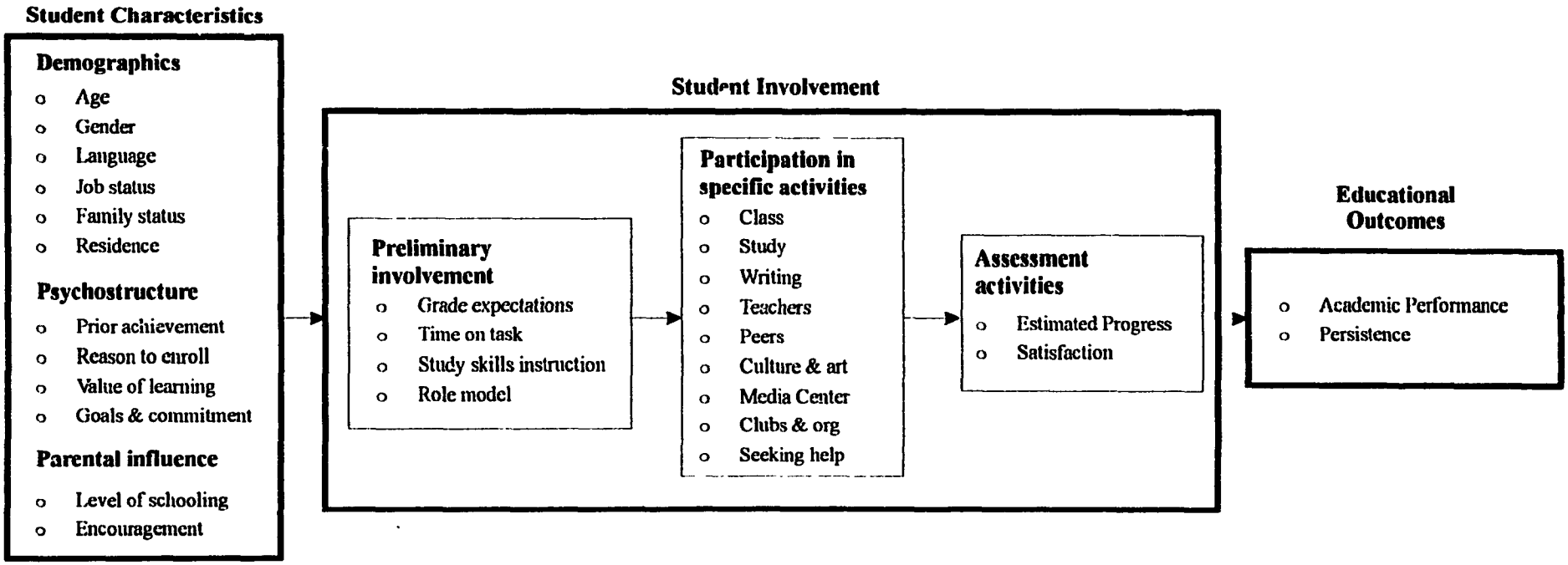
### 4.4.3 Educational Outcomes

Educational outcomes retained for this study were the ones used by colleges to assess their own and their students' performance, namely academic performance and persistence. The first was assessed by means of the GPA obtained at the end of the 1993 Spring term, and the second, by actual re-enrollment in the next Fall. Both were collected from institutional records, as well as prior performance in secondary school, which pertained to student characteristics.

## 4.5 Resulting Model

As explained in Chapter 3, the postulated model was not a causal model because a non-recursive model would probably have been required to represent all the causal relationships occurring between selected variables, due to the many feedback loops identified in the analysis of the situation. While variables in the model can be logically assumed to exert influences on variables in one direction, it is believed, and supported by prior research and meta-research, and certainly also by common experience, that these relationships may be reversed when intermediate outcomes are assessed, such as when an awareness of results influences student involvement behaviours, grade expectations, and maybe even goals, value attributed to learning and parent support.

**Figure 6 : Model of Student Involvement and Related Variables**



This research has chosen to hypothesize a correlational model where correlation and regression coefficients are interpreted, and causality explored as much as can be inferred from correlations. The direction of relationships explored is that indicated by time antecedence, that is from early involvement, to participation in learning and development opportunities, to assessment activities, to educational outcomes, after having controlled for student characteristics. This model is consistent with the hypotheses that were formulated in the proposal, and it was left for further research to explore the additional explanatory power that could be provided by a non-recursive model.

Figure 6 illustrates the selected variables as represented in the model. Exogenous or independent variables are represented in the left column; preliminary forms of involvement, participation in college activities and assessment activities are represented in the central block as three levels of mediating variables; outcome variables appear in the right column.

**Conclusion**

This concluded Phase I of the study. On the basis of discussions using a systemic perspective, "student involvement" was redefined as a threefold construct encompassing (1) preliminary forms of involvement, (2) participation in specific college opportunities, and (3) assessment types of involvement. A model for explaining relationships between student characteristics, student involvement and educational outcomes was elaborated, which included student input and resources, as well as inputs from other systems. Finally, a questionnaire for the assessment of the variables present in the model was designed, with the help of Cégep teachers and students, and using prior instruments

developed for similar purposes in other educational contexts. The validity and reliability of this instrument are discussed in the next chapter, while the assessment of variables and the study of the relationships implied in the model of student involvement are the objects of Chapters 6 and 7.

# CHAPTER 5

## VALIDITY AND RELIABILITY OF THE *QUESTIONNAIRE SUR LA QUALITÉ DE L'EXPÉRIENCE D'APPRENTISSAGE*

This chapter presents the results of the analyses performed in Phase 2 of the project, the purpose of which was to estimate the value of the *Questionnaire sur la qualité de l'expérience d'apprentissage* ($QEA_{Exp.}$) as an instrument for the assessment of student involvement and related variables, in the context of Cégeps. The required analyses were also conducted with a concern for rearranging items, eliminating uncorrelated or redundant items, and for reducing the length of the questionnaire if possible.

The questions that guided this part of the study were the following:

1. How valid is this instrument?
2. How reliable is this instrument?
3. What modifications could improve these qualities?

The contents and results of the analyses are reported and discussed sequentially in this chapter. Recommendations relative to the revision of the questionnaire are summed up at the end.

### 5.1 Instrument Validity

When seeking to determine the value of an instrument, one must deal with the concepts of validity and reliability. According to commonly received definitions, validity refers to the degree to which a test measures what it purports to measure, whereas reliability is defined as the level of internal consistency, or stability, of the measuring instrument over time. (Borg & Gall, 1989). This section studies the validity of the instrument designed for the purpose of this study, and reliability is explored in the next section.

Instruments can be examined with respect to five types of validity: content, predictive or concurrent, construct and face validity. Content validity is the degree to which the test items represent the content that the test is designed to measure. It is of major importance in achievement testing, but equally important in research designs where hypotheses are validated on the basis of measurements. Predictive validity, as implied by the name, is the degree to which predictions made by the test are confirmed by later behaviour of the subjects on a criterion measure. Predictive validity is called concurrent validity when the criterion measure is administered at the same time as the test. Construct validity is the extent to which a particular test can be shown to measure a hypothetical construct. At last, face validity is the degree to which a test merely appears to measure what it is said to measure (Borg & Gall, 1989).

Since there were no available criterion measures on student involvement, predictive and concurrent validity were not examined, but they could be dealt with in further research, using data and results generated by the present study. Considering the comments provided by student research assistants at the issue of the pilot test, considering the

collaboration obtained from teachers and students when the test was administered, and considering the similarities between this questionnaire and other instruments used in related research, it was assumed that the $QEA_{Exp.}$ was endowed with face validity. Consequently, Phase 2 focussed on the study of content and construct validity.

### 5.1.1 Content Validity

Several reasons can be provided to support the claim for content validity in the $QEA_{Exp.}$. They are related to the nature of the instrument and the development method employed. This questionnaire was designed specifically for the needs of this study, that is, to assess the variables included in the model and produce measures on which regression methods could be applied. The model itself was supported by existing research, and included variables considered relevant to this research area. There was an almost complete overlap (97%) between the contents of the model and that of the questionnaire, the slight discrepancy being due to the few items included mainly to ascertain that students in the sample were the ones aimed at in the study.

The method used to develop the questionnaire applied several suggestions by Sax (1980) as likely to increase content validity. Existing instruments used in related research to assess similar variables were carefully examined for content, structure and methodology. Whenever possible, elements were adapted and integrated into the questionnaire under construction. Additionally, the first draft was submitted to the judgment of the teachers who had participated in the modelling exercise, to ensure that the result was consistent with their own interpretation of what student involvement might mean in the context of Cégeps. This version was also discussed with an expert on content and method from the

Educational Technology Department at Concordia University, and items relative to symbiotic and conjugative involvement were added. A pilot test was then conducted on the same version, with a group of Cégep students who provided valuable comments that helped prune this draft version of the questionnaire.

Besides providing demographic or academic information, the questionnaire was intended to assess behaviours and attitudes or perceptions. While factual information can be collected rather straightforwardly with multiple-choice items, under the assumption that students will not try to deceive, the assessment of behaviours and attitudes requires more care. Even if a subject intends to respond honestly, his attitudes and perceptions of his behaviours may vary in breadth, scope, intensity and persistence (Sax, 1980). Thus it is advised to assess each attitude or behaviour by means of several items, the sum of scores on each item providing a composite score considered as a measure for this attitude, behaviour or perception. Likert scales are generally used for that purpose; they should be presented in different formulations, to avoid fixed behaviours and reduce the tendency to conform to expected results. (Kerlinger, 1986; Sax, 1980).

**Contents of the $QEA_{Exp.}$**

All the above methodological procedures were observed in the construction of the instrument needed in this study. The $QEA_{Exp.}$ comprises six sections and 160 items. The first section includes five items on age, gender, language and residence. Section 2 is designed to situate students in their programme and bring them to describe how they manage time, why they chose to enroll in college, how they value past and present learning experiences, what their expectations concerning grades are, how precise their

goals are and how committed they are to reaching them. Data provided in this section is either factual, behavioral or perceptual. Section 3 has items bearing on the level of education attained by each parent, thus providing factual data, and on the type and importance of psychological support and encouragement students receive from their parents, thus providing perceptual data.

The fourth section is the one intended to assess student engagement in college activities. It is divided into ten subsections corresponding to areas in which students may involve at entrance or while pursuing college studies. In all categories, activities are listed from most to less frequent.

Under Class[18] are grouped seven specific learning activities or behaviours students are required or expected to engage in or demonstrate during class hours, depending on the teaching strategies used by the teacher, and two more that refer to the utilization of acquired knowledge. Independent Study comprises six activities students may either have to or choose to perform, while doing coursework outside class, plus three activities referring to attendance of the Learning Resource Center. The third category covers 11 activities connected with Writing, both during and outside class. Interactions with Teachers and Peers are the topics of the next two categories. Both refer to activities (19 in all) not covered in previous sections and thought to represent a potential opportunity or source of learning and development. The next three categories contain 22 activities referring to various Cultural and Artistic Events, using the Media Center facilities, and

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18 This paragraph describes the questionnaire as it was administered during the research. A few items were not entered in the regression analyses, following results established by item and factor analysis reported later in this chapter.

joining in Athletic and Student Organizations. The subsequent category inquires about whether or not students have been Seeking Help from different services and professionals, while the last category asks about how much a student has invested in Instruction on study skills.

Section 5 brings students to report how much progress they think they have made in several areas, since entrance in college, and Section 6 is designed to bring students to assess their satisfaction and decisions.

**Response Formats**

The questionnaire employs a variety of response formats: a few items are dichotomous; other items are multiple-choice, offering up to five answers; a majority of items make use of a four-point Likert scale. This is the case for all items in the College Activities section, where students are asked whether they have (1) never or very seldom, (2) occasionally, (3) often, or (4) very often engaged in a specific activity. Scores of 1 to 4 are attributed for each response. A scale score is computed by adding the points attributed for each response on that activity, thus generating a continuous variable. A total score is computed by adding the different scale scores. This last score is the measure of the frequency, variety and intensity of involvement demonstrated by one student with respect to college activities. It represents the process aspect of student involvement. Group scores can be computed from individual scores, but there was no use for them in the study. The control aspect of student involvement is assessed by means of several items interspersed throughout Sections 2, 5 and 6 of the questionnaire, to avoid fixed behaviours in responses. As these activities did not refer to a single factor, a total score

for this aspect of student involvement was not computed.

The questionnaire also makes use of other Likert scales which refer to the degree of agreement with a statement, or other measures.

Four-point Likert scales were preferred to a dichotomous format, in order to allow for sufficient variance in responses. They were also preferred to a wider scale in which some respondents inevitably limit their responses to a subportion of the scale. An even number of points was preferred to an odd number, to avoid a midpoint around which a certain number of respondents always cluster. At last, a qualitative scale (From Very often to Never) was chosen over a quantitative scale (number of times), following evidence established by Lehman (1991) that the former provide for improved data which pose fewer problems of analysis and interpretation.

Table 3 describes the structure and contents of the $QEA_{Exp.}$ and gives examples of a few items. A complete display of the questionnaire is presented in Appendix B.

**Table 3**

**Section Titles, Number and Examples of Items in the $QEA_{Exp.}$**

| Sections | # Items | Examples |
|---|---|---|
| Personal Information | 5 | 3. What is your mother-tongue:<br>a) French b) English c) Other |
| Academic and Vocational information | 23 | 6. Without counting class time, how many hours a week to you usually spend on your studies (studying, writing papers, preparing for exams, etc)?<br>a) 1-7 hrs/wk b) 8-14 hrs/wk c) 15-21 hrs/wk d) more than 21 hrs/wk<br><br>7. Check the most important reason for which you chose to attend college:<br>a) to enroll in an already selected university program<br>b) to keep all doors open in university<br>c) because there are few jobs available presently<br>d) to recycle, retrain, move ahead in my career<br>e) other reason |
| Parental information | 8 | Indicate the degree to which this statement applies to you:<br>a) not at all b) a little c) rather well d) very well<br><br>33. My parents (mother, father or both) ask about how I am doing in college, what grades I get, what difficulties I meet. |
| College activities | 85 | Indicate how often, during the last term, you engaged in the following activities:<br>a) Never or very seldom b) Occasionally c) Often d) Very often<br><br>37. Taking notes in class during courses<br><br>51. Using books and course notes to prepare ahead for the next class.<br><br>64. Asking a teacher for advice in improving your writing skills.<br><br>76. Trying to explain an exercise or problem to another student. |
| Estimated progress | 20 | Indicate how much progress you feel you have made in the following areas, since entrance in college:<br>a) Very little or none b) Some c) Quite a bit d) A whole lot<br><br>127. Communicating verbally<br><br>135. Learning to learn, to locate needed information |
| Overall satisfaction | 19 | 145. Are you satisfied with the level of financial support received so far?<br>a) Very much b) Rather c) Not much d) Not at all<br><br>156. How do your grades compare with your expectancies?<br>a) Higher b) About same c) Somewhat lower d) Much lower |

In summary, the content validity of this questionnaire was ensured by the very number of items, the rather extended area covered by test items, the nature of the collected data,

and the method applied to develop and improve it. It did not appear possible to further improve content validity without submitting the questionnaire to analysis based on field data. Item and factor analyses did however suggest other improvements.

Content validity was important for the systemic developmental use of the results of this study. Options for improvements to Cégep education, which were formulated later, as well as priorities among them, could not have been established unless the instrument had sufficient credibility with respect to the measurement of the variables included in the model, for the population under study.

### 5.1.2 Construct validity

Construct validity is the extent to which a particular test can be shown to measure a hypothetical construct, that is, a theoretical construction about the nature of human behaviour. It therefore has to do with the generative theoretical constructs which underlie the assessed behaviours.

As this questionnaire was intended to assess several constructs, controlling its construct validity was no small challenge. In order to gather evidence for the construct validity of the questionnaire before design was initiated, hypotheses were generated about the characteristics of persons who might obtain high scores on the measure, as opposed to those who might obtain low scores. But construct validity could not be thoroughly assessed by that means, for there were no clearly identified groups of involved nor uninvolved students on which the questionnaire could be tested.

Construct validity was also examined by means of comparing the $QEA_{Exp.}$ with similar instruments used to measure forms of student involvement. A number of similarities and differences with the $QEA_{Exp.}$ can be pointed at in Lehman's Community College Student Experiences Questionnaire (CCSEQ), in Pace's College Student Experiences Questionnaire (CSEQ), in Astin's measures for the assessment of student characteristics and environmental effects, and, to a lesser degree, in in the questionnaires used by Carrier (1991), Larose & Roy (1992) and Terrill & Ducharme (1993).

These similarities were to be expected, given that a large number of activities and behaviours are expected from college students anywhere in the world, and that there are not very many ways to refer to and describe these activities. They undoubtedly contributed to enhancing construct validity in the $QEA_{Exp.}$.

### 5.2 Instrument Reliability

Having ascertained that the instrument had sufficient validity, this research proceeded with the study of instrument reliability. The purpose was to verify if each variable in the model was properly assessed by means of the items designed for that purpose.

There were 32 variables in the model. Out of these, 9 were assessed by means of a single item, 3 by two items, 1 by three items, 2 by four items, and 3 were assessed by means of data collected from student records. These single items or groups of items did not meet the criterion for factor analysis: "For each hypothesized factor, five or six variables, thought to be relatively pure measures of the factor, should be included" (Tabachnick & Fidell, 1983, p. 378). Since they provided mostly factual data, their reliability was not

tested by statistical methods. The other variables were measured by a composite score obtained by adding scores on each item in a group of items. They were:

Value of Learning

Goals and Goal Commitment

Study Skills Instruction

Class Activities

Independent Study

Writing Activities

Interactions with Teachers

Interactions with Peers

Cultural and Artistic Activities

Media Center Services

Clubs, Sports and Student Organizations

Seeking Help

An identical procedure was followed for each scale. It included:

(1) examining the distribution of answers to all items and controlling for normality, through descriptive statistics;

(2) looking for evidence of item homogeneity, as shown by Pearson inter-item correlation coefficients, item-total and reliability coefficients;

(3) forming scales through principal components analysis.

Results are reported in full detail for one college activity, but just in a summary manner for all the remaining groups of items.

### 5.2.1 Class Activities

The Class activities measure comprised nine items. These items were meant to represent a range of activities in which students engage, or at least are expected to, while attending classes. Individual study activities being part of the next set of College activities, were excluded from Class activities for this reason.

#### Descriptive Statistics and Normality

The frequencies and percentages of responses to Class activity items are reported in Table 4. The spread of answers across categories (Never, Occasionally, Often, Very often) suggested that it was more appropriate to use a four point scale, rather than a dichotomous (Yes/No) format, where valuable discriminative information could have been lost. The only cell with an almost zero frequency was the "Never" answer to Item 37 (Taking notes); the cell with the highest frequency was the "Often" answer to Item 41 (Maintaining attention during the whole class period).

**Table 4**

**Class Activities: Frequency and Percent of Responses**

| Item | | Response | | | |
|---|---|---|---|---|---|
| | n | 1 | 2 | 3 | 4 |
| 37. *Prise de notes* | 389 | 3 | 45 | 160 | 181 |
| | | 0.77 | 11.57 | 41.13 | 46.53 |
| 38. *Discussion en groupe* | 389 | 49 | 153 | 118 | 69 |
| | | 12.60 | 39.33 | 30.33 | 17.74 |
| 39. *Travail en équipe* | 389 | 15 | 126 | 155 | 93 |
| | | 3.86 | 32.39 | 39.85 | 23.91 |
| 40. *Présentation orale* | 389 | 162 | 172 | 46 | 9 |
| | | 41.65 | 44.22 | 11.83 | 2.31 |
| 41. *Attention soutenue* | 389 | 14 | 86 | 217 | 72 |
| | | 3.60 | 22.11 | 55.78 | 18.51 |
| 42. *Questions* | 389 | 62 | 178 | 107 | 42 |
| | | 15.94 | 45.76 | 27.51 | 10.80 |
| 43. *Utilisation de l'ordinateur* | 389 | 113 | 163 | 82 | 31 |
| | | 29.05 | 41.90 | 21.08 | 7.97 |
| 44. *Intégration des connaissances* | 386 | 68 | 164 | 118 | 36 |
| | | 17.62 | 42.49 | 30.57 | 9.33 |
| 45. *Application des connaissances* | 389 | 46 | 160 | 126 | 56 |
| | | 11.86 | 41.24 | 32.47 | 14.43 |

Note: 1 = Never, 2 = Occasionally, 3 = Often, 4 = Very Often.

Table 5 presents other descriptive statistics. There were no exceptionally high or low means, the highest being for "Notetaking" (3.33) and "Maintaining attention during the whole class" (2.89), and the lowest mean corresponding to "Making verbal presentations". Standard deviations were in the 0.71 to 0.93 range, indicating an acceptable spread of answers across possible choices.

**Table 5**

**Class Activities: Means, Std Deviations, Skewness and Kurtosis Coefficients**

| Item | Mean | S. Dev. | Skewness | Kurtosis |
|---|---|---|---|---|
| 37. *Prise de notes* | 3.33 | 0.71 | -0.71 | -0.23 |
| 38. *Discussions* | 2.53 | 0.93 | 0.10 | -0.86 |
| 39. *Travail en équipe* | 2.84 | 0.83 | -0.09 | -0.83 |
| 40. *Présentations orales* | 1.75 | 0.75 | 0.78 | 0.20 |
| 41. *Attention* | 2.89 | 0.73 | -0.37 | 0.04 |
| 42. *Questions* | 2.33 | 0.87 | 0.29 | -0.55 |
| 43. *Ordinateur* | 2.08 | 0.90 | 0.49 | -0.54 |
| 44. *Intégration des connaissances* | 2.32 | 0.87 | 0.19 | -0.63 |
| 45. *Application des connaissances* | 2.49 | 0.88 | 0.13 | -0.71 |

The highest skewness coefficients were for Items 37 and 40. These items were skewed left and right respectively, as could be expected from the mean. Kurtosis coefficients also took an acceptable range of values between .20 and .86, except for Item "Concentration" which was more platykurtic.

It was clear from the outset that the distributions of all items would not be normal and could not even be expected to be. Taking notes, for example, is an activity that is required from students in most classes, most of the time: one would normally expect the "Never" and "Occasionally" cells combined to have very low frequencies. The mean could thus be expected to be high, as well as the skewness coefficient, signalling a negatively skewed distribution. At the opposite end, there were activities which students are not presented with very often during a whole course. Making a verbal presentation is an example of this type of activity. As expected, the "Often" and "Very often" cells had low

frequencies, the mean was low and again, the skewness coefficient was high, this time indicating a positively skewed distribution.

However, it was also obvious that these activities could not be removed from the questionnaire, because they were crucial in describing class activities and, in spite of their low variance, they still provided valuable information on students' behaviours. Descriptive statistics were used not only to control for approximately normal distributions, but mainly to flag items and attract attention to them in further analyses. These analyses led to recommendations to delete, modify or keep items in the questionnaire. However, this research commanded caution with statistical value judgements. Over and above the ideals of the "statistically perfect" instrument which would have been needed for theory falsification, and without pushing aside all concerns for rigour, a questionnaire allowing for system trouble-shooting and innovation-promoting was preferred.

Returning to Class activities, the conclusion was that the distribution of items was approximately normal, but that special attention should be directed to Items 37 and 40 which were skewed left and right respectively, and Item 41 which had a very low kurtosis coefficient.

**Item Homogeneity**

Table 6 presents the Pearson correlation coefficients computed for all Class activities items. Coefficients ranged between .01 and .51, revealing very low to high correlations between items in this section, with a majority of moderate correlations. Item

"Concentration" correlated negatively with three others, namely "Discussions", "Teamwork" and "Verbal Presentations". These negative coefficients signalled that concentrating during the whole class period was inversely related with discussing, working in teams and communicating verbally. However, this raised doubts about the relevancy of Item 41 in the present scale. Also, more than one third of the correlation coefficients being under .15 suggested there might be more than one factor represented in this set of items.

**Table 6**

**Class Activities: Inter-Item Pearson Correlation Coefficients**

| | *Notes* | *Discussions* | *Équipe* | *Présentation* | *Attention* | *Questions* | *Ordinateurs* | *Intégr.* |
|---|---|---|---|---|---|---|---|---|
| 38. *Discussions* | .10 | | | | | | | |
| 39. *Équipe* | .16* | .41** | | | | | | |
| 40. *Présentations* | .01 | .16 * | .30** | | | | | |
| 41. *Attention* | .30** | -.08 | -.04 | -.09 | | | | |
| 42. *Questions* | .13 | .44** | .16* | .04 | .22** | | | |
| 43. *Ordinateur* | .16* | .28** | .34** | .24** | .05 | .23** | | |
| 44. *Intégration* | .18* | .15* | .15* | .14 | .17* | .22** | .20** | |
| 45. *Applications* | .11 | .15* | .06 | .16* | .12 | .23** | .10 | .51** |

Note: * indicates a $p < .01$ level
** indicates a $p < .001$ level or lower

An additional check for item homogeneity was needed. In order to estimate the internal consistency of the set of Class activities items, a reliablity coefficient (Cronbach's $\alpha$) was computed and found equal to .66 for the whole set of items. This provided some evidence that the items were measuring the same construct. Two reliability coefficients

were then computed for each item. Item-total correlation coefficients were used to measure the correlation of each item to the total set of items, and α coefficients were used to estimate the reliability of the whole set of items if each item were deleted. Both series of coefficients were computed using the odd/even method for splitting the sample. This was justified by the procedure used for entering data in the matrix. Subjects belonging to the same group and programme were entered sequentially. This method for computing reliability coefficients insured a proper representation of all groups and programmes in both halves of the sample. Table 7 presents these reliability coefficients.

**Table 7**

**Class Activities: Inter-Item and Alpha Coefficients (*Total alpha = .66*)**

| Item | Item-total Coefficient | Reliability Coefficient if Item Deleted |
|---|---|---|
| 37. *Notes* | .43 | .64 |
| 38. *Discussions* | .59 | .61 |
| 39. *Équipe* | .55 | .62 |
| 40. *Présentations* | .41 | .65 |
| 41. *Attention* | .32 | .66 |
| 42. *Questions* | .59 | .61 |
| 43. *Ordinateurs* | .58 | .61 |
| 44. *Intégration* | .60 | .61 |
| 45. *Applications* | .54 | .63 |

The correlation coefficients between single items and the total set of items ranged between .41 and .60, with one low coefficient of .32 for Item 41. This suggested that all other items in this set measured the same construct, and signalled once again the suspect nature of Item "Attention" in this set of items. As for the individual α coefficients, their

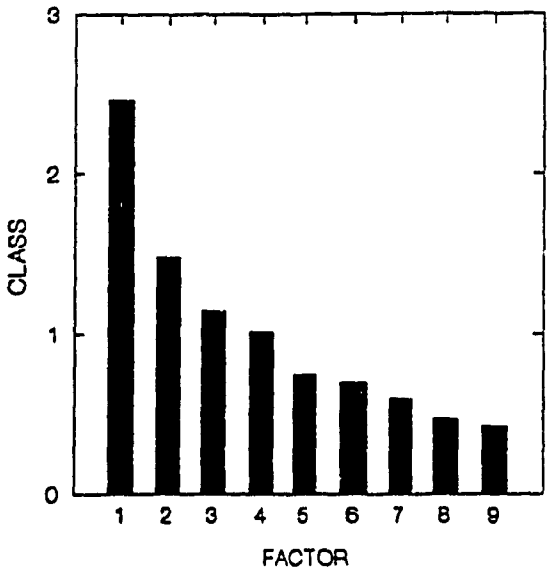
values ranged between .61 and .65, all of them being smaller than the total $\alpha$ (.66) calculated for the entire set, but for Item 41 which had an $\alpha$ coefficient equal to .66. Thus, each item appeared to make a contribution to the measurement of the construct, except for Item 41. Based on the evidence above, it appeared appropriate to proceed with factor analysis, in order to form a scale and also verify whether Item 41 should be removed or not from this scale.

### Forming a Scale

Eigenvalues were computed using principal components analysis. They are reported on the vertical axis of the scree plot in Figure 7.

**Figure 7**

**Class Activities: Plot of Eigenvalues**



The Kaiser criterion which suggests that the number of factors is equal to the number of eigenvalues greater than or equal to 1.0, was applied. Eigenvalues in Figure 7 indicated the possibility of up to four factors. Three analyses were performed, for testing one- two- and three factor solutions. Results are reported in Table 8. As is the use, only loadings above .30 are reported. "As a rule of thumb, loadings in excess of .30 are eligible for interpretation, whereas lower ones are not, because a factor loading of .30 indicates at least a 9% overlap variance between the variable and the factor" (Tabachnick & Fidell, 1983, p. 411).

**Table 8**

**Class Activities: Factor Loadings for One- Two- and Three-Factor Solutions**

| Items | Factor Loadings | | | | | |
|---|---|---|---|---|---|---|
| | Three-Factor Solution | | | Two-Factor Solution | | One-Factor Solution |
| | Factor 1 | Factor 2 | Factor 3 | Factor 1 | Factor 2 | Factor 1 |
| 37. *Notes* | .39 | .37 | .43 | .39 | .37 | .39 |
| 38. *Discussions* | .63 | -.36 | | .63 | -.36 | .63 |
| 39. *Équipe* | .59 | -.46 | | .59 | -.46 | .59 |
| 40. *Présentations* | .41 | -.41 | -.35 | .41 | -.41 | .41 |
| 41. *Attention* | | .69 | .35 | | .69 | |
| 42. *Questions* | .60 | | | .60 | | .60 |
| 43. *Ordinateurs* | .59 | | | .59 | | .59 |
| 44. *Intégration* | .60 | .38 | -.46 | .60 | .38 | .60 |
| 45. *Applications* | .52 | .37 | -.58 | .52 | .37 | .52 |

In the one-factor solution, loadings ranged between .39 and .63, with the exception of Item 41, loading .23. This supported the notion of one general factor underlying this set of items and pointed to the peculiar nature of Item 41. The two-factor solution presented

somewhat similar results, with all items but Item 41 loading between .39 and .63 on Factor 1, and only Item "Attention" loading higher (.69) on Factor 2. In the three-factor solution, all items loaded moderately or high on Factor 1, except for Item "Attention" which loaded high on Factor 2 only, and Item "Notetaking" which loaded somewhat higher on Factor 3. Although loading moderately on Factor 1, Item "Applications" also loaded somewhat higher on Factor 3. Item "Verbal presentations" loaded moderately (.41) on both Factors 1 and 2. The three-factor solution was seen as merely separating the second factor in the previous solution, into two factors of lesser importance.

The one-factor solution appeared more parsimonious and interpretable. However, the total variance explained by this solution (27%), as well as the percent of residuals under .05 (14%) between the observed and reproduced correlation matrices suggested that this solution might be improved by the removal of Item 41 from this set of items.

One-, two- and three-factor solutions were performed on the remaining eight-item scale. Results are presented in Table 9. In the three-factor solution, all items load moderately to high on Factor 1, with Items 44 and 45 loading higher on Factor 2 and Item 40 loading higher on Factor 3. In the two-factor solution, all items load moderately to high on Factor 1, with Items 44 and 45 loading higher on Factor 2. In the one-factor solution, factor loadings range between .35 and .66. However, the total variance explained by the one-factor solution rose to 30%, and 25% of the residuals between the observed and reproduced correlation matrices were now under .05, indicating a better fit between the observed and reproduced correlation matrices.

**Table 9**

**Class Activities: Factor Loadings for the Eight-Factor Scale**

| Items | Factor Loadings | | | | | |
|---|---|---|---|---|---|---|
| | Three-Factor Solution | | | Two-Factor Solution | | One-Factor Solution |
| | Factor 1 | Factor 2 | Factor 3 | Factor 1 | Factor 2 | Factor 1 |
| 37. *Notes* | .35 | | | .35 | | .35 |
| 38. *Discussions* | .66 | -.31 | -.36 | .66 | -.31 | .66 |
| 39. *Équipe* | .61 | -.48 | | .61 | -.48 | .61 |
| 40. *Présentations* | .44 | | .69 | .44 | | .44 |
| 42. *Questions* | .58 | | -.57 | .58 | | .58 |
| 43. *Ordinateurs* | .60 | | | .60 | | .60 |
| 44. *Intégration* | .58 | .60 | | .58 | .60 | .58 |
| 45. *Applications* | .51 | .68 | | .51 | .68 | .51 |

Removing Item 41 from the Class activities scale did not improve the size of the correlations between the remaining eight items, but it did eliminate the negative correlations with Items 38, 39 and 40. Item-total coefficients between each item and the total set still ranged from .39 to .63. The reliability coefficient for the entire set rose slightly from .659 to .661, and the reliability coefficients for each item in the resulting group, if each item were deleted, were all less than the total $\alpha$. The one-factor solution for the eight-item scale consequently appeared to present the best fit.

All remaining items appeared to describe class activities in an appropriate way. Items 37 through 43 referred to more or less frequent class activities. Items 44 and 45 were of a different order, referring to activities that cannot take place but towards the end, or as an outcome of learning, rather than to learning behaviour *per se*. Although they both loaded somewhat higher on Factor 2, it appeared appropriate to keep them in the Class

Activity scale. Considering the different nature of Item 41, which referred to an attitudinal behaviour rather than a specific activity, and considering the results of the preceding analyses, it was recommended to delete Item 41 from the questionnaire and the subsequent analyses.

### 5.2.2 Other College Activities

The analysis reported in the preceding section was repeated for all eight other College activity groups of items, always with the purpose of verifying if scales could be formed to assess the corresponding activities. In order to avoid repetitions, instead of dealing successively with each activity, results are presented and discussed in this section for all activities together, as far as descriptive statistics, correlations and reliability are concerned. However, results pertaining to factor analysis will be detailed for each scale. Tables used for this process will be found in Appendices C and E.

#### Descriptive Statistics

The frequencies and percentages for all groups of items can be found in Appendix C. There were absolutely no empty cells but, as argued in the preceding section, some responses had very low or very high frequencies, depending on the nature of the activity referred to. For instance, Item "Attending a Non-Mandatory Talk" in Cultural and Artistic Activities got 0.26% in the "Very Often" cell, and "Attending an Art Workshop" got 82.78% in the "Never" cell. Both activities are not what students are presented with very often in the course of a semester. But on the whole, answers were well distributed across the range of possible choices.

Tables E-2 to E-9 (Appendix E) present other descriptive statistics. Means range from 1.09 to 3.33, the lowest mean being for "Attending the Math. & Science L.R.C.", and the highest for "Instruction on Notetaking" and "Writing Draft". Standard deviations are all between 0.33 and 1.16. Skewness and kurtosis coefficients generally fall within a statistically acceptable range, except for a few cases which are discussed in the following pages.

Examining these descriptive data confirmed there was no reason to believe that distributions were not approximately normal. Some items were however detected as having peculiar characteristics, and special attention was directed to them in further analyses.

**Inter-Item Pearson Correlations**

Inter-item Pearson correlation coefficients were computed for the different College activities groups of items. Coefficients were all positive except for ten coefficients related to four different items. Coefficients ranged from .01 to .80: 26.5% were in the low .01 to .14 range; 38.6% were in the moderate .15 to .29 range and 34.9% were in the high .30 to .80. Items with negative coefficients were examined thoroughly and found uncorrelated with the remaining items in their respective groups, as will be explained shortly.

**Reliability**

The internal consistency of all College Activities scales was the next object of attention. Cronbach's $\alpha$ coefficients are reported in Table 10. They range between .66 and .81.

Inter-item reliability was examined next. Item-total correlation coefficients and coefficients $\alpha$ if each item were deleted, were computed. These figures confirmed that items in each group were related to a common factor. At the same time, they pointed to the suspect presence of a few items belonging to four different scales.

**Table 10**

**Cronbach's Alpha Coefficient for Each College Activity Scale**

| Scale | Cronbach's Alpha |
|---|---|
| Class Activities | .66 |
| Independent Study | .69 |
| Writing Activities | .77 |
| Interactions with Teachers | .81 |
| Interactions with Peers | .76 |
| Cultural and Artistic Activities | .78 |
| Media Center Activities | .75 |
| Clubs, Sports and Student Organizations | .66 |
| Seeking Help | .58 |

Based on all the preceding evidence, it appeared legitimate to proceed to the formation of scales through factor analysis.

## Factor Analysis

As explained above, the results of factor analysis are presented here successively for each of the remaining eight groups of items intended to form scales for the assessment of student involvement in college activities. One-, two- and three-factor solutions were computed for each group of items, using Principal Components. For the two- and three-

factor solutions, orthogonal rotations were performed to assist in the interpretation of the solution. Where there were reasons to suspect that scales would be improved if items were removed, several other rounds of factor analysis were performed after removing one or more items from the set.

**Independent Study**

This set comprises nine items designed to describe behaviours expected from students when they study, do assignments, prepare for exams and the like. Activities in which they engage in the company of other students were excluded from this set for they were covered in the "Interactions with Peers" section.

Descriptive statistics had revealed Items 52, 53 and 54 to be severely skewed right, with 96.6% of responses in the "Never" and "Occasionally" cells combined for Item 52, 97.7% for Item 53 and 99.1% for Item 54 (Table C). As a result, means and standard deviations were low, and skewness and kurtosis coefficients extremely high (Table E-2). All three items had negative inter-item Pearson correlation coefficients. At last, $\alpha$ coefficients if Items 52, 53 and 54 were deleted all exceeded the $\alpha$ coefficient for the total set (.69). Table 11 presents the results of the one-, two- and three-factor analyses.

The last three items have very low loadings (.15, .16 and .22 respectively). In the two-factor solution, Items 52 and 54 load high on Factor 2, while Item 53 loads only on the third factor in the three-factor solution. In the two- and three-factor solutions, the total variance explained is higher than in the one-factor model, reaching 43% for the two-factor and 55% for the three-factor. However, the percentage of residuals under .05 is not

improved by the addition of factors and remained at 36% for all three factor models.

**Table 11**

**Independent Study: One- Two- and Three-Factor Solutions**

| Items | Factor Loadings | | | | | |
|---|---|---|---|---|---|---|
| | Three-Factor Solution | | | Two-Factor Solution | | One-Factor Solution |
| | Factor 1 | Factor 2 | Factor 3 | Factor 1 | Factor 2 | Factor 1 |
| 46. *Mémorisation* | .61 | | | .61 | | .61 |
| 47. *Résumé* | .61 | | | .61 | | .61 |
| 48. *Lectures obligatoires* | .61 | .32 | | .61 | .32 | .61 |
| 49. *Lectures facultatives* | .74 | | | .74 | | .74 |
| 50. *Difficultés notées* | .71 | | | .71 | | .71 |
| 51. *Préparation au cours* | .64 | | | .64 | | .64 |
| 52. *Centre d'aide français* | | -.70 | | | -.70 | |
| 53. *Centre d'aide math/sc* | | | .88 | | | |
| 54. *Atelier méth. trav.* | | -.68 | | | -.68 | |

An explanation was found for the low loadings in the one-factor solution. While Items 46 through 51 referred to behaviours expected from students ranging across the full spectrum of academic performance, Items 52 through 54, which referred to seeking help from the Learning Resource Center, were more expected from low ability students. Additionally, Item 53 concerned only *Sciences de la nature* students. As a matter of fact, attending the L.R.C. is strongly recommended by teachers to students who get low grades on first tests in language, math or science. Although no explanation was sought for why these items did not load on a common separate factor, Items 52, 53 and 54 did appear to belong to another scale. It was recommended that they be removed from the

set of Individual Study activities and integrated to another set designed to assess the ability to seek extra help and guidance when in difficulty. Factor analysis for the remaining six-item scale was performed next: loadings for the one-factor model are presented in Table 12.

**Table 12**

**Independent Study: Six-Item Scale**

| Item | Factor Loadings |
|---|---|
| 46. *Mémorisation* | .62 |
| 47. *Résumé* | .63 |
| 48. *Lectures obligatoires* | .64 |
| 49. *Lectures facultatives* | .73 |
| 50. *Difficultés notées* | .70 |
| 51. *Préparation* | .63 |

Factor analysis revealed only one eigenvalue above 1.0. All loadings ranged from .62 and .73, thus supporting the notion of one factor underlying this reduced set of items. In all factor solutions explored, items loaded higher on Factor 1 than on Factors 2 and 3.

### Writing Activities

This section of the questionnaire refers to activities students are expected to engage in when required to submit written work. It comprises 11 items intended to cover all aspects of this frequent activity.

While the first six items appeared to be approximately normally distributed as far as revealed by descriptive statistics, the remaining five were flagged either for low means

and standard deviations or high skewness and kurtosis coefficients. Due to the number of items, one-, two-, three- and four-factor solutions were explored. Since no item loaded higher on Factor 4 than on the other factors, only loadings for the first three solutions are reported in Table 13.

**Table 13**

**Writing Activities: One-, Two- and Three-Factor Solutions**

| Items | Factor Loadings | | | | | |
|---|---|---|---|---|---|---|
| | Three-Factor Solution | | | Two-Factor Solution | | One-Factor Solution |
| | Factor 1 | Factor 2 | Factor 3 | Factor 1 | Factor 2 | Factor 1 |
| 55. *Texte court* | .58 | | | .58 | | .58 |
| 56. *Travail long* | .47 | | -.47 | .47 | | .47 |
| 57. *Plan* | .61 | | | .61 | | .61 |
| 58. *Brouillon* | .69 | | .31 | .69 | | .69 |
| 59. *Dictionnaire* | .68 | -.32 | .30 | .68 | -.32 | .68 |
| 60. *Ouvrages de référence* | .71 | | | .71 | | .71 |
| 61. *Traitement de texte* | .61 | | | .61 | | .61 |
| 62. *Lecture haute voix* | -.36 | .44 | .51 | | .44 | |
| 63. *Faire lire* | | .59 | .37 | | .59 | |
| 64. *Demande conseil* | | .72 | | | .72 | |
| 65. *Écriture facultative* | | .52 | -.32 | | .52 | |

As can be read from Table 13, the first seven items have moderate to high loadings on Factor 1 in all solutions. Items 62 through 65 have moderate to high loadings on Factor 2 in the two-factor solution. In the three-factor solution, Items 63, 64 and 65 load higher on Factor 2, while Item 62 loads higher on Factor 3.

Several additional factor solutions were explored after removing different items.

Removing Item 65 alone, on the grounds that it referred to a non course-related activity did not improve the solution, for Items 62 to 64 still loaded higher on a second factor. Removing the last four items provided moderate to high factor loadings for the remaining seven items, but the loading of Item 61 was now down from .61 to .37, as compared with the two preceding solutions, and at the same time, valuable information appeared to be lost. Removing both Items 61 and 65 provided a better solution. Factor loadings ranged from .42 to .73 in the one-factor model, as reported in Table 14.

**Table 14**

**Writing Activities: Seven-Item Scale**

| Item | Factor Loadings |
|---|---|
| 55. *Texte court* | .49 |
| 56. *Texte long* | .66 |
| 57. *Plan* | .64 |
| 58. *Brouillon* | .69 |
| 59. *Dictionnaire* | .73 |
| 60. *Ouvrages de référence* | .67 |
| 62. *Lecture haute voix* | .62 |
| 63. *Faire lire* | .48 |
| 64. *Demande conseil* | .42 |

Reliability coefficients were computed for this nine-item scale: item-total coefficients ranged between .46 and .69, revealing that items were interrelated. Additionally, all $\alpha$ coefficients were less than the total $\alpha$ (.78), providing evidence that the remaining items added substantially to the reliability of the scale.

Considering that Item 61 referred to using a specific tool, namely a word processor, and that Item 65 referred to writing activities eventually performed outside of the course context, while all other items referred to various course-related writing activities, it was recommended that Items 61 and 65 be deleted from the revised version of the questionnaire and from further computations within this project. Lower loadings for Items 63 and 64 were explained by the somewhat different nature of these activities which imply seeking help from someone. They were conserved in this scale because they were highly commendable activities which appeared important to be investigated into.

This one-factor model explained 37% of the total variance while 25% of the residuals between observed and reproduced correlation matrices were less than .05.

**Interactions with Teachers**

This set comprises eight items designed to cover the different kinds of interactions students engage in with their teachers in the context of courses. Descriptive statistics reveal some skewness in connection with four items: Table E-4 shows very clearly that a large majority of students never or almost never meet teachers in their office, nor engage in discussions about their career, difficulties or current events. In spite of that, correlation coefficients were all positive. They ranged between .20 and .50, indicating moderate to high inter-item correlation. Item-total correlation coefficients were all between .56 and .69, confirming relationships between each item and the total set. At last, all individual $\alpha$ coefficients were smaller than the total $\alpha$ computed for this scale (.77). Table 15 displays factor loadings for the different solutions explored.

**Table 15**

**Interactions with Teachers: One-, Two- and Three-Factor Solutions**

| Items | Factor Loadings | | | | | |
|---|---|---|---|---|---|---|
| | Three-Factor Solution | | | Two-Factor Solution | | One-Factor Solution |
| | Factor 1 | Factor 2 | Factor 3 | Factor 1 | Factor 2 | Factor 1 |
| 66. *Éclaircissements* | .66 | | -.46 | .66 | | .66 |
| 67. *Discussion* | .76 | | -.32 | .76 | | .76 |
| 68. *Rendez-vous* | .71 | | | .71 | | .71 |
| 69. *Travail de session* | .67 | | | .67 | | .67 |
| 70. *Plans d'avenir* | .63 | -.45 | .31 | .63 | -.45 | .63 |
| 71. *Évaluation* | .62 | .38 | | .62 | .38 | .62 |
| 72. *Encadrement* | .69 | | .54 | .69 | | .69 |
| 73. *Jaser* | .53 | -.69 | | .53 | -.69 | .53 |

There was only one eigenvalue above 1. All items had loadings between .53 and .76 on a single factor, and only Item 73 loaded higher on Factor 2 in the two- and three-factor solution. The one-factor solution seemed to represent the most parsimonious solution, explaining 44% of the total variance and with 17% of the residuals under .05.

**Interactions with Peers**

This set comprises 10 items designed to assess how often students engage in a variety of activities with other students. Cultural, artistic, athletic and other non course related activities were not included in this section, as they were the objects of other sections of the questionnaire.

As represented in Table E-5, students engage quite regularly in all activities except those described by Items 78 and 83. This was to be expected, since items were ordered in each

group starting with the most common activities and ending with the less frequent ones. Quite surprisingly though, rather few (35.7%) students declare engaging often or very often in leisure activities with other cégep students. At last, only 6.6% engage into formal peer tutoring. Accordingly, the distribution of answers to "Peer Tutoring" was skewed right, as evidenced in Table E-5. Inter-item Pearson correlation coefficients ranged from .08 to .57, with only low to moderate correlations with Item 83. Item-total coefficients spread from .56 to .66, except for Items 82 and 83 for which .39 and .48 coefficients indicated lower correlations with the total set of items. Coefficient alpha for the total set was .76, and all individual alpha coefficients were below that mark, except for Items 82 and 83. For all these reasons, it was decided to question the relevancy of Items 82 and 83 in the Interactions with Peers group of items by means of factor analysis. Table 16 presents the results of the one-, two and three-factor solutions explored in view of forming a scale for the assessment of student involvement in interactions with their peers.

Table 16 underlines the peculiar nature of Items 82 and 83. In the one-factor solution, they have low loadings on Factor 1. In the two-factor solution, Items 79 through 82 load higher on Factor 2, while Item 83 does not load on either factor. In the three-factor solution, Items 79, 80 and 81 again load higher on Factor 1, while Items 82 and 83 load higher on a separate third factor. This *va-et-vient* made all solutions but the one-factor hard to interpret.

**Table 16**

**Interactions with Peers: One-, Two- and Three Factor Solutions**

| Items | Factor Loadings | | | | | |
|---|---|---|---|---|---|---|
| | Three-Factor Solution | | | Two-Factor Solution | | One-Factor Solution |
| | Factor 1 | Factor 2 | Factor 3 | Factor 1 | Factor 2 | Factor 1 |
| 74. *Demander explications* | .59 | -.40 | | .71 | | .59 |
| 75. *Travailler ensemble* | .62 | -.55 | | .83 | | .62 |
| 76. *Donner explications* | .63 | -.35 | | .70 | | .63 |
| 77. *Discuter cours* | .69 | | | .69 | | .69 |
| 78. *Aide équipement* | .56 | | | .47 | .32 | .56 |
| 79. *Discussions (1)* | .57 | .52 | | | .77 | .57 |
| 80. *Discussions (2)* | .65 | .52 | | | .82 | .65 |
| 81. *Réviser ses idées* | .57 | .49 | | | .75 | .57 |
| 82. *Activités de loisir* | .39 | | -.59 | | .42 | .39 |
| 83. *Tutorat* | .34 | | -.71 | | | .34 |

Content analysis of Items 82 and 83 pointed to the fact that, while all other items in this group referred to academic interactions, Item 82 referred to social activities and Item 83 to some form of socio-academic commitment into which only top students are solicited to engage. It was recommended that, in spite of the small variance shared with a common factor, both items be retained in the questionnaire because of the different nature of the information they provided.

### Cultural and Artistic Activities

As argued by Pascarella and Terenzini (1991), knowledge and intellectual development are at the center of the mission of colleges. However these institutions also have the responsibility of bringing students to a certain level of knowledge and appreciation of the

arts and to develop their sense for aesthetics. This is why colleges and cégeps as well provide certain opportunities in this respect. The set of items analyzed in this section was intended to assess the degree to which students participate in such events.

As shown in Appendix C, the "Very often" cells for Items 84, 85, 86 have extremely low frequencies, which again translates into skewed distributions. These items refer to attending a non-required talk, an art exhibition or an art workshop on the campus. Of course, opportunities for attending these events on the campus being relatively scarce themselves, these low frequencies were to be expected. All items have moderate to high Pearson correlation coefficients, the lowest (.09) being between Items 85 and 88. Item-total coefficients range between .43 and .75, with the lowest coefficient for Item 85. The alpha coefficient for the entire set is .78 and all individual alphas are lower but for Item 88.

Factor analyses were performed on the total set of items. Although there were two eigenvalues greater than 1.0, only one factor was extracted in two- and three-factor solutions. This supported the notion of one general factor underlying this set of items. Results of the one-factor solution are presented in Table 17. This solution explained 45% of the total variance and 33% of the residuals were under .05.

Although the loading for Item 85 was considerably lower than the others, and although removing it would have resulted in an increase of the other factor loadings and the reliability of the total set of remaining items, it appeared desirable to keep it in the scale for the additional information it provided on students' interest for this cultural activity *par excellence*.

**Table 17**

**Cultural and Artistic Activities: Factor Loadings for the One-Factor Solutions**

| Item | Factor Loadings |
|---|---|
| 84. *Discussion sujet arts* | .72 |
| 85. *Conférence facultative* | .45 |
| 86. *Exposition sur campus* | .75 |
| 87. *Assister atelier arts* | .62 |
| 88. *Cours complémentaire arts* | .66 |
| 89. *Pratiquer activité artistique* | .70 |
| 90. *Événement artistique hors campus* | .74 |

### Media Center Activities

This set of items was designed to assess the degree to which students take advantage of the facilities offered by the Media Center where most learning resources and equipment is concentrated and made available to them through qualified personnel. Quiet carrels for individual study and small rooms are also available for small group meetings, viewing films and other similar activities.

Table 18 presents factor loadings for the three solutions explored. Descriptive statistics displayed in Appendix C and Table E-7 show approximately normal distributions, with the exception of Item 94, which stands for "Borrowing other types of equipment". Inter-item correlation coefficients were all moderate or high. Item-total reliability coefficients ranged between .53 and .70. The alpha coefficient for the total set was .75, and individual coefficients showed that all items contributed to the reliability of the scale.

**Table 18**

**Media Center Activities: One-, Two- and Three-Factor Solutions**

| Items | Factor Loadings | | | | | |
|---|---|---|---|---|---|---|
| | Three-Factor Solution | | | Two-Factor Solution | | One-Factor Solution |
| | Factor 1 | Factor 2 | Factor 3 | Factor 1 | Factor 2 | Factor 1 |
| 91. *Fréquenter bibliothèque* | .52 | -.61 | | .52 | -.61 | .52 |
| 92. *Lire périodiques* | .59 | -.56 | | .59 | -.56 | .59 |
| 93. *Emprunter livres* | .72 | | -.39 | .72 | | .72 |
| 94. *Emprunter matériel audio-visuel* | .57 | | | .57 | | .57 |
| 95. *Recherche banque* | .64 | .33 | | .64 | .33 | .64 |
| 96. *Bibliographie* | .57 | .43 | | .57 | .43 | .57 |
| 97. *Demander assistance* | .57 | | .57 | .57 | | .57 |
| 98. *Repérer matériel* | .66 | | -.52 | .66 | | .66 |

As can be seen readily in Table 18, the one-factor solution presented the best fit, for both two- and three-factor solutions had only one item loading on each additional factor. This solution accounted for 37% of the variance and 21% of the residuals were under .05.

**Clubs, Sports and Student Organizations**

This set includes seven items designed to assess student involvement in college activities that were not covered by the preceding scales. All items but Items 99 and 103 were skewed right, thus indicating that students in general do not engage very often in these activities. Inter-item correlations ranged from low to high. Item-total correlations ranged between .52 and .74. Alpha coefficients if each item were deleted were all under the coefficient computed for the total set (.66) but for Item 100. Table 19 presents the results of factor analyses conducted on this set of items.

**Table 19**

**Clubs, Sports and Student Organizations: One-, Two and Three-Factor Solutions**

| Items | Factor Loadings | | | | | |
|---|---|---|---|---|---|---|
| | Three-Factor Solution | | | Two-Factor Solution | | One-Factor Solution |
| | Factor 1 | Factor 2 | Factor 3 | Factor 1 | Factor 2 | Factor 1 |
| 99. *Babillards* | .45 | .34 | .63 | .45 | .34 | .45 |
| 100. *Guide étudiant* | .36 | .49 | .40 | .36 | .49 | .36 |
| 101. *Réunion* | .55 | .58 | | .55 | .58 | .55 |
| 102. *Para-scolaire* | .50 | .51 | -.52 | .50 | .51 | .50 |
| 103. *Entraînement* | .71 | -.51 | | .71 | -.51 | .71 |
| 104. *Cours* | .72 | -.46 | | .72 | -.46 | .72 |
| 105. *Événement sportif* | .68 | -.30 | | .68 | -.30 | .68 |

Table 19 shows that all items have moderate to high loadings in the one-factor solution, but for Item 100. The two-factor solution has Items 100 to 102 loading slightly higher on Factor 2. The three-factor solution has Items 103, 104 and 105 loading on Factor 1, Items 100 and 101 loading on Factor 2 and Items 99 and 102 loading on Factor 3. This suggests that there were probably three factors underlying this set of items, which could be labelled "Sports", "Student life" and "College events". However, since there were very small differences between loadings of the same item on different factors (Item 102 loaded .50 on Factor 1, .51 on Factor 2 and -.52 on Factor 3), it was attempted to delete only Item 100 which had the lowest loading in the one-factor solution.

Deleting Item 100 did not provide a stronger factor structure, nor improve scale reliability. In the one-factor solution, factor loadings for Items 99, 101 and 102 were reduced, while loadings for Items 103, 104 and 105 were slightly increased. Cronbach's

α rose from .662 to .664, but coefficient α for Item 99 was now greater than the total α. It was recommended to keep Item 100, for the value of the information it provided on the perceived usefulness of the student guide. But it was concluded that this group of items did not provide a very strong factor structure.

### Seeking Help

This set comprises six items related to the activities students might engage in, when seeking to be helped or plan ahead. Students were not asked to report how often they engaged in these activities, but simply whether they had engaged in them or not during the present term. Corresponding distributions were fairly symmetrical, with one exception for Item 109. Item-total coefficients ranged between .44 and .69. The α coefficient for the entire set was .58, but, at .59, the coefficient for Item 110 was greater than the total alpha. Table 20 presents the results of factor analysis.

**Table 20**

**Seeking Help: One-, Two and Three-Factor Solutions**

| Items | Factor Loadings | | | | | |
|---|---|---|---|---|---|---|
| | Three-Factor Solution | | | Two-Factor Solution | | One-Factor Solution |
| | Factor 1 | Factor 2 | Factor 3 | Factor 1 | Factor 2 | Factor 1 |
| 106. *A.p.i. prog.* | .88 | | | .57 | .45 | .57 |
| 107. *A.p.i. avenir* | .73 | | .43 | .79 | .31 | .79 |
| 108. *C.o. carrière* | .60 | | .46 | .77 | | .77 |
| 109. *Rencontre info* | | | .87 | .60 | | .60 |
| 110. *Admission univ.* | | .88 | | | -.64 | |
| 111. *Carrières réussies* | | .65 | .40 | .31 | -.71 | .31 |

The three-factor solution presented higher loadings but was not easily interpreted. The two-factor solution was more easily interpreted: Factor 1 refers to consulting and receiving information from others, while Factor 2 refers to getting your own information. Removing Items 110 and 111 did not provide for a stronger factor structure, nor did it improve reliability. The alpha for the entire set rose from .58 to .64, but then, two other items had an alpha if deleted greater than the total alpha.

The very nature of this whole activity was itself different from other college activities. It did have a much less mandatory character and was more of the "Use as needed" type. Yet, as evidenced by responses in another section of the test, while 80% of the students declare they will seek admission into university, only 58% have a clear idea about which programme they want to seek admission into. And even in the best of situations where a student has chosen a career, a programme and a university, there is still a certain amount of uncertainty about his or her being admitted in this programme and university.

This analysis led to noticing that consulting with a counsellor or an advisor, and reading career information material or success stories all refer to getting or seeking help or information from various external sources. Other sections also comprised items related to this help-seeking activity (Items 52, 53, 54 from Study activities, and Items 63 and 64 from Writing activities). After having been recoded into a dichotomous format, these items were imported and analyzed in view of forming a new scale around this construct. But data did not support this trial.

The conclusion was that, although the ability to seek help when in need appears to be

an important component of student involvement, it was not measured properly by means of the questionnaire. Consequently, this variable was dropped from the model to be tested in this study. It was recommended that, when the questionnaire is revised, special attention be directed toward designing a proper scale for the assessment of involvement in this activity.

### 5.3 Other Variables

The questionnaire contained six more groups of items designed to assess other variables included in the model. They were examined using the same procedure, to determine whether scores could be added to form a composite measure for these variables.

#### Value of learning

Table 21 presents the results of three factor analyses.

**Table 21**

**Value of Learning: One-, Two and Three-Factor Solutions**

| Items | Factor Loadings | | | | | |
|---|---|---|---|---|---|---|
| | Three-Factor Solution | | | Two-Factor Solution | | One-Factor Solution |
| | Factor 1 | Factor 2 | Factor 3 | Factor 1 | Factor 2 | Factor 1 |
| 17. *Méthodes trav. sec.* | .63 | -.52 | | .63 | -.52 | .63 |
| 18. *Matière sec.* | .57 | -.62 | | .57 | -.62 | .57 |
| 19. *Orientation sec.* | .45 | | -.85 | .45 | | .45 |
| 25. *Diplôme collégial* | .64 | 47 | .35 | .64 | .47 | .64 |
| 28. *Diplôme univ.* | .72 | .37 | | .72 | .37 | .72 |

Distributions were fairly symmetrical, with a general trend towards importance and a

pileup of positive answers for Item 25 indicating that obtaining a college diploma in the present programme was very important for a majority of students (84%). Inter-item correlations ranged between .08 and .43. Total α was .56 and the weakest contribution to reliability was from Item 19 (Usefulness of vocational guidance received in Secondary school). Table 21 presents the results of factor analysis. The one-factor solution presented a good fit which was not improved by additional factors in other solutions. This solution explained 37% of the total variance and 20% of the residuals were under .05.

**Goals and Goal Commitment**

This section was intended to assess up to what point students had clearly set goals and were committed to reach them. It comprised six items. Means were uniformly high, as a result of a pileup of responses at the positive end of the spectrum. Correlation coefficients ranged from moderate to high. Coefficient α for the entire set was .79 and all coefficients α if items were deleted were below this mark. Table 22 presents the results of factor analysis.

The one-factor solution appeared more parsimonious, with all items loading between .48 and .79 on one factor. This solution explained 45% of the total variance and 14% of the residuals were under .05.

**Table 22**

**Goals and Goal Commitment: One-, Two and Three-Factor Solutions**

| Items | Factor Loadings | | | | | |
|---|---|---|---|---|---|---|
| | Three-Factor Solution | | | Two-Factor Solution | | One-Factor Solution |
| | Factor 1 | Factor 2 | Factor 3 | Factor 1 | Factor 2 | Factor 1 |
| 20. *Obj. carr. précis* | .77 | .47 | -.02 | .77 | .47 | .77 |
| 21. *Imaginer carrière* | .74 | .42 | .22 | .74 | .42 | .74 |
| 22. *Moyens à prendre* | .71 | .29 | .21 | .71 | | .71 |
| 24. *Terminer collège* | .47 | -.67 | .21 | .48 | -.67 | .48 |
| 26. *Aller université* | .58 | .56 | .47 | .58 | -.56 | .58 |
| 27. *Obj. étude précis* | .79 | .05 | .46 | .79 | | .79 |

**Study Skills Instruction**

This set comprises 10 items designed to assess students' perceptions of just how much they had involved themselves in seeking instruction on specific study skills. The list of 10 items corresponded to the actual set of workshops that are offered students at Collège de Sherbrooke, through the Media Center, the Learning Resource Center, or in class at the request of a teacher. These workshops were developed as a result of a research project aiming to investigate into the different aspects of what was called the *Métier étudiant* (Lasnier, 1987). Material designed by Guiomar & Hébert (1994) for the development of study skills was also consulted.

Distributions were fairly symmetrical, with a slight pileup of responses at the Never/Occasionally end for Items 112 and 114. Correlations ranged between .22 and .62. The total $\alpha$ was .88 and all individual $\alpha$ coefficients were under this figure.

Table 23 presents the results of factor analysis.

**Table 23**

**Instruction on Study Skills: One-, Two and Three-Factor Solutions**

| Items | Factor Loadings | | | | | |
|---|---|---|---|---|---|---|
| | Three-Factor Solution | | | Two-Factor Solution | | One-Factor Solution |
| | Factor 1 | Factor 2 | Factor 3 | Factor 1 | Factor 2 | Factor 1 |
| 112. *Apprendre par coeur* | .71 | | | .75 | | .71 |
| 113. *Prendre des notes* | .67 | .43 | | .80 | | .68 |
| 114. *Se concentrer* | .77 | | | .79 | | .77 |
| 115. *Savoir s'exprimer* | .64 | | .54 | .50 | .40 | .64 |
| 116. *Savoir lire* | .73 | | | .64 | .37 | .73 |
| 117. *Rédiger examens* | .81 | | | .65 | .48 | .81 |
| 118. *Gestion temps* | .74 | | | .58 | .46 | .74 |
| 119. *Résolution problèmes* | .56 | -.45 | .38 | | .70 | .56 |
| 120. *Recherche biblio.* | .58 | -.50 | -.38 | | .75 | .58 |
| 121. *Travail équipe* | .70 | -.36 | | .33 | .71 | .70 |

There was only one eigenvalue greater than 1.0 and the one-factor hypothesis was confirmed. Factor loadings ranged from .56 to .81 and this solution explained 49% of the total variance, while 44% of the residuals between observed and reproduced correlation matrices were under .05.

**Progress**

This component of student involvement was assessed by means of items in Section 5. Distributions were quite symmetrical, except for Item 136. Means were above 2, except for two items, which referred respectively to learning a second language and appreciating

art. Correlation coefficients were all positive, except for Item 132 with Items 125 and 139. They ranged from .02 to .60, with a large majority of coefficients above .30. Total $\alpha$ was .86, and all coefficients if items were deleted were under this mark, except for Items 129 and 132.

Since there was no intention of forming a scale, no factor analyses were performed at this point. The sum of student answers to these 20 items was however used as an estimate for student activity in the assessment of their own progress.

**Satisfaction**

In the last section of the $QEA_{Exp.}$, 14 items addressed several aspects of student satisfaction and integration into college. This set was analyzed in order to detect which items could be used to obtain a measure of student satisfaction.

Item analysis conducted on this set of items indicated that 12 out of the 14 items could be used to form a coherent scale. Item 23 asking student to assess their decision to engage into higher studies was imported from Section 2 into this group of items. Cronbach's alpha was only .58, but all individual coefficients were under that mark. Again, no factor analysis was performed, but the sum of student answers was used as an estimate for student activity in the assessment of their own satisfaction.

### 5.4 Summary of the Questionnaire

Table 24 presents the 32 variables included in the model at this point. Variables and names are identified in the first column. How they were operationalized for assessment

purposes in the questionnaire is indicated in the center column. The third column relates variables to items in the questionnaire.

**Table 24**

**Variables, Operational Definitions and Questionnaire Item Numbers**

| Variable (VARIABLE NAME) | Operational Definitions | Item # |
|---|---|---|
| Age (AGE) | Age in years | 1 |
| Gender (GENDER) | F, M | 2 |
| Language (LANGUAGE) | French, English, other | 3 |
| Job status (JOB) | Number of hours employed /week, perceived disturbance | 8, 9 |
| Family status (FAMILY) | Perceived disturbance from study | 10 |
| Residence (RESID) | Location and distance from cégep | 4, 5 |
| Prior performance (PRPERF) | Score computed from final G.P.A. in secondary school | Records |
| Reason to attend college (REASON) | Main reason for attending college | 15 |
| Value of learning (VALUE) | Value attributed to Sec. school courses & activities | 17, 18, 19, 25, 28 |
| Goals and commitment (GOALS) | Preciseness of study & career goals | 20-22, 24, 26, 27 |
| Parents' education (PARED) | Highest degree obtained by each parent | 29-32 |
| Parent support (PARSUP) | Interest & encouragement demonstrated by parents | 33-36 |
| Study skills instruction (INST) | Amount of instruction on study skills | 112-121 |
| Role model (MODEL) | Cégep teacher playing role model for students (Y/N) | 152 |
| Performance objectives (EXPAVG) | Expected grades at end of college programme | 14 |
| Time management (TASK) | Number of hours spent attending classes, studying | 6, 7, 11 |
| Courses and classes (CLASS) | Notetaking, teamwork, presentations, using computers,... | 37-40, 41-45 |
| Study and coursework (STUDY) | Memorizing, summarizing, doing assignments ... | 46-51 |
| Writing (WRITING) | Short & long papers, outline, reference tools,... | 55-60, 62-64 |
| Teacher interactions (TEACH) | Seeking information, meeting, discussing, chatting, ... | 66-73 |
| Peer interactions (PEERS) | Seeking or providing help, discussing, peer tutoring... | 74-83 |
| Arts and culture (CULTART) | Arts, talks, exhibitions, workshops ... | 84-90 |
| Media Center (MEDIA) | Borrowing books, other equipment... | 91-98 |
| Clubs, sports & org. (CLUBSPOR) | Using guides, joining clubs, sports, organizations ... | 99-105 |
| Participation in col. act. (PART) | Sum of scores for participation in each college activity | Sum of scores |
| Estimated progress (PROGRESS) | Self-assessed progress in several areas | 122-141 |
| Satisfaction (SATISFAC) | Satisfaction with people, environment, decisions | 23, 143-146, 151, 154-160 |
| Academic performance (PERFORM) | Final grade point average at end of term | Records |
| Persistence (PERSIST) | Actual re-enrollment in Cégep next term (Y/N) | Records |

## 5.5 Recommendations for revision

Exploring the reliability of the $QEA_{Exp.}$ by means of item and factor analysis led to recommendations concerning the revision of the instrument for future use. These were formulated along the way in this chapter as resulting from the analyses performed. They

are summed up here for convenience.

The contents of the first three sections were justified by the purpose of the research, that is, exploring relationships between student characteristics, student involvement and educational outcomes. Section 4 was devoted to the assessment of involvement in specific college activities, while Sections 5 and 6 were meant to collect data for self-assessments of progress and satisfaction. If one were interested only in assessing student involvement, then the first three sections could be omitted, except for a few items aimed at assessing preliminary involvement. If other relationships were of interest, other sections should be administered as appropriate. In view of improving the instrument reliability for assessing student involvement, the following recommendations were formulated for a future revision of the questionnaire:

(1) Delete items 41, 52, 53, 54, 61, and 65, on the grounds that item and factor analyses showed that they were not contributing to the reliability of their respective scales.
(2) Design a new scale for the assessment of the ability to locate and find help when needed, which appears as a potentially important feature of student involvement.
(3) Improve the scale for the assessment of satisfaction, possibly through the design of subscales assessing different aspects of student satisfaction and self-assessment capabilities.
(4) Rearrange items assessing preliminary involvement into a section preceding College Activities.
(5) Add an open question asking students to describe anything else they do in connection with preliminary, participation and assessment activities.

# CHAPTER 6

# VALIDATION OF ANALYTIC ASSUMPTIONS

The purpose of Chapter 5 was to present and discuss results concerning the worth of the *Questionnaire sur la qualité de l'expérience étudiante* ($QEA_{Exp.}$) as an instrument to assess Cégep students' involvement in their studies, as well as other variables included in the model hypothesized in this research. Eight scales were formed for the assessment of student involvement in corresponding college activities. It was also explained how other traits and behaviours were assessed by means of other items or groups of items. Recommendations were issued as to the revision and further use of the questionnaire.

The present chapter opens on a discussion of the assumptions underlying regression methods. Mathematical transformations performed on some variables prior to analysis are reported and variables retained for analyses are presented.

## 6.1 Discussion of Assumptions Underlying Regression Methods

The last step before proceeding to regression analyses consisted in making a preliminary evaluation of data and checking whether assumptions concerning regression analysis were met.

Regression methods are based on sets of assumptions that vary somewhat according to

the purpose for which they are being used. Statistics-oriented authors tend to put forward a more stringent set of assumptions, because of their overwhelming concern for mathematical rigor. Social scientists are commonly satisfied with a more liberal set of assumptions, for fear of otherwise losing valuable and discriminative information.

Among authors consulted for the needs of this research, Tabachnick & Fidell (1983) propose a most exhaustive set of procedures to be performed prior to engaging in multivariate analyses. At the top of their list is a concern for the accuracy of data and possible computational errors generated by computer programs. After these have been taken care of, their advice is to look for missing values. Considering that the pattern of missing values is much more important than the sheer number of missing values, they suggest different treatments to deal with the situation; these go from deleting cases or variables, to treating missing data as data, or estimating missing data. Once this problem has been dealt with, these authors warn against inflated or deflated correlations due to skewness or outliers in the distribution of variables. Both univariate and multivariate outliers must be identified, and measures applied to reduce their influence. At the bottom of the checklist is a discussion of the usual assumptions concerning the normality of the distribution of variables, linearity of relationships between dependent and independent variables, homoscedasticity, multicollinearity and singularity. Altogether, Tabachnick & Fidell (1983) strongly advocate "cleaning up your act" by deleting offending cases and variables, and operating mathematical transformations on ill-distributed variables, depending on the nature and purpose of the analyses.

As noted by Pedhazur (1982), intelligent use of analytic methods requires the researcher

to discriminate between violations of assumptions leading to serious biases and those having little impact on estimators and test statistics. Taking a middle stance, this author sums up assumptions underlying regression analysis as being associated with the distribution and measurement of independent variables, relationships within independent variables, dependent variables, and between both sets of variables, and errors.

This author's concern for accuracy is more about how measurements are obtained, than with errors due to manipulations. Independent variables, he writes, must be measured without error and their values should be fixed at evenly spaced intervals along a continuum of interest. In other words, the distribution of independent variables should cover a range large enough to include extreme values, which optimizes tests of statistical significance. On the other hand, outliers must be avoided for their distorting effects on squared multiple correlations ($R^2$) and standardized regression coefficients ($\beta$). Continuous variables measured without error on an interval scale are the ideal material on which to apply regression methods, but discrete and even dichotomous variables transformed using dummy coding are considered acceptable practice.

Pedhazur's next concern is with the specification of the model to be tested. Multicollinearity, or high correlations between independent variables, and singularity which may be caused by the use of a variable which is a linear combination of other variables, are to be avoided because of their adverse effects on regression results. As for relationships between independent and dependent variables, they must be linear.

The last assumptions concern errors. The mean of errors for each observation of

dependent variables must equal 0. The variance of errors at all values of the independent variables must be constant and, if tests of significance are to be conducted, errors must be normally distributed and uncorrelated with independent variables.

According to Pedhazur (1982), "it has been demonstrated that regression analysis is generally robust in the presence of departures from assumptions, except for measurement and specification errors." Measurement errors in the dependent variables may result from various causes, among others, use of unreliable instruments, inappropriate care in administering tests, and respondents providing false or unreliable information, resulting from ill intentions or unconscious bias. Specification errors may result from the omission of relevant variables, the inclusion of irrelevant variables or specifying a linear relation when it is curvilinear. Both measurement errors and specification errors may have adverse effects on the estimation of regression coefficients, leading either to an overestimation or underestimation of these coefficients. They may also weaken tests of statistical significance of these coefficients.

At the somewhat opposite end, Cohen & Cohen (1983) argue that no assumptions are necessary for the computation of correlation, regression and other associated coefficients, or their interpretation, when they are used to describe data. They however add that, when statistics are used inferentially, the addition of certain assumptions increases their usefulness. The fixed linear regression model they propose contains the following assumptions. Variables are differentiated into independent and dependent: the values of the first are fixed, in the sense that they have been selected by the investigator; the values of the latter are assumed to be randomly sampled for each of the selected values of the

independent variables. Additionally, the residuals from the mean value of the dependent variable for each value of the independent variable must be normally distributed and with equal variance in the population.

Checking whether basic assumptions were met in this study led to the following operations: verifying the accuracy of data, identifying and dealing with missing values and outliers, verifying that errors were normally distributed, checking linearity and homoscedasticity, and lastly, controlling for multicollinearity and singularity. Results are reported in the rest of the current section.

### 6.2 Accuracy

Maximum care was brought in the early stages of this study, to protect from specification and measurement errors. Chapter 3 reported the conditions in which the questionnaire was administered, the instructions that were given research assistants and subjects, and how data was transferred mechanically from the computerized answer sheets into the statistical program, using an optical mark reader. Chapter 4 described how the questionnaire was elaborated, starting from existing material and input from experienced teachers and students, using systems modelling techniques. Chapter 5 presented a detailed report of the processes applied to assess the validity and reliability of this instrument.

The sample contained the 389 subjects to whom the questionnaire was administered. Inspection of univariate descriptive statistics (number of cases, mean, standard deviation, skewness and coefficient of variation) revealed no out-of-range values that might have

been caused by errors in data entry or successive manipulations of variables. Means and standard deviations were all plausible. Coefficients of variation for all variables ranged between .09 and .67, which was well above the .0001 level, thus indicating that no computational errors due to the rounding off of numbers in the computer program should be feared.

Variables included in the model were of three types: dichotomous, discrete and continuous. Dichotomous variables (GENDER, RESID, MODEL, PERSIST) were coded using numerical values (1 or 2). Discrete variables (AGE, JOB, PAREDUC, EXPAVG) were coded using integers 1 through 5. This procedure provided artificial variables that are believed to respect the assumptions of linear regression (Pedhazur, 1982; Tabachnick & Fidell, 1983).

As for the other variables assessed through multiple choice or Likert type scales, scores on related items were summed up to produce a unique score of continuous nature, which is a reasonable procedure accepted by authors (Kerlinger, 1973; Tabachnick, Fidell, 1983). Two other variables (PRPERF, PERFORM) were genuine continuous variables.

### 6.3 Missing Data

There were very few missing values across variables, for the number of cases ranged between 384 and 389, for all variables except for prior performance, which was available for only 340 cases.

Prior performance was extracted from student records. This statistic, labelled the SRAM

Score in the Cégep jargon, corresponds to a linear combination of weighted scores obtained for secondary school local and ministerial exams. Weights are attributed to scores on different subjects, in order to take into account the importance of these subjects in the programme of enrollment in Cégep. The SRAM Score is output by a computer programme which computes it for all students who 1) seek admission in a Cégep for the Fall term **and** 2) have a complete secondary school record, that is, who have scores for at least 16 subjects, at least 5 of which must be secondary Level V subjects. Final admission of candidates in a Cégep programme is based on this score.

This statistic was missing for 49 subjects in the sample. Looking into raw data revealed that missing values were scattered throughout the whole matrix in the following pattern: 12 were missing for students enrolled prior to 1992; 19 for students enrolled in 1992; 12 for students matriculated in 1993 and 6 for students whose matriculation number was not available. These numbers were proportional to the subsamples formed by the corresponding subgroups of students. It was further noticed that scores were missing mostly for students admitted in January and for a few foreign and adult students.

In order to control for biases related to the fact that the sample was not a purely random sample, and considering that the sample size allowed for the deletion of cases with missing values, the method adopted here for dealing with missing values was the most conservative suggested by authors (Tabachnick & Fidell, 1983), that is, listwise deletion of missing cases in analyses including this variable. This procedure left a minimum of 330 cases for any analysis.

### 6.4 Outliers

Distribution frequencies were examined for each variable, to detect possible univariate outliers. Student involvement in college activities had two potentially outlying values. But it turned out that the lowest score was within -2.45 times the standard deviation from the mean, while the highest score reached +2.98, indicating that both stood within the acceptable range of ±3 standard deviations from the mean.

As for multivariate outliers, the computer programme provided warnings for each occurrence, which made them easy to detect. Dealing with them was not as easy. Analyses were conducted first on the whole sample. When outliers and cases with high leverage occurred, a second analysis was performed on a subsample obtained after removing outliers. The output returned other warnings signalling new outliers and cases with high leverage, as often is the case (Tabachnick & Fidell, 1983). For fear that this process lead to loss of informative data, the removal of outlying cases was abandoned and another solution for dealing with the problem was sought.

Standardized residuals were plotted against estimates. These plots confirmed the presence of outliers in all models. Student involvement had six multivariate outliers, the highest one reaching +2.86; progress had seven outliers extending from -4.39 to +3.85. Satisfaction had four outliers reaching -3.12; and performance had 11 outliers, 10 of which were negative, one reaching as low as -5.77 and the largest reaching up to 3.07.

Cohen & Cohen (1983) recognize that defining what should formally be considered an outlier is arbitrary, but admit that absolute values of three, certainly four, can reasonably

be considered outliers, and are particularly bothersome when predominantly of the same sign, as was the case here with performance. They conclude however, that the decision to drop cases should not be taken lightly, and that, if outliers are few (1% or 2% of N) and not very extreme, they are probably best left alone.

Having ensured that outliers were not due to mechanical errors, it was hypothesized that they might be due to a unique combination of traits in individuals that made them stand out and deviate from the group. Considering that these occurrences, which were few in [illegible], could lead to greater insights into the situation, it was decided that outlying cases be retained in the sample and that their presence be taken into account in the interpretation of results.

### 6.5 Normality of variable distributions

Although commonly accepted assumptions concerning correlation and regression methods do not make this a formal requirement, distributions were tested for normality by inspection of their skewness coefficients. Following a formula suggested by Tabachnick and Fidell (1983), the criteria for departure from the value of 0 for normal distribution, given a sample size of 389, was computed to be equal to .32. Out of all the variables included in the preliminary model, several had coefficients the absolute value of which exceeded this .32 criterion. Table 25 presents the variables retained for analyses purposes before transformations.

**Table 25**

**Variable Type, Distribution Range and Descriptive Statistics for the Variables Retained in the Final Model**

| Variable (VARIABLE NAME) | Type | Distribution | Mean | Std Dev | Skew. | Kurt. |
|---|---|---|---|---|---|---|
| Age (AGE) | Discr. | [1, 5] | 1.82 | 0.59 | 0.07 | 0.17 |
| Gender (GENDER) | Dichot. | [1, 2] | 1.39 | 0.49 | 0.45 | -1.78 |
| Job status (JOB) | Discr. | [1, 5] | 1.88 | 0.92 | 0.59 | -0.65 |
| Residence (RESID) | Dichot. | [1, 2] | 2.09 | 1.41 | 0.69 | -1.63 |
| Prior performance (PRPERF) | Cont. | [51, 129] | 90.58 | 16.33 | -0.12 | -0.84 |
| Value of learning (VALUE) | Cont. | [4, 20] | 13.51 | 2.88 | -0.50 | 0.17 |
| Goals and commitment (GOALS) | Cont. | [4, 28] | 22.02 | 4.57 | -0.89 | 0.94 |
| Parents' level of schooling (PARED) | Discr. | [4, 8] | 5.39 | 1.37 | 0.60 | -1.22 |
| Parent support (PARSUP) | Cont. | [4, 16] | 13.13 | 2.80 | -1.27 | 1.35 |
| Performance objectives (EXPAVG) | Discr. | [1, 5] | 3.21 | 0.70 | 0.14 | 0.20 |
| Time management (TASK) | Cont. | [5, 15] | 9.89 | 1.57 | 0.30 | 0.36 |
| Study skills instruction (INST) | Cont. | [4, 44] | 22.17 | 6.66 | 0.27 | -0.62 |
| Role model (MODEL) | Dichot. | [1, 2] | 1.33 | 0.47 | 0.74 | -1.45 |
| Courses and classes (CLASS) | Cont. | [11,32] | 19.65 | 3.73 | 0.31 | -0.02 |
| Study and coursework (STUDY) | Cont. | [7, 24] | 14.95 | 3.34 | 0.15 | -0.48 |
| Writing activities (WRITING) | Cont. | [9, 36] | 24.02 | 4.73 | -0.01 | 0.13 |
| Teacher interactions (TEACH) | Cont. | [8, 30] | 14.93 | 3.98 | 0.85 | 0.73 |
| Peer interactions (PEERS) | Cont. | [8, 32] | 23.30 | 4.71 | 0.28 | 0.23 |
| Arts and culture (CULTART) | Cont. | [7, 25] | 11.75 | 3.85 | 1.08 | 0.69 |
| Media Center (MEDIA) | Cont. | [7, 27] | 16.38 | 4.43 | 0.65 | 0.31 |
| Clubs, sports & org. (CLUBSPOR) | Cont. | [4, 23] | 11.26 | 3.30 | 0.94 | 0.55 |
| Involvement in coll. act. (PART) | Cont. | [107, 221] | 136.25 | 19.95 | 0.34 | 0.11 |
| Progress assessment (PROGRESS) | Cont. | [28, 96] | 58.78 | 9.94 | 0.24 | -0.17 |
| Satisfaction assessment (SATISFAC) | Cont. | [29, 54] | 43.44 | 2.48 | -0.55 | 0.7312 |
| Academic performance (PERFORM) | Cont. | [22.7, 95.9] | 72.42 | 11.17 | -1.05 | 2.17 |
| Persistence (PERSIST) | Dichot. | [1, 2] | 1.81 | 0.39 | -1.62 | 0.62 |

Several items intended to assess different variables which were initially identified as relevant to the study had extremely high skewness coefficients. This was the case for language (Item 3: more than 97% of the students had French as a mother tongue); family responsibilities (Item 10: 96% of the students declared having no family responsibilities); reason for coming to college and intention after graduation (Items 15 and 16: 89% of the

students intended to enroll in university); and distance to Cégep (Item 5: 95% of the students lived within one hour of the Cégep). These variables, which were not of major importance in the study, were eliminated from the regression analyses because of their low variance. They might however be taken into account in other research.

Transformations were performed on eight variables with a positive skew: the square root of the values was extracted for three variables, and $\log_{10}$ of each value was computed for the other five. Skewness coefficients for the transformed variables were inspected again: all were reduced considerably and six now had a coefficient below the .32 criteria, while two remained slightly above (.42 and .52 respectively). These transformations did not affect correlation coefficients in any notable way: the difference, if any, was almost always in the third digit, while it appeared reasonable to assume that only the first digit might be significant. Transformations were performed in view of obtaining "honest" correlation and regression coefficients, and consequently, models presenting a closer fit to reality.

Standardization was performed on all variables, in order to allow equal weights for all variables used in the model.

### 6.6 Linearity

Regression analysis requires linear variables measured on an interval scale. In order to control for linearity, bivariate scatterplots were examined for pairs of continuous variables, where dependent variables were plotted against all independent variables retained in the final model. Results showed that no threats to regression could be related

to a departure from the assumption of linearity between dependent and independent variables.

Linearity was double-checked using graphs of standardized residuals plotted against estimates. All points appeared randomly scattered about the y = 0 horizontal line originating from the mean of the residuals, none suggesting that the regression might be nonlinear.

### 6.7 Distribution of Errors

The same plots were also examined to ensure that the variance of errors was constant. All points appeared to be scattered evenly about the line y = 0, and none of the graphs suggested the presence of heteroscedasticity.

### 6.8 Multicollinearity and singularity

Correlations were examined in order to assess collinearity within independent variables. Table 26 displays Pearson correlation coefficients for all nine variables.

Table 26 confirms that there were substantial correlations between several independent variables. Within the block of demographic characteristics, (gender, job, residence, parent education) location of residence correlated negatively with job status; prior performance correlated negatively with age and positively with parents' level of schooling. Significant correlations were also identified between value of learning, goals and parent support.

**Table 26**

**Pearson Correlation Coefficients Between Student Characteristics**

| | AGE | GND | JOB | RES | PRPF | VAL | GOAL | PARD |
|---|---|---|---|---|---|---|---|---|
| GND | .00 | | | | | | | |
| JOB | .09 | -.01 | | | | | | |
| RESID | .17 | -.16 | -.26** | | | | | |
| PRPERF | -.31** | -.03 | -.06 | -.11 | | | | |
| VALUE | -.13 | -.14 | -.09 | .04 | .36** | | | |
| GOALS | -.01 | -.09 | -.02 | .12 | .11 | .54** | | |
| PAREDUC | -.03 | .03 | -.05 | -.07 | .24** | .16 | .08 | |
| PARSUP | -.08 | -.19 | -.03 | .04 | .17 | .46** | .37** | .11 |

N = 332, ** indicates a $p \leq .001$ level of significance.

Mediating variables corresponding to college activities were understandably inter-correlated, for they were designed to assess the single construct of student involvement. However, only total student involvement in college activities was fed into regression analysis for hypothesis testing. Because of their inter-correlations, college activities lay claim to largely the same portion of variance of each dependent variable. It was thus expected that they would not make much by way of unique contribution, and that this would reflect in low $R^2$ and $\beta$ coefficients. Being aware of this high multicollinearity prevented the researcher from being misled in the interpretation of these results.

Several procedures are suggested for dealing with multicollinearity. Tabachnick & Fidell (1983) suggest deleting some of the correlated variables susceptible to create inflation. Cohen & Cohen suggest reflecting on the cause of this multicollinearity and, if the shared variance is attributable to a common trait, to combine several variables into one

comprehensive trait. Alternatively, it is suggested to lower the tolerance level for the entry of variables in the model, to a value of .001 or even .0001, as allowed by sample size and number of variables (Astin 1993). Also, muticollinearity having higher leverage if variables are entered sequentially in the statistical model, some researchers prefer forcing variables into the model, using available computer programme commands (Carrier, 1991). One of the currently most popular procedures is to apply hierarchical analysis, where variables are entered hierarchically into the statistical models.

Although deleting variables is the most straightforward method, it was feared that this might reduce the substantive meaning to result from these analyses. Hence, as explained in Chapter 3, it was decided to resort to hierarchical analysis to deal with this problem.

The order of entry of variables in the analysis was determined by reference to prior research and logic. Subjects' background characteristics were likely candidates to be entered first for, as they are prior to school influence, they shape the student before he or she reaches school. Although antecedence in time is not a sufficient reason for deciding on the order of entry of variables into a model, it very often coincides with theoretical and logical justifications. Based on the above, blocks of independent variables, and variables within these blocks, were entered in the following priority order: background characteristics, prior performance, psychological attributes and parental influence. Mediating variables were entered starting with involvement in more general then specific college processes, followed by assessment behaviours. Performance and persistence were entered in that order, but no priority was identified between these two outcomes.

Having performed these preliminary operations intended to verify whether collected data met the assumptions required by regression methods, it was decided to proceed to the study of the research hypotheses.

# CHAPTER 7

## EXPLORING RELATIONSHIPS BETWEEN VARIABLES

## RESULTS AND DISCUSSION

The purpose of Chapter 6 was to identify and describe the variables included in the study; assumptions underlying regression methods applied to the study of relationships between variables were discussed, and transformations performed on these variables prior to analysis were reported.

The present chapter gets at the very core of this research project which was designed to study questions that are posed by researchers, educators, students, and parents as well, as to the relative importance of student characteristics, attitudes and behaviours, versus student involvement, on major educational outcomes in college. Answers were sought through the study of relationships between variables which were considered as independent, mediating or dependent variables. Prior research had already established results for other student populations in different types of institutions. This study considered student involvement from a new perspective and validated results for the population of Québec Cégep students.

The main purpose of this research was to test a general hypothesis relating student characteristics, student involvement and educational outcomes in the context of Cégeps.

Five specific hypotheses were formulated and tested. Results concerning each hypothesis are reported sequentially in this chapter.

## 7.1 Study of Hypothesis 1

Hypothesis 1 was stated simply as follows:

Student characteristics are associated in a statistically significant manner with student involvement variables.

Student involvement was defined as a construct having aspects related to (1) preliminary involvement with the college environment, (2) participation in specific college activities, and (3) assessment activities. The study of Hypothesis 1 was performed in several steps. Relationships between student characteristics and some student involvement variables were explored first. Analyses aimed at probing deeper into involvement in specific college activities were performed next, and relationships between preliminary involvement and participation in college activities were examined last. Relationships with assessment types of involvement were studied in the context of Hypotheses 2 and 3.

### 7.1.1 Relationships Between Student Characteristics, Preliminary Involvement and Participation in College Activities

Relationships between student characteristics and student involvement variables were examined through first-order correlations, and then using regression. The question was posed in the following way: Are student characteristics associated with differences in student involvement, and if so, which are the most significant relationships?

Table 27 presents Pearson correlation coefficients between student characteristics and preliminary involvement variables. No correlations significant at p≤.01 were identified between demographic characteristics and these involvement variables. However, there were several correlations significant at the .001 level, relating preliminary involvement with the second block of independent variables corresponding to students' psychostructural profile. Correlations significant at p≤.01 or p≤.001 were also identified with parent variables.

**Table 27**

**Pearson Correlation Coefficients Between Student Characteristics and Some Student Involvement Variables**

| | AGE | GENDER | JOB | RESID | PRPERF | VALUE | GOALS | PAREDUC | PARSUP |
|---|---|---|---|---|---|---|---|---|---|
| EXPAVG | -.17 | -.15 | .05 | -.02 | .51** | .37** | .25* | .23* | .26** |
| TASK | -.12 | -.10 | -.17 | -.07 | .20 | .28** | .16 | .04 | .21 |
| INSTRUCT | .06 | -.07 | .00 | .07 | -.12 | .07 | .16 | -.09 | .11 |
| MODEL | -.02 | -.10 | .02 | .10 | -.01 | .17 | .14 | .01 | .05 |
| PART | -.02 | -.11 | .02 | .05 | .06 | .30** | .33** | .05 | .30** |

Notes: N= 331
* indicates a p ≤ .01 level of significance.
** indicates a p ≤ .001 or lower level of significance.

Judging from Table 27, one could conclude that demographic characteristics are not related with preliminary involvement behaviours in any significant way. However, nearly significant correlations, and the existence of correlations among student characteristics made it imperative to examine the whole matrix of correlations between student characteristics and student involvement variables, before reaching a conclusion.

Table 28 shows Pearson correlation coefficients between student characteristics and student involvement variables. Several significant relationships are identified.

**Table 28**

**Pearson Correlation Coefficients Among Student Characteristics and Between Student Characteristics and Some Student Involvement Variables**

| | AGE | GND | JOB | RES | PRPF | VAL | GOAL | PARD | PARS | EXP | TSK | INST | MOD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GND | .00 | | | | | | | | | | | | |
| JOB | .09 | -.01 | | | | | | | | | | | |
| RES | .17 | -.16 | -.24** | | | | | | | | | | |
| PRPF | -.31** | -.03 | -.07 | -.11 | | | | | | | | | |
| VAL | -.13 | -.14 | -.09 | .04 | .36** | | | | | | | | |
| GOAL | -.01 | -.09 | -.02 | .10 | .11 | .54** | | | | | | | |
| PARD | -.03 | .03 | -.05 | -.07 | .24** | .16 | .08 | | | | | | |
| PARS | -.08 | -.19 | -.03 | .04 | .17 | .46** | .37** | .11 | | | | | |
| EXP | -.17 | -.15 | -.05 | -.02 | .51** | .37** | .25* | .23* | .26** | | | | |
| TSK | -.12 | -.10 | -.17 | -.07 | .20 | .28** | .16 | .04 | .21 | .17 | | | |
| INST | .06 | -.07 | .00 | .07 | -.12 | .07 | .16 | -.09 | .11 | .00 | .02 | | |
| MOD | -.02 | -.10 | .03 | .10 | -.01 | .17 | .14 | .01 | .05 | .10 | .01 | .04 | |
| PART | -.03 | -.11 | .03 | .04 | .06 | .30** | .32** | .06 | .30** | .24** | .25** | .32** | .17 |

Notes: N= 331
* indicates a $p \leq .01$ level of significance.
** indicates a $p \leq .001$ or lower level of significance.

### a) Correlations Among Student Characteristics

Seven coefficients, significant at the .001 level, confirm the existence of positive or negative correlations among student characteristics. Two coefficients concern demographic characteristics: prior performance correlates negatively with age, and residence correlates negatively with job status. These correlations indicate that students

who have earned higher grades in secondary school are younger, and that students who still live with their parents tend to spend more time on work for pay.

While the first correlation is consistent with common observations, the negative correlation between job and residence was more intriguing. One could expect that students who live with their parents would spend less time on work for pay, because of lesser needs for rent money, food bills etc. However, the scholarship system in Québec is such that students who live with their parents and whose parents are not in the lower economic class, are not eligible for scholarship nor loan money and therefore depend on their parents for all school- and non school-related expenses. On the other side, they have more time on their hands because they do not usually have to deal with the total burden of domestic chores required for survival. It follows that they have many reasons to occupy jobs during the school year. Alternately, students who live in an apartment are more likely to receive public funds, which may prevent them from having to look for a job. This -.24 coefficient between job and residence is a good example that causation cannot be deducted from correlation alone. All that could be said here, is that living with parents is associated with spending more time on work for pay, and conversely, that living away from parents is associated with spending less time on work for pay. Moreover, this correlation does not imply that the time saved by not working on a job is spent on student tasks.

Other student characteristics show substantial intercorrelations. Prior performance correlates positively with value attributed to learning and with parents' level of schooling; value correlates positively with goals and goal commitment; and parent

support correlates positively with value and goals.

Correlations among student characteristics reflect much of what is known about student populations. Although a worrisome social issue, children who come from a family where parents have had the opportunity to complete higher studies do have a better chance on academic success at the start, for many reasons among which richer environments for early development and the power of example undoubtedly rank high. They also tend to attribute more value to prior and future learning and diplomas and to have clearer goals and be committed to reaching them. This attitude is reinforced by active and explicit support from parents towards engaging in higher studies.

Although undesirable among independent variables to be entered in regression analyses, these correlations are widespread in social and particularly in educational situations, where almost everything is likely to interact with everything else. As explained in Chapters 3 and 6, this multicollinearity between independent variables was partly controlled for by entering variables according to an assumed logical priority order in hierarchical analyses.

**b) Correlations Between Student Characteristics and Preliminary Involvement with the College Environment**

While no statistically significant correlations are identified between student characteristics and involvement in instruction on study skills, nor selection of a role model, nearly significant coefficients point to potential interactions between these variables. They were evidenced later by regression analysis.

High correlations are found between student characteristics and the other two preliminary involvement measures. Value of learning correlates positively with spending more time on study, more time on campus and attending a larger proportion of classes. Having obtained higher grades in secondary school, attributing a high value to learning, having clear goals and being committed to reaching them, receiving explicit encouragement from parents and having parents with a higher level of schooling all correlate positively with expecting higher grades in Cégep. Grade expectation is therefore related in an important way to academic, parental and psycho-structural characteristics of the student.

**c) Correlations Between Student Characteristics and Total Participation in College Activities**

There are also significant correlations between student characteristics and participation in college activities. Attributing more value to learning, having clearer career and study goals, and receiving strong support from parents all correlate positively with the total amount of participation in college activities.

In short, Pearson coefficients computed between student characteristics and student involvement variables indicate significant correlations with psycho-structural traits and parent environment variables. But the complex path of correlations among this set of variables did not preclude the existence of additional relationships between demographic variables and student involvement.

### 7.1.2 Probing Into Participation in Specific College Activities

This confirmation of the existence of significant relationships between student characteristics and student involvement was a prompt to continue the investigation of participation in each college activity. Further inquiries were guided by the following questions:

- Which student characteristics are related to participation in which specific activities?
- In which college activities do students invest more intensively?
- Is there a difference between programmes of enrollment in the level of student involvement in each activity?

These questions were examined successively and results are reported in the following pages.

#### a) Student Characteristics and Participation in Specific College Activities

In order to answer the first question, correlation coefficients were examined. Table 29 reports Pearson coefficients. Shaded areas were added to outline blocks of significant or nearly significant correlations and aid in the interpretation of results. This helps notice at once that value attributed to learning, having clear study and career goals and being committed to reach them, and receiving encouragement from parents stand out as characteristics of prevailing importance in connection with involvement in specific college activities. Detailed relationships are as follows.

Among demographic characteristics, only gender appears to make a difference, girls being significantly more involved in study and writing activities, and also but more moderately in cultural and artistic activities, than boys. Low correlations are identified

with age (younger students seem to invest more in study) and working on a job for pay (students who have a job get into more interaction with peers).

Students who earned higher grades in secondary school are significantly more involved in study than in any other activity. Value attributed to learning and having clearer career and study goals are related at varying degrees to all activities except artistic and cultural activities. No significant correlations are identified with parent education, but support from parents has low to moderate correlations with all eight college activities.

**Table 29**

**Pearson Correlation Coefficients Between Student Characteristics and Student Participation in Specific College Activities**

| | AGE | GENDER | JOB | RESID | PRPERF | VALUE | GOALS | PAREDUC | PARSUP |
|---|---|---|---|---|---|---|---|---|---|
| CLASS | .00 | -.05 | -.01 | .03 | -.04 | .22** | .39** | .11 | .21** |
| STUDY | .14* | -.20** | -.09 | .09 | .26** | .42** | .33** | .02 | .27** |
| WRITING | -.02 | -.23** | -.01 | .04 | .05 | .25** | .28** | .02 | .24** |
| TEACHERS | .01 | .02 | .02 | .04 | .03 | .23** | .26** | .01 | .19** |
| PEERS | -09 | .02 | -.12* | -.02 | .07 | .15* | .16* | .06 | .21** |
| CULTART | .05 | -.15* | .01 | .06 | .03 | .06 | .03 | .07 | .12* |
| MEDIA | .07 | .00 | .02 | -.01 | -.08 | .13* | .16* | -.03 | .09 |
| CLUBSPOR | .00 | .03 | .05 | .03 | .06 | .13* | .12* | .09 | .17** |

Notes: N= 331
* indicates a $p \leq .01$ level of significance.
** indicates a $p \leq .001$ or lower level of significance.

In summary, and restricting analysis to statistically significant coefficients, participation in academic activities can be associated with all categories of student characteristics;

interactions with teachers are moderately associated with psychological traits, while participation in other college activities is not found related student characteristics.

**b) Differences in Levels of Participation in Specific College Activities**

Explanations for the results reported above were sought through the analysis of levels of involvement demonstrated by college students in the different activities that are proposed to them. Mean involvement in the eight specific activities retained in the model were computed. Each mean was then divided by the number of items in the corresponding scale, to obtain a weighted mean for each activity. Ranks were determined on the basis of these weighted means. Table 30 displays the results of these computations.

**Table 30**

**Weighted Mean Involvement and Rank for Each College Activity**

| College Activities | Weighted Mean | Mean Based Rank |
|---|---|---|
| Class activities | 2.45 | 3 |
| Study activities | 2.49 | 2 |
| Writing activities | 2.67 | 1 |
| Interactions with teachers | 1.86 | 6 |
| Interactions with peers | 2.33 | 4 |
| Cultural and artistic activities | 1.67 | 7 |
| Media Center activities | 2.04 | 5 |
| Clubs, sports and org. | 1.61 | 8 |

Judging from weighted means, students appear to involve maximally in writing, study and class activities and in interactions with peers; moderately in using the Media Center facilities; and minimally in interactions with teachers and in various cultural, artistic and

athletic activities. Successive t-tests confirmed the existence of significant differences between mean levels of participation in several activities.

These differences can be accounted for, at least partially, by the availability of accommodations. Activities in the top group (writing, study, class and peers) are accessible on a permanent basis, daily and during the most part of the day; the activity in the middle group (Media Center) requires almost two thirds of the students in the sample to walk from one building to another and maybe set appointments, while two activities in the lower group (Cultural, artistic and athletic activities) refer to occasional events.

Most of these results are congruent with what could be expected. The level of interactions with teachers poses more questions. Let it be recalled that items in this scale referred to course-related or informal contacts with teachers outside class (asking for additional information, scheduling a meeting, discussing plans, difficulties, chatting...). This type of interaction has been identified elsewhere as a very important factor in the study of college impact. "Research studies have consistently shown that the greater the interactions students have with their instructors, the greater will be their personal growth, their satisfaction with college, and their persistence in college" (Astin, 1985, as cited in Friedlander & MacDougall, 1992). However, the same authors report that a large proportion of community college students declare having had very little or no individual contacts with their instructors.

Possible explanations for the low level of interaction with teachers were formulated.

Teachers may be responding fully to students' needs and expectancies through class interactions; students may not be aware that there is a lot to gain from beyond class interactions with teachers; both teachers and students may not be open to or available for this type of interaction; the scale elaborated in the questionnaire may not have provided an accurate measure for this type of interaction. Whatever the reason, it is feared that students are deprived, or perhaps are depriving themselves, of an incredibly rich source of learning and development while studying in college. Considering the importance given to teacher interactions in the literature, (Astin, 1991, 1993; Pascarella & Terenzini, 1991), it appears imperative to (1) perform the same measurements again, to check whether they can be replicated in different settings, and if they can, (2) investigate into the causes of this lack of involvement in both parties, and (3) design and experiment interventions aimed at bringing students and teachers to engage more frequently into interaction.

**c) Differences in Levels of Participation in College Activities Between Programmes**

The next question concerned differences in involvement between programmes. Considering that students in the sample came from three different families of programmes, differences in level of involvement between programmes were sought as a possible explanation for the variance in participation in college activities.

Table 31 reports the results of this investigation, showing obvious differences in means for college activities between programmes. Analyses of variance performed on all college activities confirm significant differences between programmes for five activities: class, study, writing, cultural and artistic, and also for total participation. Post hoc Bonferroni

tests confirm the following results.

- The most important differences, significant at the .0001 level, concern cultural and artistic activities: students in *Arts et lettres* are significantly more involved in this activity than students in either *Sciences de la nature* or *Sciences humaines.*

**Table 31**

**Means for Student Participation in Specific Activities in Each of Three Programmes**

| College Activities | *Sciences de la nature* (N=135) | *Sciences humaines* (N=214) | *Arts et lettres* (N=38) |
|---|---|---|---|
| Class activities | 18.85 | 20.36 | 18.71 |
| Study activities | 15.79 | 14.70 | 13.66 |
| Writing activities | 23.30 | 24.09 | 26.66 |
| Interactions with teachers | 15.15 | 14.78 | 15.18 |
| Interactions with peers | 24.12 | 23.04 | 22.29 |
| Cultural and artistic activities | 11.15 | 11.20 | 17.18 |
| Media Center activities | 15.67 | 16.69 | 17.13 |
| Clubs, sports and org. | 11.33 | 11.27 | 10.89 |
| Total participation in activities | 135.33 | 136.14 | 141.71 |

- Differences significant at the .001 level concern writing and class activities: students in *Arts et lettres* are significantly more involved in writing than students in either of the other programmes; also, students in *Sciences humaines* are more involved in class activities than students in *Sciences de la nature.*

- Other differences concern study activities. Students in *Sciences de la nature* are significantly more involved in study activities than students in either of the other

programmes.

Differences between involvement in cultural and artistic activities, as well as in writing activities may be related to the nature of the curricula in the programmes of interest. The *Arts et lettres* sample subset comprised two groups, one from the *Lettres* programme and the other from the *Arts plastiques* programme. The first curriculum requires considerable writing, and attending plays is part of the regular learning activities. The second curriculum includes several activities in which students come into interaction with the arts. Additionally, it is likely that students who enroll in either programme have strong natural inclinations for cultural and artistic activities, including writing. These results may therefore only serve to confirm that pre-university programmes in Cégep are quite different, in spite of the important place occupied by the core curiculum.

The causes of differences in class and study activities are less obvious. Do students in *Sciences de la nature* spend more time and energy on study because subject matter requires it, or because they value high grades more, or need them to enter university in the programme of their choice? Do students in *Sciences humaines* invest more in class activities and less in study because classes are more lively, activities more varied, and they subsequently need to invest less in study? Are both differences accountable for by different levels of requirements from teachers? Are assessment procedures involved? These questions remained unanswered, and more research would be needed to inquire into the matter.

As for total student participation in college activities, tests confirm that students in *Arts*

*et lettres* show significantly higher involvement, at $p \leq .0001$. This higher level of total participation could be explained, at least partially, by the size of the programmes. For the term during which the questionnaire was administered, the *Lettres* programme had a total enrollment of 56 students, while the *Arts plastiques* totalled 46 students. (There were also 63 students in the *Musique* programme, for a grand total of 165 in the *Arts et lettres* section, but students in *Musique* were not included in the sample.) Consequently, the number of different teachers in these programmes is low, and most teach more than one course to the same students during one term. It is reasonable to think that closer links would develop between students and teachers, that students would get more and better follow up and advising from their teachers, which would in turn account for higher student involvement. This conjecture is supported by the slightly higher involvement in the single teacher interactions activity.

It is likely that student behaviours in connection with all college activities are related to the complex interactions of the factors suggested above, and probably to other factors that were not included in this study.

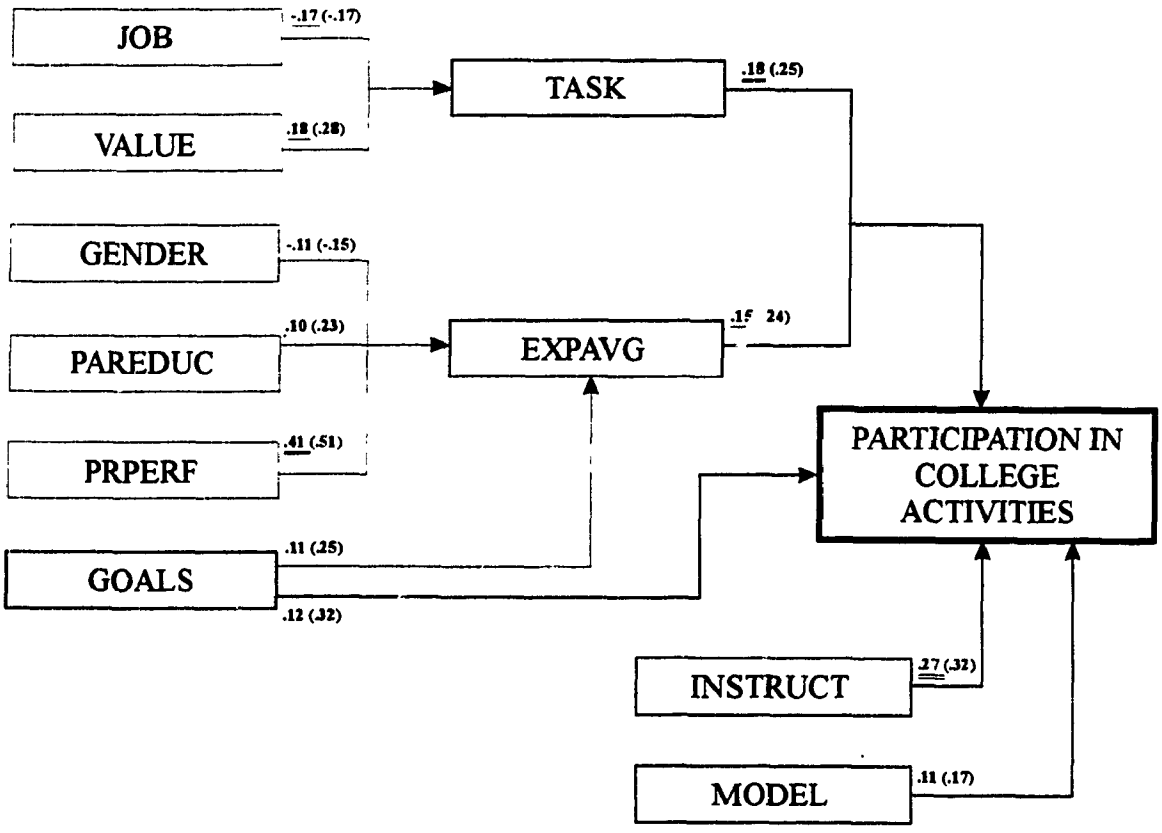
### 7.1.3 Relationships Between Preliminary Involvement and Participation in College Activities

The last step in the study of Hypothesis 1 consisted in studying relationships between preliminary involvement activities and participation in college activities. The objective was to draw the most complete picture possible for relationships occurring between variables of interest. For that purpose, total participation in college activities was regressed on student characteristics and preliminary involvement variables. This method

**Figure 8**

**Relationships Between Student Characteristics and Student Involvement Variables; Standardized β Coefficients and (Pearson Coefficients)**

**N = 332 df = 331 F = 9.51 p≤ .0001 $R^2$ = .28**




Notes : No underlining indicates a p≤.05 level of significance.
Simple underlining indicates a p≤.01 level of significance.
Double underlining indicates a p≤.001 or level of significance.

allowed the researcher to single out the influence of these preliminary involvement measures on participation in college activities, after having controlled for the influence of student characteristics. Results are presented in Figure 8 in the form of a directed graph. Lines from student characteristics to involvement variables indicate that significant relationships were identified between the two: the hypothesized direction of each relationship is as indicated by the arrow.

Coefficients appearing in Figure 8 are the standardized β coefficients obtained in successive regressions and which were subsequently tested to be different from 0 at the .05 level or lower. Levels of significance are indicated by the presence or absence of underlining. Numbers in parentheses are the Pearson inter-item correlation coefficients presented in Table 28.

As can be seen in Figure 8, six out of the nine student characteristics from all three blocks of independent variables are associated with participation in college activities, as well as all preliminary involvement variables. Incremental variance partitioning was used to assess the explanatory power of each variable. As warned by Pedhazur (1982), this approach is to be used cautiously, mainly because $R^2$ is sample-specific and also because increments in variance explained depend on the order of entry of variables in the analysis. Nonetheless, Pedhazur does acknowledge that the method can be useful for studying the influence of independent variables or blocks of variables on a dependent variable, after having controlled for other variables, providing that this is done in accordance with a theoretical model.

When student participation in college activities was regressed on all 13 variables entered in the specified order, the variance explained in student involvement was equal to 28%, and five variables (goals, expected average, time on task, instruction on study skills and teacher as model) had β coefficients significant at $p \leq .05$. Student characteristics accounted for 15% of the variance in total participation in college activities, demographic variables explaining 1%, prior performance another 1%, value attributed to learning 8%, goals 3%, and parent characteristics 2%. Preliminary involvement accounted for 13%, expected average and time on task explaining 2% and 3% respectively, while involvement in instruction on study skills added 7%, and having a teacher as role model an extra 1%.

To repeat, these figures are not indicators of the relative importance of variables. They merely indicate how much of the total variance is explained by one variable, after controlling for the variables entered previously in the model.

As is the use in multiple regression (Pedhazur, 1982, Cohen & Cohen, 1983, Cook and Campbell, 1979; Tabachnick & Fidell, 1983), β coefficients were used to compare the strength of the relationships between student characteristics and student involvement variables. Five variables were directly related to participation in college activities: they were, in increasing order of importance, having a teacher as role model, having clear goals, expecting a high grade point average in Cégep, spending more time on task, and having received more instruction on study skills. Five more variables were indirectly related with participation in college activities: they were, again in increasing order of importance, a higher level of schooling in parents, gender, not spending too much time on work for pay, attributing a high value to prior and future learning and having

attained a high level of academic performance in Secondary school.

Judging from the magnitude of β coefficients, prior performance in secondary school can be said to have the most important influence on participation in college activities. This influence is however indirect, in that it is mediated by the level of expectancies concerning grades in Cégep. The single most important direct influence would be involvement in instruction on study skills since entrance in Cégep.

Considering the level of significance of these results, the null hypothesis was rejected. Students' background characteristics and attributes are associated to both preliminary forms of involvement and participation in specific college activities. It was found additionally that early commitments influence later involvement behaviours. Of course, confirming the model did not prove it, for there could be other models that would fit the situation more closely.

**Conclusion of the Study of Hypothesis 1**

This concluded the study of the first hypothesis. The null hypothesis was rejected and it was confirmed that student characteristics, attitudes and behaviours are associated with student involvement variables. These results provided information as to which students are likely to demonstrate more involvement in early and on-going college activities.

Involved students are, more likely than not, students who expect higher grades in Cégep and spend more than average time on their *métier étudiant*. They profit by every opportunity to polish their study skills, often adopting one of their teachers as role

model. Success in high school is the best predictor of high grade expectancies; women have a slight advantage over men in this respect, and parents' higher level of schooling also helps a little. Not spending too much time on work for pay, and being convinced that learning and diplomas represent valuable assets induce students into allocating more time to student tasks. Having selected a career and being determined to get there also makes a difference on the level of grade expectancies and involvement in learning and development opportunities.

Student involvement in writing, study and class activities is higher than in other activities across all programmes. There are differences in levels of student involvement in several activities between programmes; some of these differences can be accounted for by considerations related to the nature of the curriculum and the location of facilities, while other differences appear to be related to students themselves. Further research would be required to provide more answers and better insight into the situation.

In summary, student characteristics account for 15% of the variance explained in participation in college activities, while preliminary involvement behaviours explain 13%, over and above what was explained by student characteristics.

### 7.2 Study of Hypothesis 2

Hypothesis 2 was stated as follows:

Preliminary involvement and participation in college activities exert a significant positive influence on estimated progress.

Progress was assessed by means of 20 items in Section V of the questionnaire. Progress areas had been identified in consideration of the numerous specific objectives that appear in college and programme monographies and other similar official documents, and also after having reviewed other instruments cited in the literature. This process yielded a large amount of outcomes which were grouped into 20 items. These were arranged in much the same manner as that used by Lehman (1991) for her 23 item list, so that measures obtained for four-year and community colleges in other educational systems could be compared.

In Phase 1 of the study, the activity of estimating one's progress in several areas of learning and development was defined to be a form of awareness essential for students to steer their own ship. The outputs of this activity, which requires comparing actual attainments with goals and expectancies, and present with previous states of knowledge and development, are self-reported estimates of progress and as such, may be considered as intermediate outcomes on which the influence of preliminary involvement and participation in college activities may be studied.

The study of Hypothesis 2 was performed according to the same pattern followed in connection with Hypothesis 1. Correlation and regression coefficients were analyzed in order to identify and assess significant relationships between the variables of interest. Subsequently, other questions were examined.

### 7.2.1 Relationships Between Student Characteristics, Preliminary Involvement, Participation in College Activities, and Estimated Progress

Table 32 presents the Pearson inter-item correlation coefficients for the variables included in this hypothesis.

**Table 32**

**Pearson Correlation Coefficients Between Student Characteristics, Preliminary Involvement, Participation in College Activities, and Estimated Progress**

| | AGE | GND | JOB | RES | PRPF | VAL | GOAL | PARD | PARS | EXP | TSK | INST | MOD | PAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GND | .00 | | | | | | | | | | | | | |
| JOB | .09 | -.01 | | | | | | | | | | | | |
| RES | .17 | -.16 | -.24** | | | | | | | | | | | |
| PRPF | -.31** | -.03 | -.07 | -.11 | | | | | | | | | | |
| VAL | -.13 | -.14 | -.09 | .04 | .36** | | | | | | | | | |
| GOAL | -.01 | -.09 | -.02 | .10 | .11 | .54** | | | | | | | | |
| PARD | -.03 | .03 | -.05 | -.07 | .24** | .16 | .08 | | | | | | | |
| PARS | -.08 | -.19 | -.03 | .04 | .16 | .46** | .37** | .11 | | | | | | |
| EXP | -.17 | -.15 | -.05 | -.02 | .51** | .37** | .25* | .23* | .26** | | | | | |
| TSK | -.12 | -.10 | -.17 | -.07 | .20 | .28** | .16 | .04 | .21 | .17 | | | | |
| INST | .06 | -.07 | .01 | .07 | -.12 | .08 | .16 | -.08 | .11 | -.00 | .02 | | | |
| MOD | -.02 | -.10 | .03 | .10 | -.01 | .17 | .14 | .01 | .04 | .10 | .01 | .04 | | |
| PART | -.03 | -.11 | .03 | .04 | .06 | .31** | .32** | .06 | .30** | .24** | .25** | .32** | .17 | |
| PROG | .08 | -.07 | .02 | .16 | -.12 | .18 | .27** | -.04 | .20 | .04 | .12 | .78** | .07 | .47** |

Notes: N= 331

* indicates a $p \leq .01$ level of significance.

** indicates a $p \leq .001$ or lower level of significance.

Progress has an extremely high correlation with involvement in instruction on study skills, a high correlation with total participation in college activities, and a moderate correlation with goals, all significant at the .001 level. Correlations with other

independent variables, location of residence, parent support and value of learning are not statistically significant at .05.

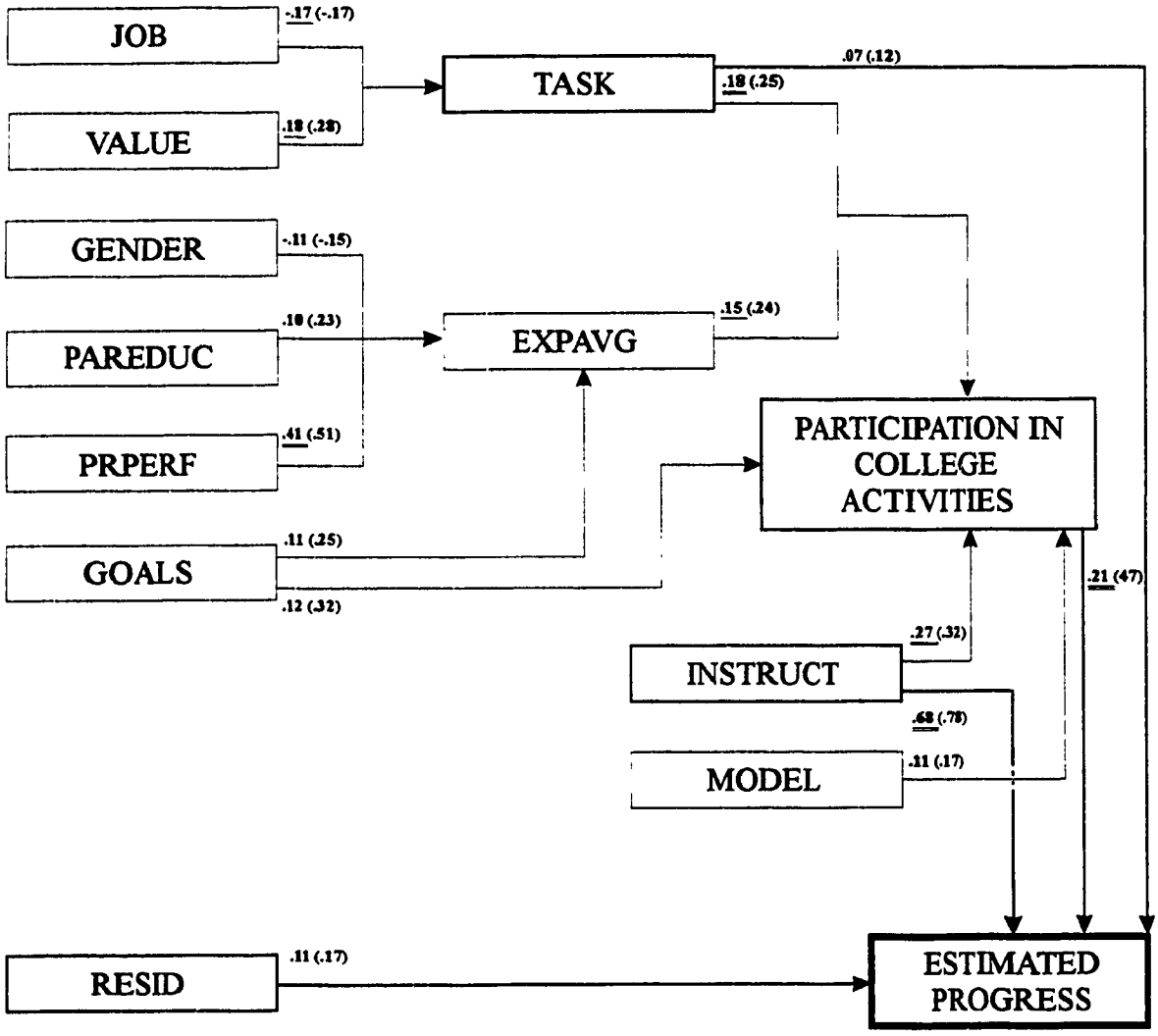
When estimated progress was regressed on student characteristics alone, one β coefficient significant at the .05 level was identified with residence. Two β coefficients significant at the .01 level were also computed; one negative coefficient related progress to prior performance and the other, positive, related progress to goals. This was interpreted in the following way: students who live away from their parents and who were not high performers in secondary school tend to report higher progress in several areas than other students.This tendency is increased in students who have a clear picture of what they want to become in life, know how to get there and are determined to reach this goal.

When progress was regressed on all student characteristics and student involvement variables, only residence was retained in the model, along with involvement variables time on task, instruction on study skills and total participation in activities. Results of this final analysis are presented in Figure 9. A glance at Figure 9 reveals that 12 out of the 14 candidates for exerting influence on progress are retained in the final model, age and parent support being the ones left out. As one important mediating variable exerting a direct influence on estimated progress, participation in college activities brings with itself the ten variables associated directly or indirectly with it, as established in Section 7.1. The resulting profile describing progress bound students is therefore much the same as that characterizing students who participate in college activities. The proportion of variance in estimated progress explained by this model is 69%. It is the highest established in this study. Using the same order of entry of variables, student characteristics explain 12% of

**Figure 9**

**Relationships Between Student Characteristics, Involvement Variables and Progress; Standardized β Coefficients and (Pearson Coefficients)**

**N = 332 df = 331 F = 50.68 p ≤ .0001 $R^2$ = .69**




Notes : No underlining indicates a p≤.05 level of significance.
Simple underlining indicates a p≤.01 level of significance.
Double underlining indicates a p≤.001 or level of significance.

the variance in estimated progress: location of residence accounts for a first 2% of the variance, while prior performance accounts for 1%, value of learning for 5%, goals for 3% and parents' level of education for 1%. Variance explained makes a 52% leap with the addition of instruction on study skills, and total participation in college activities add 5%.

With both direct and indirect influences, involvement in instruction on study skills imposes itself as the single variable having the largest impact on estimated progress. Other variables which have a direct influence on estimated progress are, in decreasing order of importance, participation in college activities, location of residence and time on task.

Estimated progress is affected positively though mildly, by the fact that students are living away from their parents' home. This result is consistent with Astin's (1977, 1993) findings, which identify leaving home to attend college as having direct effects on satisfaction with student life and with the overall college experience, self-reported growth in cultural awareness, leadership skills, interpersonal skills and job skills, as well as with a number of social behaviours.

Other independent variables have indirect influences on estimated progress, following the same pattern observed in connection with Hypothesis 1.

### 7.2.2 Other Questions

Several other questions guided the study of the implications of this model, among which were the following:

- In what areas do students declare having made more progress?

- Are there differences in progress on specific outcomes related to academic programme of enrollment?

- What are the most significant relationships between participation in specific college activities and estimated progress?

- Are there relationships between specific areas of higher estimated progress and participation in specific college activities?

Results related to the investigation of each of these questions are reported sequentially in the following pages.

**a) Areas of Highest and Lowest Estimated Progress**

Frequency and percent of students' responses to the 20 items identifying possible areas of development are to be found in Appendix C and descriptive statistics for the same items in Table E-14. Exploration of these data revealed that students declared having made most progress in the five following areas, presented here in order of decreasing importance. This rank order was established using the percentage of students who declared having made very much or much progress in each area.

1. Learning to learn
2. Getting to know oneself
3. Gaining familiarity with different disciplines
4. Communicating by writing
5. Becoming acquainted with other cultures

The five areas where progress was estimated lowest, also presented here in order of

decreasing importance, were the following:

16. Developing physical well-being

17. Gaining interest in current events and issues

18. Appreciating literature

19. Appreciating art

20. Understanding and speaking another language.

Major gains are thus related to areas of personal and academic development of overwhelming importance. Acquiring tools for learning to learn by oneself and becoming clearer about one's own capacities and interests, combined with being introduced to several disciplines and being able to write, probably constitute the very *raison d'être* of college education. The last of the leading progress items is related to the area labeled "Alien Cultures" in this project. It may indicate that coming to college represented a first opportunity to brush with different cultures and ways of life, for this population of young students originating from a linguistically and ethnically homogeneous social group.

Minor gains refer to one item in Personal Developement (developing physical well-being); the other four items refer to domains of a more alien nature to the interests of the average young college student, namely art and literature, economics and socio-politics, and learning to speak another language. Interestingly enough, these items are all connected with the on-going reform of the core curriculum in Cégeps. The number of Physical Education courses is being brought down from four to two; the number of courses in Humanities is being reduced from four to three, and the same measure applies

to elective courses labelled *cours complémentaires*. This rearrangement will make place for two English language courses in the core curriculum, and one more French language course. Also, the rule concerning elective courses will be more carefully enforced, in hope of increasing chances that students develop new domains of interest: three courses not related to the major field of study will be selected by each student.

Comparisons with results concerning areas of high and low progress reported by Lehman (1991) and Astin (1993) were established. They are presented in Table 33.

**Table 33**

**Comparisons Between Areas of Major and Minor Estimated Progress Reported by Several Researchers**

| Items | Giard | | Lehman | | Astin | |
|---|---|---|---|---|---|---|
| | % Reporting Very Much or Much Progress | Rank on 20 Items | % Reporting Very Much or Much Progress | Rank on 23 Items | % Reporting Much Stronger in 1985 Than 1989 | Rank on 11 Listed Items* |
| Learning to learn | 65.7 | 1 | 60.2 | 2 | - | - |
| Self-knowledge | 61.9 | 2 | 62.1 | 1 | - | - |
| Different disc. | 60.7 | 3 | 52.5 | 3 | 49 | 2 |
| Writing | 55.9 | 4 | 43.1 | 4 | 27 | 8 |
| Different cultures | 55.8 | 5 | 43.2 | 11 | - | - |
| Physical fitness | 38.6 | 16 | 41.8 | 13 | - | - |
| Socio-politics | 33 | 17 | 28.8 | 21 | - | - |
| Literature | 32.7 | 18 | 31.2 | 19 | - | - |
| Art | 27.6 | 19 | 27.2 | 22 | - | - |
| Another language | 23.5 | 20 | 23.5 | 23 | 8.1 | 11 |

Note: * These results were extracted from Table 7.3 (Astin, 1993, p. 223) where 11 of the 19 items describing different areas of growth were reported.

Table 33 points to astonishing similarities between results obtained for American four-year and Community colleges and Canadian Cégeps. There is an almost perfect coincidence for the first four and the last four items assessed by Lehman and Giard. The only differences shown are for the middle items, which get a high and low rank respectively in Giard, while they are more located around the middle of the scale in Lehman. Of course, other differences not appearing in Table 33 were also observed between the complete rankings. The most obvious is Using computers, which ranks 6 in Giard and 14 in Lehman.

Results reported by Astin are also congruent with the other results reported above. While only three items could be compared, it is readily seen that the ranking is preserved, and that learning to speak another language is a skill that is not presently mastered as a result of going to college. This issue is of course more crucial for Québec students, who very much need to have a functional mastery of English prior to engaging in higher studies at university.

**b) Differences in Estimated Progress Between Programmes of Enrollment**

Analysis of variance was performed to seek whether there were significant differences in estimated progress associated to programme of enrollment, but as opposed to participation in college activities, none were found for the composite score assessing total progress. At $p \leq .07$, results however suggested there might be differences between programmes in the amount of progress reported on single items, but this issue was not investigated any further.

Successive analyses of variances, followed by post-hoc Bonferroni tests of significance confirmed there were indeed differences closely associated with the nature of the curricula. In order to single out the most important differences, a level of significance of .0001 was retained for these analyses. Resulting findings are presented succinctly below.

Students in *Arts et lettres* report significantly higher progress in the appreciation of arts and literature, and in learning to speak a second language, than students in both other programmes; students in *Sciences humaines* report considerably more progress in verbal communication, in understanding history, and also in becoming acquainted with different cultures, than students in *Sciences de la nature*; the latter report significantly more progress in the whole area of the development of quantitative thinking (using mathematics, interpreting data and establishing links between science and technology). As suggested before, these differences between estimated progress on different learning outcomes reflect differences between curricula. Inasmuch as these differences are referring to courses that are part or not of a specific curriculum (foreign languages, social science, mathematics and science) these differences result from deliberate choices to introduce students to different broad areas of knowledge at Cégep level, instead of providing them only with general education courses. But, to the point that these differences refer to outcomes that should be part of the knowledge and skills attested by any Cégep level diploma (second language, verbal communication skills, some acquaintance with methods of natural and social science), then, these differences may indicate gaps in Cégep curricula or in the ways subjects and students are being taught and assessed.

**c) Relationships Between Participation in Specific College Activities and Progress**

The next issue investigated, aimed at determining participation in which college activities had the most significant influences on estimated progress. Progress was thus regressed on the eight college activities. Results indicated that participation in class activities ($\beta$ = .20), Media Center ($\beta$ = .18), study ($\beta$ = .11) and cultural and artistic activities ($\beta$ = .10) all had significant influences on estimated progress. The first three were activities of academic nature, while the last one was more related to the co-curriculum. The total variance explained in progress in this sub-model was 25%.

**d) Comparison Between Higher Participation in College Activities and Areas of Higher Progress**

The next operation consisted in looking for relationships between areas of high estimated progress and high participation in college activities. In other words, the idea was to find out if participation in one activity was followed by progress in the same area. There were two steps to the study of this issue.

Factor analysis was performed on the 20 Progress items, using Principal Components analysis and Varimax rotation. There were six eigenvalues above 1.0 so, applying the Kaiser criterion, solutions were examined after forcing successive extractions of four, five and six factors. The five-factor solution was the most interpretable, with factor loadings ranging between .35 and .81 for 17 items out of 20. Three items, Value System, Learning Another Language, and Developing Physical Well-Being, were grouped with factors on the basis of substantive meaning rather than factor loading size. This solution yielded five clusters which were labeled Personal Development, Quantitative Thinking, Art,

Communication, and Introduction to Alien cultures.

The second step in studying relationships between estimated progress on several learning outcomes and student participation in college activities related to these outcomes was to compute inter-item Pearson correlation coefficients between variables in both sets. Table 34 reports these results. Factors and items describing progress are presented in column 1; 10 items are preceded by a + or - sign, indicating whether they correspond to areas of highest or lowest progress according to the previously established ranking. Pearson coefficients follow in the next columns for all eight college activities, simple or double asterisks indicating statistical significance at the .01 and .001 levels respectively. Shaded areas were added to aid in the interpretation of results. They evidence blocks of interesting correlations, most of them significant at the .001 level.

Table 34 displays informative correlations between College activities and items used to assess progress. Starting with a vertical analysis, it can readily be seen that involvement in class activities shows significant correlations with progress in personal development, communication, and introduction to alien cultures, all of these being strongly related to course subjects. Independent study correlates with progress in the development of quantitative learning. It is to be noted that this is the only activity that is correlated with this area of progress. Involvement in writing activities correlates with the art and communication areas, particularly with written communication and literature, as expected. It also correlates with an awareness of one's own capacities and interests, and developing methods for learning to learn. Media Center activities also correlate with several areas of academic activity: learning to learn, written and verbal communication,

**Table 34**

**Pearson Coefficients Indicating Relationships Between Participation in College Activities and Areas of Progress**

| Progress Items | Class | Study | Write | Teach | Peers | Cultart | Media | Clubs |
|---|---|---|---|---|---|---|---|---|
| *Personal Development* | | | | | | | | |
| Career goals | .20 | .11 | .17 | .17 | .16 | .06 | .05 | .02 |
| +Self-Knowledge | .21 | .16 | .29** | .19 | .24* | .22* | .12 | .14 |
| +Different disciplines | .16 | .11 | .17 | .10 | .16 | .15 | .08 | .07 |
| +Learning to learn | .18 | .16 | .23* | .22* | .22* | .14 | .24* | .18 |
| Values and ethics | .30** | .18 | .21 | .26** | .24* | .14 | .18 | .14 |
| - Physical Well-Being | .17 | .11 | .19 | .28** | .25** | .10 | .23* | .32** |
| *Quantitative thinking* | | | | | | | | |
| Mathematics | .10 | .31** | .03 | .15 | .16 | -.17 | .08 | .11 |
| Science & technology | .12 | .16 | -.04 | .17 | .16 | -.04 | .03 | .12 |
| Quantitative information | .20 | .22* | .08 | .17 | .16 | -.12 | .16 | .14 |
| *Art* | | | | | | | | |
| - Appreciation of literature | .18 | .07 | .23* | .15 | .13 | .30** | .18 | .03 |
| - Appreciation of art | .04 | -.03 | .22* | .14 | .15 | .53** | .12 | .07 |
| *Communication* | | | | | | | | |
| +Written communication | .28** | .21 | .33** | .20 | .19 | .13 | .25** | .13 |
| Verbal communication | .28** | .21 | .33** | .20 | .19 | .13 | .25** | .13 |
| Using computers | .25** | .14 | .18 | .10 | .18 | .01 | .22* | .12 |
| -Learning another language | .13 | .09 | .21 | .19 | .15 | .14 | .12 | .06 |
| *Alien Cultures* | | | | | | | | |
| Different peoples, places | .31** | .14 | .17 | .17 | .14 | .05 | .25** | .13 |
| +Different cultures | .29** | .17 | .18 | .23* | .20 | .15 | .20 | .15 |
| History | .28** | .11 | .14 | .18 | .16 | .10 | .20 | .12 |
| -Economics & socio-politics | .21 | .07 | .08 | .12 | .18 | .07 | .16 | .19 |
| Tolerance | .24* | .16 | .13 | .21 | .23* | .15 | .15 | .21 |

Notes: N= 332

* indicates a $p \leq .01$ level of significance.

** indicates a $p \leq .001$ level of significance.

using computers and acquaintance with different cultures. These relationships are quite understandable, considering that the Media Center is the place where required or useful learning material (books, computers, maps, study skills workshops) may be used, consulted, borrowed from or attended. It also correlates with physical well-being for reasons that remained unidentified.

The block of interactions with teachers and peers is significantly correlated with personal development and also with alien cultures. Peer interactions have a specific relationship with self-knowledge and the development of tolerance attitudes, while teacher interactions are related to opening up to different cultures. Both are significantly related to acquiring methods leading to autonomous learning, developing a personal value system and acquiring sound health habits.

Several correlations are also identified in connection with joining in cultural, artistic, sports and student activities. Cultural and artistic activities correlate unsurprisingly with appreciation of arts and literature, and somewhat more surprisingly with self-awareness. And of course, joining sports and teams correlates significantly with physical activity.

A horizontal scanning of Table 34 helps summarize the points above:

- items related to progress in personal development have significant correlations with 7 of the 8 college activities;
- items related to progress in the development of quantitative thinking are related only to study activities;
- items which clustered into the factor dealing with progress in the arts have the highest

correlations with cultural and artistic activities, and moderate correlations with writing;

- items related to communication are generally correlated with class, writing and Media Center activities;

- items related to the introduction to alien cultures are related to four college activities: class, Media Center and interactions with teachers and peers.

These results corroborate results established by several researchers. Pace (1984) and Lehman (1991), identified high inter-correlations between quality of student effort in college activities, and estimates of gains in related areas. As concluded by Lehman (1991), "these findings support the notion that effort is related to progress toward achieving important educational goals. The more effort community college students put into their college experiences, the more likely they are to make personal and academic gains. Furthermore, effort in specific areas result in progress in educational goals". (p. 206)

Returning to Table 34, it is seen that items related to higher progress correlate with from three to six college activities, while items related to lower estimated progress are related to two college activities or less. As a matter of fact, two items which rank 17 (career goals) and 20 (other language) on the progress items rank order, are not correlated with any of the college activities. There are however two notable exceptions to this observation: becoming acquainted with different disciplines (a major area of progress for 61% of the students) is not related in a statistically significant manner with any specific college activity; and developing physical well-being, (declared a minor area of progress by 61% of the students) correlates with four college activities at a significant level.

In spite of these exceptions, it appears justified to observe that it is participation in several college activities, more than in any single activity, however high the level of involvement in this activity, which generally combines into higher estimates of progress on related outcomes. Study activities illustrate this effect: it is significantly correlated with quantitative thinking, but these learning outcomes rank low on progress. Appreciation of the arts is another example: items correlate with two college activities, writing and cultural and artistic activities, yet these were assessed as areas of low progress.

In summary, correlations reported in Table 34 support the notion that participation in specific areas of college activity contributes to the attainment of specific goals, and that more active participation in college experiences results in higher assessments of progress toward related goals.

**Conclusion of the Study of Hypothesis 2**

This completed the study of Hypothesis 2: the null hypothesis was rejected and it was concluded that preliminary forms of involvement and participation in college activities do influence student assessments of progress. Living away from parents is the only student characteristic directly associated with progress. Other characteristics, attitudes and behaviours are mostly indirectly associated with progress. After having controlled for student characteristics, which explain 12% of the variance in progress, it was established that involvement in preliminary activities and total participation in college activities account for 57% of the variance in progress.

### 7.3. Study of Hypothesis 3

Hypothesis 3 was formulated as follows:

Preliminary involvement and participation in college activities exert a statistically significant, positive influence on student satisfaction.

Satisfaction was assessed by means of 13 items, mostly in the last part of the questionnaire. Items inquired generally about satisfaction with study areas, equipment, financial support, peers, teachers and other personnel, courses, grades and overall satisfaction. They also asked students to assess their decision to engage in higher studies and enroll in this college, as well as their intent to persist.

#### 7.3.1 Student Characteristics and All Student Involvement Variables

Table 35 presents Pearson coefficients describing correlations between student characteristics and all forms of student involvement, from early involvement, to participation in college activities and assessment of progress and satisfaction.

Table 35 identifies three significant correlations between satisfaction and student characteristics, namely, value of learning, goals and parent support. Two significant correlations are also identified with preliminary involvement measures: expected average and amount of instruction on study skills. Satisfaction is also positively correlated with estimated progress. All the above correlations are significant at $p \leq .001$. As for prior performance and participation in college activities, their .19 correlation coefficient is significant at $p \leq .05$.

## Table 35

### Pearson Correlation Coefficients Between Student Characteristics and All Student Involvement Variables

| | AGE | GND | JOB | RES | PRPF | VAL | GOAL | PARD | PARS | EXP | TSK | INST | MOD | PART | PRG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GENDER | .00 | | | | | | | | | | | | | | |
| JOB | .09 | -.01 | | | | | | | | | | | | | |
| RESID | .17 | -.16 | -.24** | | | | | | | | | | | | |
| PRPERF | -.31** | -.03 | -.07 | -.11 | | | | | | | | | | | |
| VALUE | -.13 | -.14 | -.09 | .04 | .36** | | | | | | | | | | |
| GOALS | -.01 | -.09 | -.02 | .10 | .11 | .54** | | | | | | | | | |
| PAREDUC | -.03 | .03 | -.05 | -.07 | .24** | .16 | .08 | | | | | | | | |
| PARSUP | -.08 | -.19 | -.03 | .04 | .17 | .46** | .37** | .11 | | | | | | | |
| EXPAVG | -.17 | -.15 | -.05 | -.02 | .51** | .37** | .25* | .23' | .26** | | | | | | |
| TASK | -.12 | -.10 | -.17 | -.07 | .20 | .28** | .16 | .04 | .21 | .17 | | | | | |
| INSTRUCT | .06 | -.07 | .01 | .07 | -.12 | .08 | .16 | -.08 | .11 | .00 | .02 | | | | |
| MODEL | -.02 | -.10 | .03 | .10 | -.01 | .17 | .14 | .01 | .05 | .10 | .01 | .04 | | | |
| PART | -.03 | -.10 | .03 | .04 | .06 | .30** | .32** | .06 | .30** | .24** | .25** | .32** | .17 | | |
| PROGRESS | .08 | -.07 | .02 | .16 | -.12 | .18 | .27** | -.04 | .20 | .03 | .12 | .78** | .07 | .47** | |
| SATISFAC | -.14 | -.06 | -.05 | -.02 | .19 | .35** | .28** | .07 | .32** | .30** | .17 | .22** | .09 | .19 | .28** |

Notes: N= 331
* indicates a $p \leq .01$ level of significance.
** indicates a $p \leq .001$ or lower level of significance.

Satisfaction was regressed first on student characteristics. Beta coefficients, significant at the .01 level, were obtained for value of learning and parent support, while that for goals was only significant at the .05 level.

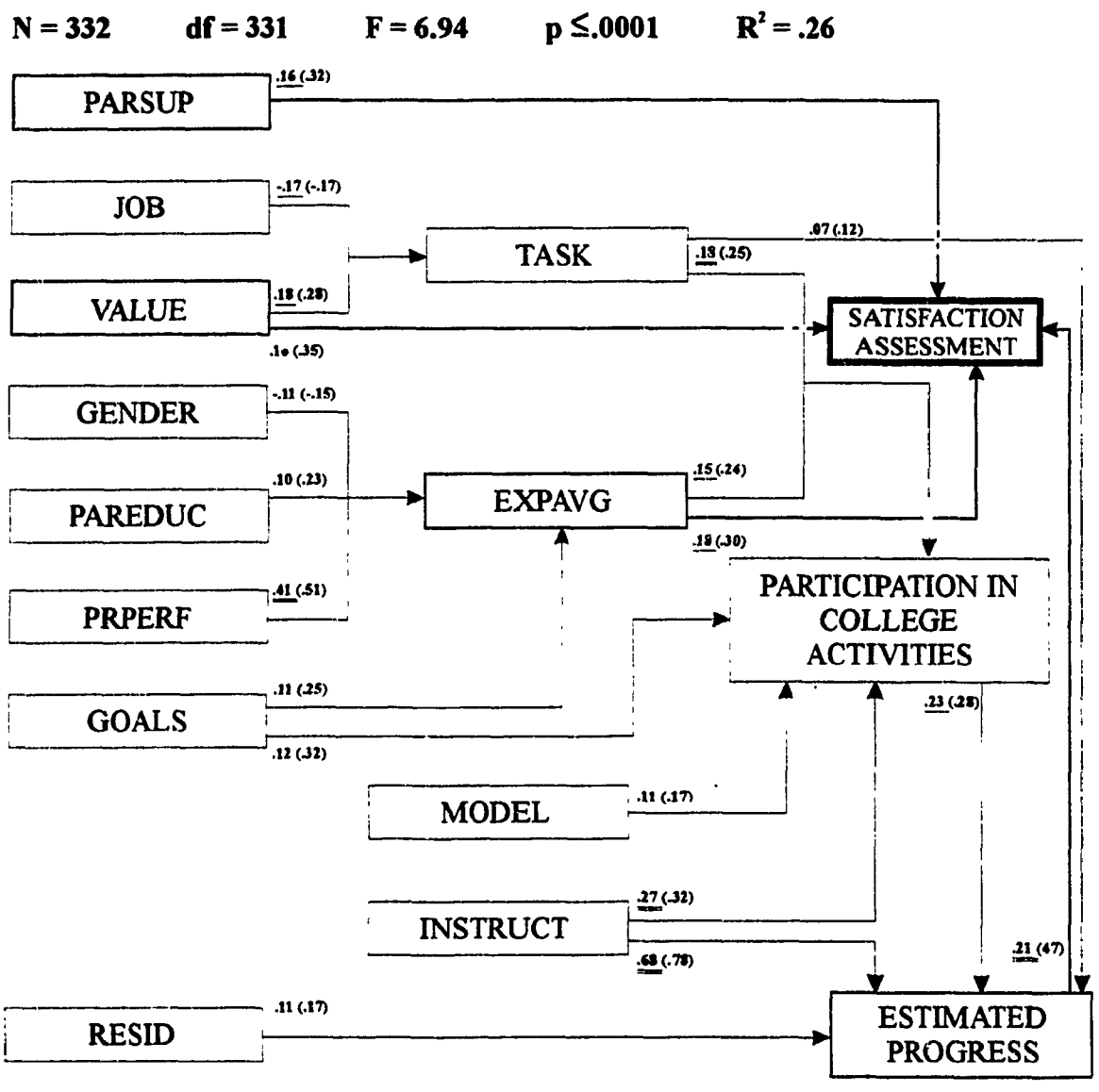
Satisfaction was then regressed on all student characteristics and other involvement variables. As expected from correlation coefficients, progress, coupled with value attributed to learning, expected average in Cégep and parent support all combine into inducing satisfaction.

The model resulting from the regression of satisfaction on all variables is as illustrated in Figure 10. The proportion of variance in satisfaction explained by this model is 26%. It is detailed as follows. Student characteristics explain a total of 17% of the variance, demographic characteristics accounting for a first 2%, prior performance adding 3%, value of learning contributing 8%, while goals add 2% and parent support add another 2%. Early involvement explains 6%, with grade expectancies explaining 2% and involvement in the development of study skills explaining 4%; estimated progress adds a final 3%. In terms of relative importance, estimated progress has the most important direct influence on satisfaction ($\beta$ = .23); expected average comes second ($\beta$ = .18), while value of learning and parent support follow ($\beta$ = .16). However, all other variables but progress also have indirect influences on satisfaction, as mediated by participation in college activities and estimated progress.

In terms of demographic characteristics, satisfied students are more often girls than boys, who do not spend too much time on work for pay, live more often than not away from

**Figure 10**

**Relationships Between Student Characteristics, Involvement Variables and Satisfaction; Standardized β Coefficients and (Pearson Coefficients)**




Notes : No underlining indicates a p≤.05 level of significance.
Simple underlining indicates a p≤.01 level of significance.
Double underlining indicates a p≤.001 or level of significance.

their parents, who themselves have a slightly above average level of schooling and provide their offspring with strong support and encouragement for studies. These students' academic performance in secondary school was above average and on the psychological level, they tend to consider learning and diplomas as important assets, have clear educational goals and be committed to reaching them. This brings them to expect higher than average grade points in Cégep, to spend considerable time on their tasks as students, getting involved in several of the college activities that are proposed to them. Higher estimates of progress on learning outcomes result in higher satisfaction toward the system.

Satisfied students are those who estimate that they have made substantial gains in several areas of cognitive growth and development. These students have high expectations concerning their grades in Cégep. They are convinced that a college diploma represents an important asset in life, and they are explicitly encouraged by their parents to go ahead with their study projects. The profile of satisfied students is closely modeled on the profile of students who demonstrate involvement in college activities and estimate they have made progress in several areas.

### 7.3.2 Other questions

Other questions were investigated concerning differences between programmes, and also concerning areas of higher satisfaction.

#### a) Differences Between Programmes

Analyses of variance were performed to determine whether there was a difference in

satisfaction levels between programmes, but none were found.

**b) Areas of Higher and Lower Satisfaction**

As for levels of higher satisfaction, it was found that students are most satisfied with, listed here in decreasing order, their decision to enroll in this college, the up-to-dateness of course contents (but not their interest or motivating power, which ranked 12 on 17), the condition of material and equipment and their overall satisfaction with the college experience.

On the opposite side, they appear least satisfied with their academic performance in Cégep, as measured by the grade point average. Their answers to questions related to integration into college also indicate low levels of satisfaction. They declare not having made many new friends in Cégep since their entrance in the programme, not belonging to any particular subgroup of students and not being inclined to display clothes or other material identified to college colors. With respect to the last item, it must be said that such material identified specifically to pre-university programmes is practically non-existent, as opposed to technical programmes where it is more available. This in itself may indicate that students in pre-university programmes do not develop a high *sentiment d'appartenance* with the programme or college.

**c) Relationships Between Satisfaction and Participation in Specific Activities**

When satisfaction was regressed on college activities, study was the only variable retained in the model, with a $\beta$ coefficient of .29, significant at a .001 level. It accounted for 9% of the variance explained in satisfaction. However, study was not entered in the

final model, as it was already subsumed under the indirect influence exerted on satisfaction by participation in college activities. Due to the low correlation between total participation in college activities and satisfaction, no attempt was made to relate the former to any particular area of satisfaction.

**Conclusion of the Study of Hypothesis 3**

This concluded the study of Hypothesis 3, which was only partly confirmed. Two student characteristics, value attributed to learning and parent support were found directly associated with satisfaction. Grade expectancies as a preliminary form of involvement, and estimated progress as an assessment form of involvement, were both found to exert influence on satisfaction. Participation in study activities was found to exert influence on student satisfaction in college at a $p \leq .001$ level, but total participation in college activities did not enter the regression model.

In his 1993 study, Astin concludes that "in contrast to other types of student outcomes, student satisfaction depends much more on actual environmental experiences than on entering student characteristics. Satisfaction with most aspects of the undergraduate experience is facilitated by living on campus rather than at home and by living some distance from home. Satisfaction is enhanced by frequent interactions with faculty and fellow students" (p. 310). Although results established in this study are somewhat different from Astin's, the influence of student involvement on satisfaction is confirmed.

### 7.4 Study of Hypothesis 4

Hypothesis 4 was formulated as follows:

Student involvement has a statistically significant, positive influence on academic performance in college.

The study of Hypothesis 4 was conducted in the same manner as that of the previous hypotheses: correlation and regression coefficients were analyzed first, and other questions were asked subsequently.

#### 7.4.1 Student Characteristics, Student Involvement and Performance

Performance was assessed by means of students' grade point average at the end of the 1993 Spring term. Table 36 reports correlation coefficients for all variables included in the study of this hypothesis.

Six statistically significant correlations are identified between performance and the following independent or mediating variables: prior performance, value of learning, expected average and time on task ($p \leq .001$), parent support and satisfaction ($p \leq .01$). Other correlations with participation in college activities, goal commitment and gender were identified. They were significant at $p \leq .05$. The absence of correlation between academic performance and both instruction on study skills and estimated progress could not go unnoticed.

**Table 36**

**Pearson Correlation Coefficients Between Student Characteristics, Student Involvement and Performance**

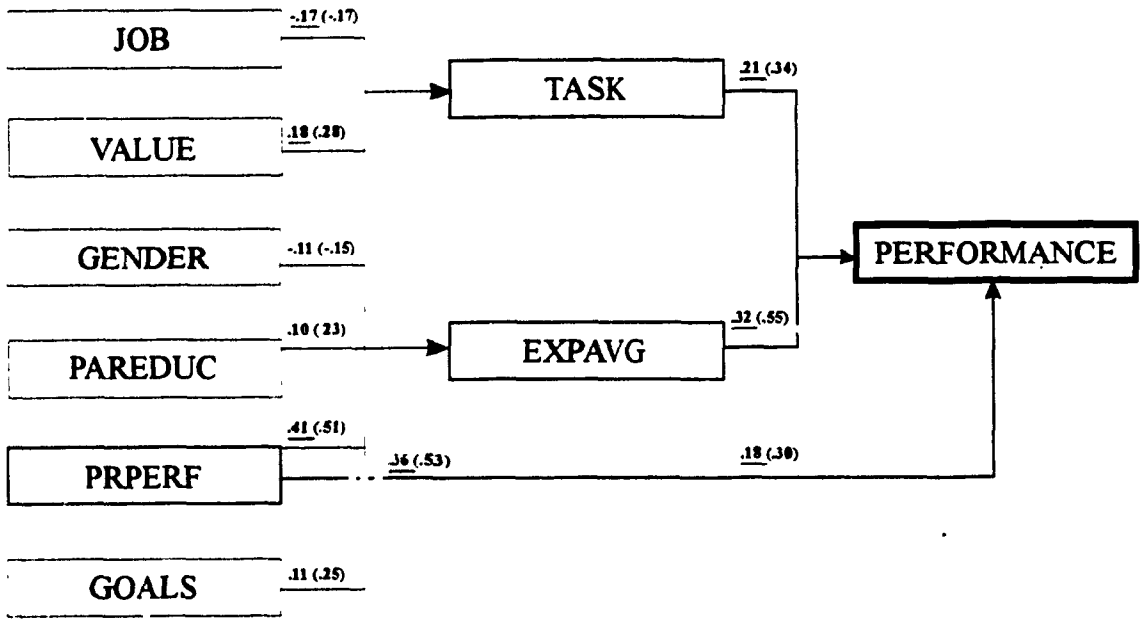
| | AGE | GND | JOB | RES | PRPF | VAL | GOAL | PARD | PARS | EXP | TSK | INST | MOD | PART | PRG | SAT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GENDER | .00 | | | | | | | | | | | | | | | |
| JOB | .09 | -.01 | | | | | | | | | | | | | | |
| RESID | .16 | -.15 | -.24** | | | | | | | | | | | | | |
| PRPERF | -.31** | -.03 | -.07 | -.10 | | | | | | | | | | | | |
| VALUE | -.13 | -.14 | -.09 | .04 | .36** | | | | | | | | | | | |
| GOALS | -.01 | -.09 | -.02 | .10 | .11 | .54** | | | | | | | | | | |
| PAREDUC | -.02 | .03 | -.05 | -.07 | .24** | .16 | .08 | | | | | | | | | |
| PARSUP | -.08 | -.19 | -.03 | .04 | .17 | .46** | .37** | .11 | | | | | | | | |
| EXPAVG | -.16 | -.15 | -.05 | -.02 | .51** | .37** | .25* | .23* | .26** | | | | | | | |
| TASK | -.12 | -.10 | -.17 | -.07 | .20 | .28** | .16 | .04 | .21 | .17 | | | | | | |
| INSTRUCT | .07 | -.07 | .00 | .08 | -.12 | .07 | .17 | -.09 | .11 | .00 | .02 | | | | | |
| MODEL | -.02 | -.10 | .02 | .10 | -.01 | .17 | .14 | .01 | .05 | .10 | .01 | .04 | | | | |
| PART | -.02 | -.11 | .02 | .05 | .06 | .30** | .33** | .05 | .30** | .24** | .25** | .32** | .17 | | | |
| PROGRESS | .09 | -.07 | .02 | .17 | -.12 | .17 | .27** | -.04 | .20 | .03 | .12 | .78** | .07 | .47** | | |
| SATISFAC | -.14 | -.06 | -.05 | -.02 | .19 | .35** | .28** | 07 | .32** | .30** | .17 | .22** | .09 | .19 | .28** | |
| PERFORM | -.08 | -.18 | -.03 | .04 | .53** | .36** | .20 | .11 | .26* | .55** | .34** | .03 | .05 | .22 | .05 | .24* |

Notes: N= 331
* indicates a $p \leq .01$ level of significance.
** indicates a $p \leq .001$ or lower level of significance.

When performance was regressed on student characteristics alone, gender was found related to performance ($\beta$ = -.12, $p \leq .05$), thus confirming that girls perform better in Cégep. However, prior performance in high school was a far more important variable in explaining performance in Cégep ($\beta$ = .51, $p \leq .0001$). Performance was subsequently regressed on all variables. Results are presented in Figure 11.

**Figure 11**

**Relationships Between Student Characteristics, Student Involvement and Performance; Standardized $\beta$ Coefficients and (Pearson Coefficients)**




Notes : No underlining indicates a p≤.05 level of significance.
Simple underlining indicates a p≤.01 level of significance.
Double underlining indicates a p≤.001 or level of significance.

The profile of students who perform well in Cégep is rather simple to draw. From a demographic standpoint, there are more women than men, who spend less than average time on work for pay, and whose parents hold higher diplomas. They have performed well in Secondary school, attribute a high value to prior and future learning and also have clear career and study goals. These dispositions induce them into entertaining high expectancies about their performance in Cégep and to spend considerable time on study and on the campus, attending most of their classes.

Variance partitioning reveals that demographic characteristics altogether explain 4% of the variance in performance in Cégep. As expected, prior performance accounts for 28% of the variance alone, while value and goals combined add 3%. Expected average in Cégep also explains 8% of the variance, and time on task 4%. Other involvement measures make no significant contribution, either positive or negative, to explaining performance in Cégep. This model explains 47% of the variance in academic performance.

Prior performance is the most important factor directly ($\beta$ = .36) and indirectly ($\beta$ = .41) associated with performance in Cégep. Combined with expected performance, ($\beta$ = .32) and time on task ($\beta$ = .21), they are by far the best predictors of success in Cégep.

As noted above, the large number of negative outliers in the distribution of performance in Cégep probably exerted a strong pull on the regression (Cohen & Cohen 1983), which could account for lower than expected $R^2$ and $\beta$ coefficients in the study of this hypothesis.

### 7.4.2 Other Questions

Other questions were raised in the study of Hypothesis 4, in connection with differences between programmes and especially in connection with the observed absence of relationships between some variables.

**a) Differences Between Programmes**

Differences in academic performance related to programme of enrollment were sought. Analysis of variance revealed significant differences in performance between programmes. The mean performance was higher in *Sciences de la nature* than in both other programmes, and higher in *Sciences humaines* than in *Arts et lettres*. The difference was significant at the .0001 level between *Sciences de la nature* and *Sciences humaines*. These differences reflect similar differences in admission requirements concerning prior performance in all three programmes.

**b) Relationships Between Participation in College Activities and Academic Performance**

A second question concerned the relationship between academic performance and participation in college activities. A Pearson coefficient equal to .22 indicates there is a moderate correlation between the two variables, but total participation in college activities is not retained in the regression model. An explanation was sought in the statistical methods used. Following the logical priority order selected for performing this hierarchical analysis, six other variables correlated at $p \leq .001$ with participation, were entered in the regression analysis prior to entering participation in college activities. As these variables lay claim on much the same portion of variance in academic performance

as participation in college activities did, the variance that could have been explained by participation in college activities, had the other correlated variables not been present in the model, was "used up" so to say, before participation in college activities could even be entered in the model.

This interpretation is supported by the fact that, when performance was regressed on separate college activities, Independent Study was retained in the model. With a $\beta$ coefficient of .39, significant at .0001, study explained 15% of the variance in performance.

**c) Relationships Between Progress and Academic Performance**

The most intriguing question concerned the absence of an observed relationship between progress and performance. Considering that both are measures of learning and development, it was expected that they would be correlated at least to a certain degree. However, the Pearson coefficient shows this correlation to be nearly nonexistent ($r = .05$).

Several hypotheses were formulated as possible explanations for failing to detect a certain level of correlation between these two variables. The first had to do with the nature of the measurements. Progress was assessed by means of a sum of scores on 20 items in the questionnaire, while performance was assessed by means of the grade point average earned by students at the end of the 1993 Spring term. Thus, when relationships between progress and performance were sought, self-reports were being compared with measures obtained through a more formal grading system. Final grades in each subject are a linear combination of scores on all papers, tests, lab reports, etc. that were marked and retained for summative evaluation purposes during that term, plus a final examination in most

subjects. The computed average is the arithmetic mean of final grades in all subjects and does not include any other manipulation deriving from the distribution of grades. And of course, estimates of progress were obtained by asking students to assess how much progress they thought they had made on several outcomes. The question posed was: Are both reliable measures of student learning and development?

The issue of the reliability of self-reports has already been discussed in the review of literature. Let it be recalled that Pascarella & Terenzini (1991), though admitting that there are assessment problems with self-reports, write that they have been found to correlate (r = .25 to .65) with more objective measures.

In addition to the GPA and results on various standardized tests, Astin (1993) also uses self-reports to assess growth in knowledge and intellectual skills, mainly because of the "extraordinary cost of administering tests to measure such skills". While admitting that "such 'quick-and-dirty' assessments ... are clearly not as valid as actual before-and-after assessments", Astin reports that "recent studies indicate that self-estimates of gain do have some modest validity when compared against pretest-posttest changes in performance" (p. 222). Out of the 19 measures obtained for self-reported growth, Astin enters 11 in regression analyses. A total of 7 (general knowledge and knowledge of a particular field, ability to think critically, analytical and problem-solving skills, job-related skills, writing skills, and preparation for graduate or professional school) are found associated with the involvement measure "hours per week spent studying or doing homework". The same estimates plus foreign-language skills are found associated with the undergraduate student's GPA.

The extremely widespread use of self-reports in research seemed to legitimate its use in the current project, and precluded this explanation to be retained for the absence of an observed relationship between progress and academic performance.

The absence of observed relationship between progress and academic performance raised the issue of the relevancy of using the Grade Point Average or other similar measures of academic performance, for the purpose of studying relationships between educational variables. It is common knowledge that grades, in the context of progressive evaluation, are a mixture of results obtained through distribution norm and criterion referenced tests, combined with more or less subjective judgements, aiming to assess learning, skills, attitudes, etc. Each instructor being responsible for assessing student performance in his or her own course, students in different class sections are generally submitted to different tests which may be marked according to different scales.

However reliable both measures would be, one cannot but argue that progress and academic performance assess quite different objects. Progress addresses educational outcomes by asking students whether they have made gains in the areas of personal development, art, communication, quantitative thinking and alien cultures. These represent rather broad capabilities on educational outcomes scales and it is certainly not easy for students to assess their gains in these areas without error. Academic performance, although purporting to take into account the development of intellectual skills and attitudes, assesses more minute knowledge acquisition and the development of narrower technical skills which may correspond to lower objectives levels. Further inquiry into principles, techniques and instruments used for learning assessment in

college would be needed to probe deeper into this issue.

Astin notes that "few studies of undergraduate grades have involved more than one institution", both because grading systems and academic standards vary across different colleges, and because grades are "relative indices and therefore suspect as measures of the student's intellectual growth and development" (p. 187). The present research argues that there may also be an important variability on grades within a single institution, when there is a lack of agreement on standards and learning assessment methods, and especially when different programmes are included in one study.

To conclude this discussion, two orientations for further investigations into the relationship between the GPA and estimated progress were formulated: (1) use the final GPA (after the two-year programme has been completed) instead of the intermediate GPA obtained after one year, as was the case for a large number of students in the sample; and (2) study correlations and regressions with separate measures or clusters of measures of self-reported growth instead of with a number representing total progress.

**Conclusion of the Study of Hypothesis 4**

Since no significant relationship was identified between participation in college activities and performance in Cégep, the null hypothesis was not rejected. However, as many of the strong determinants of student involvement, namely time on task, expected average and prior performance were retained in models of student involvement and performance, there are grounds to believe that some relationships between participation in college activities and performance in Cégep do exist, but that they could not be singled out in

this study. The correlation between academic performance and total participation in college activities, as well as the relationship identified between performance and the single study activity both support this interpretation.

### 7.5 Study of Hypothesis 5

Hypothesis 5 was formulated in the following manner:

Student involvement has a statistically significant, positive influence on persistence in college.

The study of Hypothesis 5 was performed through the examination of correlation and regression coefficients, and also by examining other questions.

#### 7.5.1 Student Characteristics, Student Involvement and Persistence

Persistence was operationalized as the decision to remain in college evidenced by reenrollment in the Fall term, that is, the term following that during which students completed the questionnaire. It was coded using 1 for absence and 2 for presence in the Fall of 1993. Although persistence is a dichotomous variable and the other variables are either continuous or discrete, the Pearson coefficient was computed for the assessment of correlations between persistence and these variables because this statistic is the most stable, with a small standard error. It is also the most frequently used in research (Borg & Gall, 1989). Correlations between persistence and all other independent variables are presented in Table 37.

**Table 37**

**Pearson Correlation Coefficients Between Variables Included in the Study of Student Involvement and Persistence**

| | AGE | GND | JOB | RES | PRPF | VAL | GOAL | PARD | PARS | EXP | TSK | INST | MOD | PART | PRG | SAT | PRF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GENDER | .01 | | | | | | | | | | | | | | | | |
| JOB | .10 | -.01 | | | | | | | | | | | | | | | |
| RESID | .15 | -.15 | -.27** | | | | | | | | | | | | | | |
| PRPERF | -.31** | -.04 | -.07 | -.08 | | | | | | | | | | | | | |
| VALUE | -.15 | -.14 | -.10 | .07 | .39** | | | | | | | | | | | | |
| GOALS | -.03 | -.08 | -.02 | .11 | .14 | .54** | | | | | | | | | | | |
| PAREDUC | -.02 | .01 | -.06 | -.06 | .24** | .18 | .10 | | | | | | | | | | |
| PARSUP | -.09 | -.18 | -.02 | .08 | .18 | .47** | .37** | .13 | | | | | | | | | |
| EXPAVG | -.18 | -.16 | -.05 | -.03 | .52** | .38** | .25* | .25* | .27** | | | | | | | | |
| TASK | -.12 | -.11 | -.18 | -.01 | .20 | .28** | .17 | .04 | .22 | .18 | | | | | | | |
| INSTRUCT | .06 | -.06 | .00 | .07 | -.11 | .05 | .15 | -.06 | .10 | -.02 | .02 | | | | | | |
| MODEL | -.02 | -.10 | .03 | .09 | -.01 | .16 | .14 | .02 | .05 | .12 | .01 | .02 | | | | | |
| PART | -.03 | -.13 | .04 | .05 | .08 | .31** | .31** | .06 | .32** | .25** | .26** | .32** | .15 | | | | |
| PROGRESS | .08 | -.07 | .02 | .16 | -.12 | .18 | .27** | -.04 | .20 | .04 | .12 | .78** | .07 | .47** | | | |
| SATISFAC | -.14 | -.08 | -.05 | -.03 | .19 | .37** | .29** | .07 | .32** | .31** | .17 | .22** | .08 | .19 | .28** | | |
| PERFORM | -.08 | -.18 | -.03 | .04 | .53** | .36** | .20 | .11 | .26** | .55** | .34** | .03 | .05 | .22 | .05 | .24 | |
| PERSIST | -.14 | -.05 | -.05 | -.04 | .13 | .30** | -.06 | -.03 | .11 | .21* | .14 | -.05 | .04 | .00 | -.03 | .20 | .20 |

Notes: N= 359
* indicates a $p \leq .01$ level of significance.
** indicates a $p \leq .001$ or lower level of significance.

Table 37 identifies several correlations between persistence and other variables: correlations with satisfaction and performance in Cégep are significant at $p \leq .05$, expected average is significant at $p \leq .01$, while value attributed to learning is significant at $p \leq .001$. Persistence being a dichotomous variable, a direct discriminant function analysis was performed on this set of variables, in order to determine whether they could serve as predictors for persistence in college. In technical terms, value, expected average, satisfaction and performance were tested as predictors of membership in persistent or nonpersistent groups. The analysis was performed on 359 cases corresponding to students who did not get their diploma at the end of the 1993 Spring term, regardless of the number of terms they had been in Cégep.

One discriminant function was calculated that separated the persistent from the nonpersistent group, with a $X^2$ (3) = 42.38, $p < .0001$. It accounted for 34% of the between group variability.

A loading vector of correlations between predictor variables and the discriminant function suggested that the primary variable in discriminating between persistence and non persistence is value attributed to learning. Persistent students attribute a higher value to learning (mean = 0.10[19]) than do nonpersistent students (mean = -.73). Table 38 presents data related to this analysis.

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[19] Means given here are for standardized variables.

**Table 38**

**Results of Discriminant Function Analysis of Predictors of Persistence in College**

| Predictor variables | Correlations of predictor variables with discriminant function | Univariate F (1,359) p < .0001 | Pooled within-group correlations among predictors | | |
|---|---|---|---|---|---|
| | | | Satisfaction | Performance | Expected average |
| Value | .85 | 33.08 | .31 | .34 | .38 |
| Satisfaction | .65 | 19.37 | | .25 | .28 |
| Performance | .63 | 18.01 | | | .53 |
| Expected average | .61 | 16.95 | | | |

Also contributing to discrimination between persistent and nonpersistent groups, in decreasing order of importance, are satisfaction, performance and expected average. Students who are generally more satisfied (mean = .11) tend to persist more than students who are not satisfied (mean = -.53). Students who perform better (mean = .06, as contrasted with -.53) persist until graduation, and lastly, students who expect higher grades (mean = .07) stay in college while students who expect lower grades (mean = -.55) are more prone to quitting. All univariate tests are highly significant ($p \leq .0001$).

Pooled within-group correlations among the four predictors are also shown in Table 38. All four coefficients would show statistical significance ($p \leq .001$) if tested individually. There is a positive relationship between the three variables, confirming that students who persist attribute a higher value to learning, are generally more satisfied, have performed better and have previously anticipated higher grades. Using canonical scores, a classification of the 359 cases was attempted. Tables showed that 310 cases were classified correctly. This 86% correct classification rate was achieved by classifying 11% of the cases

as persistent when they had actually dropped out, a proportion four times larger than the proportion of cases that were incorrectly classified in the opposite sense (classified as having quit when they had actually persisted). Using this set of predictors, the probability of classifying nonpersistent students correctly was thus higher than that of correctly classifying students who had persisted.

### 7.5.2 Other Questions

Differences in persistence between programmes were sought, but no significant differences were identified.

In spite of the fact that no correlation was identified between total participation in college activities and persistence, correlations between participation in specific college activities and persistence were computed, in order to detect whether some of these activities might have an influence on the decision to remain in college. Results showed that persistence was not significantly correlated with any of these. The highest coefficient obtained was with study activities, but it was not statistically significant. A difference in means for participation in college activities was sought through successive t-tests. The only significant differences confirmed by these tests were for study. The level of involvement in study activities was significantly higher ($p \leq .05$) for persistent students (mean = .08) than for non-persistent students (mean = -.31).

### Conclusion of the Study of Hypothesis 5

This concluded the study of Hypothesis 5. The null hypothesis was not rejected because no significant influence of participation in college activities on persistence could be

observed, neither in terms of zero-order correlation or through including it in the set of predictors. However, time on task and expected average being among the predictors of persistence, as well as satisfaction, it was concluded that both early involvement and self-assessment activities exert influence on persistence.

## Conclusion

The model for student experiences in Cégep, and the underlying hypotheses, were thus partly confirmed, and partly modified. Among the nine student characteristics that were studied in connection with student involvement, eight were found associated with different student involvement variables, age being the one left out. Preliminary involvement measures were found to influence the level of student participation in college activities. This last variable was found to influence estimates of cognitive growth and development, which in turn influences satisfaction. It was also established that academic performance as measured by the GPA could be predicted mostly from prior performance, expected average and time on task, while persistence in college could be predicted mostly from value attributed to learning, satisfaction, performance in Cégep and expected average. These results were consistent with results established by previous research on student involvement but new variables and relationships were also studied. The final model retained in this research is presented in the next chapter.

# CHAPTER 8

# SUMMARY AND IMPLICATIONS

This research aimed at developing and validating a model of student experiences in Cégeps, derived from a study of this particular educational context and supported by prior results established for American four-year and community colleges. This model included student personal and academic characteristics, and parent characteristics, as input variables. Student involvement, considered as the process by which students take charge of their studying-in-college project, encompassed several mediating variables. Academic performance and persistence were retained as outcome variables. Statistical analysis confirmed that student inputs can be associated with student involvement, which in turn influences student achievement.

The purpose of this last chapter is to present a summary of the results established in this research. The limitations of the study are discussed next, followed by a presentation of possible implications for education. The chapter closes on hypotheses that were generated in this study and which could be explored in further research.

## 8.1 Summary of the Research Process and Results

This study sought to contribute to the field of educational technology by providing an extended definition for student involvement, an explanation for how student involvement

is related to the attainment of specific educational goals, and an instrument to be used for the enhancement of achievement in college. The educational context in which this research was conducted was that of Canadian francophone Cégeps in Québec.

**Meaning of Student Involvement**

Four questions formulated at the outset of this research served as guiding questions throughout the process. In this chapter, they are connected back to the results. The first question was stated in the following way: What does student involvement mean in the context of Cégeps, or rather, how much of what it means in other situations is relevant to the situation under study?

Student involvement was redefined as a complex process by means of which students allocate resources into planning, participating in and controlling their college experiences. Student involvement is thus considered to be threefold construct describing student behaviours from entrance in college to graduation. (1) Preliminary involvement refers to the early commitments that bring students to set their own performance standards, allocate time between the different tasks that will be assigned or proposed to them as students within academic or nonacademic activities, and make preliminary choices among means available to them for facilitating the attainment of educational goals, depending on their particular needs and preferences. (2) Participation in college activities corresponds to the definition generally given for student involvement in the research literature. It concerns the variety of activities students engage in, as well as the frequency and intensity that characterize their engagement. (3) The third aspect of student involvement concerns the assessments students must necessarily make with respect to

their study projects, after engaging in college activities and receiving some information regarding their performance.

It was argued that these three components are needed to take full account of what students are able to do, and actually engage into at different levels, while in college. This conception of student involvement is based on an educational technology perspective on student involvement; it considers students as subsystems of the college system, in which autonomous and responsible behaviours have to be recognized, encouraged and educated if college level educational objectives are to be attained.

It was hypothesized that these three essential components of student involvement are related to student characteristics; that there is a flow of influence from early commitments to self-assessment activities, through participation in college learning and development opportunities; and that student involvement is an important determinant of the attainment of educational outcomes. A model representing these variables and hypothesized relationships was subsequently tested using hierarchical analysis.

A questionnaire was designed for the assessment of the variables included in this model. It was composed of six sections. The first concerned student demographic, personal and academic characteristics. The next two sections inquired about their attitudes toward learning, career goals and commitment, and parent characteristics. The central section aimed at assessing student participation in numerous activities related to the broad areas that characterize student activity in college. The last two sections were designed to bring students to assess their own progress, satisfaction, and decisions. After the validity and

reliability of the questionnaire had been evaluated, this instrument was used to collect data from a sample of 389 students enrolled in all pre-university programmes at one Cégep.

**Relationships Between Student Characteristics, Student Involvement and Educational Outcomes**

The second guiding question was phrased as follows: What relationships hold between student characteristics, student involvement and educational outcomes? Multiple regression analyses, multivariate analyses of variance and discriminant analysis were conducted to study the nature and strength of the hypothesized relationships.

Early involvement was found to be associated with variables from all three groups of student characteristics. Working on a job for pay proved to be negatively associated with time spent on tasks as a student. Actually, this portion of the model proved to be very accurate for it explained all of the variance measured by the correlation coefficient between these two variables. Gender and parent education were found related to grade expectancies, but the most significant relationships with preliminary involvement were with prior performance in secondary school and psychostructural traits subsumed under value attributed to learning and commitment to clear study and career goals.

Early involvement was also found significantly related to participation in college activities. Involvement in instruction on study skills proved to have the single most important positive direct influence on participation in college activities. Other positive direct influences, in decreasing order, were time on task, expected average in Cégep,

having clear study and career goals and being committed to reach them, and having a teacher as role model.

The amount of self-reported progress was clearly shown to be influenced by preliminary involvement and participation in specific activities, particularly class, study, Media Center, and cultural and artistic activities. More deeply involved students reported higher progress in several areas, but again, involvement in instruction on study skills was of more importance. Living away from parents, whether on campus or not, was also moderately associated with self-reported progress.

Satisfaction with several aspects of college was associated predominantly with value attributed to learning. It was also found directly influenced by estimated progress, higher expectancies concerning grades in Cégep, and parental support. Participation in study activities only had an indirect influence, as mediated by estimated progress.

In answer to the third question asking whether student involvement could be used to predict educational outcomes, prior performance in secondary school and expected average in Cégep, as measured by the corresponding GPAs, plus the number of hours spent on student tasks, were found to be the best predictors of performance in college. Neither degree of total participation in college activities, nor self-assessment of progress and satisfaction, were found related, directly or indirectly, to academic performance.

It was also demonstrated that persistence could be predicted in a reliable way by value attributed to learning, while satisfaction, performance and expected average were

established as predictors of somewhat lesser importance.

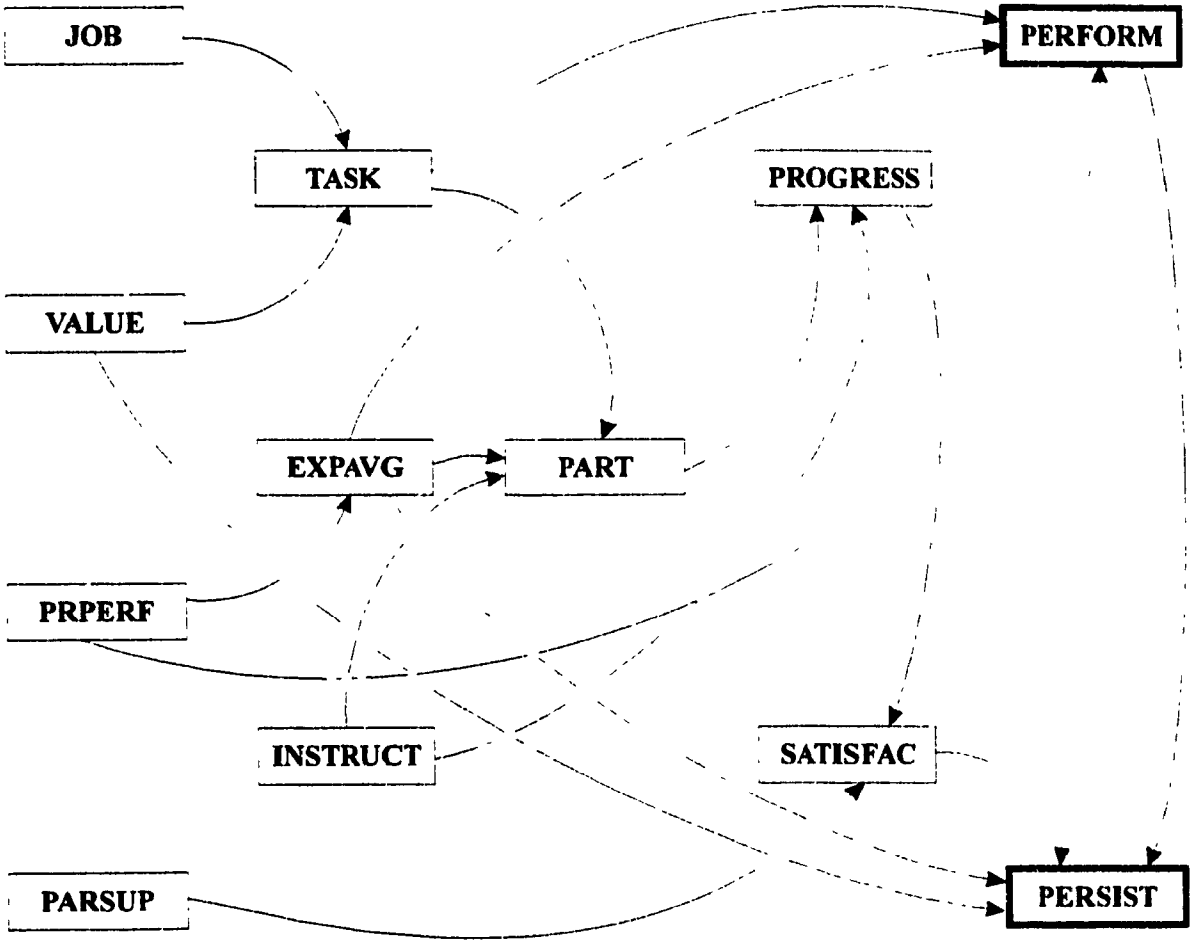
These results confirmed the general hypothesis and model tested in this study. Student involvement is related to student characteristics; its components are interrelated and they are also related to educational outcomes. Null hypotheses, concerning relationships between student characteristics and student involvement variables, and among components of student involvement, were thus rejected. The other null hypotheses were not rejected, for performance and persistence were not found to be related to all three forms of student involvement, but mostly only with preliminary involvement, or with assessment activities.

Figure 12 presents the final model, summarizing relationships between student characteristics, student involvement and educational outcomes. For the sake of clarity, a more stringent significance level was applied for the inclusion of variables in this final model: only variables with a $\beta$ coefficient significant at $p \leq .01$ are represented. The reduced set of variables thus retained provides a simple model showing which student characteristics interact most significantly with involvement variables to influence educational attainment.

Out of the nine student characteristics included in the analysis, four are retained in the final model. Three out of four variables referring to preliminary involvement are also retained, as well as the other components of student involvement. Figure 12 illustrates the tight network of relationships between these variables. Academic performance stands out as depending mostly on prior performance in secondary school,

**Figure 12**

**Final Model of Student Learning Experiences in Cégep**




Note : Relationships significant at ps .01.

time on tasks as a college student, and level of expectancies concerning grades in college. Of course, students getting high scores on all three variables are more likely to succeed, but it must be remembered that these variables contribute independently to academic success. This implies that students who did not get higher grades in secondary school do have a chance to succeed, if they value a college education enough to spend the number

of hours on the task required for them to succeed.

Although influenced by expected average and actual performance in Cégep, persistence is also related to how much value students attribute to learning and diplomas, and to their level of satisfaction. Grades in college are therefore confirmed as an important predictor of persistence which does not explain all by itself how and why students decide to stay. Variables pertaining to the affective domain appear to play an equally important role. The role of self-monitoring activities on persistence decisions is also clearly illustrated in the path from early commitments, to active participation in college activities, to higher estimated progress and satisfaction.

Figure 12 provides evidence for the validity of the general hypothesis under study. It confirms that there is a flow of influence from what students are, to what they do, through to what they achieve.

**Previous Results**

These results are consistent with general results established by prior research in connection with similar variables. Many studies, operating in the framework created by Tinto's (1975) model for student persistence in college, have produced evidence concerning the stringent relationships existing between academic performance and persistence in college. Students' grades have been found the single most revealing indicators of their adjustment to the requirements of college studies, which adjustment later translates into persistence and graduation. Although heavily influenced by academic ability and aptitudes, as demonstrated by prior performance, grades in college have been

found to be influenced by such factors as personal motivation and organization, study habits and quality of effort. As for persistence, it has also been established to be differentially influenced by social and academic integration, social integration tending to have a compensatory interaction with academic integration and vice versa.

Effects of student involvement on college level educational outcomes have been studied extensively by several researchers since the 1970s. Most recently Astin (1993), working with the Cooperative Institutional Research Program, published the results of an exhaustive study which involved some 25 000 students enrolled in nearly 500 four-year colleges, for a six-year period starting in 1985. The experimental design included 146 measures for student input characteristics, 192 environmental measures among which 57 measures were for forms of student involvement, and 82 types of outcomes. The purpose of this huge study was to assess the influence of college environment variables on student development, after controlling for student characteristics. To this date, published results confirm multiple effects of environmental and involvement variables on educational outcomes, but separate analyses by gender, ability, etc. have yet to be performed.

Building on work by Pace (1979, 1982, 1984, 1989) and working with the population of community colleges, Lehman (1991) identified correlations between quality of effort and estimates of gains. The questionnaire designed for that purpose contained sections on demographic characteristics and college environment but these were not included in the study of relationships, at least in the publications consulted within this research.

In a study concerning students enrolled in distance education courses, Carrier (1991) studied the effects of several personal characteristics on the utilization and appreciation of tutoring services as mediating variables, and on other educational outcomes as well. His findings identified sex, previous experience in distance education, number of years of schooling, locus of control and family support as having significant effects on tutor utilization and appreciation.

**Contributions**

Results established in this study focus on a particular age group (17-18), in a distinctive educational, geographical and cultural context. They concern the relationships occurring between specific student characteristics, attitudes and behaviours prior to college or as they are manifested at entrance, on students' manifestations of involvement in the educational activities that are proposed to them to help reach educational goals. These results add new insights into the nature of student involvement and the key role played by student involvement variables on how educational objectives are reached by college students. They also point to several areas of intervention that are not presently receiving the attention they deserve, as described in Section 8.3.

This research poses and justifies an extended definition for student involvement, which deals with the different aspects of student activity in a more comprehensive manner. Limiting student involvement to observable interactions with learning opportunities ignores less salient but nonetheless essential behaviours that allow students to set their own objectives and standards, evaluate their chances of reaching them, and subsequently realign these objectives, set new objectives and eventually raise or lower standards, and

take further decisions concerning persistence or re-orientation.

This research developed and validated a French-language instrument, the *Questionnaire sur la qualité de l'expérience d'apprentissage (QEA)* for the assessment of student involvement in college studies. This instrument can be used by institutions, to generate information for their own use, concerning the components of the actual learning environment they are offering and the quality of student experiences within that environment. This information can then be transformed into propositions for improving the adaptability of the college environment to the needs of its diversified clientèle. The questionnaire can also be used by teachers and advisors, for assessment and comparison purposes aimed at improving their own performances as professionals, in order to provide students with better guidance towards their study, career, and perhaps life goals. When assessment results generated by the questionnaire are transmitted to students, they may combine with grades and other performance measures to give them a more complete picture of the situation, together with hints for explaining what is currently happening to them. The research also produced a refined French version of Boyd's (1992) Modelling Scheme, which can be used for modelling educational systems.

This research also generated knowledge about relationships occurring between variables not often included in studies on college education. The influence exerted by value attributed to learning, career and study goals and goal commitment, and parent support, on student involvement, the role played by progress and satisfaction as integral components of student involvement, and how these interconnected variables appear to influence the attainment of educational goals constitute the main contributions of this

research.

These results confirm and complement prior results established in studies bearing on student involvement. They provide a simple model for understanding how and why things happen in college, and what can be done to help and guide students toward their educational objectives. In doing so, they add to the technology aimed at enhancing the attainment of educational outcomes and improving achievement in college. It is asserted that both the definition and knowledge resulting from this study, although subject to confirmation by further research, constitute a modest but original contribution toward a "theory" of involvement.

### 8.2 Limitations of the Study

Answers proposed to the questions under study here are not final. This study was conducted in one institution, on a sample including 389 students enrolled in pre-university programmes. The sample was formed using random sampling procedures of whole groups across all pre-university programmes.

Sample demographic characteristics were as follows. The mean age was around 18.7 years. The sample contained 20% more girls than boys. French was the first language for more than 97% of the sample, and over 50% were still living with their parents, at an average travel distance of 23 minutes from the Cégep. More than half of the students worked on a job between 1 and 20 hours a week and a majority had no family responsibilities. Students were predominantly first generation as far as their parents' level of schooling was concerned, and 89% were planning to transfer to university after

graduation. Sample validity in connection with research objectives was established for the population of pre-university programmes in francophone Cégeps. Important similarities between Cégeps in this area support the assertion that results established in this study are generalizable to the population of francophone Cégep students in pre-university programmes of study.

In order to investigate the generalizability of these results, the study could easily be replicated in other Cégeps of smaller size or located in different geographical and cultural environments. The QEA revised according to the recommendations formulated in Chapter 5 should be used for that purpose.

In the case of Cégep technical programmes, the questionnaire would have to be modified to take into account the differences in clientele, objectives and curricula, going back to the inquiry group technique. Presumably, most relationships would hold, due to similarities between both types of programmes (core curriculum, facilities, policies and practices etc.) while others would be altered.

As for other college level institutions elsewhere, it is reasonable to assume that the extended definition given to student involvement in this research, as well as the methodology, could be productively applied. Of course, preliminary research would be needed to analyze their particular educational contexts, adapt the questionnaire and test the resulting model.

This is corroborated by Astin (1993) who concludes that most effects of institutional type

such as public or private, size, etc. are indirect, that is, they are mediated by faculty and peer groups and involvement variables.

Data obtained from multi-institutional and longitudinal studies offer more in terms of generalizability. This study was originally designed to include data collection operations spread over a two-year period. This would have allowed the research to collect three series of academic performance indicators instead of one, two persistence records instead of one, plus data on graduation. Due to uncontrollable factors, the study had to be conducted within a shorter period of time, thus somewhat limiting the scope and depth of the conclusions that could be drawn.

Regarding the questionnaire, although its validity and reliability were established, recommendations were formulated for further revisions. The two scales that could be improved are those purporting to assess the ability to locate and seek help when needed, and also that measuring satisfaction.

One last limitation may be mentioned in relation with the size of correlation coefficients obtained in this study. Caution must be applied in deriving implications, for while the statistical significance of any correlation or regression coefficient establishes the probability that the relationships assessed are due to chance, the real scientific usefulness of these coefficients is inferred from their size. In that perspective, considering that correlation coefficients for relationships identified in this study generally range between .25 and .55, with one high coefficient of .78 between the amount of instruction on study skills and estimates of progress, it must be underlined that the conclusions of this study

are based on statistical significance rather than on the size of correlation coefficients themselves.

### 8.3 Implications of the Study

The last guiding question was formulated thus: What is the relative importance of variables on the attainment of the selected educational outcomes and which are controllable? In spite of these limitations, this research established results that have significant implications for educational technology interventions aiming to improve Cégep education.

One such implication concerns counselling and advising services. The challenge for student mentors in general is to identify variables that may be controlled and students who may be helped. Relationships established in connection with demographic characteristics confirm results arrived at time and again regarding gender and work for pay: women perform better, and students who spend too much time on work for pay experience more difficulties.

Women perform better in college partly because high prior performance gets them to expect higher grades in Cégep. But other variables, value attributed to learning, goal commitment and encouragement from parents combine with gender and prior performance to induce students into higher levels of involvement in several college activities, thus making them more likely to be satisfied, persist and reach academic standards. On the other hand, students whose involvement in work for pay is considerable, necessarily spend less time on their tasks as students, involve more loosely

in college activities, report less progress, and generally experience lower levels of satisfaction and more difficulties in reaching performance standards.

For educational progress, this problem of underachievement should not be analyzed from the point of view of gender, which is not retained in the final model as a variable significant at the .01 level, but from the point of view of controllable variables. Advising should try and help students - men if such is the case - assess their real financial needs, inventory the different sources of financial support and make choices that do not pre-empt success right from the start. Additionally, considering the importance of psychological attributes related to the value of learning, advising should by all means work on developing and stimulating students' motivation for studies. A third implication is derived from the role of goal and goal commitment. It is extremely hard for students to be motivated for studying if they do not know what they are ultimately aiming for. Considering that only 44% of the students declared having made major progress in developing more precise career goals, counselling should make it a priority to bring all unoriented students to make a career choice as soon as possible after entrance in college, and concentrate their efforts around this concrete project, even if this project should subsequently be modified.

What this research essentially shows is that demographic variables only have limited effects on student involvement in college, that other controllable variables also play a role that is far from trivial, and that the road to a college diploma is not unique. Although professional help is available, all educators should be aware that informal conversations can sometimes help a lot, since it is known that students who need most help are often

the last to engage into seeking professional help. These concerns are particularly relevant for teachers:

> *Il faut ... reconnaître que les facteurs qui exercent une influence sur la volonté d'apprendre et de participer à la vie de la classe sont des aspects au sujet desquels l'enseignant doit intervenir directement et explicitement. L'enseignant a même des responsabilités déontologiques à l'égard de la motivation scolaire de l'élève. Il est inutile et même nuisible à ce dernier de tenir un discours sur la nécessité de s'engager, de participer et de persévérer pour réussir sans lui signaler clairement les stratégies et les moyens ... pour y arriver.* (Tardif, 1992, p. 92-93)

In order for counselling and advising services to be improved, immediate attention must be given to the issue of testing. Students are admitted in Cégep programmes on the basis of their grades in secondary school and ministerial exams, and very little is known about their needs, aspirations and interests. There is a scarcity of college level French-language standardized tests (equivalent to the SAT, the ACT, the various forms of the GRE, etc.) that could be used reliably by colleges to test verbal proficiency, scientific, analytic and problem-solving skills. The same can be said about vocational maturity and orientation at entrance in college. To increase their educational efficiency, colleges need to invest more into better testing at entrance, in order to gain better knowledge of who the students they admit are and what their special needs might be. Tests need to be designed and validated for that purpose, and norms established by institutional type.

As more is known about student profiles in one institution, colleges can proceed with the revision of policies with an incidence on student achievement. As an example, in view

of increasing interactions with teachers, colleges could consider hiring more student-oriented teachers rather than teachers exclusively centered on their discipline. Although there is no inherent contradiction between these two qualities, which can most certainly be found in the same person, it must be acknowledged that pre-university programmes are not intended for specializing students in one discipline, but rather for providing them with basic knowledge in several disciplines related to their nominal choice of major. Teachers with broad views on several disciplines, and who are concerned about student difficulties, are more likely to help students establish connections between courses and disciplines, and integrate the learning and skills developed in specific courses into a more coherent body of knowledge. As a general rule, colleges should focus attention on defining policies that build the variety required for all needs to be tended to.

Considering the importance of involvement in instruction on study skills evidenced in this study, it is likely that students, at least those who were not top performers in high school, estimate that what they enter college with, is not enough to get them through college successfully. Consequently, colleges might well offer more in this area. It is suggested that much of this instruction be integrated naturally to regular classes and course-related activities, where all students can "grab" whatever they are lacking. Special needs could be catered to through special services such as those presently offered by learning support centers, peer tutoring and ad hoc workshops. For these services to be implemented and improved, professionally-designed material and instruments are required, and teachers need to be trained to integrate this concern into their courses.

Teacher education should not be limited to the development of the ability to dispense

instruction on study skills. Educational technology has developed powerful tools for knowledge representation, such as concept maps and entailment meshes. It has also proposed original approaches to instructional design. These should be included in professional education programmes for prospective as well as in-service teachers.

An important message delivered to college educators by this research, is to focus attention on developing the self-monitoring function that appears to play an important role in student involvement and the attainment of educational outcomes. In order for students to become more able managers of their own learning, they must make a habit of setting goals and standards and, even more importantly, of continuously assessing their performance and adjusting their course of action. This function is essential to the attainment of educational goals, it can be practiced and learned, but since it is seldom mentioned in connection with teaching, present practice seems to assume that it is either unimportant or that it develops naturally in all students.

In this research students were modeled as autonomous and conscious systems that can both reflect on their past decisions and change their goals. Cybernetic principles argue in favor of building on positive feedback loops to initiate processes in which success breeds success, rather than relying solely on negative feedback based interventions aiming to maintain goal orientation by correcting deviations from a projected course. The mere fact that a student is in a Cégep programme proves that he or she has experienced at least some success in the past, even if grades in Cégep are currently low. Referring to those events in which students were successful might help them identify their strengths and orient them toward new successes. The presence of "winners" in Cégep does not

entail that there have to be so many "losers" as there are at present.

Additionally, instead of just thinking in terms of feedback, educational technology advocates setting up feedforward systems to provide students with information on projected futures and what might be if ... Anticipatory controls can be developed if students are brought to imagine themselves as practicing the career they are preparing for. Future can be described in terms of what could happen if one succeeds and what could happen if one fails. This may suggest adjustments before events actually happen. In order for this to be possible, students must have at their disposition, a sufficient variety of means so they can develop solutions for the various problems they are likely to encounter.

Results established in this study also send a clear message to parents. Even after controlling for parents' level of schooling, parent support stands out as one important variable with respect to student satisfaction. Although young women and men aspire to a life on their own, this research has shown that receiving explicit encouragement from parents, engaging in discussions on topics covered in class, and even being asked about one's standing, may be interpreted as manifestations of interests and not necessarily as intrusions into students' private affairs.

Coming back to the general problem stated at the beginning of this thesis, in terms of persistence and quality, this research has established that persistence is enhanced by value attributed to learning, satisfaction, expected average and performance. This implies that only students who are convinced that what they are striving for is important will

find in themselves the resources needed to persist. Also, it is illusory to think that students who are not satisfied with what they find in Cégep, in terms of equipment, environment, services or interpersonal relationships will remain in college. Alternatives are available to them and the benefits that are said to accrue from a college education, or the disadvantages of not having one, may not be concrete enough to persuade them to stay.

### 8.4 Further Research

More work could be invested in using the quantitative results established for relationships between variables in this study, possibly to build a model for predicting student involvement and the attainment of educational objectives. Also, much more could be drawn from the data collected in this research. Analyses by gender, programmes of enrollment could be conducted. Investigation into specific activities which were found significantly related to educational outcomes by other research, but in which students in the sample appeared to involve very moderately, namely interactions with teachers, could also be inquired into. It is suggested however, that other research methods be applied to check whether the same conclusions hold when case studies and other qualitative approaches are used.

Analyses could be repeated using three subscores for participation in college activities instead of one: Class, Study, Writing, and Media Center could be grouped into Academic Activities; Interactions with teachers, peers, and other professionals could be clustered into Interpersonal Activities, while Arts and Culture, Clubs and Sports could be grouped under Other Activities. Analysis *à la* Astin using separate measures or clusters of

measures of self-reported growth instead of the sum of estimates could also be conducted.

Regarding the nature of student involvement, existing results could be usefully complemented by looking for patterns of involvement consistent with existing models for explaining individual differences between students. Also, mathematical expressions could be explored in view of obtaining a total score for student involvement that would take into account all three aspects of the construct identified in this research.

The absence of correlation between academic performance measured by grades, and self-reported progress on learning and development outcomes suggest that further research be conducted toward designing grading systems and procedures that reliably assess broader types of educational outcomes.

This study just barely touched the surface of the role played by assessment behaviours in student involvement. One could look for better ways to measure involvement into this activity. In particular, one could study the relationships between this control function and the psychological construct "locus of control". An attempt could be made to validate a hypothesis studying differences in student involvement and achievement associated with different levels of student-originated control. A non-recursive causal model, which would allow for the inclusion of loops from assessment activities back to the reformulation of objectives and re-evaluation of participation into learning and development opportunities, could also be hypothesized and tested using appropriate structural modelling techniques.

# CHAPTER 9

# CONCLUSION

In this research, student involvement was redefined as a complex process by means of which students allocate resources into planning, participating in, and controlling their college experiences. It was assessed by asking students to quantify and qualify their interactions with the college environment.

Results confirm that this new tri-partite definition for student involvement is operational and that it provides a plausible explanation for how differently involved students reach different levels of attainment. Students' psycho-structural characteristics are found more significantly related with student involvement than either demographic or parent characteristics. Time on task, grade expectancies and instruction on study skills are found to influence the level of participation in college activities. It is confirmed that high involvement increases the levels of progress and satisfaction reported by students. It has also been established that academic performance and persistence in college can be predicted from some preliminary and self-assessment variables.

The model hypothesized at the beginning of the research was supported in good part by data. The validated model draws a map of student experiences in college which

illustrates different paths students follow on the road to educational attainment. Performance in Cégep is mostly dependent on the number of hours spent on academic activities, the level of expectancies concerning grades in Cégep, and prior performance in secondary school. High performers in secondary school come to Cégep with high expectations; this is especially so for women, for students with clear career and study plans, or students coming for parents with a higher level of schooling. If they manage to put on their studies the amount of time needed for them to succeed, academic performance will accrue, although they may not estimate that they have made all that much progress. Low performers have lower expectations, but they tend to seek more instruction on study skills, and to feel more satisfied with the progress they have made; if they are also generally satisfied with the college environment, they may persist and eventually reach passing grades. The path from entrance to graduation is more intricate for low performers in secondary school than for high performers, and achievement is enhanced for both categories by attributing a high value to learning and diplomas.

The model also suggests ways to support students in their study and career projects. This study is an example of educational technology being concerned with the rational structuring of educational environments. Its results are directly applicable for the engineering of more effective and efficient Cégeps.

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## APPENDIX A

### Protocole d'entrevue adapté de Boyd (1992)

**1. IDENTIFICATION DES BUTS DU SYSTÈME À MODÉLISER (SM)**

a) Nommez le SM, les sous- et super-systèmes s'il y a lieu.
b) Où vous situez-vous par rapport à ce système? D'autres personnes sont-elles également impliquées?
c) Énoncez les principales aspirations du SM, telles que vous les percevez.
d) Quelles difficultés prévoyez-vous rencontrer en modelant le SM?
e) Quels buts ont été identifiés, négociés (imposés?) au SM?
f) Qui supporte les coûts présents et futurs de ce système?
g) Qui profite ou profitera le plus de ce système?

**2. REPRÉSENTATION ET ANALYSE DU CONTEXTE DU SM**

a) Faites un diagramme représentant le SM, le super-système dont il fait partie et les autres sous-systèmes pertinents à la situation. Quelle est la zone d'influence du SM?
b) Identifiez les frontières du SM. Est-il de votre pouvoir de déplacer/ changer/modifier ces frontières?
c) Identifiez les ressources entrant dans le SM.
d) Indiquez les extrants (souhaités, visés, intentionnels) du SM.
e) Indiquez les principales formes d'extrants non désirés.
f) Existe-t-il des boucles reliant les extrants aux intrants?
g) Quelles formes de contrôle l'environment exerce-t-il sur le SM?

**3. STRUCTURE INTERNE DU SM**

a) Quelles sont les principales variables du SM?
b) Décrivez les processus de transformation qui caractérisent le SM
c) Décrivez les processus de contrôle en opération dans le SM. Quelle est leur variété?
d) Existe-t-il des boucles de rétroaction positives? négatives?
e) Identifiez-vous des sources de perturbation affectant le SM?

**4. FONCTIONNEMENT DU SM**

a) Décrivez le ou les processus à la disposition du SM.
b) Quelles sont les règles/conditions/actions?
c) Représentez le flot des opérations qui se réalisent dans le SM.
d) Décrivez le comportement du SM au cours d'un cycle complet. Si possible, représentez le comportement de variables importantes sous forme de série chronologique.

**5. PROGNOSTIC**

a) La performance du SM paraît-elle satisfaisante? à qui?
b) Le SM dispose-t-il de la variété requise pour contrôler les perturbations?
c) Pouvez-vous identifier des endroits/moments où des interventions d'importance réduite produisent des effets importants?

**6. PRESCRIPTION**

Quelles sont vos suggestions pour améliorer le SM? Qui pourrait s'en charger? Quand?

## APPENDIX B

## LA QUALITÉ DE L'EXPÉRIENCE D'APPRENTISSAGE DE L'ÉTUDIANTE ET DE L'ÉTUDIANT

### Information aux participants

**Objectifs**

L'objectif principal de la présente cueillette de données est de faire la **validation d'un questionnaire** portant sur la qualité de l'expérience d'apprentissage des étudiantes et des étudiants.

Ce questionnaire permettra de tracer un tableau des activités d'apprentissage offertes au collège, ainsi que du niveau d'engagement des étudiantes et des étudiants dans ces activités. Une fois validé, ce questionnaire servira aussi à étudier les liens entre la qualité de l'expérience d'apprentissage et diverses variables liées aux caractéristiques individuelles ainsi qu'au cheminement scolaire.

**Participation des étudiantes et étudiants**

En acceptant de remplir ce questionnaire, l'étudiante ou l'étudiant pose un geste concret visant à doter le collège d'un instrument qui permettrait d'évaluer la qualité de l'environnement d'apprentissage et la qualité de l'expérience étudiante dans cet environnement, dans le but d'améliorer la qualité de la formation dispensée.

Il est donc très important que vous répondiez le plus consciencieusement possible à toutes les questions. Le temps requis pour remplir ce questionnaire est d'environ 30 minutes. Il va de soi que chacun est libre de participer ou non.

**Aspects déontologiques**

Le numéro matricule n'est demandé que pour pouvoir ajouter par la suite aux réponses fournies par l'étudiante ou l'étudiant sur le questionnaire, des données concernant son cheminement scolaire: durée des études, date de diplômation et résultats scolaires. Par la suite, le numéro matricule ne sera pas conservé et sera remplacé par un numéro séquentiel ne permettant pas l'identification de l'individu. **Aucune analyse individuelle ne sera faite**, seuls des résultats de groupe seront calculés et analysés.

Les données recueillies par le moyen du questionnaire et dans les dossiers scolaires serviront exclusivement à des **fins de recherche** et non à des fins administratives. La **confidentialité** est assurée par le fait que seule la chercheure aura accès à ces données.

**Consignes**

1. remplir le questionnaire en utilisant un crayon à **mine de plomb** pour marquer vos réponses, car la feuille-réponse sera lue par un lecteur optique. Pour **changer** une de vos réponses, veuillez s.v.p. **effacer** complètement la marque indiquant votre première réponse.

2. signer le formulaire attestant que vous avez pris connaissance des conditions de la recherche.

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**QUESTIONNAIRE**
**SUR LA QUALITÉ DE L'EXPÉRIENCE D'APPRENTISSAGE**

**VERSION EXPÉRIMENTALE**

## SECTION 1 INFORMATIONS GÉNÉRALES

***Consigne: 1. Avant de commencer à répondre au questionnaire, remplissez d'abord sur la feuille-réponse informatisée les sections concernant votre NUMÉRO MATRICULE, votre PROGRAMME D'ÉTUDES et votre GROUPE DE BASE.***

***2. Ensuite, indiquez votre réponse à chaque question en noircissant la case appropriée sur la feuille-réponse.***

**1. Age**

A. 17 ans et moins
B. 18 - 19 ans
C. 20 - 25 ans
D. 26 - 39 ans
E. 40 ans et plus

**2. Sexe**

A. F
B. M

**3. Langue maternelle**

A. Français
B. Anglais
C. Autre

**4. Où habitez-vous présentement pendant la semaine?**

A. Chez vos parents
B. A la résidence du cégep
C. En chambre, à l'extérieur du cégep
D. En appartement, seul(e) ou avec d'autres étudiants
E. Autre endroit

**5. Combien de temps devez-vous mettre pour vous déplacer de votre lieu de résidence pendant la semaine, au cégep?**

A. Moins de 10 minutes
B. Entre 10 minutes et 1/2 heure
C. Entre 1/2 heure et 1 heure
D. Plus de 1 heure

## SECTION 2: CHEMINEMENT SCOLAIRE ET ORIENTATION

*Consigne: Indiquez votre réponse en noircissant la case appropriée sur la feuille-réponse.*

**6. Sans compter les heures de classe, combien d'heures par semaine consacrez-vous habituellement à vos études (étudier, faire des travaux, vous préparer aux examens, etc.)?**

A. aucune
B. 1 - 7 heures/sem.
C. 8 - 14 heures/sem.
D. 15 - 21 heures/sem.
E. plus de 21 heures/sem.

**7. Sans compter les heures de classe, combien d'heures par semaine passez-vous habituellement AU collège (étude, bibliothèque, laboratoires de micro-ordinateurs, gymnase, loisirs, résidence, etc.)?**

A. aucune
B. 1 - 7 heures/sem.
C. 8 - 14 heures/sem.
D. 15 - 21 heures/sem.
E. plus de 21 heures/sem.

**8. Au cours de la présente session, environ combien d'heures par semaine avez-vous consacré à un emploi rémunéré?**

A. 0 (pas d'emploi rémunéré)
B. 1 - 10 heures/sem.
C. 11 - 20 heures/sem.
D. 21 - 39 heures/sem.
E. 40 heures/sem. et plus

**9. Si vous avez un emploi, comment estimez-vous que celui-ci affecte votre travail scolaire?**

A. Pas d'emploi rémunéré
B. N'affecte pas mon travail scolaire.
C. Occupe un peu du temps requis par mon travail scolaire.
D. Occupe une grande partie du temps requis par mon travail scolaire.

**10. Si vous avez des enfants, comment estimez-vous que le temps consacré à vos responsabilités familiales affecte votre travail scolaire?**

A. Pas de responsabilités familiales
B. N'affectent pas mon travail scolaire
C. Occupent un peu du temps requis par mon travail scolaire
D. Occupent une grande partie du temps requis par mon travail scolaire

*Consigne: Indiquez votre réponse en noircissant la case appropriée sur la feuille-réponse.*

**11. A quelle proportion de vos heures de cours (théorie, exercices, laboratoires, etc.) avez-vous assisté?**

A. en moyenne, moins de 40%
B. en moyenne, environ 40%
C. en moyenne, environ 60%
D. en moyenne, environ 80%
E. à toutes les heures de cours, sauf de très rares exceptions

**12. Depuis combien de sessions êtes-vous inscrit(e) au collège dans le programme que vous suivez actuellement?**

A. c'est ma 1ère session
B. c'est ma 2e session
C. c'est ma 3e session
D. c'est ma 4e session
E. cela fait plus de 4 sessions

**13. Dans combien de sessions prévoyez-vous obtenir votre DEC?**

A. à la fin de la présente session
B. encore 1 autre session
C. encore 2 autres sessions
D. encore 3 autres sessions
E. plus de 3 sessions

**14. Quelle moyenne cumulative vous attendez-vous à conserver pour l'ensemble de votre DEC?**

A. moins de 60%
B. 60 - 69
C. 70 - 79
D. 80 - 89
E. 90% et plus

**15. Quelle est la principale raison pour laquelle vous avez décidé de faire des études collégiales?**

A. Parce que vous avez besoin de ce DEC pour entrer à l'université dans la faculté ou le programme que vous avez choisi
B. Parce que vous ne savez pas encore ce que vous voulez faire plus tard et vous voulez vous ouvrir des portes pour aller à l'université
C. Parce qu'il est difficile de trouver du travail actuellement
D. Parce que vous vouliez vous recycler, vous perfectionner, avancer dans votre carrière actuelle
E. Autre raison

**16. Qu'avez-vous présentement l'intention de faire quand vous aurez votre DEC?**

A. Vous inscrire à l'université
B. Continuer des études collégiales
C. Entrer sur le marché du travail
D. Autre

***Consigne: Indiquez dans quelle mesure les énoncés proposés s'appliquent à votre situation, en noircissant la case appropriée sur la feuille-réponse.***

***A. ne s'applique pas du tout***
***B. s'applique relativement peu***
***C. s'applique assez bien***
***D. s'applique très bien***

17. Les méthodes de travail que j'ai développées au secondaire me sont utiles au collégial.

18. L'ensemble des matières que j'ai étudiées au secondaire sont pertinentes pour mes cours au collégial.

19. L'orientation professionnelle et l'information sur les carrières que j'ai reçues au secondaire m'ont aidé(e) à faire mon choix de carrière.

20. Mes objectifs de carrière sont très précis.

21. Il m'arrive de m'imaginer en train d'exercer la carrière que j'ai choisie.

22. Je sais comment arriver à faire ce que je veux faire dans la vie.

23. Je suis sûr(e) d'avoir fait un bon choix en décidant d'aller au cégep.

24. Je terminerai mes études collégiales quelles que soient les difficultés rencontrées.

25. Il est très important pour moi d'obtenir un DEC dans le programme actuel.

26. Je suis certain(e) de faire une demande d'admission à l'université à la fin de mes études collégiales.

27. J'ai une idée très précise de ce que je veux faire à l'université.

28. L'obtention d'un diplôme universitaire est un objectif prioritaire pour moi.

## SECTION 3: INTERACTIONS PARENTALES

*Consigne: Indiquez votre réponse en noircissant la case appropriée sur la feuille-réponse.*

**29. Votre mère détient-elle un diplôme de niveau collégial?**

A. oui
B. non

**30. Votre mère détient-elle un diplôme de niveau universitaire?**

A. oui
B. non

**31. Votre père détient-il un diplôme de niveau collégial?**

A. oui
B. non

**32. Votre père détient-il un diplôme de niveau universitaire?**

A. oui
B. non

*Consigne: Indiquez dans quelle mesure les énoncés proposés s'appliquent à votre situation, en encerclant la lettre appropriée sur la feuille-réponse.*

*A. ne s'applique pas du tout*
*B. s'applique relativement peu*
*C. s'applique assez bien*
*D. s'applique très bien*

33. Mes parents (mon père ou ma mère ou les deux) s'informent de mon cheminement scolaire, de mes résultats, de mes difficultés.

34. Mes parents approuvent mon choix d'études collégiales.

35. Il m'arrive de discuter avec mes parents de ce que j'ai appris dans les cours.

36. Mes parents m'encouragent à entreprendre des études universitaires.

## SECTION 4 L'EXPÉRIENCE D'APPRENTISSAGE AU CÉGEP

***Question: Environ combien souvent, au cours de la présente session, vous êtes-vous engagé(e) dans chacune des activités suivantes?***

***Consigne: Indiquez votre réponse en noircissant la case appropriée sur la feuille-réponse.***

***A. Jamais ou très rarement***
***B. Occasionnellement***
***C. Souvent***
***D. Très souvent***

### 4.1 LES COURS ET LE TRAVAIL EN CLASSE

37. Prendre des notes pendant un cours.

38. Participer à une discussion de groupe en classe.

39. Travailler en équipe, pendant le cours, en classe.

40. Faire un exposé oral devant toute la classe.

41. Concentrer votre attention sur le cours pendant toute la durée du cours.

42. Poser des questions en classe, au sujet de la matière abordée en classe ou dans vos lectures.

43. Utiliser l'ordinateur pendant les heures de cours ou de laboratoire.

44. Établir des liens entre les cours dans différentes disciplines.

45. Appliquer l'information apprise dans un cours, par exemple pour résoudre un problème pratique ou pour comprendre ce qui se passe autour de vous.

### 4.2 L'ÉTUDE ET LE TRAVAIL HORS CLASSE

46. Mémoriser des formules, des définitions, des termes, des points importants.

47. Faire un résumé des points importants de vos notes de cours ou de vos lectures.

48. Faire les lectures et les exercices demandés par le professeur.

49. Faire des lectures ou des exercices supplémentaires facultatifs.

50. Noter les questions, les difficultés, les contradictions rencontrées pendant le travail individuel, dans le but de demander des explications supplémentaires.

51. Utiliser les manuels et notes de cours pour préparer le prochain cours.

52. Fréquenter le centre d'aide à l'apprentissage pour y recevoir de l'aide en français.

53. Fréquenter le centre d'aide à l'apprentissage pour y recevoir de l'aide en mathématiques ou en sciences.

54. Participer à un atelier sur les méthodes de travail intellectuel, au centre d'aide ou en classe.

## 4.3 LES ACTIVITÉS D'ÉCRITURE

55. Produire un texte d'environ une page.

56. Produire un travail long et étoffé.

57. Rédiger un plan des idées principales et de leur enchaînement, avant de commencer à rédiger un texte.

58. Écrire et réviser le brouillon d'un texte ou d'un travail et le corriger avant de le rendre.

59. Utiliser un dictionnaire pour vérifier le sens, la définition ou l'orthographe d'un mot.

60. Utiliser d'autres ouvrages de référence pour vérifier différentes règles.

61. Produire un texte au moyen d'un traitement de texte.

62. Relire une phrase ou un passage à haute voix, afin de repérer les corrections nécessaires (phrases incomplètes ou mal structurées, mauvaise concordance des temps, etc.)

63. Faire relire un de ses textes par une autre personne.

64. Demander conseil à quelqu'un pour améliorer vos habiletés d'écriture.

65. Écrire en-dehors du contexte des cours (lettre, journal personnel, poème, etc.)

## 4.4 INTERACTIONS AVEC LES PROFESSEURS

66. Demander des éclaircissements au sujet des divers travaux et examens.

67. Discuter brièvement après le cours, au sujet du contenu du cours.

68. Prendre rendez-vous pour une rencontre au bureau d'un professeur.

69. Discuter de vos idées en vue d'un travail de session ou d'un autre projet d'étude.

70. Discuter de votre avenir (carrière, plans, objectifs, ambitions et intérêts).

71. Demander des explications supplémentaires au sujet de vos notes, de l'évaluation, des commentaires écrits sur vos travaux.

72. Analyser avec un de vos professeurs les causes de vos difficultés.

73. Jaser au sujet de l'actualité, des activités en cours au cégep ou de sujets non reliés au cours.

## 4.5 INTERACTIONS AVEC D'AUTRES ÉTUDIANTS

74. Demander des explications, de l'aide à d'autres étudiants.

75. Étudier ou faire des travaux en compagnie d'autres étudiant(e)s.

76. Essayer d'expliquer un exercice ou un problème à un(e) autre étudiant(e).

77. Discuter avec d'autres étudiants, de la matière vue au cours.

78. Montrer à un(e) autre étudiant(e) comment utiliser un appareil de laboratoire, un ordinateur.

79. Avoir des discussions avec des étudiants qui diffèrent de vous par l'âge, la langue maternelle, l'origine ethnique, les opinions politiques les croyances religieuses, etc.

80. Avoir des discussions avec des étudiants, au sujet de questions sociales ou éthiques liées à la science et à la technologie, telles l'énergie, la pollution, la génétique, les déchets toxiques, le recyclage, les formes d'énergie alternative, etc.

81. Réviser vos idées personnelles, vos comportements, suite à des discussions de ce genre.

82. Vous engager dans des activités de loisir, en compagnie d'autres étudiant(e)s du cégep.

83. Vous engager dans un système d'aide par les pairs, pour apporter de l'aide à d'autres étudiants.

## 4.6 ACTIVITÉS CULTURELLES ET ARTISTIQUES

84. Discuter d'un sujet touchant les arts (peinture, sculpture, architecture, musique, théâtre, cinéma, etc.) avec d'autres étudiants du collège.

85. Assister à une conférence au cégep, à laquelle vous n'étiez pas tenu(e) d'assister.

86. Visiter une exposition ou assister à un autre type d'événement artistique sur le campus du cégep.

87. Participer à un atelier du socio-culturel du cégep, pour développer des habiletés reliées à la pratique d'une activité artistique.

88. Suivre un cours du cégep relevant du domaine des arts.

89. Pratiquer une activité artistique: musique, peinture, théâtre, etc.

90. Assister à un événement artistique (autre que le cinéma) ailleurs qu'au cégep.

## 4.7 ACTIVITÉS AU CENTRE DES MÉDIAS

91. Vous rendre à la bibliothèque ou la matériathèque pour lire ou étudier.

92. Lire des journaux ou revues en montre à la bibliothèque.

93. Emprunter des livres de la bibliothèque ou de la matériathèque.

94. Emprunter d'autres types de matériel (audiovisuel, etc) à la bibliothèque.

95. Localiser la documentation disponible sur un sujet à la bibliothèque en faisant une recherche dans les fichiers ou le système Multilis.

96. Élaborer une bibliographie ou une section des références pour un travail de session, un rapport.
97. Vous adresser au personnel de la bibliothèque pour obtenir de l'aide.

98. Fouiner sur les étagères de la bibliothèque.

## 4.8 CLUBS, ORGANISATIONS ET ACTIVITÉS SPORTIVES

99. Chercher de l'information sur les événements en cours au cégep et sur les activités des organisations étudiantes, dans le Cégep-Inter, sur les babillards ou ailleurs.

100. Utiliser le guide étudiant pour vous orienter sur le campus, ou pour y trouver une information administrative ou pédagogique.

101. Assister à une réunion d'un club ou d'une organisation étudiante.

102. Vous engager dans une activité ou une organisation étudiante reliée à votre domaine d'études.

103. Suivre un programme d'entraînement avec moniteur.

104. Vous inscrire à un cours pour améliorer votre performance dans un sport donné.

105. Assister à une manifestation sportive au cégep.

## 4.9 DEMANDE D'AIDE PROFESSIONNELLE

106. Rencontrer un api au sujet des cours à suivre, des programmes, des préalables, etc.

107. Discuter de vos intérêts professionnels, aptitudes, ambitions, avec un api.

108. Rencontrer un conseiller du Service de psycho-orientation, pour obtenir des informations sur les carrières, déterminer ou confirmer votre choix d'orientation, etc.

109. Assister à une rencontre d'information sur les études et les carrières, dispensée par des étudiants ou des responsables universitaires, des entreprises, etc.

110. Demander ou lire des informations au sujet de l'admission dans un programme ou une université qui vous intéresse.

111. Lire des livres, monographies, articles de revues ou de journaux, portant sur la carrière ou la vie de personnages québécois qui ont eu une carrière réussie.

## 4.10 MÉTHODES DE TRAVAIL, D'ÉTUDES ET D'APPRENTISSAGE

112. Apprendre par coeur (des formules, lois, principes, procédures, dates, etc.)

113. Prendre des notes personnelles (en classe, en lisant, etc.)

114. Se concentrer, écouter, apprendre en écoutant un exposé, etc.

115. Communiquer verbalement (exposer ses idées, les défendre, discuter les idées des autres)

116. Lire, apprendre en lisant, lire plus vite, retenir ce qu'on lit.

117. Passer des examens (se préparer, étudier, répondre à un test, contrôler son anxiété, etc.)

118. Gérer son temps (utiliser un agenda, se fixer des échéances, des priorités, etc.)

119. Résoudre des problèmes (comprendre l'énoncé, estimer la réponse, choisir et appliquer différentes techniques et stratégies, formuler la solution, la critiquer, etc.)

120. Faire des recherches en bibliothèque

121. Former une équipe et travailler en équipe

## SECTION 5 APPRENTISSAGES ET PROGRÈS RÉALISÉS

***Question: En réfléchissant à vos expériences au cégep jusqu'à ce jour, quel progrès croyez-vous avoir fait dans chacun des domaines suivants?***

***Consigne: Indiquez une réponse pour chaque domaine, en encerclant la lettre appropriée sur la feuille-réponse.***

***A. Très peu ou pas de progrès***
***B. Un peu de progrès***
***C. Passablement de progrès***
***D. Énormément de progrès***

122. Connaissance de soi

123. Objectifs de carrière plus précis

124. Acquisition de connaissances dans différentes disciplines

125. Appréciation des arts

126. Appréciation de la littérature

127. Communication verbale

128. Communication écrite

129. Utilisation de l'ordinateur et de différents logiciels

130. Connaissance de différentes cultures

131. Établissement de votre propre système de valeurs

132. Utilisation de connaissances mathématiques

133. Capacité d'interpréter l'information présentée sous forme de graphiques

134. Compréhension du rôle de la science et de la technologie

135. Apprendre à apprendre, localiser l'information requise

136. Capacité de comprendre et de parler une autre langue

137. Sensibilisation à l'actualité

138. Interprétation de l'histoire

139. Connaissance du monde

140. Tolérance et ouverture d'esprit à la différence

141. Bien-être et forme physique

## SECTION 6 JUGEMENT D'ENSEMBLE SUR L'ENVIRONNEMENT D'APPRENTISSAGE AU COLLÈGE DE SHERBROOKE

*Consigne: Indiquez votre réponse en encerclant la lettre appropriée sur la feuille-réponse.*

**142. Y a-t-il sur le campus du collège, suffisamment de place pour travailler et étudier avec d'autres étudiants?**

A. Oui, amplement de place
B. Oui, assez de place
C. Non

**143. Les équipements disponibles (livres, appareils audio-visuels, micro-ordinateurs, équipements de laboratoires, etc.) sont-ils assez récents et en bonne condition de fonctionnement?**

A. Tous
B. La plupart
C. Quelques-uns
D. Aucun

**144. Les équipements disponibles (livres, appareils audio-visuels, micro-ordinateurs, équipements de laboratoires, etc.) sont-ils accessibles en nombres suffisants?**

A. Tous
B. La plupart
C. Quelques-uns
D. Aucun

**145. Vous estimez-vous satisfait(e) du soutien financier dont vous avez disposé jusqu'ici (prêts, bourses, soutien familial, emploi, etc.)**

A. Très satisfait(e)
B. Plutôt staisfait(e)
C. Plutôt insatisfait(e)
D. Très insatisfait(e)

**146. Parmi les étudiants que vous connaissez, combien vous paraissent amicaux et aidants envers les autres?**

A. Tous
B. La plupart
C. Quelques-uns
D. A peu près aucun

**147. Depuis votre arrivée au collège, vous êtes-vous fait de bons amis parmi les étudiantes et les étudiants du collège?**

A. Oui
B. Non

**148. Vous identifiez-vous à un sous-groupe d'étudiants au collège?**

A. Oui
B. Non

**149. Si vous vous identifiez à un sous-groupe d'étudiants, à quel type de groupe vous identifiez-vous?**

A. Aucun sous-groupe
B. Etudiant(e)s de votre groupe de base, de votre programme
C. Etudiant(e)s provenant de la même région que vous
D. Etudiant(e)s ayant la même langue ou origine ethnique que vous
E. Autre type de sous-groupe

**150. Portez-vous des vêtements (blouson, T-shirt, etc.) identifiés au collège (couleurs du collège, nom du collège ou du programme, etc.)?**

A. Oui
B. Non

**151. Parmi les professeurs que vous connaissez, combien sont faciles à aborder, aidants et soutenants?**

A. Tous
B. La plupart
C. Quelques-uns
D. A peu près aucun

**152. Parmi vos professeurs, y en a-t-il un ou une qui vous sert de "modèle" ou dont vous vous dites que vous aimeriez un jour être comme lui ou elle?**

A. Oui
B. Non

**153. Parmi le personnel autre qu'enseignant que vous avez rencontré (api, conseillers, secrétaires, administrateurs...), combien qualifieriez-vous d'aidants, compétents et attentifs aux besoins des étudiants?**

A. Tous
B. La plupart
C. Quelques-uns
D. A peu près aucun

**154. Parmi les cours que vous suivez ou avez suivis, combien décririez-vous comme stimulants, intéressants et qui en valent la peine?**

A. Tous
B. La plupart
C. Quelques-uns
D. A peu près aucun

**155. Estimez-vous que les connaissances qu'on vous a enseig[illegible] sont à jour?**

A. Dans tous les cours
B. Dans la plupart des cours
C. Dans quelques cours
D. Dans à peu près aucun cours

**156. Comment vos résultats scolaires se situent-ils par rapport à vos attentes?**

A. Plus élevés que vos attentes
B. A peu près à la hauteur de vos attentes
C. Un peu plus bas que vos attentes
D. Beaucoup plus bas que vos attentes

**157. De façon générale, dans quelle mesure êtes-vous satisfait(e) de votre expérience d'apprentissage au Collège de Sherbrooke?**

A. Très satisfait(e)
B. Plutôt satisfait(e)
C. Plutôt insatisfait(e)
D. Très insatisfait(e)

**158. Croyez-vous avoir pris une bonne décision en choisissant de vous inscrire au Collège de Sherbrooke?**

A. Tout à fait certain(e)
B. Plutôt certain(e)
C. Plutôt incertain(e)
D. Tout à fait incertain(e)

**159. Conseilleriez-vous à un de vos amis, frères ou soeurs de s'inscrire au Collège de Sherbrooke?**

A. Oui
B. Peut-être
C. Non

**160. Avez-vous l'intention de vous réinscrire au Collège de Sherbrooke à la prochaine session?**

A. Oui
B. Peut-être
C. Non

**Merci de votre collaboration**
**et bon succès dans vos études et dans votre carrière!**

# APPENDIX C

## QUESTIONNAIRE
## SUR LA QUALITÉ DE L'EXPÉRIENCE D'APPRENTISSAGE

### Frequencies and Percentages of Responses by Item

### SECTION 1 INFORMATIONS GÉNÉRALES

| Student Characteristics | Response | Frequency | Percent |
|---|---|---|---|
| 1. Age | A. 17 ans et moins | 109 | 28.02 |
| | B. 18 - 19 ans | 240 | 61.70 |
| | C. 20 - 25 ans | 37 | 9.51 |
| | D. 26 - 39 ans | 1 | 0.26 |
| | E. 40 ans et plus | 2 | 0.51 |
| 2. Sexe | A. F | 237 | 60.39 |
| | B. M | 152 | 39.07 |
| 3. Langue maternelle | A. Français | 378 | 97.42 |
| | B. Anglais | 6 | 1.55 |
| | C. Autre | 4 | 1.03 |
| 4. Où habitez-vous présentement pendant la semaine? | A. Chez vos parents | 232 | 59.79 |
| | B. A la résidence du cégep | 16 | 4.12 |
| | C. En chambre, à l'extérieur du cégep | 21 | 5.41 |
| | D. En appartement, seul(e) ou avec d'autres étudiants | 110 | 28.35 |
| | E. Autre endroit | 9 | 2.32 |
| 5. Combien de temps devez-vous mettre pour vous déplacer de votre lieu de résidence pendant la semaine, au cégep? | A. Moins de 10 minutes | 122 | 31.44 |
| | B. Entre 10 minutes et 1/2 heure | 182 | 46.91 |
| | C. Entre 1/2 heure et 1 heure | 67 | 17.27 |
| | D. Plus de 1 heure | 17 | 4.38 |

## SECTION 2: CHEMINEMENT SCOLAIRE ET ORIENTATION

| Student Characteristics | | Response | Frequency | Percent |
|---|---|---|---|---|
| 6. | Sans compter les heures de classe, combien d'heures par semaine consacrez-vous habituellement à vos études (étudier, faire des travaux, vous préparer aux examens, etc.)? | A. aucune | 2 | 0.52 |
| | | B. 1 - 7 heures/sem. | 142 | 36.60 |
| | | C. 8 - 14 heures/sem. | 153 | 39.43 |
| | | D. 15 - 21 heures/sem. | 67 | 17.27 |
| | | E. plus de 21 heures/sem. | 24 | 6.19 |
| 7. | Sans compter les heures de classe, combien d'heures par semaine passez-vous habituellement AU collège (étude, bibliothèque, laboratoires de micro-ordinateurs, gymnase, loisirs, résidence, etc.)? | A. aucune | 42 | 10.80 |
| | | B. 1 - 7 heures/sem. | 235 | 60.41 |
| | | C. 8 - 14 heures/sem. | 69 | 17.74 |
| | | D. 15 - 21 heures/sem. | 19 | 4.88 |
| | | E. plus de 21 heures/sem. | 24 | 6.17 |
| 8. | Au cours de la présente session, environ combien d'heures par semaine avez-vous consacré à un emploi rémunéré? | A. 0 (pas d'emploi rémunéré) | 173 | 44.70 |
| | | B. 1 - 10 heures/sem. | 106 | 27.38 |
| | | C. 11 - 20 heures/sem. | 91 | 23.51 |
| | | D. 21 - 39 heures/sem. | 16 | 4.13 |
| | | E. 40 heures/sem. et plus | 1 | 0.26 |
| 9. | Si vous avez un emploi, comment estimez-vous que celui-ci affecte votre travail scolaire? | A. Pas d'emploi rémunéré | 168 | 43.98 |
| | | B. N'affecte pas mon travail scolaire | 102 | 26.70 |
| | | C. Occupe un peu du temps requis | 94 | 24.61 |
| | | D. Occupe une grande partie du temps requis | 18 | 4.71 |
| 10. | Si vous avez des enfants, comment estimez-vous que le temps consacré à vos responsabilités familiales affecte votre travail scolaire? | A. Pas de responsabilités familiales | 357 | 95.97 |
| | | B. N'affectent pas mon travail scolaire | 6 | 1.61 |
| | | C. Occupent un peu du temps requis | 7 | 1.88 |
| | | D. Occupent une grande partie du temps requis | 2 | 0.54 |

| Student Characteristics | | Response | Frequency | Percent |
|---|---|---|---|---|
| 11. | À quelle proportion de vos heures de cours (théorie, exercices, laboratoires, etc.) avez-vous assisté? | A. en moyenne, moins de 40% | 3 | 0.77 |
| | | B. en moyenne, environ 40% | 3 | 0.77 |
| | | C. en moyenne, environ 60% | 12 | 3.08 |
| | | D. en moyenne, environ 80% | 99 | 25.45 |
| | | E. à toutes les heures de cours, sauf de très rares exceptions | 272 | 69.92 |
| 12. | Depuis combien de sessions êtes-vous inscrit(e) au collège dans le programme que vous suivez actuellement? | A. c'est ma 1ère session | 40 | 10.31 |
| | | B. c'est ma 2e session | 288 | 74.23 |
| | | C. c'est ma 3e session | 12 | 3.09 |
| | | D. c'est ma 4e session | 44 | 11.34 |
| | | E. cela fait plus de 4 sessions | 4 | 1.03 |
| 13. | Dans combien de sessions prévoyez-vous obtenir votre DEC? | A. à la fin de la présente session | 33 | 8.57 |
| | | B. encore 1 autre session | 28 | 7.27 |
| | | C. encore 2 autres sessions | 218 | 56.62 |
| | | D. encore 3 autres sessions | 58 | 15.06 |
| | | E. plus de 3 sessions | 48 | 12.47 |
| 14. | Quelle moyenne cumulative vous attendez-vous à conserver pour l'ensemble de votre DEC? | A. moins de 60% | 3 | 0.78 |
| | | B. 60 - 69 | 47 | 12.24 |
| | | C. 70 - 79 | 210 | 54.69 |
| | | D. 80 - 89 | 114 | 29.69 |
| | | E. 90% et plus | 10 | 2.60 |
| 15. | Quelle est la principale raison pour laquelle vous avez décidé de faire des études collégiales? | A. Parce que vous avez besoin de ce DEC pour entrer à l'université | 229 | 58.87 |
| | | B. Parce que vous ne savez pas encore ce que vous voulez faire plus tard | 116 | 29.82 |
| | | C. Parce qu'il est difficile de trouver du travail | 13 | 3.34 |
| | | D. Parce que vous vouliez vous recycler | 5 | 1.29 |
| | | E. Autre raison | 26 | 6.68 |
| 16. | Qu'avez-vous présentement l'intention de faire quand vous aurez votre DEC? | A. Vous inscrire à l'université | 314 | 80.75 |
| | | B. Continuer des études collégiales | 33 | 8.48 |
| | | C. Entrer sur le marché du travail | 21 | 5.40 |
| | | D. Autre | 21 | 5.40 |

1. ne s'applique pas du tout
2. s'applique relativement peu
3. s'applique assez bien
4. s'applique très bien

| Item | | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 17. | Les méthodes de travail que j'ai développées au secondaire me sont utiles au collégial | 388 | 51 | 153 | 151 | 33 |
| | | | 13.14 | 39.43 | 38.92 | 8.51 |
| 18. | L'ensemble des matières que j'ai étudiées au secondaire sont pertinentes pour mes cours au collégial. | 388 | 24 | 146 | 172 | 46 |
| | | | 6.19 | 37.63 | 44.33 | 11.86 |
| 19. | L'orientation professionnelle et l'information sur les carrières que j'ai reçues au secondaire m'ont aidé(e) à faire mon choix de carrière. | 387 | 167 | 121 | 60 | 39 |
| | | | 43.15 | 31.27 | 15.50 | 10.08 |
| 20. | Mes objectifs de carrière sont très précis. | 388 | 62 | 90 | 130 | 106 |
| | | | 15.98 | 23.20 | 33.51 | 27.32 |
| 21. | Il m'arrive de m'imaginer en train d'exercer la carrière que j'ai choisie. | 387 | 46 | 74 | 112 | 155 |
| | | | 11.89 | 19.12 | 28.94 | 40.05 |
| 22. | Je sais comment arriver à faire ce que je veux faire dans la vie. | 386 | 15 | 55 | 183 | 133 |
| | | | 3.89 | 14.25 | 47.41 | 34.46 |
| 23. | Je suis sûr(e) d'avoir fait un bon choix en décidant d'aller au cégep. | 384 | 11 | 22 | 56 | 295 |
| | | | 2.86 | 5.73 | 14.58 | 76.82 |
| 24. | Je terminerai mes études collégiales quelles que soient les difficultés rencontrées. | 384 | 8 | 13 | 41 | 322 |
| | | | 2.08 | 3.39 | 10.68 | 83.85 |
| 25. | Il est très important pour moi d'obtenir un DEC dans le programme actuel. | 385 | 35 | 28 | 57 | 265 |
| | | | 9.09 | 7.27 | 14.81 | 68.83 |
| 26. | Je suis certain(e) de faire une demande d'admission à l'université à la fin de mes études collégiales. | 385 | 31 | 45 | 73 | 236 |
| | | | 8.05 | 11.69 | 18.96 | 61.30 |
| 27. | J'ai une idée très précise de ce que je veux faire à l'université. | 387 | 73 | 104 | 98 | 112 |
| | | | 18.86 | 26.87 | 25.32 | 28.94 |
| 28. | L'obtention d'un diplôme universitaire est un objectif prioritaire pour moi. | 386 | 52 | 42 | 86 | 206 |
| | | | 13.47 | 10.88 | 22.28 | 53.37 |

## SECTION 3 INTERACTIONS PARENTALES

| Student Characteristics | Response | | Frequency | Percent |
|---|---|---|---|---|
| 29. Votre mère détient-elle un diplôme de niveau collégial? | A. | non | 234 | 60.47 |
| | B. | oui | 153 | 39.53 |
| 30. Votre mère détient-elle un diplôme de niveau universitaire? | A. | non | 310 | 79.90 |
| | B. | oui | 78 | 20.10 |
| 31. Votre père détient-il un diplôme de niveau collégial? | A. | non | 206 | 53.23 |
| | B. | oui | 181 | 46.77 |
| 32. Votre père détient-il un diplôme de niveau universitaire? | A. | non | 254 | 65.97 |
| | B. | oui | 131 | 34.03 |

1. *ne s'applique pas du tout*
2. s'applique relativement peu
3. s'applique assez bien
4. s'applique très bien

| Item | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 33. Mes parents (mon père ou ma mère ou les deux) s'informent de mon cheminement scolaire, de mes résultats, de mes difficultés. | 389 | 19 | 50 | 114 | 206 |
| | | 4.88 | 12.85 | 29.31 | 52.96 |
| 34. Mes parents approuvent mon choix d'études collégiales. | 388 | 12 | 19 | 82 | 275 |
| | | 3.09 | 4.90 | 21.13 | 70.88 |
| 35. Il m'arrive de discuter avec mes parents de ce que j'ai appris dans les cours. | 389 | 52 | 85 | 129 | 123 |
| | | 13.37 | 21.85 | 33.16 | 31.62 |
| 36. Mes parents m'encouragent à entreprendre des études universitaires. | 388 | 30 | 29 | 80 | 249 |
| | | 7.73 | 7.47 | 20.62 | 64.18 |

## SECTION 4 L'EXPÉRIENCE D'APPRENTISSAGE AU CÉGEP

### 4.1 LES COURS ET LE TRAVAIL EN CLASSE

1. Jamais ou très rarement
2. Occasionnellement
3. Souvent
4. Très souvent

| Item | | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 37. | Prendre des notes pendant un cours. | 389 | 3 | 45 | 160 | 181 |
| | | | 0.77 | 11.57 | 41.13 | 46.53 |
| 38. | Participer à une discussion de groupe en classe. | 389 | 49 | 153 | 118 | 69 |
| | | | 12.60 | 39.33 | 30.33 | 17.74 |
| 39. | Travailler en équipe, pendant le cours, en classe. | 389 | 15 | 126 | 155 | 93 |
| | | | 3.86 | 32.39 | 39.85 | 23.91 |
| 40. | Faire un exposé oral devant toute la classe. | 389 | 162 | 172 | 46 | 9 |
| | | | 41.65 | 44.22 | 11.83 | 2.31 |
| 41. | Concentrer mon attention sur le cours pendant toute la durée du cours. | 389 | 14 | 86 | 217 | 72 |
| | | | 3.60 | 22.11 | 55.78 | 18.51 |
| 42. | Poser des questions en classe, au sujet de la matière abordée en classe ou dans vos lectures. | 389 | 62 | 178 | 107 | 42 |
| | | | 15.94 | 45.76 | 27.51 | 10.80 |
| 43. | Utiliser l'ordinateur pendant les heures de cours ou de laboratoire. | 389 | 113 | 163 | 82 | 31 |
| | | | 29.05 | 41.90 | 21.08 | 7.97 |
| 44. | Établir des liens entre les cours dans différentes disciplines. | 386 | 68 | 164 | 118 | 36 |
| | | | 17.62 | 42.49 | 30.57 | 9.33 |
| 45. | Utiliser l'information apprise dans un cours, pour résoudre un problème pratique ou pour comprendre un aspect du monde qui vous entoure. | 388 | 46 | 160 | 126 | 56 |
| | | | 11.86 | 41.24 | 32.47 | 14.43 |

## 4.2 L'ÉTUDE ET LE TRAVAIL HORS CLASSE

A. Jamais ou très rarement
B. Occasionnellement
C. Souvent
D. Très souvent

| Item | | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 46. | Mémoriser des formules, des définitions, des termes, des points importants. | 389 | 14 | 89 | 188 | 98 |
| | | | 3.60 | 22.88 | 48.33 | 25.19 |
| 47. | Faire un résumé des points importants de vos notes de cours ou de vos lectures. | 389 | 55 | 16[illegible] | 107 | 59 |
| | | | 14.14 | 43.19 | 27.51 | 15.17 |
| 48. | Faire les lectures et les exercices demandés par le professeur. | 388 | 5 | 54 | 184 | 145 |
| | | | 1.29 | 13.92 | 47.42 | 37.37 |
| 49. | Faire des lectures ou des exercices supplémentaires facultatifs. | 389 | 133 | 179 | 59 | 18 |
| | | | 34.19 | 46.02 | 15.17 | 4.63 |
| 50. | Noter les questions, les difficultés, les contradictions rencontrées pendant le travail individuel, dans le but de demander des explications supplémentaires. | 389 | 64 | 157 | 109 | 59 |
| | | | 16.45 | 40.36 | 28.02 | 15.17 |
| 51. | Utiliser les manuels et notes de cours pour préparer le prochain cours. | 389 | 118 | 160 | 88 | 23 |
| | | | 30.33 | 41.13 | 22.62 | 5.9[illegible] |
| 52. | Fréquenter le centre d'aide à l'apprentissage pour y recevoir de l'aide en français. | 389 | 343 | 33 | 6 | 7 |
| | | | 88.17 | 8.48 | 1.54 | 1.80 |
| 53. | Fréquenter le centre d'aide à l'apprentissage pour y recevoir de l'aide en mathématiques ou en sciences. | 389 | 368 | 12 | 4 | 5 |
| | | | 94.60 | 3.08 | 1.03 | 1.29 |
| 54. | Participer à un atelier sur les méthodes de travail intellectuel, au centre d'aide ou en classe. | 389 | 362 | 24 | 1 | 2 |
| | | | 93.06 | 6.17 | 0.26 | 0.51 |

## 4.3 LES ACTIVITÉS D'ÉCRITURE

1. Jamais ou très rarement
2. Occasionnellement
3. Souvent
4. Très souvent

| Item | | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 55. | Produire un texte d'environ une page. | 389 | 6 | 67 | 135 | 181 |
| | | | 1.54 | 17.22 | 34.70 | 46.53 |
| 56. | Passer 5 heures ou plus à écrire un texte. | 389 | 66 | 170 | 95 | 58 |
| | | | 16.97 | 43.70 | 24.42 | 14.91 |
| 57. | Rédiger un plan des idées principales et de leur enchaînement, avant de commencer à rédiger un texte. | 389 | 33 | 139 | 145 | 72 |
| | | | 8.48 | 35.73 | 37.28 | 18.51 |
| 58. | Ecrire et réviser le brouillon d'un texte ou d'un travail, pour le corriger avant de le rendre. | 388 | 6 | 44 | 155 | 183 |
| | | | 1.55 | 11.34 | 39.95 | 47.16 |
| 59. | Utiliser un dictionnaire pour vérifier le sens, la définition ou l'orthographe d'un mot. | 389 | 12 | 73 | 152 | 152 |
| | | | 3.08 | 18.77 | 39.07 | 39.07 |
| 60. | Utiliser une grammaire pour vérifier différentes règles. | 389 | 86 | 171 | 79 | 53 |
| | | | 22.11 | 43.96 | 20.31 | 13.62 |
| 61. | Utiliser un traitement de texte pour produire un travail. | 388 | 91 | 88 | 83 | 126 |
| | | | 23.45 | 22.68 | 21.39 | 32.47 |
| 62. | Relire une phrase ou un passage à haute voix, afin de repérer les corrections nécessaires (phrases incomplètes ou mal structurées, mauvaise concordance des temps, etc.) | 389 | 47 | 108 | 136 | 98 |
| | | | 12.08 | 27.76 | 34.96 | 25.19 |
| 63. | Demander à quelqu'un de relire un texte que vous aviez écrit pour voir s'il leur paraissait clair. | 389 | 55 | 123 | 131 | 80 |
| | | | 14.14 | 31.62 | 33.68 | 20.57 |
| 64. | Demander à un professeur son aide et ses conseils pour améliorer vos habiletés d'écriture. | 389 | 187 | 148 | 47 | 7 |
| | | | 48.07 | 38.05 | 12.08 | 1.80 |
| 65. | Ecrire en-dehors du contexte des cours (lettre, journal personnel, poème, etc.) | 388 | 139 | 112 | 73 | 64 |
| | | | 35.82 | 28.87 | 18.81 | 16.49 |

## 4.4 INTERACTIONS AVEC LES PROFESSEURS

1. Jamais ou très rarement
2. Occasionnellement
3. Souvent
4. Très souvent

| Item | | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 66. | Demander à un professeur de l'information au sujet des devoirs, travaux de récupération, examens, etc. | 388 | 17 | 175 | 156 | 40 |
| | | | 4.38 | 45.10 | 40.21 | 10.31 |
| 67. | Poser des questions ou discuter brièvement avec le professeur après le cours, au sujet du contenu du cours. | 388 | 108 | 185 | 69 | 26 |
| | | | 27.84 | 47.68 | 17.78 | 6.70 |
| 68. | Prendre un rendez-vous avec un professeur pour une rencontre à son bureau. | 389 | 171 | 165 | 38 | 15 |
| | | | 43.96 | 42.42 | 9.77 | 3.86 |
| 69. | Discuter de vos idées en vue d'un travail de session ou d'un autre projet avec un professeur. | 389 | 135 | 182 | 62 | 10 |
| | | | 34.70 | 46.79 | 15.94 | 2.57 |
| 70. | Discuter de votre carrière, vos plans, objectifs, ambitions et intérêts avec un professeur. | 389 | 265 | 106 | 14 | 4 |
| | | | 68.12 | 27.25 | 3.60 | 1.03 |
| 71. | Demander des explications à un professeur au sujet de vos notes, de l'évaluation. des commentaires écrits sur vos travaux. | 389 | 83 | 180 | 106 | 20 |
| | | | 21.34 | 46.27 | 27.25 | 5.14 |
| 72. | Demander à un de vos professeurs d'analyser avec vous les causes de vos difficultés, et de vous faire des suggestions pour y remédier. | 389 | 215 | 137 | 32 | 5 |
| | | | 55.27 | 35.22 | 8.23 | 1.29 |
| 73. | Jaser informellement avec un professeur au sujet de l'actualité, des activités en cours au cégep ou de sujets d'intérêt commun non reliés au cours. | 389 | 196 | 140 | 45 | 8 |
| | | | 50.39 | 35.99 | 11.57 | 2.06 |

## 4.5 INTERACTIONS AVEC D'AUTRES ÉTUDIANTS

1. Jamais
2. Occasionnellement
3. Souvent
4. Très souvent

| Item | | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 74. | Demander des explications, de l'aide à d'autres étudiants. | 388 | 14 | 95 | 185 | 94 |
| | | | 3.61 | 24.48 | 47.68 | 24.23 |
| 75. | Étudier ou faire des travaux en compagnie d'autres étudiant(e)s. | 388 | 26 | 118 | 169 | 75 |
| | | | 6.70 | 30.41 | 43.56 | 19.33 |
| 76. | Essayer d'expliquer un exercice ou un problème à un(e) autre étudiant(e). | 389 | 9 | 136 | 181 | 63 |
| | | | 2.31 | 34.96 | 46.53 | 16.20 |
| 77. | Discuter avec d'autres étudiants, de la matière vue au cours. | 389 | 13 | 113 | 194 | 69 |
| | | | 3.34 | 29.05 | 49.87 | 17.74 |
| 78. | Montrer à un(e) autre étudiant(e) comment utiliser un appareil de laboratoire, un ordinateur. | 389 | 126 | 173 | 72 | 18 |
| | | | 32.39 | 44.47 | 18.51 | 4.63 |
| 79. | Avoir des discussions sérieuses avec des étudiants qui diffèrent de vous par l'âge, la langue maternelle, l'origine ethnique, les opinions politiques les croyances religieuses, etc. | 389 | 109 | 166 | 67 | 47 |
| | | | 28.02 | 42.67 | 17.22 | 12.08 |
| 80. | Avoir des discussions sérieuses avec des étudiants, au sujet de questions sociales ou éthiques liées à la science et à la technologie, telles l'énergie, la pollution, la génétique, les déchets toxiques, le recyclage, les formes d'énergie alternative, etc. | 389 | 90 | 179 | 78 | 42 |
| | | | 23.14 | 46.02 | 20.05 | 10.80 |
| 81. | Réviser vos idées personnelles, vos comportements, suite à des discussions de ce genre. | 389 | 77 | 178 | 105 | 29 |
| | | | 19.79 | 45.76 | 26.99 | 7.46 |
| 82. | Vous engager dans des activités de loisir, en compagnie d'autres étudiant(e)s du cégep. | 389 | 99 | 151 | 96 | 43 |
| | | | 25.45 | 38.82 | 24.68 | 11.05 |
| 83. | Vous engager dans un système d'aide par les pairs, pour apporter de l'aide à d'autres étudiants. | 389 | 288 | 75 | 20 | 6 |
| | | | 74.04 | 19.28 | 5.14 | 1.54 |

## 4.6 ACTIVITÉS CULTURELLES ET ARTISTIQUES

1. Jamais ou très rarement
2. Occasionnellement
3. Souvent
4. Très souvent

| Item | | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 84. | Discuter d'un sujet touchant les arts (peinture, sculpture, architecture, musique, théâtre, cinéma, etc.) avec d'autres étudiants du collège. | 389 | 87 | 151 | 97 | 54 |
| | | | 22.37 | 38.82 | 24.94 | 13.88 |
| 85. | Assister à une conférence au cégep, à laquelle vous n'étiez pas tenu(e) d'assister. | 389 | 273 | 102 | 13 | 1 |
| | | | 70.18 | 26.22 | 3.34 | 0.26 |
| 86. | Visiter une exposition ou assister à un autre type d'événement artistique sur le campus du cégep. | 389 | 219 | 142 | 25 | 3 |
| | | | 56.30 | 36.50 | 6.43 | 0.77 |
| 87. | Participer à un atelier du socio-culturel du cégep, pour développer des habiletés reliées à la pratique d'une activité artistique. | 389 | 322 | 48 | 15 | 4 |
| | | | 82.78 | 12.34 | 3.86 | 1.03 |
| 88. | Suivre un cours du cégep relevant du domaine des arts. | 389 | 318 | 31 | 12 | 28 |
| | | | 81.75 | 7.97 | 3.08 | 7.20 |
| 89. | Pratiquer une activité artistique: musique, peinture, théâtre, etc. | 389 | 201 | 83 | 47 | 58 |
| | | | 51.67 | 21.34 | 12.08 | 14.91 |
| 90. | Assister à un événement artistique (autre que le cinéma) ailleurs qu'au cégep. | 388 | 115 | 161 | 66 | 46 |
| | | | 29.64 | 41.49 | 17.01 | 11.86 |

## 4.7 ACTIVITÉS AU CENTRE DES MÉDIAS

1. Jamais ou très rarement
2. Occasionnellement
3. Souvent
4. Très souvent

| Item | | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 91. | Utiliser la bibliothèque ou la matériathèque comme un endroit tranquille pour lire ou étudier. | 389 | 53 | 130 | 109 | 97 |
| | | | 13.62 | 33.42 | 28.02 | 24.94 |
| 92. | Lire des journaux, revues ou périodiques disponibles à la bibliothèque. | 389 | 161 | 136 | 59 | 33 |
| | | | 41.39 | 34.96 | 15.17 | 8.48 |
| 93. | Emprunter des livres pour lire à l'extérieur de la bibliothèque. | 389 | 149 | 144 | 59 | 37 |
| | | | 38.30 | 37.02 | 15.17 | 9.51 |
| 94. | Emprunter d'autres types de matériel (audiovisuel, etc) à la bibliothèque. | 389 | 259 | 105 | 19 | 6 |
| | | | 66.58 | 26.99 | 4.88 | 1.54 |
| 95. | Faire une recherche dans les fichiers ou le système informatique pour trouver la documentation disponible sur un sujet à la bibliothèque. | 388 | 87 | 146 | 108 | 47 |
| | | | 22.42 | 37.63 | 27.84 | 12.11 |
| 96. | Préparer une bibliographie ou des références pour un travail de session, un rapport, etc. | 388 | 77 | 123 | 124 | 64 |
| | | | 19.85 | 31.70 | 31.96 | 16.49 |
| 97. | Demander l'aide du personnel de la bibliothèque pour trouver de la documentation sur un sujet. | 389 | 161 | 154 | 61 | 13 |
| | | | 41.39 | 39.59 | 15.68 | 3.34 |
| 98. | Trouver des livres intéressants en fouinant sur les étagères de la bibliothèque. | 389 | 161 | 135 | 59 | 34 |
| | | | 41.39 | 34.70 | 15.17 | 8.74 |

## 4.8 CLUBS, ORGANISATIONS ET ACTIVITÉS SPORTIVES

1. Jamais ou très rarement
2. Occasionnellement
3. Souvent
4. Très souvent

| Item | | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 99. | Chercher de l'information sur les événements en cours au cégep et sur les activités des organisations étudiantes, dans le Cégep-Inter, sur les babillards ou ailleurs. | 388 | 95 | 145 | 109 | 39 |
| | | | 24.48 | 37.37 | 28.09 | 10.05 |
| 100. | Utiliser le guide étudiant pour vous orienter sur le campus, ou pour y trouver une information administrative ou pédagogique. | 389 | 224 | 126 | 31 | 8 |
| | | | 57.58 | 32.39 | 7.97 | 2.06 |
| 101. | Assister à une réunion d'un club ou d'une organisation étudiante. | 388 | 285 | 80 | 14 | 9 |
| | | | 73.45 | 20.62 | 3.61 | 2.32 |
| 102. | Vous engager dans une activité ou une organisation étudiante reliée à votre domaine d'études. | 388 | 318 | 48 | 14 | 8 |
| | | | 81.96 | 12.37 | 3.61 | 2.06 |
| 103. | Suivre un programme d'entraînement ou de pratique d'un sport sur le campus. | 388 | 196 | 96 | 56 | 40 |
| | | | 50.52 | 24.74 | 14.43 | 10.31 |
| 104. | Suivre un cours ou demander l'aide d'un moniteur pour améliorer votre performance dans une activité athlétique ou un sport. | 388 | 250 | 77 | 34 | 27 |
| | | | 64.43 | 19.85 | 8.76 | 6.96 |
| 105. | Assister à un événement sportif sur le campus du cégep. | 388 | 260 | 88 | 23 | 13 |
| | | | 67.01 | 22.68 | 6.96 | 3.35 |

## 4.9 DEMANDE D'AIDE PROFESSIONNELLE

A. Oui
B. Non

| Item | n | Response 1 | Response 2 |
|---|---|---|---|
| 106. Rencontrer un api au sujet des cours à suivre, des programmes, des préalables, etc. | 371 | 164 | 207 |
| | | 44.20 | 55.80 |
| 107. Discuter de vos intérêts professionnels, aptitudes, ambitions, avec un api. | 376 | 212 | 164 |
| | | 56.38 | 43.62 |
| 108. Rencontrer un conseiller en orientation ou en choix de carrière, pour obtenir des informations sur les carrières, déterminer ou confirmer votre choix d'orientation, etc. | 375 | 211 | 164 |
| | | 56.27 | 43.73 |
| 109. Assister à une rencontre d'information sur les études et les carrières, dispensée par des étudiants ou des responsables universitaires, des entreprises, etc. | 380 | 250 | 130 |
| | | 65.79 | 34.21 |
| 110. Demander ou lire des informations au sujet de l'admission dans un programme ou une université qui vous intéresse. | 349 | 148 | 201 |
| | | 42.41 | 57.59 |
| 111. Lire des livres, monographies, articles de revues ou de journaux, portant sur la carrière ou la vie de personnages québécois qui ont eu une carrière réussie. | 367 | 174 | 193 |
| | | 47.41 | 52.59 |

## 4.10 MÉTHODES DE TRAVAIL, D'ÉTUDES ET D'APPRENTISSAGE

1. aucune formation
2. un peu
3. passablement
4. beaucoup

| Item | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 112. Comment mémoriser (des formules, lois, principes, procédures, dates, etc.) | 388 | 140 | 140 | 84 | 24 |
| | | 36.08 | 36.08 | 21.65 | 6.19 |
| 113. Comment prendre des notes (en classe, en lisant, etc.) | 388 | 75 | 162 | 99 | 52 |
| | | 19.33 | 41.75 | 25.52 | 13.40 |
| 114. Comment se concentrer, écouter, apprendre en écoutant un exposé, etc. | 388 | 143 | 127 | 84 | 34 |
| | | 36.86 | 32.73 | 21.65 | 8.76 |
| 115. Comment communiquer verbalement (exposer ses idées, les défendre, discuter les idées des autres) | 388 | 90 | 130 | 130 | 38 |
| | | 23.20 | 33.51 | 33.51 | 9.79 |
| 116. Comment lire, apprendre en lisant, lire plus vite, retenir ce qu'on lit. | 388 | 145 | 122 | 82 | 39 |
| | | 37.37 | 31.44 | 21.13 | 10.05 |
| 117. Comment passer des examens (comment se préparer, étudier, répondre à un test, contrôler son anxiété, etc.) | 388 | 100 | 133 | 107 | 48 |
| | | 25.77 | 34.28 | 27.58 | 12.37 |
| 118. Comment gérer son temps (utiliser un agenda, se fixer des échéances, des priorités, etc.) | 387 | 117 | 128 | 91 | 51 |
| | | 30.23 | 33.07 | 23.51 | 13.18 |
| 119. Comment résoudre des problèmes (comprendre l'énoncé, estimer la réponse, choisir et appliquer différentes techniques et stratégies, formuler la solution, la critiquer, etc.) | 388 | 59 | 132 | 152 | 45 |
| | | 15.21 | 34.02 | 39.18 | 11.60 |
| 120. Comment faire des recherches en bibliothèque | 388 | 94 | 120 | 121 | 53 |
| | | 24.23 | 30.93 | 31.19 | 13.66 |
| 121. Comment travailler en équipe | 388 | 115 | 110 | 123 | 40 |
| | | 29.64 | 28.35 | 31.70 | 10.31 |

## SECTION 5 APPRENTISSAGES ET PROGRÈS RÉALISÉS

1. Très peu ou pas de progrès
2. Un peu de progrès
3. Passablement de progrès
4. Énormément de progrès

| Item | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 122. Connaissance de vos propres capacités et intérêts | 386 | 29 | 118 | 177 | 62 |
| | | 7.51 | 30.57 | 45.85 | 16.06 |
| 123. Objectifs de carrière plus clairs | 388 | 100 | 117 | 110 | 61 |
| | | 25.77 | 30.15 | 28.35 | 15.72 |
| 124. Familiarisation avec différents champs du savoir | 387 | 24 | 128 | 176 | 59 |
| | | 6.20 | 33.07 | 45.48 | 15.25 |
| 125. Compréhension et appréciation des arts (musique, théâtre, etc.) | 387 | 178 | 102 | 56 | 51 |
| | | 45.99 | 26.36 | 14.47 | 13.18 |
| 126. Compréhension et goût de la littérature (essais, romans, poésie, etc.) | 388 | 149 | 112 | 87 | 40 |
| | | 38.40 | 28.87 | 22.42 | 10.31 |
| 127. Communication verbale | 388 | 82 | 143 | 120 | 43 |
| | | 21.13 | 36.86 | 30.93 | 11.08 |
| 128. Communication par écrit | 388 | 46 | 125 | 162 | 55 |
| | | 11.86 | 32.22 | 41.75 | 14.18 |
| 129. Capacité d'utiliser l'ordinateur | 388 | 85 | 100 | 106 | 97 |
| | | 21.91 | 25.77 | 27.32 | 25.00 |
| 130. Connaissance de l'existence de différentes philosophies, cultures, modes de vie | 387 | 39 | 132 | 149 | 67 |
| | | 10.08 | 34.11 | 38.50 | 17.31 |
| 131. Conscience de vos propres valeurs et standards d'éthique | 388 | 54 | 145 | 146 | 43 |
| | | 13.92 | 37.37 | 37.63 | 11.08 |
| 132. Compréhension et utilisation de connaissances mathématiques pratiques | 387 | 116 | 121 | 112 | 38 |
| | | 29.97 | 31.27 | 28.94 | 9.82 |

| Item | n | Response 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 133. Capacité d'interpréter l'information présentée dans des graphiques | 386 | 76 | 119 | 142 | 49 |
| | | 19.69 | 30.83 | 36.79 | 12.69 |
| 134. Compréhension du rôle de la science et de la technologie | 388 | 82 | 150 | 117 | 39 |
| | | 21.13 | 38.66 | 30.15 | 10.05 |
| 135. Capacité d'apprendre par vous-même, de trouver l'information dont vous avez besoin | 388 | 32 | 101 | 164 | 91 |
| | | 8.25 | 26.03 | 42.27 | 23.45 |
| 136. Capacité de comprendre et de parler une autre langue | 387 | 202 | 90 | 61 | 34 |
| | | 52.20 | 23.26 | 15.76 | 8.79 |
| 137. Sensibilisation à l'actualité | 388 | 102 | 158 | 86 | 42 |
| | | 26.29 | 40.72 | 22.16 | 10.82 |
| 138. Interprétation de l'histoire | 387 | 112 | 117 | 110 | 48 |
| | | 28.94 | 30.23 | 28.42 | 12.40 |
| 139. Connaissance du monde | 386 | 106 | 117 | 106 | 57 |
| | | 27.46 | 30.31 | 27.46 | 14.77 |
| 140. Tolérance et ouverture d'esprit à la différence | 388 | 57 | 124 | 144 | 63 |
| | | 14.69 | 31.96 | 37.11 | 16.24 |
| 141. Bien-être et forme physique | 388 | 102 | 136 | 98 | 52 |
| | | 26.29 | 35.05 | 25.26 | 13.40 |

## SECTION 6 JUGEMENT D'ENSEMBLE SUR L'ENVIRONNEMENT D'APPRENTISSAGE AU COLLÈGE DE SHERBROOKE

| Item | Response | | Frequency | Percent |
|---|---|---|---|---|
| 142. Y a-t-il sur le campus du collège, suffisamment de place pour travailler et étudier avec d'autres étudiants? | A. | Oui, amplement de place | 42 | 10.82 |
| | B. | Oui, assez de place | 184 | 47.42 |
| | C. | Non | 162 | 41.75 |
| 143. Les équipements disponibles (livres, appareils audio-visuels, micro-ordinateurs, équipements de laboratoires, etc.) sont-ils assez récents et en bonne condition de fonctionnement? | A. | Tous | 0 | 0 |
| | B. | La plupart | 38 | 9.84 |
| | C. | Quelques-uns | 287 | 74.35 |
| | D. | Aucun | 61 | 15.80 |
| 144. Les équipements disponibles (livres, appareils audio-visuels, micro-ordinateurs, équipements de laboratoires, etc.) sont-ils accessibles en nombres suffisants? | A. | Tous | 4 | 1.03 |
| | B. | La plupart | 86 | 22.22 |
| | C. | Quelques-uns | 243 | 62.79 |
| | D. | Aucun | 54 | 13.95 |
| 145. Vous estimez-vous satisfait(e) du soutien financier dont vous avez disposé jusqu'ici (prêts, bourses, soutien familial, emploi, etc.) | A. | Très satisfait(e) | 38 | 9.90 |
| | B. | Plutôt satisfait(e) | 70 | 18.23 |
| | C. | Plutôt insatisfait(e) | 163 | 42.45 |
| | D. | Très insatisfait(e) | 113 | 29.43 |
| 146. Parmi les étudiants que vous connaissez, combien vous paraissent amicaux et aidants envers les autres? | A. | Tous | 3 | 0.78 |
| | B. | La plupart | 100 | 25.84 |
| | C. | Quelques-uns | 253 | 65.37 |
| | D. | A peu près aucun | 31 | 8.01 |
| 147. Depuis votre arrivée au collège, vous êtes-vous fait de bons amis parmi les étudiantes et les étudiants du collège? | A. | Oui | 31 | 8.05 |
| | B. | Non | 354 | 91.95 |

| Item | Response | | Frequency | Percent |
|---|---|---|---|---|
| 148. Vous identifiez-vous à un sous-groupe d'étudiants au collège? | A. | Oui | 201 | 52.07 |
| | B. | Non | 185 | 47.93 |
| 149. Si vous vous identifiez à un sous-groupe d'étudiants, à quel type de groupe vous identifiez-vous? | A. | Aucun sous-groupe | 47 | 12.37 |
| | B. | Etudiant(e)s de votre groupe de base, de votre programme | | |
| | C. | Etudiant(e)s provenant de la même région que vous | 22 | 5.79 |
| | D. | Etudiant(e)s ayant la même langue ou origine ethnique que vous | 130 | 34.21 |
| | E. | Autre type de sous-groupe | 181 | 47.63 |
| 150. Portez-vous des vêtements (blouson, T-shirt, etc.) identifiés au collège (couleurs du collège, nom du collège ou du programme, etc.)? | A. | Oui | 338 | 88.71 |
| | B. | Non | 43 | 11.29 |
| 151. Parmi les professeurs que vous connaissez, combien sont faciles à aborder, aidants et soutenants? | A. | Tous | 6 | 1.55 |
| | B. | La plupart | 137 | 35.40 |
| | C. | Quelques-uns | 220 | 56.85 |
| | D. | A peu près aucun | 24 | 6.20 |
| 152. Parmi vos professeurs, y en a-t-il un ou une qui vous sert de «modèle» ou dont vous vous dites que vous aimeriez un jour être comme lui ou elle? | A. | Oui | 260 | 67.36 |
| | B. | Non | 126 | 32.64 |
| 153. Parmi le personnel autre qu'enseignant que vous avez rencontré (api, conseillers, secrétaires, administrateurs...), combien qualifieriez-vous d'aidants, compétents et attentifs aux besoins des étudiants? | A. | Tous | 11 | 2.84 |
| | B. | La plupart | 142 | 36.60 |
| | C. | Quelques-uns | 210 | 54.12 |
| | D. | A peu près aucun | 25 | 6.44 |

| Item | Response | | Frequency | Percent |
|---|---|---|---|---|
| 154. Parmi les cours que vous suivez ou avez suivis, combien décririez-vous comme stimulants, intéressants et qui en valent la peine? | A. | Tous | 15 | 3.87 |
| | B. | La plupart | 198 | 51.03 |
| | C. | Quelques-uns | 164 | 42.27 |
| | D. | A peu près aucun | 11 | 2.84 |
| 155. Estimez-vous que les connaissances qu'on vous a enseignées sont à jour? | A. | Dans tous les cours | 2 | 0.52 |
| | B. | Dans la plupart des cours | 51 | 13.18 |
| | C. | Dans quelques cours | 248 | 64.08 |
| | D. | Dans à peu près aucun cours | 86 | 22.22 |
| 156. Comment vos résultats scolaires se situent-ils par rapport à vos attentes? | A. | Plus élevés que vos attentes | 59 | 15.21 |
| | B. | A peu près à la hauteur de vos attentes | 169 | 43.56 |
| | C. | Un peu plus bas que vos attentes | 143 | 36.86 |
| | D. | Beaucoup plus bas que vos attentes | 17 | 4.38 |
| 157. De façon générale, dans quelle mesure êtes-vous satisfait(e) de votre expérience d'apprentissage au Collège de Sherbrooke? | A. | Très satisfait(e) | 11 | 2.84 |
| | B. | Plutôt satisfait(e) | 57 | 14.69 |
| | C. | Plutôt insatisfait(e) | 257 | 66.24 |
| | D. | Très insatisfait(e) | 63 | 16.24 |
| 158. Croyez-vous avoir pris une bonne décision en choisissant de vous inscrire au Collège de Sherbrooke? | A. | Tout à fait certain(e) | 6 | 1.55 |
| | B. | Plutôt certain(e) | 22 | 5.67 |
| | C. | Plutôt incertain(e) | 138 | 35.57 |
| | D. | Tout à fait incertain(e) | 222 | 57.22 |
| 159. Conseilleriez-vous à un de vos amis, frères ou soeurs de s'inscrire au Collège de Sherbrooke? | A. | Oui | 5 | 1.29 |
| | B. | Peut-être | 63 | 16.28 |
| | C. | Non | 319 | 82.43 |
| 160. Avez-vous l'intention de vous réinscrire au Collège de Sherbrooke à la prochaine session? | A. | Oui | 52 | 13.47 |
| | B. | Peut-être | 19 | 4.92 |
| | C. | Non | 315 | 81.61 |

## APPENDIX D

### Formulaire de consentement

Je reconnais avoir pris connaissance des informations concernant la recherche. J'accepte de participer, à condition que les informations soient traitées **confidentiellement** et que seules des statistiques de groupe fassent l'objet d'interprétation.

NOM DATE

## APPENDIX E

### Table E-1
### Class Activities: Means, Standard Deviations, Skewness and Kurtosis Coefficients

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 37. | 3.33 | 0.71 | -0.71 | -0.23 |
| 38. | 2.53 | 0.93 | 0.10 | -0.86 |
| 39. | 2.84 | 0.83 | -0.09 | -0.83 |
| 40. | 1.75 | 0.75 | 0.78 | 0.20 |
| 41. | 2.89 | 0.73 | -0.37 | 0.04 |
| 42. | 2.33 | 0.87 | 0.29 | -0.55 |
| 43. | 2.08 | 0.90 | 0.49 | -0.54 |
| 44. | 2.32 | 0.87 | 0.19 | -0.63 |
| 45. | 2.49 | 0.88 | 0.13 | -0.71 |

### Table E-2
### Independent Study: Means, Standard Deviations, Skewness and Kurtosis Coefficients

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 46. | 2.95 | 0.79 | -0.35 | -0.38 |
| 47. | 2.44 | 0.91 | 0.23 | -0.76 |
| 48. | 3.21 | 0.72 | -0.54 | -0.23 |
| 49. | 1.90 | 0.82 | 0.69 | -0.00 |
| 50. | 2.42 | 0.94 | 0.19 | -0.84 |
| 51. | 2.04 | 0.87 | 0.45 | -0.57 |
| 52. | 1.17 | 0.53 | 3.70 | 14.50 |
| 53. | 1.09 | 0.42 | 5.40 | 30.49 |
| 54. | 1.08 | 0.33 | 5.18 | 33.30 |

**Table E-3**
**Writing Activities: Means, Standard Deviations, Skewness and Kurtosis Coefficients**

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 55. | 3.26 | 0.79 | -0.69 | -0.53 |
| 56. | 2.37 | 0.93 | 0.30 | -0.77 |
| 57. | 2.66 | 0.88 | -0.04 | -0.75 |
| 58. | 3.33 | 0.74 | -0.83 | 0.11 |
| 59. | 3.14 | 0.83 | -0.60 | -0.46 |
| 60. | 2.25 | 0.95 | 0.42 | -0.70 |
| 61. | 2.63 | 1.16 | -0.14 | -1.45 |
| 62. | 2.73 | 0.97 | -0.24 | -0.95 |
| 63. | 2.61 | 0.97 | -0.09 | -0.97 |
| 64. | 1.68 | 0.75 | 0.86 | 0.09 |
| 65. | 2.16 | 1.09 | 0.45 | -1.11 |

**Table E-4**
**Interactions with Teachers: Means, Standard Deviations, Skewness and Kurtosis Coefficients**

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 66. | 2.56 | 0.74 | 0.22 | -0.39 |
| 67. | 2.03 | 0.85 | 0.59 | -0.18 |
| 68. | 1.73 | 0.79 | 0.98 | 0.61 |
| 69. | 1.86 | 0.77 | 0.58 | -0.15 |
| 70. | 1.37 | 0.61 | 1.66 | 2.86 |
| 71. | 2.16 | 0.82 | 0.26 | -0.49 |
| 72. | 1.55 | 0.70 | 1.09 | 0.70 |
| 73. | 1.65 | 0.76 | 0.95 | 0.26 |

## Table E-5
## Interactions with Peers: Means, Standard Deviations, Skewness and Kurtosis Coefficients

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 74. | 2.92 | 0.79 | -0.30 | -0.45 |
| 75. | 2.75 | 0.84 | -0.19 | -0.59 |
| 76. | 2.77 | 0.74 | 0.06 | -0.61 |
| 77. | 2.82 | 0.75 | -0.16 | -0.40 |
| 78. | 1.95 | 0.83 | 0.57 | -0.28 |
| 79. | 2.13 | 0.96 | 0.55 | -0.59 |
| 80. | 2.18 | 0.91 | 0.48 | -0.50 |
| 81. | 2.22 | 0.85 | 0.30 | -0.50 |
| 82. | 2.21 | 0.95 | 0.34 | -0.80 |
| 83. | 1.34 | 0.65 | 2.02 | 3.82 |

## Table E-6
## Cultural and Artistic Activities: Means, Standard Deviations, Skewness and Kurtosis Coefficients

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 84. | 2.30 | 0.97 | 0.28 | -0.88 |
| 85. | 1.34 | 0.55 | 1.49 | 1.76 |
| 86. | 1.52 | 0.65 | 1.05 | 0.69 |
| 87. | 1.23 | 0.56 | 2.68 | 7.24 |
| 88. | 1.36 | 0.85 | 2.36 | 4.19 |
| 89. | 1.90 | 1.11 | 0.85 | -0.73 |
| 90. | 2.11 | 0.96 | 0.57 | -0.60 |

## Table E-7
## Media Center Activities: Means, Standard Deviations, Skewness and Kurtosis Coefficients

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 91. | 2.64 | 1.00 | -0.06 | -1.10 |
| 92. | 1.91 | 0.95 | 0.78 | -0.36 |
| 93. | 1.96 | 0.96 | 0.74 | -0.42 |
| 94. | 1.41 | 0.66 | 1.65 | 2.61 |
| 95. | 2.30 | 0.95 | 0.23 | -0.87 |
| 96. | 2.45 | 0.99 | 0.03 | -1.03 |
| 97. | 1.81 | 0.82 | 0.73 | -0.17 |
| 98. | 1.91 | 0.95 | 0.78 | -0.38 |

## Table E-8
## Clubs, Sports and Student Organizations: Means, Standard Deviations, Skewness and Kurtosis Coefficients

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 99. | 2.24 | 0.93 | 0.25 | -0.84 |
| 100. | 1.54 | 0.73 | 1.26 | 1.15 |
| 101. | 1.35 | 0.66 | 2.14 | 4.62 |
| 102. | 1.26 | 0.62 | 2.71 | 7.27 |
| 103. | 1.84 | 1.02 | 0.90 | -0.46 |
| 104. | 1.58 | 0.92 | 1.46 | 1.02 |
| 105. | 1.47 | 0.77 | 1.69 | 2.23 |

## Table E-9
## Seeking Help: Means, Standard Deviations, Skewness and Kurtosis Coefficients

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 106. | 1.56 | 0.50 | -0.23 | -1.95 |
| 107. | 1.44 | 0.50 | 0.26 | -1.93 |
| 108. | 1.44 | 0.50 | 0.25 | -1.94 |
| 109. | 1.34 | 0.47 | 0.67 | -1.56 |
| 110. | 1.58 | 0.50 | -0.31 | -1.91 |
| 111. | 1.53 | 0.50 | -0.10 | -1.99 |

## Table E-10
## Study Skills Instruction: Means, Standard Deviations, Skewness and Kurtosis Coefficients

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 112. | 1.98 | 0.91 | 0.54 | -0.65 |
| 113. | 2.33 | 0.94 | 0.28 | -0.78 |
| 114. | 2.02 | 0.97 | 0.53 | -0.78 |
| 115. | 2.30 | 0.93 | 0.10 | -0.93 |
| 116. | 2.04 | 0.99 | 0.54 | -0.83 |
| 117. | 2.26 | 0.98 | 0.24 | -0.97 |
| 118. | 2.20 | 1.01 | 0036 | -0.99 |
| 119. | 2.47 | 0.89 | -0.07 | -0.74 |
| 120. | 2.34 | 0.99 | 0.11 | -1.05 |
| 121. | 2.23 | 0.99 | 0.18 | -1.10 |

**Table E-11**
**Value of Learning: Means, Standard Deviations, Skewness and Kurtosis Coefficients**

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 17. | 2.43 | 0.82 | -0.02 | -0.56 |
| 18. | 2.62 | 0.77 | -0.03 | -0.41 |
| 19. | 1.92 | 0.99 | 0.77 | -0.53 |
| 25. | 3.43 | 0.97 | -1.56 | 1.07 |
| 28. | 3.15 | 1.08 | -0.96 | -0.48 |

**Table E-12**
**Goals and Goal Commitment: Means, Standard Deviations, Skewness and Kurtosis Coefficients**

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 20. | 2.72 | 1.03 | -0.29 | -1.07 |
| 21. | 2.97 | 1.03 | -0.59 | -0.88 |
| 22. | 3.12 | 0.79 | -0.69 | 0.11 |
| 24. | 3.33 | 0.97 | -1.24 | 0.27 |
| 26. | 2.64 | 1.09 | -0.13 | -1.29 |
| 27. | 3.76 | 0.61 | -2.90 | 8.32 |

**Table E-13**
**Parental Support: Means, Standard Deviations, Skewness and Kurtosis Coefficients**

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 33. | 3.30 | 0.87 | -1.07 | 0.23 |
| 34. | 3.60 | 0.72 | -1.95 | 3.46 |
| 35. | 2.83 | 1.02 | -0.41 | -0.97 |
| 36. | 3.41 | 0.93 | -1.49 | 1.09 |

**Table E-14**
**Progress: Means, Standard Deviations, Skewness and Kurtosis Coefficients**

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 122. | 2.70 | 0.82 | -0.21 | -0.48 |
| 123. | 2.34 | 1.03 | 0.15 | -1.13 |
| 124. | 2.70 | 0.80 | -0.13 | -0.47 |
| 125. | 1.95 | 1.06 | 0.76 | -0.74 |
| 126. | 2.05 | 1.01 | 0.51 | -0.93 |
| 127. | 2.32 | 0.93 | 0.16 | -0.85 |
| 128. | 2.58 | 0.87 | -0.15 | -0.66 |
| 129. | 2.55 | 1.09 | -0.07 | -1.29 |
| 130. | 2.63 | 0.88 | -0.08 | -0.73 |
| 131. | 2.46 | 0.87 | -0.00 | -0.67 |
| 132. | 2.19 | 0.97 | 0.26 | -1.01 |
| 133. | 2.42 | 0.95 | -0.03 | -0.93 |
| 134. | 2.29 | 0.91 | 0.19 | -0.79 |
| 135. | 2.81 | 0.89 | -0.32 | -0.64 |
| 136. | 1.81 | 1.00 | 0.91 | -0.42 |
| 137. | 2.17 | 0.94 | 0.42 | -0.70 |
| 138. | 2.24 | 1.01 | 0.23 | -1.07 |
| 139. | 2.29 | 1.03 | 0.21 | -1.11 |
| 140. | 2.55 | 0.93 | -0.08 | -0.85 |
| 141. | 2.26 | 0.99 | 0.29 | -0.97 |

## Table E-15
## Satisfaction: Means, Standard Deviations, Skewness and Kurtosis Coefficients

| Item | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| 142. | 2.31 | 0.66 | -0.42 | -0.74 |
| 143. | 3.06 | 0.50 | 0.11 | 0.87 |
| 144. | 2.90 | 0.63 | -0.17 | 0.14 |
| 145. | 2.91 | 0.93 | -0.57 | -0.51 |
| 146. | 2.81 | 0.58 | -0.21 | 0.22 |
| 147. | 1.92 | 0.27 | -3.08 | 7.51 |
| 148. | 1.48 | 0.50 | 0.08 | -1.99 |
| 150. | 1.11 | 0.32 | 2.45 | 3.99 |
| 151. | 2.68 | 0.61 | -0.09 | -0.18 |
| 152. | 1.33 | 0.47 | 0.74 | -1.45 |
| 153. | 2.64 | 0.64 | -0.13 | -0.12 |
| 154. | 2.44 | 0.62 | 0.09 | -0.27 |
| 155. | 3.08 | 0.61 | -0.18 | 0.21 |
| 156. | 2.30 | 0.78 | -0.02 | -0.55 |
| 157. | 2.96 | 0.65 | -0.58 | 1.13 |
| 23. | 3.65 | 0.72 | -2.19 | 4.17 |
| 158. | 3.48 | 0.68 | -1.25 | 1.45 |
| 159. | 2.81 | 0.42 | -2.09 | 3.58 |
| 160. | 2.68 | 0.70 | -1.85 | 1.63 |