

**Evaluating the University Environment
from a Comprehensive System Perspective:
The College/University Environment Scale**

by

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Abstract

The purpose of this study was twofold: first, to undertake a comprehensive systems evaluation of the university environment, and second, to determine which aspects of the university environment predict satisfaction and achievement. One hundred and fifteen undergraduate students (mean age = 20.46) completed The College/University Environment Scale (CUES) and The College and University Classroom Environment Inventory (CUCED). First-order and second-order factor analyses were conducted on the CUES. Reliability and validity were considered for the CUES. Mixed multiple regressions were employed to investigate psychosocial climate, teaching style, and subject matter as predictors for student satisfaction and achievement. Psychosocial climate and teaching style were found to predict satisfaction and achievement. A description of the university environment from the students' perspective and implications for future research are included.

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Introduction

Two decades of research into the classroom environment has addressed important issues in education (Fisher & Fraser, 1991; Waxman, 1991). Students' perceptions of the psychosocial climate in the classroom (Moos, 1979), teaching styles (Fraser & Rentoul, 1980), and subject matter (Knight, 1991) have all been found to be predictors of academic achievement and student satisfaction. The role of other factors such as physical grounds, organizational structure or technical support has not been thoroughly investigated. The purpose of this project is to begin the construction of a comprehensive evaluation scale for universities and colleges, The College/University Environment Scale (CUES) (Williams & Horvath, 1996).

Classrooms and Academic Achievement

The psychosocial climate in a classroom can significantly predict academic achievement (Fraser, 1991; Knight, 1991; Levin & Levin, 1991). Psychosocial climate has been defined as the social and interpersonal experiences that occur in a classroom. Students in classrooms perceived as having greater cohesiveness, goal direction, and less friction and disorganization were consistently found to achieve better on cognitive and affective outcome measures (Fraser, 1987). Recent research in retention rates of minority university students has contributed evidence for the positive relationship between the perception of classroom environment and academic achievement (Grimes, 1995; Mickler & Zippert, 1987). Changes made in classrooms, such as introducing small group activities and individual faculty-student interaction, have increased retention rates in some U.S. higher education institutions (Grimes, 1995).

Classroom environments are dynamic systems where students interact with each other and teachers. Information and social amenities are exchanged continuously. Moos (1979) proposed that each classroom has a personality that exerts pressures on students'

and teachers' actions, and that both are aware of the psychosocial climate in the classroom. The relationship between the classroom's dynamic environment and the students' perceptions of their classroom environment has been the foundation of psychosocial climate research by Rudolph Moos (Moos, 1979; Waxman, 1991). Moos's works have been scrutinized and validated in works by Barry Fraser (1991).

Psychosocial climate is only one component of the classroom environment (Moos, 1979). The classroom is a small subsystem in the larger school (Fisher & Fraser, 1991). Systems theory proposes that large institutions, like schools, can interact with individuals in a way that influences their experiences and perceptions (Levine & Perkins, 1987). The school is a dynamic system that influences the educational process and a student's individual learning. A review of current methodology and established environment scales is followed by a discussion of systems theory in relation to the university or college.

Systems Evaluation

An open system has a dynamic flow of resources (Levine & Perkins, 1987). The community environment contributes people, money and materials to the system. Interaction among these input resources and the process of the system generates a product that is either returned to the community or reprocessed in the system. A comprehensive system evaluation assesses input, process and output. Early researchers (Astin & Panos, 1969; Moos, 1973) set out to assess educational institutions from a systems perspective. Their seminal works formed the foundation for ecological or environment research in education. To date, the systems evaluations conducted have focused mainly on junior high and high school classroom environments.

The university classroom has been conceptualized as a dynamic environment that influences the students' experiences and education outcome (Astin & Panos, 1969; Moos, 1973). These early works established the important role social interaction has on learning. Astin and Panos (1969) conducted a four-year longitudinal study of 36,000 college

students. Their objective was to identify the institutional factors and educational practices that influence the student's decisions to complete college and pursue a career. Their work is still considered groundbreaking because it identified faculty-student interaction as one of the most essential factors that keep students in university (Grimes, 1995; Levin & Levin, 1991; Millis, 1994).

Moos (1973) conceptualized the classroom as a behaviour setting. He viewed the classroom as a structured opportunity to influence student behaviour and improve academic achievement. He suggested that every institution in society attempts to set conditions that will maximize certain behaviours. In the classroom, learning is the targeted behaviour. Moos (1973) asserted that optimal arrangement of a behaviour setting is the most potent technique of behaviour modification available. This premise was the foundation of the Moos Social Climate Scales. One of these scales was designed to assess the classroom, The Classroom Environment Scale (Moos, 1979). A review of several prominent classroom environment scales follows.

Classroom Environment Scale (CES)

Moos (1973) hypothesized that each classroom has a personality, and that if the classroom personality could be determined, then student placements could be made based on person-environment fit. The Classroom Environment Scale (CES), a self report measure derived from theory, was developed to assess the social climate or "personality" of junior and senior high classrooms (Moos, 1979). Three dimensions characterize the classroom environment: Relationship Dimension, Development Dimension, and Maintenance and System Change Dimension (Moos, 1973). Each dimension was theoretically constructed and is composed of subscales that define the characteristics of the classroom. Item analysis led to a 90 item true/false self-report scale (Moos, 1979).

The Relationship Dimension measures students' perceptions of Involvement, Affiliation and Support. Involvement is the extent to which students pay attention and

show interest in class activities. Affiliation measures how well the students get to know each other and how much they work together. Support measures the teacher's concern for the students.

The Development Dimension assesses students' perceptions of self enhancement and personal growth. Task Orientation and Competition are the two subscales in this dimension. Task Orientation measures to what extent classroom activities are centered on accomplishing specified academic objectives. Competition measures the emphasis on competition among students in the classroom.

The Maintenance and System Change Dimension assesses students' perceptions of the level of orderliness, clarity of expectations, and responsiveness to change in the classroom environment. Order and Organization, Rule Clarity, Teacher Control, and Innovation are the four subscales in this dimension. Order and Organization measures the degree of organization in class activities. Rule Clarity measures whether rules are explicit and well understood. Teacher Control measures to what degree the teacher enforces rules. Innovation measures to what extent different modes of teaching and classroom interaction take place in the classroom.

Each subscale is represented by 10 items in statement form. A sample item for Affiliation is "Students in this class get to know each other really well". One for Rule Clarity is "There is a clear set of rules for students to follow". There is a real form and an ideal form. On the real form students (or teachers in the teacher form) are asked to answer to what extent this statement is mostly true or mostly false in their classroom. The ideal form has identical items but different instructions. The students (or teachers) are asked to answer the items as they would pertain to an ideal classroom.

A comparison between real and ideal can help identify problem areas in a classroom (Fisher & Fraser, 1983). Intervention targeted at a specific goal can be assessed by administering the real form after a designated trial has passed (Moos, 1980). In one study, the real and preferred forms were completed by 22 Grade 9 girls and boys studying

science in Tasmania, Australia (Fraser, 1991). The teacher received feedback in the form of profiles representing class means of actual and preferred scores. Differences were noted in general areas of friction, competitiveness and cohesiveness. The teacher introduced an intervention targeted at increasing levels of Teacher Support, and Order and Organization in the class. The real form was readministered, and statistically significant differences were found between the original subscale scores and the post intervention scores for Teacher Support, and Order and Organization.

The CES was developed further so it could be used with more diverse student populations (Tricket, Leone, Fink & Braaten, 1993). The Classroom Environment Scale-Revised for Special Education (CES-SP) is a modified version of the CES. The CES-SP does not contain the dimensions of competition and innovation. The authors suggested the omission of these dimensions better reflected the highly structured classrooms typical of special education.

The CES appears to be a reliable, valid scale to assess students' actual and preferred perceptions of the social interactions that occur in the classroom. Its uses include targeting areas for intervention, assessing person-environment fit, and profiling classrooms or schools (Fraser, 1991; Hearn & Moos, 1978; Trickett et al., 1993). University classrooms do not typically have the same parameters as junior and high school classrooms. Conduct, work habits, teacher expectations, and student participation are usually experienced in a less structured format. The CES may, therefore, not be the best classroom environment scale for university students.

Individualized Classroom Environment Questionnaire (ICEQ)

The Individualized Classroom Environment Questionnaire (ICEQ) was developed to assess the congruency of person-environment fit of junior and senior high students (Fraser & Rentoul, 1980). It is a theory-driven self-report measure of 50 items rated on a 5-point Likert scale. The scale measures five dimensions: Personalization, Participation,

Independence, Investigation, and Differentiation. The ICEQ was developed from Moos's dimensions of relationship, personal development and system maintenance.

Fraser and Rentoul (1980) asserted that it was the person-environment fit and not teaching style that was important in predicting academic outcomes. A sample of 285 students in fifteen junior high classrooms was assessed for cognitive achievement at the beginning and end of the 1978 school year. The ICEQ was administered mid-year to evaluate the students' perception of classroom environment. Students completed two forms of the ICEQ, one of the classroom as it was and one of an ideal or preferred classroom. Students whose responses were similar for the actual and preferred classroom forms appeared to achieve higher grades. These findings supported the importance of person-environment fit over the teaching methods used for cognitive achievement.

The ICEQ was designed to measure whether a student was in a preferred classroom environment or in an incongruent one. Personal suitability for the classroom structure and atmosphere can be assessed. The ICEQ measures some system processes with the subscales Differentiation and Participation. Differentiation taps the diverseness of student learning styles. Participation assesses the extent to which students contribute to the classroom. The ICEQ is limited to assessing only the classroom environment, not the educational institution.

College and University Classroom Environment Inventory (CUCEI)

The College and University Classroom Environment Inventory (CUCEI) was constructed to provide a classroom environment measure for use in higher education (Fraser, 1993; Fraser, Treagust & Dennis, 1986). The CUCEI was specifically introduced to target a university or college population (Fraser, 1991). The CUCEI was developed from Moos's three dimensions of classroom environment, Relationship Dimension, Personal Development Dimension, and System Maintenance and Change Dimension.

The Relationship Dimension is represented by the subscales Personalization,

Involvement, Student Cohesiveness, and Satisfaction. Personalization measures how many opportunities the student has to interact with the professor and the professors' level of concern. Involvement assesses student participation in class. Student Cohesiveness assesses friendships between students. Satisfaction measures the level of enjoyment in class. The Personal Development Dimension is composed of Task Orientation. Task Orientation measures the structure, and organization of class activities. The System Maintenance and Change Dimension includes the subscales Innovation and Individualization. Innovation assesses how often the instructor uses new or unusual class activities or teaching methods. Individualization measures how often the students are allowed to make decisions and whether they can work at their own pace.

College Classroom Environment Scale (CCES)

The College Classroom Environment Scale (CCES) is a more recent addition to the established social climate scales of university classrooms (Winston, Vahala, Nicholls, Gillis, Wintrow & Rome, 1994). It is composed of six subscales: Cathetic Learning Climate, Professorial Concern, Inimical Ambiance, Academic Rigor, Affiliation, and Structure.

Cathetic Learning Climate assesses the level of stimulation, opportunities for discussion and cooperative learning experiences. Professorial Concern measures the personal interest the professor displays toward the students. Inimical Ambiance addresses the atmosphere in the class. It measures levels of hostility, competitiveness, and rigidity of structure. Academic Rigor measures the academic and intellectual quality of the class. Affiliation assesses the social climate in the classroom. Structure measures the evaluation criteria and course content.

The CCES is composed of 62 statements, rated on a 5-point Likert scale. There are real and preferred forms. The intercorrelations of the scales range from a low of $-.05$ between Inimical Ambiance and Academic Rigor to a high of $.66$ between Cathetic

Learning Climate and Professorial Concern. The overlap between some subscales was not addressed by the authors (Winston et al., 1994).

The CCES was constructed to evaluate the college student's perspective of classroom climate and learning. The theoretical influence from the CES and the ICEQ resulted in many similarities for scale descriptions and items. Affiliation and Structure overlap considerably with Affiliation and Task Orientation. Unfortunately, the authors of the CCES did not improve on social climate evaluation. The items lack objective measures and are often vague. One example is "This class seems to go fast." This item does not identify whether it is interest, the subject matter or class length that influences this perception. The CCES does, however, have face validity.

The Classroom: A Subsystem

A complete system evaluation assesses input, process and output. Astin and Panos (1969) began their examination of the university environment by considering output. Their conclusions focused on faculty-student interaction. Moos (1979, 1980) evaluated the classroom psychosocial climate and its influence on student behaviour. Both faculty-student interaction and classroom psychosocial climate are processes in a dynamic system.

Moos's (1979) CES was the first environment assessment scale for the classroom. The research generated from this scale suggests that psychosocial climate and students' preferences for teaching styles are important variables in learning, but the educational environment also extends beyond the classroom and learning is dependent on more than classroom personality (Yinger & Hendricks-Lee, 1993).

Fraser and Rentoul (1980) considered the important issue of person-environment fit and how it related to output. Their initial proposition was that optimal student placements could be determined by identifying the classroom personality that was congruent with the student's personality. They hypothesized cognitive achievement could

be enhanced by person-environment fit. Their findings suggested placement in a preferred environment contributed to predicting outcomes. The limitation of this study was that it did not consider the larger system in which the classroom exists. The climate structure of the whole school was not investigated. It is not yet clear how much influence the whole system has on individual achievement.

Winston and colleagues (1994) constructed the CCES to evaluate the university classroom. The construction was from the students' perspective. Face validity and updated issues for university students were improvements in design to be noted in the CCES. Theoretically, however, the CCES does not represent progress in systems evaluation.

The CES, ICEQ, and CCES are useful environmental scales designed to evaluate a classroom. Their purpose is to measure how students experience classroom instruction and relate this to their academic achievement. However, the personal experience in the classroom is only one aspect of the learning environment. Teaching and learning occur in many forms, in many locations, and many modalities (Sherman, 1985). Students' perceptions of their learning environment beyond the classroom have not been thoroughly investigated. The dynamic approach of systems evaluation may be able to broaden our present knowledge about teaching and learning by providing a more comprehensive list of variables to consider in relation to student satisfaction and achievement.

A New Scale: The Rationale

Psychosocial climate in the classroom is an important variable in the learning environment (Fraser, 1987, 1991; Moos, 1979). The research has spanned international boundaries. Fraser, (1991) has contributed to our understanding of the dynamic relationship between social interaction and academic achievement (Waxman, 1991). It is time to expand this research to consider the whole system. How important are students'

perceptions of the physical environment, learning styles or financial support to academic achievement? Do factors in the institution as a whole, and not just in the classroom, influence the performance of students? A new scale, the College/University Environment Scale (CUES) is being developed to contribute to our knowledge in these areas (Williams & Horvath, 1996).

There are five issues that guided the theoretical development of this new scale. First, many of the current classroom environment scales are appropriate for elementary, junior high and high schools. The CUES is being constructed to assess higher education institutions. The lack of higher education environment scales continues to be a noted gap in the research literature (Fraser, 1987, 1991; Waxman, 1991).

Second, the CES, CUCEI, ICEQ and CCES are measures of global perception. Their questions ask how students feel, are treated, or what they do in the classroom. In contrast, the CUES asks how the individual students assess their learning environment in a more discrete way. Questions ask for specific details. For example, there are seven items that represent what the curriculum covers: computer technology, business management, etc. The items are rated on a 5-point frequency scale ranging from "never" to "always".

Third, school-wide assessments may contribute to our understanding of predictor variables for learning and academic achievement (Fisher & Fraser, 1991; Moos, 1979). The CUES was developed from a systems perspective and includes items that reflect input, process and output. Therefore, the larger school system is also evaluated. The classroom remains an important, but not exclusive, component in the assessment.

Fourth, process is evaluated. Outcome evaluations are common in classroom environment research (Waxman, 1991). The limitation of this type of research is that the process variables have not all been accounted for. The relationship between the educational process and academic achievement has not been fully explained (Knight, 1991). Faculty-student interaction and psychosocial climate are essential criterion variables (Millis, 1994). High academic achievement prior to enrollment at a university

can also positively influence outcome (Grimes, 1995). Research has not yet explained the extent to which or the mechanism by which other process variables, for example administration style or structure, influence learning and academic achievement (Waxman, 1991).

Fifth, parsimony can be achieved with a scale that incorporates process and outcome evaluations as parts of the overall system (Fraser, 1987). The inclusion of some outcome measures such as scholastic and career goals may enhance our understanding of how students experience the university environment. For example, a student who is not enrolled in the required courses for his or her chosen career experiences may be dissatisfied with the registration process, or the academic counseling process. A scale that only asks if the student is satisfied in the classroom may not reveal the cause of the dissatisfaction. Further evaluation of student satisfaction would be required to reveal the same information. The CUES includes items designed to assess both process and outcome.

A scale that addresses the preceding issues may be of value in the evaluation of higher learning institutions. Differential profiles between types of schools may also be valuable (Fisher & Fraser, 1991). A profile for university graduate schools, undergraduate programs and community colleges may be useful in guiding policy, funding or entrance requirements. It may be possible to assess innovations and changes in curriculum prior to outcome measurement by evaluating student satisfaction. The positive relation among person-environment fit, student satisfaction and academic achievement has been reported for junior and senior high students (Fraser & Rentoul, 1980). Person environment-fit assessments may also help retention rates of minority and learning disabled students in the university or college environment (Fisher & Fraser, 1983; Grimes, 1995; Mickler & Zippert, 1987).

Assessing the Dynamic University

One way to conceptualize the university environment is as an open system.

Evaluations of classroom environments have a place in the assessment but do not provide information about the dynamics of the university system as a whole.

University: An Open System

In this study, an open system is defined by the dynamic interaction of input, process and output. In simple terms one can describe the university system as students paying tuition (input), attending classes and learning (process), then graduating (output). The learning process is a cyclical pattern of course selection, tuition payment, fulfilling course requirements, and receiving credits. The pattern is repeated until the student graduates or drops out. It is recognized that the educational activities, business functions, and personal or intellectual contributions by staff faculty and students are varied and complex. The system model cannot describe adequately these aspects, but rather it provides a framework from which to generate theoretical components inherent in the university environment.

Some of the input into the system includes student tuition fees and physical property. Students contribute financial resources in the form of self or family earnings, university scholarships or bursaries, and business or community sponsorship. The quality of students may be influenced by the amount of funds available through the institution, business or community. Scholarship funding may attract higher quality students. These students in turn influence further funding by increasing the reputation of the quality of student body and this may encourage sponsors to continue contributing money. The institution contributes physical resources. A campus with good facilities may attract more students and therefore more money.

A university is an institution of higher education and learning. Two of the university roles are to acquire and dispense knowledge, and the provision of the physical

requirements for students to receive a higher education. The various educational and scholarly research activities are included in the definition of process.

One definition of output is the transition of processed resources from the system to the larger community (Levine & Perkins, 1987). A university graduates students who have fulfilled program requirements. In this model, the students have been processed and returned to the community. Output may also include research findings and academic innovations. In this case, knowledge has been produced from the processes inherent in the system.

The dynamics of a system cannot be fully understood without considering the people who interact with it. The university has, at the minimum, three distinct levels of membership that interact in different ways within the system, including management and support staff, faculty, and students. The interaction between each group varies according to context and situation. Changes in the system may affect each level in different ways. For example, an administrative policy that reduces current journal holdings in the library has an influence at all three levels. The library staff are required to increase their workload to include processing inter-library loans, and faculty need to assign work with the constraint of not having resource material readily available. This may have an impact on the amount of assigned work, the type of work assigned, and the expected completion times. Students may find their research task more difficult and time consuming, as well as the extra costs for inter-library loan services may increase the financial strain on the students. One of the deleterious effects may be a reduction in the quality of research and the quantity of resource material the student is exposed to.

Administration includes management and support staff. Their roles include budgeting, clerical support, technical support, institutional program development, and personnel evaluation. This level of membership is instrumental in how smoothly the system is able to cycle resources. Any changes in administration may have ripple effects throughout the system. Faculty includes all teaching staff. There may be part-time, full-

time, adjunct, assistant, associate, or full tenured professors (Millis, 1994). This group has the role of educating the student body. Sometimes their roles can overlap with administrative functions, as happens with department heads and committee appointees (DiLorenzo & Heppner, 1994).

Faculty have been identified as one of the most important factors in the quality of education (Astin & Panos, 1969; DiLorenzo & Heppner, 1994; Millis, 1994). Individual faculty members interact with a large number of students during each course they teach. Their availability is evident in office hours, e-mail addresses, telephone numbers and class discussions. It is the students' perception of the faculty's availability, not necessarily the one-on-one interactions that influences the students favorably (Grimes, 1995; Levin & Levin, 1991; Mickler & Zippert, 1987).

Traditional students are defined as entry students (Grimes, 1995) or first-year students (Millis, 1994) who have university preparedness skills. Mature students bring a different set of experiences to the classroom as they tend to be more pragmatic and goal-oriented than first-year students (Millis, 1994). Minority students bring different life experiences to the education milieu (Levin & Levin, 1991; Mickler & Zippert, 1987). Students with learning difficulties have become a noticeable part of the student body (Wilczenski & Gillepsie-Silver, 1992). The enrollment of more nontraditional, minority and learning disabled students has increased 200% during the last five years in the United States (Grimes, 1995). The diversity in the student body challenges the university system to provide sufficient educational opportunities for each group (Grimes, 1995; Levin & Levin, 1991; Millis, 1994). The students are a main source of energy and renewable resources that drive the dynamic flow of the system. The continuous influx of new students brings renewed energy, vision, and funds for the process of the system. The target population of this study will be the student body. It will concentrate on the students' experiences and perceptions of the university environment as defined by the components and elements proposed in the next section.

Components of the System

The open system model of input, process, and output provides a framework from which to investigate the university system. A new scale, The College/University Environment Scale (CUES) is being developed as an attempt to assess the university as a dynamic system. A brief description of the CUES can be found in Table 1. Theoretically, a dynamic system has distinct components that interact with each other and contribute unique influences on the quality and quantity of the system's functions and outcome. The classroom is represented in the scale as only a part of the educational process experienced in university. Other features assumed to be important to the educational process are also represented. The student-faculty interaction, financial resources, technical support and scholarly achievement are some of the components targeted. The items, rationally constructed to represent each element, can be reviewed in Appendix A.

Resources

Two input elements for a university system are financial and physical. Financial resources are used to provide education services and employ management, support staff, and faculty. Government, businesses and community organizations may contribute a significant amount. Students also contribute to the financial resources by paying tuition. Some students are recipients of school scholarships or bursaries. At times, business or community groups sponsor students by paying for their education expenses. The amount of money available in scholarships, bursaries, and business or community sponsorship may influence the quality of the students who decide to attend the university.

Physical resources are also important as the university requires sufficient and appropriate learning, housing and recreational facilities to carry out its functions. Characteristics of a student's environment have been reported to have a positive influence on their learning (McCarthy, Pretty & Catano, 1990; Moos, 1979). The physical

Table 1.
An Overview of The College/University Environment Scale (CUES)

Components	Elements	Selected Sample Items
Input Resources	<ul style="list-style-type: none"> * financial support * physical attributes 	Financial support for my education is available from: self/family, community organizations
Process Administration	<ul style="list-style-type: none"> * procedures * organization structure 	Administrative services are: efficient, flexible, reasonably priced
Facilitation	<ul style="list-style-type: none"> * teaching facilitation * technical support * professor evaluation * student evaluation 	Teaching is facilitated by: traditional teaching methods, computer technology
Learning	<ul style="list-style-type: none"> * curriculum * learning styles * effectiveness 	Students can select courses based on: course content, grading method, teaching style
Interaction	<ul style="list-style-type: none"> * social/academic support * influence of students * social activities and recreation 	Students have a say in: course selection, course content, evaluation method
Output Education	<ul style="list-style-type: none"> * scholarly * job/career 	My job/career aspirations are met with: job skills training, selection of degree programs

environment has also been found to be related to staff and faculty well-being (Fisher & Fraser, 1991).

Financial. Some of the university's financial resources come from the students in the form of tuition, registration fees, residence expenses, government funding, etc. Student funds are sometimes based on family contributions or employment earnings. Scholarships, bursaries and grants can help students pay their education expenses in part or in full.

Physical. Physical resources include campus location, facilities, and new construction. The quality of the physical resources may influence more students to enroll in the university.

Process

One way to conceptualize the process functions in this model is to categorize them into four components: Administration, Facilitation, Learning, and Interaction. Administration includes the managerial, clerical and financial aspects. Facilitation is defined by teaching and evaluation methods. Learning is composed of curriculum and learning styles. Interaction includes the psychosocial aspects of social support, recreation, and student interactions.

Administration

Organizational structure is addressed by the elements of procedures and organization. The organizational structure of a university includes departments, policies and procedures, and the administrative functions of running the university.

Procedures. Procedures and rules help define the teaching and learning activities in the system. Efficient and cost effective services like registration may have a positive impact on the student's learning experience (Sherman, 1985).

Organization. Organizational structure may facilitate teaching and learning by providing good quality, efficient services. It has been suggested that the fewer stressors in a student's life, the better he or she will learn (McCarthy et al., 1990).

Facilitation

Four elements facilitate the educational process in the university: Teaching Facilitation, Technical Support, Professor Evaluations and Student Evaluations. Students may receive instruction, extra help or scholastic stimulation from these elements. The changes in student populations have resulted in calls for an evaluation of the teaching process (Lamdin, 1982; Wilczenski & Gillepsie-Silver, 1992). Post-secondary institutions are being challenged to provide instruction to increasingly larger numbers of diverse students (Millis, 1994). Changes in the student population include more representation from minority groups and adult learners. Learning for these groups may be facilitated by evaluating current teaching practices and making necessary changes (Mickler & Zippert, 1987; Millis, 1994; Moos, 1979, 1980).

The importance of evaluating facilitation is illustrated in the following example. One university professor found her class of students resisting her teaching method (Seldin & Associates, 1990). The students demanded more concrete definitions and specific examples. She was teaching from a theoretical viewpoint. The teacher administered a learning style assessment and found her teaching style to be incompatible with the class's learning style. The teacher changed her teaching method and the students learned more quickly and achieved higher grades.

Teaching facilitation. This element includes the aids used by faculty to fulfill the requirements of teaching. It has been suggested that teaching methods, innovative ideas, and a selection of learning environments can enhance the quantity and quality of learning (Sherman, 1985).

Technical. The technical element includes computer technology, audiovisual and

electronic equipment, and library services. It has been suggested that the quantity and quality of learning increases as the teaching modalities increase (Lamdin, 1982).

Professor Evaluation and Student Evaluation. The quantity and quality of teaching and learning in the system need to be evaluated on an ongoing basis as faculty need to know how effective their teaching methods are and students need to know their academic progress. Standardized evaluations of teaching and learning are considered important elements (Hearn & Heydinger, 1985).

Learning

Learning may be considered the main function of the system. Administration provides the organizational structure, faculty provide the teaching, and students are the service clientele. Learning takes place in a cyclical pattern. Students are repeatedly processed through the system until they accrue sufficient credits to graduate or they drop out. Curriculum, Learning Style and Effectiveness are three elements of this component.

Curriculum. Current course content has been reported to facilitate learning (Lamdin, 1982; Mickler & Zippert, 1987). As an example, the business practices in the nineties have gone through tremendous changes. Students need to become proficient in computer technology, logical decision making, and adaptability to compete in the job market. If the university wants to teach these skills, then these changes need to be incorporated into the curriculum.

Learning style. This element highlights some of the learning requirements of individual students. It has been found that students who can select course content and course format may improve their academic progress (Grimes, 1995). For example, some students prefer a highly structured learning environment. When they have the choice, these students tend to enroll in structured classes and their academic achievement appears to improve (Fraser, 1982).

A diverse student body may require flexibility in the form of individual choice in a

university. For example, students with learning difficulties may require alternate methods of evaluation (Wilczenski & Gillespie-Silver, 1992). A selection of different courses and formats may improve the academic achievement of these diverse students.

Effectiveness. A very important element of learning is teaching effectiveness. Students may participate more, complete more assignments and study more for exams if they feel they are learning valuable information. The quality of teaching may also influence future enrollment as students will recommend some courses or professors, but not others. Many institutions of higher learning have course evaluation procedures, therefore this element is not intended to replace a more comprehensive course evaluation.

Interaction

Faculty-student interaction has been considered one of the most important variables in students' education successes (Levin & Levin, 1991; Mickler & Zippert, 1987; Millis, 1994). Faculty-student interaction is said to be crucial to help retain students in university until degree requirements are completed (Astin & Panos, 1969; Levin & Levin, 1991; Wilczenski & Gillespie-Silver, 1992). Quality dyadic interaction with faculty members seems to be one the major factors in retaining minority students at the university level (Levin & Levin, 1991). It has been suggested that social support is a key element in educating all students (Millis, 1994).

Interaction with other aspects of the system may be related to positive student outcome (McCarthy et al, 1990). Students who feel they have a say in the day to day running of the college/university may expend more energy into their learning activities. Influence addresses this element. Peer interaction and friendships may help provide students with positive learning experiences (Fraser et al, 1986). The Social/Recreation Activities element addresses these issues.

Social/academic support. This element measures the support services, such as academic counseling, financial counseling and personal counseling, that are available to the

student. These services include opportunities to discuss class material, learning difficulties, career goals, and personal difficulties on an individual basis. These include opportunities for students to receive individual attention.

Influence. Students interact with the system. For example, students may influence which courses are offered in the future. Feedback can be received in the form of low registration numbers in unpopular courses. These courses may be withdrawn from the program. In this way, students can influence course selection, teaching style or evaluation method by selecting certain courses and not others.

Social/recreation activities. The amount of social and recreational facilities may contribute to individual well-being and sense of self-satisfaction. These two factors have been found to contribute to academic achievement (Levin & Levin, 1991; Moos, 1979).

Output

One outcome of a university education is the convocation of students who are properly educated and possess competent work skills. Good quality graduates may influence the community as the university's reputation may draw more applicants, more community support, and more business interests.

Education

Scholarly. Universities were traditionally built to produce scholars. Scholars are the thinkers, philosophers, inventors, and leaders of the community.

Job/career. Educational requirements in the job market have shifted educational requirements in universities to a more technical level. The education a student receives in university may help with the transition into the job/career system.

Purpose and Design of the Present Study

A review of the classroom environment research suggested it was time to expand the realm of study of the classroom environment, to include more moderator variables and to evaluate the whole system (Fraser, 1987, 1991; Moos, 1979; Waxman, 1991). The

purpose of this study was to examine the university environment from a systems perspective and to evaluate the psychometric properties of the CUES. This project attempted to determine how students perceive and experience the various system elements as proposed in the CUES. It looked at each element in the CUES and evaluated which were more important and which were less important from the students' perspective. It was assumed, by the author, that students would access, use or recognize the elements that were more instrumental to their education. The CUES attempted to establish the availability of each element as perceived by the student body. The analyses were twofold; first, there was a scale analysis, and second, there was an investigation into the efficacy of CUES in describing the university environment.

Scale Analysis Design Item analysis of the CUES is used to help determine whether the constructed items can accurately and consistently measure the intended elements. The first step in item analysis involves analyzing the seven items within each element. The inter-correlation of items in the each element is evaluated for redundancy and unrelated items. Ideally, the seven items reflect a moderately homogeneous sampling of the element. Inter-total correlations are performed at the element level to see whether the item reflects the construct at the element level. The number of items for each element may be revised based on the item analysis. The retention of items at this stage is based both on systems theory and statistical properties.

The reliability of each element is evaluated with alpha coefficients. Alpha coefficients refer to inter-correlation of the seven items with the element. The CUES was constructed from a rational point of view, a step-by-step test construction model, and the items in the elements were designed to be moderately consistent and the elements to be distinct from each other. The alpha coefficients help determine to what extent this goal has been achieved.

The underlying theoretical constructs of the CUES is evaluated with a factor analysis of the elements. A factor analysis is conducted to explore the relationship of each

element with each other and its respective hypothesized component. The elements can be tested with principle components factor analysis with varimax rotation. The factors extracted may necessitate a revision of the theoretically derived components.

Description of the University Environment Design The total scores for each element are correlated with the scores tabulated from the General Evaluation Measure (GEM) (Williams & Horvath, 1996). The GEM is a subjective rating scale designed to assess student satisfaction. Research has suggested that there is a solid connection between student satisfaction and achievement (Fraser, 1982; Fraser & Rentoul, 1980; Knight, 1991). These studies investigated satisfaction as it related to teaching style, psychosocial classroom atmosphere and subject matter. In general, these studies suggested that satisfied students were more likely to achieve better grades than unsatisfied students. An investigation of the relationship between CUES elements and satisfaction will consider this relationship as well as other aspects of the university environment that may contribute to student satisfaction. The strength of the relationship between the CUES elements and the dependent variable satisfaction are analyzed in a Correlation Matrix.

The correlations between GPA scores and CUES elements are also analyzed, and may help uncover some previously undefined relationships. The cumulative GPA from the previous academic term for each participant was requested on the demographic form. There is always a concern with research using achievement as a dependent measure because students may not recall actual GPA values. Therefore, permission from the Registrar was sought to access student transcripts. Each participant was asked to supply their Grade 12 average at the completion of high school.

Correlations between the elements in the CUES and the subscales in the CUCEI are calculated. On the basis of a review of the constructs defined in each scale and a comparison of individual elements, certain CUES components are expected to correlate with certain CUCEI subscales (See Table 2). Moderate relationships are expected between the following: Teaching Facilitation with Innovation, Curriculum with Task

Orientation, Learning Styles with Individualization, Learning Effectiveness with Satisfaction, Social/Academic Support with Personalization, Influence with Involvement, and Social/Recreation Activities with Student Cohesiveness.

Hypotheses

One focus of this study is to evaluate the influence of the perceived university environment on students' satisfaction and achievement. The literature suggests psychosocial aspects of student-faculty interaction, social and recreational activities, and social support services will be most important to students. The importance of the other elements will be also investigated. The following two hypotheses are based on the university environment literature review and are expected to be replicated with the new CUES. The first hypothesis is that the extracted factors most similar to psychosocial climate, teaching style and subject matter will enter the regression equation in the prediction of student satisfaction. The second hypothesis is that the extracted factors most similar to psychosocial climate, teaching style and subject matter will enter the regression equation in the prediction of achievement.

Table 2.
An Overview of Subscales in the CUES and CUCEI

CUES	CUCEI
Resources	
Financial	
Physical	
Administration	
Procedures	
Organization	
Facilitation	
Teaching	Innovation
Technical	
Professor	
Evaluation	
Student	
Evaluation	
Learning	
Curriculum	Task Orientation
Styles	Individualization
Effectiveness	Satisfaction
Interaction	
Social/Academic	
Support	Personalization
Influence	Involvement
Social/Recreation	Student Cohesiveness
Activities	
Education	
Scholarly	
Job/Career	

Method

Participants

One hundred and fifteen students (65 women and 50 men, ages ranges from 17-45, median age = 20) were recruited at Acadia University. The researcher requested and attained permission from various professors to recruit participants from among 2nd, 3rd

Table 3.
Demographic Characteristics of the Sample

	Participants		Enrollment (1996-1997)		Age
	N	%	N	%	Median
Female	65	57	1907	54	19
Male	50	43	1615	46	20
total	115		3522		20

and 4th year classes. These classes were randomly chosen to represent various degree programs, and zero to four volunteers were recruited from each class. Participants were also recruited from the Introductory Psychology pool if they met the criteria of attending Acadia for at least one year prior to participation. Introductory Psychology students were given one point to be added to their term mark if they participated. The prerequisite of one year of enrollment as a full-time or part-time student prior to participation allowed the recruitment of students who had experienced various aspects of the university environment. Eighteen participants were in the first year of their program, 56 were in their second year, 27 were in their third year and 14 were in their fourth year. Two participants withdrew part way through testing. See Table 3 for the sample characteristics and Table 4 for the distribution of degree programs.

Table 4.
Sample Distribution of Degree Programs

Degree Program	N
Bachelor of Science	47
Bachelor of Arts	38
Bachelor of Business Administration	11
Bachelor of Computer Science	6
Bachelor of Physical Education	5
Bachelor of Recreation Management	5
Bachelor of Music	2
unknown	1
total	115

Measures

Four pen-and-paper self-report questionnaires were collated and administered to the participants: Demographic Data, CUES, CUCEI and GEM.

Demographic Data. Participants were asked to record their age, sex, GPA and high school average along with other details about their enrollment status (see Appendix B).

The College/University Environment Scale (CUES). The CUES is in the process of development. Theoretical constructs were defined and a list of potential items was developed prior to using this measure with a university sample. The CUES has been constructed to assess six components of the university environment. The six components are Resources, Administration, Facilitation, Learning, Interaction, and Education. These components are subdivided into 16 elements that are designed to represent distinct aspects of each component. A literature review of published environment scales was conducted. Items were generated to reflect the important factors identified in the application and research of published assessment scales. A comprehensive number of items were generated from the literature, and from discussion with students and faculty. The items

were reviewed and edited for clarity and to remove repetition. The result is a total of 112 items, seven for each of the 16 elements (see Appendix A).

In an attempt to establish the availability of elements in the university environment, the CUES items are rated with a 5-point frequency scale. The directions ask each participant to "Please select the most appropriate response for the following items." The scale ranges from never (-2), rarely (-1), sometimes (0), often (1) to always (2). As with any self-report measure, some of the variance in responding can be attributed to the participants' perceptions of the environment. However, it is assumed, as suggested by Anastasi (1988), that using group data from the frequency rating scale will also evaluate the actual environment as perceived by students.

The scale was distributed to various university students in a pilot study. Eight students enrolled in Acadia University for at least one full academic year and three students from Halifax universities completed the questionnaire, and an evaluation page. Specific questions were asked about content clarity, appropriateness of items, difficulty level and overall impressions of the scale. A qualitative analysis of each item was conducted with the returned questionnaires (Appendix C). The clarity and appropriateness of each item were considered. Based on the feedback, the wording of some items was changed.

The final items are a rational attempt to reflect distinct aspects of the elements included in the CUES. The result is a total of 112 items, seven for each of the 16 elements: Financial, Physical, Procedure, Organization, Teaching Facilitation, Technical, Professor and Student Evaluation, Curriculum, Learning Style, Effectiveness, Social/Academic Support, Influence, Social/Recreation Activities, Scholarly and Job/Career. An inadvertent error eliminated one item from the Teaching Facilitation element prior to printing. Each participant was administered a CUES questionnaire with only 111 items.

The College and University Classroom Environment Inventory (CUCEI). An established environment scale, CUCEI, was included to assess congruent validity. The CUCEI was chosen because its subscales appeared to resemble somewhat the item content and elements in the CUES (see Table 2) and it was originally constructed for university students. The CUCEI (Fraser, 1993; Fraser et al., 1986), a 49-item, self-report measure, was designed for use in college and university classrooms (Appendix D). Each item has four possible responses: strongly agree, agree, disagree and strongly disagree. The CUCEI subscales include Personalization, Involvement, Student cohesiveness, Satisfaction, Task Orientation, Innovation and Individualization. The alpha coefficients for the subscales range from .75 to .90.

General Evaluation Measure (GEM). A nine-item, self-report, pen-and-paper scale, The General Evaluation Measure (GEM), was developed to measure subjective ratings of importance, satisfaction, and perceived helpfulness to learning experience (Williams & Horvath, 1996). The items are rated on a 5-point Likert scale that ranges from "agree" to "disagree". Together, these items are designed to establish general student satisfaction. Sample outcome measures are: "I am satisfied with my experiences at this college/university" and "I value, find important a certificate, degree or diploma from this college/university". Appendix E has the scale in its entirety.

Procedure

Testing occurred from October 1996 to January 1997. The prerequisite of one year enrollment prior to participation was an attempt to recruit students with experience in various aspects of the university environment. Consent to participate in the study was requested of each participant. There were two parts to the consent procedure (see Appendix F). Part A was a mandatory general consent. Part B was optional; the researcher requested permission to access GPA and high school marks from the Registrar. Fifteen participants did not complete Part B of the consent form. A review of the sample

characteristics of this group as compared with the whole sample suggested these two groups did not differ. After giving consent, the participants were instructed to answer the questionnaires to the best of their ability and to ask any questions they may have. A debriefing paragraph was distributed after completion of the questionnaires (Appendix G).

Scoring Procedures

The total of individual item scores was used in the item analysis of CUES. Item totals for each CUES element were tabulated by summing item scores in each element. Sixteen total element scores were derived and used in the analyses investigating element characteristics and relationships. Missing cases were not included in the analysis.

The items with underlined numbers in the CUCEI were scored 1, 2, 4, 5, respectively, for the responses strongly disagree, disagree, agree and strongly agree. All other items were scored in the reverse manner. Missing cases were scored 3.

The nine GEM items were scored 0, 1, 2, 3, 4, for the rating scale values -2, -1, 0, 1, 2, respectively. The mean obtained from the GEM was 25.95 with a standard deviation of 5.87 (N= 109). The Registrar provided cumulative GPA scores for each participant who gave consent. The mean GPA was 2.62, with a standard deviation of .82 (N=100).

Results

Scale Analysis

Scale analysis was the first step in considering the results elicited by the CUES in this study. Results from item analysis, first-order factor analysis, Cronbach's alpha, and second-order factor analysis are presented in the following sections.

Item Analysis

A preliminary item analysis of the CUES in its entirety (items = 111) was conducted to investigate the inter-item relationships and the consistency of each element. Moderate correlations were expected between the items in each element. Statistical

characteristics of items were considered in several steps. First, the mean and standard deviation of each item were reviewed for irregular patterns and low variability (Appendix H). There were no areas of concern in these figures. Second, item relationships were considered with inter-item correlation matrices for each element. This method of scale analysis, examining inter-item correlations, did not prove to be helpful in discerning any patterns in the data. Third, the corrected item-total correlations were reviewed to consider relationships between the individual item and its composite element. Items with inter-item correlations greater than .30 were considered to demonstrate sufficient consistency for each element because the items were constructed to be moderately homogeneous and to sample various aspects within an element. The corrected item-total correlations identified some variability in the consistency for items in some elements.

There was some ambiguity in the internal consistency for the Financial element. Self/family funding ($r = -.03$) and government loans ($r = -.08$) had negative relationships with the whole element. University scholarships and bursaries ($r = .18$), trust funds ($r = .17$) and bank loans ($r = .11$) had very low correlations with the element as a whole. These values suggested that the items in this element were dissimilar to the students. The Financial element was constructed to represent the diversity of funding options available to students. The unexpected inconsistent inter-item relationships suggested that there may be a problem with either the theoretical assumption or the wording of the question itself. Based on informal feedback, it is possible that participants misunderstood this question and answered with their actual funding situation rather than with describing possible alternate sources of funding. The question may have yielded different results had the wording been "Students may get financial support from one or more of these sources".

Low corrected item-total correlations were also noted in Procedures, Teaching Facilitation, Influence, and Social/Recreation Activities. Each of these elements had one

item with a very low corrected item-total correlation (range -.13 to .17). This suggests that more than one construct was included in these elements. It is difficult to determine from the wording alone if these items did not adequately represent the element or if participants did not understand the item's relationship to the element. For example, in the element Influence, the corrected item-total correlation for the students' say in course selection was low compared to the students' say in program requirements and course content. The item course selection was intended to identify if students felt they had an influence in what courses were offered. The item, program requirements, was designed to rate students' perception of their influence over choosing courses that comply with the requirements. For example, one program may require two language credits. Some students may choose an English course and a French course, others may choose a Spanish course and a German course. It may be students understood course selection to mean influence over the course schedule timetable from which they choose their courses for a term. This concept is quite different from the one intended. The preliminary item analysis suggested that the relationship among items in some of the elements was variable, and that the items may possibly be measuring dissimilar constructs. This possibility suggested that factor analysis of the elements would be appropriate and helpful to determine the composition of the elements.

Factor Analysis of Items in Elements

The rational construction of the CUES elements and items was an initial step in the attempt to identify variables related to the university environment. A statistical exploration of the resulting rational constructs and items was next. Principle Component Analysis with varimax rotation was employed to investigate the composition of the elements and the relationship between the items in each element. The number of extracted factors ranged from 1 to 3 in the different elements for a total of 31 first-order factors. The factor loadings of elements and percentage of variance accounted for are presented in

Appendix I. The resultant factors of the elements were included in further analyses to help describe students' perceptions of the university environment, predictors of satisfaction and GPA, and scale characteristics of CUES.

The Financial element measures where students get money for their educational expenses. Three factors were extracted. The first factor concerns funding from sources other than self/family. These funds include money provided through scholarships from community, business and university organizations, and government sponsored loans. The second factor identifies self and family funding. The third factor is bank/private loans.

The Physical element measures the physical resources available in the university environment. All seven items constituted one factor. This result suggests components of the physical environment were perceived by the students as similar or related constructs.

The Procedure element was constructed to evaluate the efficiency and cost effectiveness of administrative services. Two factors were extracted. The first factor extracted represents the flexibility of administrative services. Flexibility is defined as how responsive these services are to students' individual needs. The second factor concerns the efficiency of administrative services.

The Organization element was constructed to evaluate the organizational structure of the university. Three factors were extracted. The first factor extracted represents the main structures of the university organization, including administration and academic departments. The second factor identifies academic support services or structured activities such as tutorials and library services designed to help students in the educational process. The third factor identifies structures that are more individually oriented such as the counseling center and campus societies.

The Teaching Facilitation element was constructed to evaluate students' perceptions of aids that help professors to teach. Two factors were extracted. The first factor extracted concerns technological and innovative resources. Computer, audio and video technologies, libraries, and extra curricular activities make up this factor. The

second factor includes more traditional methods of teaching: lectures, overheads and chalkboards.

The Technical element was designed to evaluate technological support and equipment available at the university. Two factors were extracted. The first factor extracted reflects technological facilities and resources: computer, library and lab facilities, and their respective resources. These are interactive sources for information acquisition and processing. The second factor identifies audio and video resources. These resources seem to refer to more receptive sources of information and technical support as they are designed to present information to students.

The Professor Evaluation element was constructed to assess the evaluation process of professors. Two factors were extracted. The first factor extracted identifies how professors are evaluated for their teaching function. The second factor considers how professors are evaluated for other related duties like conducting scholarly research.

The Student Evaluation element was designed to measure evaluation methods of students' academic progress. Two factors were extracted. The first factor extracted reflects the procedure used in evaluating academic progress. Fairness, feedback and appeal policies are included in the evaluation procedure identified in this factor. The second factor considers standardization of evaluation methods as perceived by students in the present university and with other universities.

The Curriculum element was constructed to evaluate the availability of different courses based on their content. One factor was extracted suggesting students see these items as related constructs. It may be that students do not differentiate the contents of courses. However, the mean score for items in the Curriculum element was 3.19 ($sd = .57$), a very favourable endorsement, and suggests most courses were available. Students appeared to understand the question and found it to be a global construct.

The Learning Style element was constructed to evaluate the individual learning requirements of students. Two factors were extracted. The items in the first factor reflect

the responsiveness of timetables and scheduling to students' needs. These include lecture length, time of day, and part-time or full-time attendance. The second factor identifies options students may have concerning educational processes. These processes include teaching format, grading method and educational requirements.

The Effectiveness element was constructed to evaluate students' perception of the quality of teaching and learning that occurs. One factor with seven items was extracted. The essence of students' perception of what constitutes effective teaching that facilitates learning seems to have been represented by the seven items in this element.

The Social/Academic Support element was constructed to evaluate the various support services available for individual counseling. One factor was extracted, suggesting that students see these items as related or similar constructs. These services are structured opportunities for students who seek guidance or help in resolving different issues.

The Influence element was designed to address the various ways students exert pressure on different aspects of the university system. For example, higher enrollment numbers may result in larger classes or in more course sections offered. Three factors were extracted. The first factor identifies educational processes that are somewhat responsive to students' needs. These processes include program requirements, teaching style, learning style and course content. Students sometimes select programs or courses that are perceived to be similar to their learning style or aptitudes. The second factor is made up of university issues and policies. The third factor identifies a single item, course selection. It may be students understood this item to mean the course schedule timetable from which they choose their courses for a term.

The Social/ Recreation Activities element was constructed to evaluate the opportunities for socializing and participating in recreational activities in the university environment. Two factors were extracted. The first factor identifies opportunities for organized social and recreational activities on campus. The second factor identifies non-traditional social and recreational opportunities such as classrooms and off-campus

facilities.

The Scholarly element was designed to assess the university services that meet the scholastic aspirations of students. Two factors were extracted. The first factor extracted identifies established structures, such as educational programs and course content, for students to meet their intellectual goals. The second factor reflects innovative opportunities to enhance scholastic learning, including experiences, extra-curricular activities and colloquia.

The Job/Career element was constructed to evaluate whether students' job or career aspirations were met with the education provided by the university. Two factors were extracted. The first factor identifies career enhancement opportunities. These opportunities range from educational programs to external experiences that direct students' attention to future jobs or careers. These include acquisition of job skills, accumulation of educational credentials, and networking opportunities. The second factor identifies job experience in a university setting. Experience is gained in the context of the university setting and is more closely related to students' educational experience in general.

In summary, the item analysis began with checking means, standard deviations, inter-item correlations, and corrected item-total correlations. Negative correlations between some items and corrected item-total correlations less than .30 for some elements guided the decision to employ a Principle Component Analysis to investigate the composition of the elements and the relationship of items in each element. The factor structure of the elements suggests there are 31 first-order factors in the CUES. These factors represent different features of the elements. The unique and important information these features can provide in describing the university environment suggests it is appropriate to continue the analysis using the 31 first-order factors.

Cronbach's Alpha

The exploration of the CUES as a reliable instrument continued with evaluating the internal consistency of the original CUES elements in relation to the obtained factor structures in the previous section. Cronbach's alpha measures the internal consistency of a scale. In the CUES each element was constructed to represent distinct constructs, therefore the reliability analysis was employed at the element level. Item analysis suggested there were some elements with variable inter-item relationships, for example within the Financial element. Internal consistency relies on moderate to strong homogeneity among items. The alpha coefficients were calculated for the original elements (7-items) and for the first-order factor that accounted for the most variance in each element. The premise was that first-order factors would be more homogeneous than the original elements and should demonstrate higher internal consistency. Table 5 lists two sets of alpha values for each element; first the alpha values for the original elements and second the alpha values for the first-order factor extracted (items range from 3 to 7) in each element. The alpha coefficients for elements within the single factors range from a low .37 to a high .91 (mean = .74, s.d. = .13). Alpha coefficients in the original elements range from .32 to .88 (mean = .72, s.d. = .13). Although comparable, the alpha coefficients do suggest that the factors are an improvement in terms of internal consistency.

There are some differences in the alpha values that suggest the factor design offers an improvement in reliability. The clearest improvement is in the increase of alpha in six elements; Finance, Teaching Facilitation, Professor Evaluation, Influence, Social/Recreation Activities, and Scholarly. The decrease in alpha in five elements is not much of a concern because if these first-order factors were augmented to 7 moderately homogeneous items each, then alpha would mathematically improve.

Table 5.
Alpha Coefficients of CUES Elements with 7 Items and with Strongest Factor

Element	Alpha (all 7 items)	Alpha (# items in factor)
Financial	.32	.37 (4)
Physical	.80	.80 (7)
Procedure	.72	.69 (4)
Organization	.61	.56 (3)
Teaching Facilitation	.56	.66 (5)
Technical	.78	.72 (5)
Professor Evaluation	.75	.80 (5)
Student Evaluation	.73	.68 (4)
Curriculum	.82	.82 (7)
Learning Styles	.75	.72 (4)
Effectiveness	.81	.81 (7)
Social/ Academic Support	.88	.88 (7)
Influence	.74	.83 (5)
Social/ Recreation	.78	.91 (5)
Scholar	.68	.74 (4)
Job/Career	.81	.79 (5)

That is, a scale with 10 items will have a greater alpha value than a subset of 5 items from the same scale because alpha coefficients are affected by both the item consistency and the number of items. The decrease in alpha values in the first-order factors is influenced by the lower number of items. Item analysis, factor analysis and the examination of alpha values suggest that the CUES elements have some diversity. More homogeneous elements could be constructed and included in the scale. The resultant scale would be an improvement in terms of reliability.

Second-Order Factor Analysis

The CUES elements were selected as discernible aspects of the university environment. The first-order factors suggest there are different features represented in each element. The next step in the assessment of CUES involved a second-order factor analysis to investigate the more general constructs or underlying factors present in the perceived university environment. Principle Components Analysis with varimax rotation

was conducted on the 31 first-order factors. Ten second-order factors were extracted with a total of 65.4% of variance accounted for (Table 6).

Factor 1 represents the program requirements and career enhancement opportunities in the university environment. This factor reflects the traditional role universities have held in offering technical and career oriented skills in response to students' needs and goals. This factor labeled, Technical and Career Objectives, suggests students perceive career-oriented education as an underlying factor in the university environment. Technical and Career Objectives accounted for 21.8% of the variance.

Factor 2 represents the evaluation and quality of education in the university environment. It includes different departments of the organization, evaluation measures of student progress, quality of teaching method, and program selection. This factor labeled, Academic Quality, offers an overview of the teaching and learning processes that occur in a university. Academic Quality accounted for 7.7% of the variance.

Factor 3 represents different facilities in the university environment. These facilities include physical grounds and buildings, classrooms, and technological resources. This factor labeled, Physical and Technical Facilities, has drawn together the physical attributes that were evaluated by items in three elements: Physical, Organization, and Technical. Technical and Physical Facilities are oriented to support services for students. These include residences, common areas, libraries, and computer labs. Technical and Physical Facilities accounted for 6.0% of the variance.

Factor 4 represents the curriculum, course selection and scheduling structure in the university environment. This factor, Academic Programs, appears to measure the responsiveness of the university to the student's learning style. The interaction between students' learning styles and curriculum is understandable because students seek courses that pertain to their individual abilities and interests. They select courses based on content, interest and individual faculty. This factor accounted for 5.5% of the variance.

Table 6
Second-Order Factor Loading of CUES First-Order Factors

Factor	First-Order Factor	Loading	Percent of Variance
Technical and Career Objectives	job/career 2	.77	21.8
	job/career 1	.74	
	influence 1	.64	
	teaching facilitation 1	.63	
Academic Quality	teaching facilitation 2	.72	7.7
	professor evaluation 1	.70	
	student evaluation 2	.58	
	student evaluation 1	.55	
	organization 1	.52	
	effectiveness 1	.51	
	scholar 1	.46	
Technical and Physical Facilities	technical 1	.65	6.0
	technical 2	.64	
	organization 2	.63	
	physical 1	.59	
Academic Programs	influence 3	.78	5.5
	learning style 2	.63	
	learning style 1	.60	
	curriculum 1	.53	
Support Systems	recreate 1	.77	5.3
	scholar 2	.61	
	support 1	.54	
	financial 1	.43	
	recreate 2	.37	
Administration Services	procedure 1	.83	4.4
	procedure 2	.71	
Career and Professional Activities	professor evaluation 2	.71	4.0
	organization 3	.61	
Influence on Policy	influence 2	.84	3.8
Bank Loans	financial 3	.81	3.6
Self/Family Funding	financial 2	.84	3.3
total variance			65.4

Factor 5 represents the different support structures in the university environment. These support structures range from scholarship funding to social support. Factor analysis has drawn together the different types of support inherent in the system to constitute Support Systems. Social support from recreational and social activities, funding, and institutional support services are distinct but necessary supports for students' well-being and academic success. Although, these support structures are conceivably used for different purposes and at different times, students appear to perceive their value in aiding their education as a whole. Support Systems accounted for 5.3% of the variance.

Factor 6 represents the administrative services of the university. The separation of administrative tasks from teaching and learning suggests students' perceive administration as a non-learning aspect of the system. Although the university cannot function nor survive without administrative support, it may be that students perceive administration services to be separate from other educational processes and thus it constitutes a factor on its own. This factor, Administration Services, accounted for 4.4% of the variance.

Factor 7 drew together societies, counseling centre and professor evaluation. This factor labeled, Career and Professional Activities, identifies the various opportunities students and professors have to network with colleagues and develop their professional role outside of the traditional classroom setting. This factor accounted for 4.0% of the variance.

Factor 8 is a single item factor of student influence on university issues and policies. This factor, Influence on Policy, suggests that university issues and policies relate indirectly to the educational process in the university environment. students did not appear to perceive a relationship between university policy and learning. This result is counterintuitive to the systems approach that suggested students would be sensitive to administrative issues (Levine & Perkins, 1987). Influence on Policy accounted for 3.8% of the variance.

The last two factors are single items: Factor 9 is bank loans, and Factor 10 is

self/family funding. These private financing sources are seen as unique and separate issues by the students. Bank Loans include lines of credit, non-government student loans and personal loans. This factor accounted for 3.6% of the variance. Self/Family Funding represents savings students may have from summer jobs, part-time jobs during the academic year, and financial contributions from their family. This factor accounted for 3.3% of the variance.

The ten second-order factors help clarify the general constructs, as defined in the CUES, in the university environment. Some of the constructs are more traditional representations of the university including Technical and Career Objectives, Academic Quality, Technical and Physical Facilities, Academic Programs, Support Systems, and Administration Services. The CUES was also able to discriminate some non-traditional constructs inherent in the university environment, including Career and Professional Activities, Influence on Policy, Bank Loans and Self/Family Funding. The following sections describe how students perceive the university environment, and investigate the relationship between the CUES with student satisfaction and achievement.

Efficacy of Describing the University Environment

The efficacy of a scale is partly dependent on its reliability, that is, the consistency of its items. The previous results suggest that most of the CUES elements are sufficiently reliable to use as an evaluation instrument for the university environment. The efficacy of a scale is also dependent on validity, that is, it measures what it professes to measure. The effectiveness of the CUES first-order and second-order factors in describing and evaluating the university environment was assessed with criterion-related validity and congruent validity.

Correlation of CUES First-Order Factors, Satisfaction and GPA

Criterion-related validity was considered with correlation of CUES first-order factors with satisfaction as defined in GEM, and GPA (Table 7). Twenty of the 31 first-

order factors significantly correlated with the GEM. These correlations suggest there is a significant relationship between students' self-reports of satisfaction and different aspects of the university environment. Psychosocial climate, teaching style and subject matter have been reported in literature as important variables in student satisfaction and are supported by these results. The first-order factors that resemble these constructs, Teaching Facilitation (factors 1 and 2), Curriculum, Learning Styles (factors 1 and 2), Effectiveness, Support and Recreation (factor 1), are significantly correlated with student satisfaction. These results suggest the CUES may be able to discriminate the relationship between psychosocial climate, teaching style, subject matter and satisfaction.

Financial support in the form of university, business and community organization scholarships has a significant relationship with satisfaction ($r = .25, p < .05$). Scholarships are one type of support available in the university environment. Technological facilities, scholastic goals, and departmental infrastructure also have significant positive relationships with students' satisfaction. Factors from Procedure, Technical, Professor Evaluation, Student Evaluation, Scholarly, and Job/Career are significantly correlated with student satisfaction. In this study, satisfaction is not significantly related to the physical features in the environment, rather satisfaction seems to be related to their perceptions of the processes and structures inherent in the system.

The significant correlations between first-order factors and GPA were fewer than with the satisfaction measure (Table 7). The significant correlations with factors from Teaching Facilitation, Professor Evaluation, and Effectiveness suggest that the quality of faculty and effective teaching have a positive relationship with student achievement. It is also likely that students who do well academically value the quality of teaching and learning in the university environment. The significant relationship between quality faculty and achievement is consistent with reported findings in other research projects (Astin & Panos, 1969; Grimes, 1995).

Table 7.
Correlation of Satisfaction (GEM), GPA and CUES First-Order Factors

CUES Element	GEM	GPA
Financial		
Factor 1	.25*	.22*
Factor 2	.08	.01
Factor 3	-.11	-.19
Physical	.08	.08
Procedure		
Factor 1	.21*	-.04
Factor 2	.04	.02
Organization		
Factor 1	.17	.19
Factor 2	.13	-.16
Factor 3	.18	.04
Teaching Facilitation		
Factor 1	.26**	.08
Factor 2	.26**	.31**
Technical		
Factor 1	.33**	.09
Factor 2	.23*	.07
Professor Evaluation		
Factor 1	.44**	.29**
Factor 2	.19	-.09
Student Evaluation		
Factor 1	.35**	.18
Factor 2	.38**	.16
Curriculum	.36**	.20*
Learning Styles		
Factor 1	.24*	.23*
Factor 2	.21*	.09
Effectiveness	.56**	.32**
Support	.27**	.00
Influence		
Factor 1	.25**	.03
Factor 2	.15	.00
Factor 3	.15	.10
Recreation		
Factor 1	.27**	.10
Factor 2	.09	-.04
Scholarly		
Factor 1	.49**	.32**
Factor 2	.28**	.00
Job/Career		
Factor 1	.34**	-.04
Factor 2	.25**	-.05

* p < .05

** p < .01

Curriculum, Learning Styles and Scholarly were also significantly correlated with GPA. Educational programs, curriculum content and course scheduling are positively related to student achievement. The first-order factors of these elements represent the traditional learning activities in the university environment, and GPA is the standard method of evaluating learning activities. These results highlight the relationship between learning and achievement. The effect learning activities has on individual performance cannot be determined without considering a third variable, ability.

Scholarship funding was also significantly correlated with GPA, $r = .22$, $p < .05$. Pre-existing abilities can account for this relationship as students with the highest academic achievement tend to be the recipients of scholarships and bursaries.

Table 8.

Correlation of Satisfaction, GPA and CUES Second-Order Factors

Second-Order Factor	Satisfaction	GPA
1. Technical and Career Objectives	.38**	.03
2. Academic Quality	.60**	.38**
3. Technical and Physical Facilities	.26**	.06
4. Academic Programs	.37*	.23*
5. Support Systems	.38**	.09
6. Administration Services	.17	-.02
7. Career and Professional Activities	.23*	-.04
8. Influence on Policy	.15	.00
9. Bank Loans	-.11	-.19
10. Self/Family Funding	.08	.01

* $p < .05$ ** $p < .01$

The numerous significant correlations of 31 first-order factors with satisfaction and GPA suggested that the CUES has good criterion-related validity. In order to determine whether criterion-related validity was present for the underlying constructs in CUES, a second correlation matrix with second-order factors, satisfaction and GPA was analyzed (see Table 8).

Technical and Career Objectives, Academic Quality, Technical and Physical

Facilities, Academic Programs, Support Systems, and Career and Professional Activities have significant positive relationships with satisfaction. That is, students found 6 out of 10 discernible features of the university environment as important to their overall sense of satisfaction. These results contribute to the interpretation that CUES has criterion-related validity as a measure of student satisfaction of the university environment. Two significant relationships with GPA were identified with the second-order factors: Academic Quality ($r = .38, p < .01$) and Academic Programs ($r = .23, p < .05$). The CUES identified teaching processes, learning processes, and educational programming as important variables in relation to achievement. Criterion-related validity between the CUES and achievement is reflected by these correlations.

Criterion-related validity was first assessed by the correlations of 31 first-order factors with satisfaction and GPA, and second with the second-order factors. The significant relationships found in these two correlation matrices suggest the CUES can provide important and significant information about students' satisfaction and academic achievement in relation to discernible features in the university environment.

Correlation of CUES Elements and CUCEI Subscales

The CUCEI was included in the study to assess congruent validity with CUES. The CUCEI was chosen as a comparable measure of the university environment for three reasons. First, the psychometric properties reported in the literature suggested it was a reliable and valid instrument for evaluating the university classroom environment, (Fraser, 1993; Fraser et al., 1986). Second, the items were constructed for university students not junior or senior high school students. Third, based on the description of CUCEI subscales, certain CUCEI subscales appeared to be similar to certain CUES elements. Alpha values of the CUCEI subscales are presented in Table 9. The alpha values for CUCEI subscales in this study, mean = .66, were generally lower than those reported by Fraser (1993), mean = .77.

Table 9.
Alpha Coefficients of CUCEI Subscales

CUCEI Subscale	Present Study Alpha	Published Alpha*
Personalization	.70	.80
Involvement	.62	.70
Student Cohesiveness	.78	.84
Satisfaction	.78	.87
Task Orientation	.42	.70
Innovation	.68	.72
Individualization	.65	.74

* Adapted from Fraser, 1993

Correlations of CUES original elements, first-order factors and CUCEI subscales were conducted to investigate congruent validity. Table 10 presents the correlations of CUES elements that were expected to correlate with CUCEI subscales. In review: Personalization is the type of individual attention the professor gives to students; Involvement is the amount of classroom participation; Student Cohesiveness is how well students know each other; Satisfaction defines how much students enjoy attending class; Task Orientation is the rules and course expectations; Innovation is how many novel activities there are; and Individualization is how much the student works on his or her own. Expected significant relationships were found between Teaching Facilitation and Innovation ($r = .18, p < .05$), Effectiveness and Satisfaction ($r = .35, p < .01$), and Social/Recreation Activities and Student Cohesiveness ($r = .31, p < .01$). Contrary to theoretical expectations the following correlations were not significant: Curriculum and Task Orientation, Learning Styles and Individualization, Social/Academic Support and Personalization, and Influence and Involvement. The correlations between the 31 first-order factors and CUCEI subscales confirm the absence of several expected relationships. At this level, only Effectiveness and Social/Recreational Activities factors 1 and 2 were significantly correlated with Satisfaction and Student Cohesiveness, respectively. These findings suggest the CUES and CUCEI subscales measure only a few

Table 10.
Correlation of CUES Elements, CUES First-Order Factors and CUCEI Subscales

CUES Element	CUCEI Subscales	Correlation
7-Item Elements		
Teaching Facilitation	Innovation	.18*
Curriculum	Task Orientation	-.01
Learning Styles	Individualization	.13
Effectiveness	Satisfaction	.35**
Social/Academic Support	Personalization	.05
Influence	Involvement	.15
Social/Recreation Activities	Student Cohesiveness	.31**
First-Order Factors		
Teaching Facilitation	Innovation	
Factor 1		.16
Factor 2		.10
Curriculum	Task Orientation	-.01
Learning Styles	Individualization	
Factor 1		.15
Factor 2		.07
Effectiveness	Satisfaction	.35**
Social/Academic Support	Personalization	.05
Influence	Involvement	
Factor 1		.11
Factor 2		.17
Factor 3		.07
Social/Recreation Activities	Student Cohesiveness	
Factor 1		.24*
Factor 2		.26**

*p < .05

**p < .01

similar theoretical constructs.

A review of all correlations between the 16 CUES elements and the 7 CUCEI subscales was conducted to examine other possible relations (Table 11). Student

Table 11.
Correlation of CUES Elements (7-items) and CUCEI Subscales

	Per	Inv	StC	Sat	Task	Inn	Ind
Finance	-.07	-.03	.01	.14	.05	.02	.01
Physical	.08	-.07	-.01	.00	-.10	.14	.10
Procedure	.02	.11	.07	.24*	-.08	.09	.27**
Organization	.12	.19*	.27**	.31**	.10	.19	.35**
Teaching Facilitation	.05	.14	.27**	.19*	.06	.18*	.19*
Technical	.03	-.02	.22*	.12	-.07	.19*	.15
Professor Evaluation	.15	.05	.21*	.12	.00	.19*	.21*
Student Evaluation	.11	.17	.24*	.39**	.16	.12	.22*
Curriculum	.13	.05	.21*	.17	-.01	.18	.14
Learning Styles	.07	.04	.03	-.01	.04	.10	.13
Effectiveness	.20*	.24*	.36**	.35**	.01	.24**	.37**
Support	.05	.01	.22*	.13	-.02	.15	.22*
Influence	.16	.15	.22*	.11	-.06	.11	.26**
Recreation	.24*	.07	.31**	.13	-.02	.17	.19*
Scholarly	.18	.13	.28**	.23*	.00	.24**	.22*
Job/Career	.09	.06	.21*	.12	.06	.10	.10

* $p < .05$

** $p < .01$

Note: Per - Personalization
 Inv - Involvement
 StC - Student Cohesiveness
 Sat - Satisfaction
 Task - Task Orientation
 Inn - Innovation
 Ind - Individualization

Cohesiveness significantly correlated with 12 CUES elements, Satisfaction with 6 elements, and Individualization with 9 elements. The numerous correlations between CUES elements and CUCEI subscales were unexpected. Correlations between CUES first-order factors and CUCEI subscales were conducted to examine these relations in more detail. Correlations between all 31 first-order factors and CUCEI subscales are

presented in Appendix J. Personalization significantly correlated with 6 CUES first-order factors, Student Cohesiveness with 15 first-order factors, Satisfaction with 7 first-order factors, and Individualization with 9 first-order factors. The results suggest that the CUES factors do correlate with the CUCEI subscales. However, the correlation of CUES factors with several CUCEI subscales at the same time questions the distinctiveness of the CUCEI subscales. A similar problem with using the CUCEI for establishing congruent validity was reported by Winston et al. (1994). Their paper reported a lack of discriminability among the CUCEI subscales. Consequently, an investigation into the CUCEI factor structure was initiated.

Table 12.
Factor Loading of CUCEI Subscales

Subscale	Factor 1	Factor 2
Personalization	.53	.55
Involvement	.50	.66
Student Cohesiveness	.70	.22
Satisfaction	.43	.69
Task Orientation	-.19	.89
Innovativeness	.68	.16
Individualization	.88	-.02
Percent of Variance	46.8	18.0

Principle Components Analysis with varimax rotation was conducted to investigate the factor structure of the CUCEI. Two factors were extracted from the seven CUCEI subscales (Table 12). Even here, three of the CUCEI subscales loaded substantially on both factors. The unexpected relationships between the CUES elements and CUCEI subscales are explained by the lack of discrimination among CUCEI subscales.

Testing of Hypotheses

The CUES ability to identify which aspects of the university environment, as perceived by students, have the greatest role in the prediction of satisfaction and GPA was investigated by testing the following two hypotheses. First, the extracted factors most similar to psychosocial climate, teaching style, and subject matter were hypothesized to enter a regression equation in the prediction of satisfaction. Second, the extracted factors most similar to psychosocial climate, teaching style, and subject matter were hypothesized to enter a regression equation in the prediction of GPA.

The hypotheses were tested in two parts. First, they were tested with the 31 first-order factors, and second, with the 10 second-order factors. A mixed hierarchical and stepwise design was employed. Pre-established abilities, as measured by High School Marks, were entered on the first step of each regression. The rest of the factors were entered in stepwise fashion. This design was chosen because the first step accounts for all the variance that can be attributed to students' pre-established academic performance. Any tendency for high achieving students to be more satisfied, perform better or assertively interact with the university environment is accounted for with this design. Therefore, the results of the stepwise portion of the regression represents the variance the CUES factors contribute to the prediction of satisfaction and achievement with the influence of pre-established abilities partialled out.

The Prediction of Satisfaction and GPA with First-Order Factors

Item content was reviewed to define how CUES represents psychosocial climate, teaching style and subject matter. The first-order factors most closely resembling psychosocial climate include Social/Academic Support, Procedure (factor 1) and Recreation (factors 1 and 2). The first-order factors most closely resembling teaching style include Teaching Facilitation (factor 2), Professor Evaluation (factors 1 and 2) and Effectiveness. The first-order factors most closely resembling subject matter include

Curriculum, and Learning Style (factor 1).

A mixed hierarchical and stepwise multiple regression with 31 first-order factors was conducted to predict satisfaction as defined in the GEM (Table 13). High School marks were entered on the first step to account for the influence of pre-established

Table 13.

Stepwise Multiple Regression of First-Order Factors Predicting Satisfaction and GPA with High School Marks Entered on First Step

Predictor	R Square	F	Final Beta
Prediction of Satisfaction			
Step 1. High School Marks	.05	4.39*	.01
2. Effectiveness	.29	17.04***	.27**
3. Professor Evaluation (factor 1)	.38	16.56***	.28**
4. Scholarly (factor 2)	.42	14.59***	.25**
5. Student Evaluation (factor 2)	.45	13.31***	.22*
Prediction of GPA			
Step 1. High School Marks	.22	21.17***	.36***
2. Finance (factor 3)	.29	15.06***	-.34***
3. Finance (factor 1)	.35	13.45***	.28**
4. Professor Evaluation (factor 1)	.39	11.72***	.25**
5. Procedure (factor 1)	.44	11.28***	-.23**
*p < .05 **p < .01 ***p < .001			

abilities. High School Marks was a significant predictor of satisfaction, $F(1, 84) = 4.39$, $p < .05$, and contributed 5% of the variance. The final beta value was not significant; the influence of High School Marks was not found to be a strong predictor of satisfaction. The 31 first-order factors were then entered in stepwise fashion. Effectiveness, Professor Evaluation (factor 1), Scholarly (factor 2) and Student Evaluation (factor 2) entered in the regression equation as significant predictors of satisfaction, final $F(5, 80) = 13.31$, $p < .001$. These elements contributed 40% of the variance beyond the high school grade contribution. The first hypothesis was partially supported: teaching style (Effectiveness,

Professor Evaluation factor 1) entered the regression equation for the prediction of satisfaction. Psychosocial climate and subject matter were not represented by the factors that entered the regression equation. The non-predictive value of these variables may indicate this aspect of the learning environment is less important in the prediction of university students' satisfaction compared to junior or senior high school students. The results suggest that students' perceptions of the quality of teaching, quality of faculty, educational opportunities, and consistency in student evaluations are more predictive of students' satisfaction in the university environment.

A mixed hierarchical and stepwise multiple regression with 31 first-order factors was conducted to predict GPA (Table 13). High School marks were entered on the first step to account for the influence of pre-established abilities. High school marks was a significant predictor of GPA, $F(1, 76) = 21.17, p < .001$, and contributed 22% of the variance. The 31 first-order factors were entered in stepwise on the second step. Financial (factor 3), Financial (factor 1), Professor Evaluation (factor 1), and Procedure (factor 1) were significant predictors of GPA, final $F(5, 72) = 11.28, p < .001$, and contributed 22% of the variance beyond the high school contribution. The second hypothesis was partially supported with psychosocial climate (Procedure factor 1) and teaching style (Professor Evaluation factor 1) entering the regression equation in the prediction of GPA. The university environment for university students seems to have a different relationship with achievement than what has been reported for junior and senior high students in the literature.

Financial (factor 1) is composed of scholarship funding and Financial (factor 3) is composed of bank/private loans. Bank/private loans have a negative final beta, $B = -.34, p < .001$; scholarship funding has a positive final beta, $B = .28, p < .01$. These results suggest the brightest students receive university, community and business scholarship funding and do not require private loans. The funding available in the university environment may attract high quality students or the receipt of funding may motivate

students to perform at optimal levels. The exact relationship cannot be determined from this regression but the issue of funding is recognized as significant for predicting academic achievement. The quality of faculty and the flexibility of administrative procedures also predict GPA. It is possible these elements attract high quality students and motivate them to achieve.

The Prediction of Satisfaction and GPA with Second-Order Factors

Theoretical interpretations of the 10 factors were reviewed to determine which factors represent the constructs psychosocial climate, teaching style, and subject matter. The second-order factors most closely resembling psychosocial climate were Support Systems and Administration Services. The second-order factor most closely resembling teaching style was Academic Quality. The second-order factor most closely resembling subject matter was Academic Programs.

A mixed hierarchical and stepwise multiple regression with 10 second-order factors was conducted to predict satisfaction as defined in the GEM (Table 14). High School Marks were entered on the first step to account for the influence of pre-established abilities. High School Marks was a significant predictor of satisfaction, $F(1, 84) = 4.39$, $p < .05$, and contributed 5% of the variance. The final beta value was not significant; therefore, High School Marks were not a strong predictor of satisfaction. The ten second-order factors were then entered in stepwise fashion. Academic Quality and Support Systems entered in the regression equation as significant predictors of satisfaction, $F(3, 82) = 18.93$, $p < .001$ and contributed 36% of the variance beyond high school marks. These results partially support the first hypothesis: extracted factors most similar to psychosocial climate (Support Systems) and teaching style (Academic Quality) entered the regression in predicting satisfaction. Academic Quality, teaching and learning processes, loads as the strongest predictor of satisfaction. Support Systems, including

Table 14.
Stepwise Multiple Regression of Second-Order Factors Predicting Satisfaction and GPA
with High School Marks Entered on First Step

Predictor	R Square	F	Final Beta
Prediction of Satisfaction			
Step 1. High School Marks	.05	4.39*	-.01
2. Academic Quality	.37	24.30***	.54***
3. Support Systems	.41	18.93***	.21*
Prediction of GPA			
Step 1. High School	.22	21.17***	.34***
2. Bank/Private Loans	.29	15.06***	-.29**
3. Academic Quality	.33	12.29***	.31**
4. Administration Services	.38	11.36***	-.24**
*p < .05 **p < .01 ***p < .001			

academic support, social support and institutional financial support, are the second and last significant predictor of satisfaction.

A mixed hierarchical and stepwise multiple regression with 10 second-order factors was conducted to predict GPA (see Table 14). High School marks were entered on the first step to account for the influence of pre-established abilities. High school marks were a significant predictor of satisfaction, $F(1, 76) = 21.17$, $p < .001$, and contributed 22% of the variance. The ten second-order factors were then entered in stepwise fashion. Bank Loans, Academic Quality and Administration Services entered the regression equation as significant predictors of GPA, $F(4,73) = 11.36$, $p < .001$ and contributed 16% of variance beyond high school marks. Psychosocial climate (Administration Services) and teaching style (Academic Quality) can significantly predict achievement as hypothesized. This regression is very informative because Academic Quality predicts GPA even after the effect of pre-established ability is accounted for by entering high school marks on the first step. This finding suggests that good teaching results in good grades. Another explanation may be that students with good grades rate teaching more

favourably. However, by partialling out the effects of High School grades this seems unlikely. It could be that students who receive better grades than expected, based on their High School performance, attribute their better grades, in part at least, to the teaching. Subject matter did not predict achievement as hypothesized.

In this regression, the factor most representative of psychosocial climate (Administration Services) is a negative significant predictor of achievement, final Beta = $-.24$, $p < .01$. This finding is contrary to the hypothesized positive influence on achievement. It is possible that students who emphasize Administration Services are not focused on the academic aspects of university life. However, students who are struggling academically may have more interaction with administration. For example, these students may drop courses mid semester or they may require special permission to attend some courses.

The factor Bank Loans is a negative predictor for achievement, final beta, $-.29$, $p < .01$. This suggests private bank loans (Factor 9) have an adverse effects on achievement. Less successful students may represent a select group that are not able fund their education through scholarships.

Summary. In general, both the 31 first-order factors and the 10 second-order factors suggest the experiences and perceptions of university students may be interpreted with the CUES. The statistical analysis of CUES consisted of two parts, scale analysis and efficacy. Item analysis, inter-item correlations, and item-total correlations suggested the CUES elements were somewhat variable in their consistency. Therefore, a first-order factor analysis was conducted and used in subsequent analysis to describe the university environment from the students' perspective. Second-order factor analysis was employed to examine the underlying constructs in CUES. Ten extracted factors improved the interpretability of the CUES in relation to students' perceptions of the university environment. Criterion-related validity was assessed to be good and congruent validity was inconclusive due to psychometric difficulties with the CUCEI. Some hypotheses were

supported and several differences were noted between published relationships found for junior and senior high students, and the current results with university students.

Discussion

The purpose of this study was twofold: first, to undertake a comprehensive systems evaluation of the university environment from the students' perspective, and second, to determine which aspects of the university environment relate to student satisfaction and achievement. Various facets of the university, and their relationship with satisfaction and achievement, were explored, some of which predicted satisfaction and achievement. The findings in this study were based on the CUES, a rationally constructed instrument designed to provide a comprehensive systems evaluation of colleges and universities. The proposed new scale was an attempt to fill a gap in the research because many of the previously published instruments were limited to measuring classroom environment and not various aspects of the institution.

The methodological approach of this study provided two levels of information about the university environment. The first-order factors highlighted specific, single elements inherent in the university environment from the students' perspective. The second-order factors drew together similar constructs and provided a way to describe more global aspects of the university experience from the students' perspective. Both the first-order factors and second-order factors provide pertinent information about the university environment. The first-order factors represent specific details encountered in the university environment. For example, in the Social/Recreation Activities element, the two first-order factors delineate traditional or university sponsored opportunities for recreation and non-traditional opportunities such as off-campus facilities. These specific details may provide entry points for intervention or change. The 10 second-order factors draw together the underlying constructs in the CUES in a more general way. For example, the two first-order factors in Social/Recreation Activities load

on the second-order factor Support Systems. Support Systems, a description of the various types of support, can thus be evaluated as a whole and provide insight into the general level of support available in the university environment as perceived by students.

First-Order Factors

The first-order factor analysis at the element level indicated that students' perceptions of the university environment could be conceptualized in 31 discrete factors. A review of these factors suggested that they are reasonable expressions of students' experiences and are discussed further here.

The Financial element was constituted of three types of funding: funding from sources other than self/family, that is, scholarships, and government sponsored loans (Finance 1), self and family funding (Finance 2), and bank/private loans (Finance 3). The first type of funding, scholarships and government loans, addressed the financial resources available to the student in the university environment. Scholarships, provided by the university, businesses and community organizations, are typically available in the university environment. Sponsors of government loans make forms available to students at the university, and they provide on-set loan processing at certain times of year. Students who are supported by self or family funding appear to not associate these funds as part of the university environment per se, rather they see them as outside sources of financing. The same can be said for private/bank loans.

The Physical element was perceived as a single entity by the students in this study (Physical 1). It was assumed from the findings that the students in this sample were generally not overly concerned with the quality of it. This lack of appreciation for one's physical surroundings was suggested by the lack of relationship with student satisfaction. Student satisfaction will be discussed in more detail in a later section.

The Procedure element was constructed to represent the way administrative services are dispensed. Students' responses suggested they perceive these activities as two

factors: flexibility (Procedure 1) and efficiency (Procedure 2). The flexibility of administrative services is defined by the setting of tuition fees, how available the services are outside of business hours, and the availability of an appeal process. The efficiency of administrative services addressed the ease of processing requests such as registration. Students separated these two aspects of administrative services suggesting that flexibility is important and is a separate issue from that of efficiency.

The Organization element was constructed to evaluate the wide variety of organizational structures inherent in the university environment. Some of the structures sampled included administration, professor offices, academic departments, support services such as libraries, and ancillary programs such as campus societies. This range of sampling of the structures was diverse as suggested by the three factors that make up this element. The first factor identified the main or administrative functions of the university (Organization 1), the second factor identified the support services (Organization 2), and the third factor identified the ancillary activities (Organization 3). These three types of structures offer an insight into students' perceptions of administrative functions. The students in this study did not seem to perceive a connection between the various offices, departments, and services. Students seemed to perceive these to be separate entities, possibly because they are influenced differently by the various departments. Recent research had suggested that students are aware of the structures in the university and are influenced by them (McCarthy et al., 1990).

The Teaching Facilitation element was constructed to gauge students' perceptions about the aids professors use in their classrooms. This element asked students to identify how frequently teaching was facilitated by different aids. Students perceived this element to be two factors: technological resources (Teaching Facilitation 1), and traditional teaching methods (Teaching Facilitation 2). The technological factor included computer and audio-visual technologies, and resources outside the classrooms, including libraries,

and were found to be important as aids to teaching. Students separated the traditional teaching methods of lectures, overheads and chalkboards from the technological resources used in the classroom. It may be that the traditional teaching methods are viewed as somewhat outdated by students.

Building on the use of technology in the classroom, the Technical element attempted to evaluate the availability and adequacy of technical resources used as aids to teaching and learning in the university environment. Two types of technical support were identified with the two factors: technological facilities and resources (Technical 1), and audio-visual resources (Technical 2). The technological resources represent interactive sources for information acquisition and processing. Computers, libraries, and labs offer opportunities for this interaction. Audio-visual resources are used by students as receptive sources of information. These two factors suggested that students perceive the use of these technologies as serving different roles in the dispensing and acquisition of information.

The Professor Evaluation element was designed to assess the evaluation process of professors as understood by the student population. Students identified two ways in which professors are evaluated: for their teaching function (Professor Evaluation 1), and for their other related duties such as research projects (Professor Evaluation 2). Students appeared to realize that professors were evaluated on a regular basis with a standardized format.

The Student Evaluation element was composed of two factors: the evaluation procedure (Student Evaluation 1), and the standardization of evaluations (Student Evaluation 2). Fairness, feedback and appeal policies were included in the evaluation procedure factor. This was differentiated from the standardization of the procedures as similar or consistent in different courses and on a larger scale, consistent with other universities. It appears that students perceive fairness and standardization as distinct aspects of evaluation. The need for flexibility in evaluation methods is apparent in certain

types of courses, for example computer programming requires mastery type of evaluation, whereas, students with learning problems may require alternate evaluation methods (Grimes, 1995). It seems students recognize the need for flexibility in some courses.

The Curriculum element was included to evaluate the diversity of courses offered (Curriculum 1). It was found to be a single factor. Some of the courses sampled were computer technology, business management, and the sciences (biology, chemistry, etc.). It seems students conceptualize courses to have sufficient common features to view them as a global construct. Students enrolled in different degree programs tend to complete required core courses and electives. It is possible that students review all courses available in all disciplines when selecting their electives. This may account for the degree to which students are aware of the diversity of courses available at a university.

The Learning Style element was designed to evaluate the responsiveness of the university environment to individual preferences and educational requirements. Students perceived there were two factors involved: the responsiveness of timetables and scheduling to students' needs (Learning Style 1), and options of educational processes such as grading method or teaching format (Learning Style 2). Timetables and scheduling are structural components of the education system, where as grading and teaching formats reflect the process of education. The Learning Style element appears to have captured these two basic components of a system: structure and process.

The Effectiveness element, the quality of teaching and learning, was found to reflect the global construct of effective teaching (Effectiveness 1). This element was more subjective than most of the others as students were asked how often professors facilitated learning by means of competent lectures, sensitivity to students' needs, up-to-date knowledge, and professor availability. This type of question seemed to sample students' perceptions of the quality of teaching adequacy. Student comments during the study suggested they appreciated the opportunity to evaluate the teaching and learning process.

The Social/Academic Support element was found to evaluate the different types of counseling available to students, for example academic, financial and peer counseling (Support 1). The single factor in this elements suggested that the common features in the various types of counseling were apparent to the students in this study. Social support and academic help have long been considered essential ingredients for university students to prosper personally and academically (Astin & Panos, 1969; Grimes, 1995; Levin & Levin, 1991).

The Influence element was constructed to evaluate how much say students had in the daily functioning of the university environment. This element identified three types of influence: educational processes responsive to students needs (Influence 1), university issues and policies (Influence 2), and course selection (Influence 3). Students appear to perceive they have some influence in the educational programs and processes they participate in, and they differentiate this type of influence from their influence on university issues and policies. Students often choose a program before they choose a university and this may result in feelings of having a say in the educational process. Students perceive the more structural based course selection (Influence 3) as separate and distinct from educational processes.

The factor analysis of the Social/Recreation Activities element identified that recreational activities on-campus (Recreate 1) are conceptually different than off-campus and social opportunities in the classroom (Recreate 2). The opportunity to participate in recreational and social activities is thought to help students succeed at university (Levin & Levin, 1991; Moos, 1979). Social opportunities in the classroom, that is free time to interact with classmates before and after the lecture, were included as part of the Social/Recreation Activities element because psychosocial literature suggested a friendly classroom atmosphere was conducive to learning in junior high and senior high classrooms (Fraser et al., 1986; Moos, 1979). The low mean and low inter-item correlation with other items in the Social/Recreation Activities element suggested that

social opportunities in classrooms are less important to students at this level. It may be that the university student is able to separate work and recreation in a way younger students can not. Further investigation into the difference between the three groups, junior high, senior high, and university students is required.

The Scholarly element included two types of university services designed to meet their scholastic aspirations: established, traditional structures (Scholar 1) and innovative opportunities to enhance scholastic learning (Scholar 2). Students perceive the traditional structures of program selection, course content and challenge of educational programs as similar opportunities to meet their scholastic needs. Innovative opportunities to enhance scholastic learning, including extracurricular activities, colloquia, and field experiences are not directly related to classroom activities and were found to be conceptually different. This study did not address whether students prefer the traditional or non-traditional ways to meet their scholastic aspirations. Further research may help to define how students aspirations are met and what relationship this has with their academic progress.

The Job/Career element was included to evaluate if students perceived that the university environment met their needs for acquiring skills for a job or a career. Two factors were found: career enhancement opportunities (Job/Career 1) and job experience in a university setting (Job/Career 2). Students perceived career enhancement opportunities as job skills training, on the job experience, and networking contacts. Included in their career enhancement, but not as great as suggested by the lower factor loadings, was the selection of educational programs and scientific training at the university.

Second-Order Factors

The 31 first-order factors provide specific information about the university environment. However, a description of the university environment based on these factors

tends to be fragmented and simplistic. The information these factors can contribute to our understanding of the university environment is limited by the simplicity of the first-order factors. A more unified description of the university environment can be based on the more global constructs, or variables, identified in the second-order factor analysis. The second-order factors group together the 31 first-order factors in the way that students' perceive them in the university environment. The following second-order factors were found to be relevant variables to students during their educational experiences: Technical and Career Objectives, Academic Quality, Technical and Physical Facilities, Academic Programs, Support Systems, Administration Services, Career and Professional Activities, Influence on Policy, Bank Loans, and Self/ Family Funding.

One role of the university has been to promote students' career aspirations and to educate them appropriately to meet these goals. The Technical and Career Objectives addresses students' experiences in the university environment that relate to their future career plans. Job skills training and networking are part of students' experiences and their expectations in the university environment. Students appear to be attentive to the opportunities the university provides in these areas and they participate in them. For example, they join campus societies and network with peers. The technological support used in courses is also viewed as preparatory skills for future jobs and careers. Students appear to be sensitive to the current need for the acquisition of computer skills and information technology to compete in the job market. Technology in the classroom may be viewed as a timeline of skills acquisition that will be used to negotiate the transition from student to employee.

The way that students' evaluate the quality of educational programs is illustrated by the Academic Quality factor. Academic Quality, in terms of the quality of faculty, the effectiveness of teaching and the selection of educational opportunities, is a major part of students' everyday experiences in the university. Students seem to be aware of the basic functions

of education, namely, fair and consistent appraisals of their academic progress, the effectiveness of classroom instruction, and traditional teaching methods. This information about students' perceptions of the university environment broadens our view of students' experiences. This study suggests that the educational process, the learning environment, and the caliber of teaching are related variables in students' perception of the university environment.

Technical and Physical Facilities represent the technological resources and physical facilities that support the educational process in the university environment. Residences, classrooms, grounds, libraries, and computer labs all contribute to students' educational experiences by providing a learning environment rich with resources. Changes in how the world does business have included information processing techniques generated by computer use. Universities and colleges must address this issue in their curriculum by providing first-rate technological support (Hearn & Heydinger, 1985). Students in this sample seem to be aware of the requirements for technology in the work force.

The Academic Programs factor represents the course selection, curriculum, and scheduling available at the university. The basic educational process of the university as perceived by students is captured in this construct. This study points out that students can discriminate the content of educational programs from other variables such as evaluation and teaching. The discrimination between Academic Programs and Academic Quality suggests the two factors, although inter-related, have different meanings for students. These two factors can be interpreted as psychosocial climate (Academic Quality) and subject matter (Academic Programs). This study concurs with recent research (Fraser, 1991; Levin & Levin, 1991) that these two variables are salient variables in students' experiences in the university environment.

Several types of support are recognized by the students and fall under the global construct called Support Systems. Different types of support are reported to enhance

well-being (Barrera & Ainlay, 1983) and to promote positive transitions into college and university environments (Compas, Wagner, Slavin & Vannatta, 1986). Scholarship funding has been identified as one type of support offered by the university environment (Levin & Levin, 1991). Scholarships may be considered a benevolent act on the part of an association, a person or a department that grants the funding. However, in this study students perceived scholarships as part of an overall support system. Financial support has been considered as one determinant of persistence among students of minority backgrounds in the completion of their post-secondary education (Levin & Levin, 1991). The relationship between the general student population and funding requires further investigation.

Social support, as defined in Support Systems, is apparent in the social and recreational activities that are available in the university environment, and students recognize the importance of these activities in their daily lives. More individual-oriented support is discerned by students in their recognition that academic counseling, financial counseling, personal counseling and peer support are accessible to students in need of these services. This second-order factor has drawn together numerous types of support available in the university environment: social support, recreation, scholarships, opportunities to enhance scholastic goals, and counseling. Students can distinguish between the different types of support, yet they also perceive the availability of support services provided in the university environment as significant parts of an overall support system.

Students do not appear to view the flexibility and efficiency of Administration Services to be directly related to the educational process. Registration procedures, students' accounts, and departmental red-tape are not associated with the day-to-day learning environment by most students. Students appear to be more aware of the flexibility provided by administrative services when they are struggling academically, as suggested by the negative, albeit non significant, correlations with achievement. These

students may find they are dealing with the university administration on more occasions than students who are not having academic problems. One example, in the extreme, is the student on academic probation. This student may be required to attend help sessions and submit regular progress reports. In this case, there is no clear division between administration and education.

Students seem to also be cognizant of the career-related opportunities, as described by the Career and Professional Activities factor, that are available in the university environment. These activities, including career-related programs, information sessions, and opportunities to network, are offered at the counseling centres and through campus societies. Students are able to link their career aspirations with their educational experiences when they participate in these activities. The faculty also pursue ventures outside the classroom walls. These ventures include research projects, speaking engagements, and supervision of graduate students.

Students' Influence on Policy appears to be a less salient variable in the university environment. It was suggested by one participant that students do not have the time to become involved in policy-making activities. It is possible that what is often described as apathy for the current issues in education may, in reality, be a lack of energy on the part of students to participate on committees, or advisory panels. If this premise is true, then the committees, special interest groups or advisory panels may want to consider alternate ways to conduct their activities.

Funding is a significant aspect in describing the university environment. Two types of funding appear to be of concern to students at this time: Bank Loans, and Self/Family Funding. The expense a student incurs while attaining a post-secondary education is much greater than in the past. Students are less able to find summer employment during their years at university. Students are burdened with government loans for tuition costs that resemble, in size, small mortgages. More and more students are looking for bank loans to help cover their expenses. Traditionally students have

contributed self-earnings from summer jobs and parents have contributed considerable amounts of money. Family contributions are still important to students, however, whether private financing has become more prevalent and necessary cannot be surmised from this study.

Satisfaction

Satisfaction with one's learning environment has been a major focus of classroom environment research and was included in this study. Students tend to invest time, money and energy toward their post-secondary education, and their level of satisfaction may be regarded as an evaluation of what happens on a day-to-day basis during their enrolment at a specific institution. Satisfaction, therefore, is a measure of the process of education. One reason to study student satisfaction is the influence it can have on retention rates (Levin & Levin, 1991). If students enjoy, or at the minimum do not dislike their experiences, they are more likely to continue their studies. If they are satisfied consumers, it is assumed they will return and pay tuition fees. Retention is an important issue for administrators who in these times of fiscal restraint must compete more and more for the consumer's dollar. This study considered satisfaction as it relates to psychosocial climate, teaching style and subject matter. These relationships were analyzed at two levels: first-order factors as predictors of satisfaction, and second-order factors as predictors of satisfaction.

Psychosocial climate. The first-order factors most closely resembling psychosocial climate include Support 1, Procedure 1, Recreate 1, and Recreate 2. Support 1 incorporates the social and academic supports available in the university environment. These types of support tend to be individual-oriented and offer an opportunity for students to interact on a more personal level. Procedure 1 includes individual-oriented interactions such as flexibility and appeal processes. Recreate 1, the traditional recreational activities, and Recreate 2, non-traditional activities, address the friendliness or social component of

the psychosocial climate. Taken together, these four factors incorporate personal interactions, flexibility for individual needs, and social components and represent a reasonable correspondence to psychosocial climate. The two second-order factors, partly defined by the four first-order factors that represent psychosocial climate, are Support Systems and Administration Services.

The prediction of satisfaction was considered at both the first-order and second-order level. Psychosocial climate was found not to predict satisfaction at the first-order level. However, Support Systems, a second-order factor, did predict satisfaction. This apparent contradiction may be the result of the inclusion of another first-order factor, Scholar 2, in Support Systems that did indeed predict satisfaction at the first level. Scholar 2 can be conceptualized as innovative opportunities for students' scholastic learning. As a single factor, Scholar 2 does not fit the description of psychosocial climate. Psychosocial climate did not predict satisfaction at the first-order level because educational processes, including Scholar 2, were more important to satisfaction. However, when the various types of support are drawn together in the second-order factor, Support Systems, then Scholar 2 shares some of the variance contributed to support. The type of support in Scholar 2 is less interpersonal in nature. Therefore, there is weak support for psychosocial climate as a predictor of student satisfaction.

The review of psychosocial climate research had presented a strong case that it would predict student satisfaction (Fraser et al., 1987; Levin & Levin, 1991; Moos, 1979). However, the majority of psychosocial research has been conducted with junior high and senior high school students. Few studies have reported comprehensive findings about university student satisfaction and psychosocial climate. The role psychosocial climate has in the university classroom appears to be different than for the lower grades. There may be a developmental change as students mature into adults; they may view their studies as work rather than a time to socialize and make friends.

Teaching style. The first-order factors most closely resembling teaching style include Teaching Facilitation 2, Professor Evaluation 1, Professor Evaluation 2, and Effectiveness 1. These first-order factors address the lecture style in Teaching Facilitation 2, students' perceptions of the quality of professors in Professor Evaluation 1 and 2, and the quality of the teaching and learning process in Effectiveness 1. The second-order factor, Academic Quality, includes Teaching Facilitation 2, Professor Evaluation 1, and Effectiveness. The second-order factor suggests that students do indeed group the first-order factors relating to teaching style into one global concept, the quality of the academic program in which they are enrolled.

Recent research suggested that teaching style would predict student satisfaction (Fraser & Rentoul, 1980; Grimes, 1995). Two first-order factors, Effectiveness 1 and Professor Evaluation 1, predicted student satisfaction as did the second-order factor, Academic Quality. The consistency of prediction at the two levels suggests that teaching style has a major influence on student satisfaction. Student satisfaction with the quality of academic programs and faculty may be one way for administrators to evaluate current programs.

Subject matter. The first-order factors most closely resembling subject matter include Curriculum 1, and Learning Style 1. Curriculum 1 represents the course content, and Learning Style 1 represents the format the course has. Learning Style 1 is included in the definition of subject matter because different courses are taught with different formats and these formats are an important part of the subject matter, for example, a biology lab or a drama course. The second-order factor that incorporates the first-order factors is Academic Programs.

Subject matter was not found to predict student satisfaction at either the first-order or second-order factor level. These findings, contrary to what was hypothesized, offer some insight into the general student population. This study attempted to sample a more diverse group of students in one university, not a specific group. Therefore, it is assumed

that the results for this sample may be more reflective of the general student population than previous research. Research about subject matter and its role in the prediction of achievement has been reported from grade three students (Knight, 1991) and marginalized groups such as single parent, impoverished, adult learners (Mickler & Zippert, 1987). The results of this study suggests there is a lack of support for subject matter in the prediction of student satisfaction in a less specialized, university group. This finding can be applied at the curriculum and administrative levels. Administrators may better use their resources if they target some groups with specialized curriculum and also provide a collective curriculum for the larger more general student body.

Achievement

Colleges and universities are in the business of acquiring and dispensing knowledge and of teaching skills. The amount a student has learned has traditionally been measured with achievement. In this study, GPA was used as a measure of achievement. This study considered achievement as it relates to psychosocial climate, teaching style and subject matter. These relationships were analyzed at two levels: first-order factors as predictors of satisfaction, and second-order factors as predictors of achievement.

Psychosocial climate. The first-order factors most closely resembling psychosocial climate include Support 1, Procedure 1, Recreate 1, and Recreate 2. The second-order factors that represent psychosocial climate are Support Systems and Administration Services. The only first-order factor that predicted achievement was Procedure 1. The second-order factor, Administration Services (which includes Procedure 1), predicted achievement.

Procedure 1 was a significant negative predictor of achievement, that is, students who interact with Administration Services tend to have lower academic standings. Procedure 1 includes individual-oriented interactions such as flexibility and appeal processes. This finding suggests that students who are not doing well academically may

have more opportunities to interact with administration, and thus the negative relationship. Based on previous literature, the hypothesis had predicted that psychosocial climate would have a positive influence on academic achievement. The present study used a university sample as compared to grade school (Knight, 1991) and junior and senior high students (Fraser, 1991; Levin & Levin, 1991). These findings suggest that university students are less influenced by the interpersonal interactions that occur in the classroom and on campus.

Teaching style. The first-order factors most closely resembling teaching style include Teaching Facilitation 2, Professor Evaluation 1, Professor Evaluation 2, and Effectiveness 1. Teaching style is represented in the second-order factor Academic Quality.

Professor Evaluation 1 was a significant predictor of achievement at the first-order level. Professor Evaluation 1 refers to the quality of the instructor. Academic Quality incorporates the quality of staff, the contribution from Professor Evaluation 1, into a more global definition of quality. This construct includes the effectiveness of teaching and learning. The second-order factor, Academic Quality, had a significant role in predicting academic achievement. Similar findings were reported from research conducted with select populations of college and university students: students with learning disabilities (Grimes, 1995), students of differing ethnic backgrounds (Levin & Levin, 1991), and adult, impoverished, inner-city students (Mickler & Zippert, 1987). Teaching style reflects the basic function of the university environment, education. This study demonstrates that the quality and effectiveness of teaching do have a positive influence on students' achievement. These findings contribute to the body of educational research by demonstrating that these relationships are generalizable to a diverse university student sample.

The quality of the educational programs is an important consideration of the university environment. Students' perceptions of effective teaching and the quality of

faculty are important indicators of their academic progress. The relationship between students' perception of quality in their learning environment and achievement have been well documented in past research (Fraser, 1982; Fraser & Rentoul, 1980; Moos, 1973; Waxman, 1991) and is replicated in this study. Students are concerned with the education they are receiving, and they value their university achievement. The investigation into different aspects of the university environment and students' achievement confirms that the quality of faculty, teaching methods and educational programs influence students' achievement and, therefore learning. It is likely that the higher the quality of the educational program the more high quality students are attracted to the university. A college or university that has a good reputation will have better quality of students, enrolment numbers, and will receive more funds.

Subject matter. The first-order factors most closely resembling subject matter include Curriculum 1, and Learning Style 1, and the second-order factor that incorporates these first-order factors is Academic Programs. Neither the first-order factors nor the second-order factor predicted achievement in this sample. Subject matter may be too diverse of a variable and its effect on achievement may have been diluted or washed out. The first-order factor, Curriculum 1, may not be sufficiently sensitive to measure the diversity of subject matter.

Subject matter has been tentatively linked with improved achievement in previous research of junior high and senior high school students. In one study by Knight (1991), the type of course requirements in three junior high language arts classrooms predicted achievement. In other words, the actual work required in the language arts classes predicted achievement to some extent. The failure to support this part of the hypothesis in this study suggests there may be a difference in educational experiences for junior high, senior high and university students. Due to their younger age, junior high and senior high school students may be affected more by the actual subject matter. In an attempt to compete with the modern world of video games, internet, and satellite television,

administrators and teachers at the junior high and senior high school level may exert more energy into the issue of subject matter. Perhaps university students, who are more focused on acquiring credits toward their degrees, do not feel they have the flexibility to make choices based on subject matter. This finding has implications for methods evaluating colleges and universities. Evaluation instruments that were conceived, developed and tested on junior and high school students may not be adequate to evaluate the university environment.

These findings can help administrators and faculty in curriculum development and program planning. The results suggest that educational processes inherent in the university environment need as much, if not more, attention than subject matter. This is an important finding because there is pressure from the outside community to alter college and university programming to include more technologically based courses in response to business needs (Hearn & Heydinger, 1985). Faculty are pressured into incorporating these changes into their course work (Millis, 1994). Acadia Advantage, the introduction of personal computers into the classroom, is an example of one university's response to these external pressures. An evaluation of the current perception of teaching effectiveness may help predict the success rate of this type of new program. The CUES is an example of a method that may be appropriate to evaluate new or well-established programs while they are in progress.

Bank and Private Loans

Two first-order factors, Finance 1 and Finance 3, had significant relationships with achievement. Finance 1, scholarships, was a significant positive predictor of achievement and Finance 3, bank/private loans, was a negative predictor of achievement. Students with high academic marks are generally the recipients of most scholarships, bursaries and awards. Students, who are struggling academically, are not able to compete for scholarships and require alternate sources of funding. However, these students may have

less time and energy for their studies, thus, lower grades. Further investigation is required to determine whether student financing can predict achievement, or whether students' academic abilities determine the type of financing students receive.

The Systems Approach

One issue that arose during the course of this study was the efficacy of an input, process and output model in relation to the university environment. This systems model was employed as a framework to develop a comprehensive evaluation of the university environment. The scale analysis suggested that the CUES can provide a reasonably comprehensive evaluation. However, the efficacy of the systems model to aid our understanding of the university environment fell short of this author's expectations as it was deemed to be overly simplistic. This systems model suggested that discernible aspects of the university environment have an influence on student satisfaction and achievement. In general, the results of this study suggested that pre-established abilities, psychosocial climate and teaching style were most predictive of student satisfaction and achievement. Psychosocial climate and teaching style are complex variables, and are partly dependent on students' abilities, attributions and motivations. The systems model does not adequately address these interrelationships.

The College/University Environment Scale (CUES)

Scale analysis of the CUES indicated there was some variability in the items at the element level. Some of the variability can be accounted for by the wording in some items, for example, in the Financial and Influence elements. Several participants related that they interpreted the Financial question to ask what type of funding they were receiving rather than what types of funding were generally available. In the Influence element, endorsement for the item "Students have a say: in course selection" was extremely low suggesting that the students may have misinterpreted the item. The Financial and Influence elements need to be reviewed for clarity and interpretation. Any

revisions to the wording should be tested on a sample from the target population of college and university students.

The brief instructions at the beginning of the CUES may not be conspicuous enough to highlight that students are to respond as to how available the different items are in their college or university. It is possible that students answered items as if they were asking if they personally had ever used the resources. The CUES uses a frequency scale that rates the availability of a range of items in each element. For example, in the Curriculum element, students are asked to rate on a scale from never to always, how often different courses are offered, such as computer technology and business management. Most scales ask for responses to questions like "what courses are you taking" or "how do you like these courses". In the CUES, the method of evaluating the educational opportunities and organizational structures is quite different from other measures. Better written instructions may improve the quality of the scales' data.

Another approach to the issue item interpretation may be a composite scale format. That is, the elements would be regrouped and the rating scale would be altered to improve the readability and interpretation. In a composite format the item curriculum may retain a frequency scale whereas the teaching facilitation may be rated on a 5-point Likert scale ranging from disagree to agree.

One issue that needs to be addressed is the use of a self-report scale to evaluate the university environment. Self-report measures are often conceptualized as subjective expressions of individuals' perceptions. However, it was assumed that combining the individual responses in a frequency format and from a sufficiently large and representative sample into group data would approximate the actual representation of the true circumstances as perceived by students (Anastasi, 1988). This methodology did not incorporate data from faculty or from administration, and therefore cannot represent the university environment in general. Therefore, the descriptions of the university are not tempered by these other perspectives.

The reliability and factor structure of the CUES elements were investigated. Based on inter-item correlations, alpha coefficients, and first-order factor analysis, the most reliable elements included: Physical, Professor Evaluation, Curriculum, Effectiveness, Social/Academic Support, and Social/Recreation Activities. The Financial, Procedure, Teaching Facilitation, Influence and Organization elements were the least reliable. The elements were rationally constructed to provide a more comprehensive evaluation of the university environment than is typically conducted. Factor analysis at the element level revealed that many of the elements did not constitute a single global construct and this contributed to the low reliability. The reliability of the elements was improved when the alpha coefficients were calculated for single or primary factor in each element.

The second-order factor structure drew elements together into factors that represented more general constructs of the university environment. General constructs are more likely to represent underlying dimensions, can be more meaningful than single items or even 7-item elements, and can be more applicable to the understanding of the university environment. The ten second-order factors constitute the input, process, and output of the university system. Bank Loans, Self/Family Funding, and Physical and Technical Facilities are the financial and physical resources of input. Academic Quality, Academic Programs, Support Systems, Administration Services, Career and Professional Activities, and Influence on Policy represent the educational processes and organizational structures in the system. Technical and Career Objectives include future-oriented output. The methodological approach of this study appears to have sampled adequately the university environment.

Preliminary validation of CUES was initiated. Congruent validity was considered by reviewing similarities and differences between the CUES and the CUCEI. Many of the CUES 31 first-order factors correlated with the CUCEI subscales, suggesting that one of the scales may not have discriminating subscales. Subsequent factor analysis indicated

that this was the case with the CUCEI subscales. Two factors, with considerable overlap in terms of subscales loading on both factors, were extracted in the CUCEI. The discriminating function of the CUES elements contributes more to our understanding of the university environment than the CUCEI. Several participants in this study expressed a preference for the CUES and stated the CUCEI was inappropriate for the types of classes they attended. These qualitative comments suggested the CUES had face validity for this sample.

Criterion-related validity of CUES was evaluated by means of correlations with satisfaction and achievement. The many significant positive relationships among the 31 first-order factors and satisfaction support the use of CUES in evaluating students' perceptions of the educational processes available in the university environment. The significant positive relationships between Teaching Facilitation, Professor Evaluation and Effectiveness with achievement indicated that some parts of the CUES are effective in predicting students' current academic performance. The CUES, therefore, demonstrated good criterion-validity with the sample in this study.

The construct-related validity of an instrument is an indication to what extent the instrument measures expected theoretical constructs and it requires a gradual accumulation of information from a variety of sources (Anastasi, 1988). The results from this inaugural study provide the initial information for this gradual accumulation. The previous discussion of criterion-related validity, face validity, and congruent validity suggests that the CUES has moderate to good validity. The CUES was constructed as a comprehensive evaluation of the university environment. Factor analysis provided a foundation for construct-validity by suggesting that different aspects of the university environment are being measured. The ten second-order factors, with their ability to predict satisfaction and achievement, suggest that the CUES adequately samples the university environment.

Methodological Issues

The results and interpretations are limited by some of the weaknesses found in the scale. Some problems with item clarity and general instructions were found, and revisions of the problem areas are necessary before any future work with this scale. Another limitation of this project was the exclusion of the role that students' motivations and interests may have with satisfaction and achievement. The analysis of the numerous relationships between students' perceptions of the environment with achievement and satisfaction was limited by not being able to partial out the effects that the variance of motivation and interest may have. Another limitation of this design was the exclusion of ability variables that could potentially account for the relationships of perception of the environment with achievement and satisfaction. Some variables that need to be considered include aptitudes for certain courses and programs as well as personality traits that may influence career or educational choices. Our understanding of the effect that students' career plans may have on their satisfaction and their educational goals is limited. The study of aptitude and career variables and their relationship to the university environment would strengthen the inferences about the influence of the university environment on students' satisfaction and achievement. As mentioned previously, the lack of data from the faculty and administration limits the results and discussions to only the students' perspectives.

One of the strengths of this study's design was its sampling procedure. The CUES was administered to a representative sample at one rural university. The sampling procedure resulted in representation of students who were in their second to fourth year of study in eight different degree programs. Therefore, the results generated from this study present a fairly balanced description of this university's environment. A second strength of this design, the use of High School Marks as a covariant, was an attempt to partial out the pre-established abilities of competent students. However, it is not known to what extent this sample represents students with academic difficulties, such as those with

learning disorders or English as a second language.

Contributions to College/University Environment Research

The present approach to measuring the university contributes to the evaluation of college and university environments by employing a comprehensive assessment tool. There has been some work in comprehensive university evaluations reported in the literature (Pascarella & Chapman, 1983). This study introduced an instrument that attempted to evaluate the university environment and provide quantitative responses. The approach included a methodology and an instrument to evaluate the influence that elements, other than education-related ones, have on student satisfaction and achievement. Some of these other elements found to have an influence include funding, administration services and scholastic aspirations. Even with some problems as identified, the present approach provides a method to evaluate the university environment in a more comprehensive way than possible by means of presently existing measures, and contributes to our knowledge about learning at the post-secondary level.

Second, funding is an important issue for students as suggested by the positive effect of scholarships and the negative effect of bank loans with regards to achievement. Three types of funding were identified in this study: scholarships and bursaries, self/family funding, and bank loans. In these days of fiscal restraint, there are fewer scholarships available to students, and families are less able to support their children. The banking industry has responded to this by introducing student lines of credit and private student loans. Students, who traditionally could not afford a post-secondary education, can finance their education with private loans. However, the present findings are consistent with the view that students' marks may suffer if they are required to work and study at the same time.

Third, the traditional classroom structure has a positive influence on achievement. This is an important contribution to the college and university research because

innovativeness is the buzz word for education in the nineties. Innovativeness is being addressed at the curriculum level, such as Acadia Advantage, and at the faculty development level (DiLorenzo & Heppner, 1994). It may be prudent to ensure some traditional learning opportunities are incorporated into innovative programs.

Fourth, an approach or method such as the College/University Environment Scale is potentially an improvement over other measures because it can provide a comprehensive system evaluation that can assist program evaluation. Therefore, depending on the purpose of the evaluation, a method such as the CUES can provide unique information about the university environment by investigating a variety of important elements. For example, the effects of funding can be evaluated by the evaluation of input, program changes can be monitored by the evaluation of process, and outcome-related issues by elements such as career aspirations that can also be linked with current programming.

Conclusions and Implications for Future Research

In conclusion, an approach such as the College/University Environment Scale (CUES) is potentially an improvement over current instruments because it is a comprehensive systems evaluation and with revisions may adequately evaluate the university environment from the students' perspective. Funding, educational programs and quality teaching are important predictors of students' satisfaction and achievement. This scale provides in-depth information in various areas not covered by other measures, for example, the availability of technological support in the classroom. The present approach may be used to evaluate programs during their implementation. This is encouraging because administrators or faculty need a variety of tools to determine the efficacy of curriculum, teaching methods, or classroom environments.

The transition from school to work is gaining attention from researchers (Byrne, Constant & Moore, 1992). The number of graduates who have gainful employment is one

consideration in the reputation of a university. Students want jobs and they will likely be attracted to an institution that has a reputation for delivering the type of training and education required to improve their chances for employment. The present approach provides a unique opportunity to understand students' perceptions of the university environment by linking current educational experiences with satisfaction and achievement.

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Appendix A
The College/University Environment Scale

The purpose of this questionnaire is to evaluate the college/university you are presently enrolled in.

Please select the most appropriate response for the following items:

- 0 - never
- 1 - rarely
- 2 - sometimes
- 3 - often
- 4 - always

Input

Resources:

Financial

Financial support for my education is available from:

self/family	0	1	2	3	4
community organizations	0	1	2	3	4
business	0	1	2	3	4
university (scholarships, bursaries)	0	1	2	3	4
government loans	0	1	2	3	4
trust fund/ benefits plan	0	1	2	3	4
bank/private loan	0	1	2	3	4

Physical

The college/ university grounds, residences, classrooms and buildings are:

conveniently located	0	1	2	3	4
open convenient hours	0	1	2	3	4
clean	0	1	2	3	4
reasonable size	0	1	2	3	4
barrier-free (handicap access)	0	1	2	3	4
suitable for learning and teaching	0	1	2	3	4
up-to-date, modern	0	1	2	3	4

**Process
Administration:**

Procedures

Administrative services, such as registration and students' accounts, are:

efficient	0	1	2	3	4
clearly defined	0	1	2	3	4
flexible	0	1	2	3	4
reasonably priced (tuition, residence)	0	1	2	3	4
available (outside of office hours)	0	1	2	3	4
open to an appeal process	0	1	2	3	4
up-to-date (e.g., mail-in registration)	0	1	2	3	4

Organization

Assistance for academic questions, such as registration procedures or student status questions, is available from:

administration	0	1	2	3	4
professors office hours	0	1	2	3	4
academic departments	0	1	2	3	4
support services(library, computer centre)	0	1	2	3	4
organized help sessions (labs, tutorials)	0	1	2	3	4
campus societies	0	1	2	3	4
counseling centre	0	1	2	3	4

Facilitation:

Teaching Facilitation

Teaching is facilitated by:

traditional methods (lectures, overheads, chalkboards)	0	1	2	3	4
computer technology	0	1	2	3	4
audio and video technology	0	1	2	3	4
resources outside the classroom (library, computer lab)	0	1	2	3	4
extra curricular activities	0	1	2	3	4
guest speakers/ special lectures	0	1	2	3	4
up-to-date reference material	0	1	2	3	4

Technical

The following technical support is up to date:

computer facilities (programs, software)	0	1	2	3	4
audio resources	0	1	2	3	4
video resources	0	1	2	3	4
library holdings and services	0	1	2	3	4
internet, world wide web, e-mail, etc.	0	1	2	3	4
lab equipment	0	1	2	3	4
telephone, TV cable, etc.	0	1	2	3	4

Evaluation

Professors are evaluated by students, departments or both:

on a regular basis	0	1	2	3	4
in a fair manner	0	1	2	3	4
in a variety of ways	0	1	2	3	4
on a standardized format	0	1	2	3	4
with adequate feedback	0	1	2	3	4
for their teaching style	0	1	2	3	4
for their research projects	0	1	2	3	4

Students are evaluated or graded in courses by professors:

on a regular basis	0	1	2	3	4
in a fair manner	0	1	2	3	4
in a variety of ways	0	1	2	3	4
on a standardized format	0	1	2	3	4
with adequate feedback	0	1	2	3	4
with an opportunity for appeal	0	1	2	3	4
similar to other colleges/universities	0	1	2	3	4

Learning:

Curriculum

Courses are available at this institution on the following topics:

computer technology	0	1	2	3	4
on the job training/practical experience	0	1	2	3	4
business management, commerce, etc.	0	1	2	3	4
theoretical/scholarly issues	0	1	2	3	4
lab work	0	1	2	3	4
arts (languages, history, etc.)	0	1	2	3	4
sciences (biology, chemistry, etc.)	0	1	2	3	4

Learning Styles

Students can select courses based on:

course content	0	1	2	3	4
schedule format (1&1/2 hr, 3 hr)	0	1	2	3	4
grading method	0	1	2	3	4
teaching format (correspondence, lecture)	0	1	2	3	4
educational/training requirements	0	1	2	3	4
time of day/week/term	0	1	2	3	4
full-time or part-time status	0	1	2	3	4

Effectiveness

The instructors facilitate learning with:

competent and effective lectures	0	1	2	3	4
sensitivity to student needs	0	1	2	3	4
up-to-date knowledge	0	1	2	3	4
availability during and after class	0	1	2	3	4
fair and consistent evaluations	0	1	2	3	4
personal interest in the course material	0	1	2	3	4
practical experience in their field	0	1	2	3	4

Interaction:

Social and Academic Support

Support services available include:

career counseling	0	1	2	3	4
peer counseling	0	1	2	3	4
academic counseling	0	1	2	3	4
personal counseling	0	1	2	3	4
study skills training	0	1	2	3	4
financial counseling	0	1	2	3	4
individual needs (interpreters, 2nd language tutoring, physical assistance, etc.)	0	1	2	3	4

Influence

Students have a say in:

course selection	0	1	2	3	4
program requirements	0	1	2	3	4
course content	0	1	2	3	4
evaluation method	0	1	2	3	4
teaching style	0	1	2	3	4
learning style (assignment selection)	0	1	2	3	4
university issues and policies	0	1	2	3	4

Social Activities and Recreation

Social and recreational opportunities are available in the following settings:

classrooms	0	1	2	3	4
residence	0	1	2	3	4
sports activities	0	1	2	3	4
recreational facilities	0	1	2	3	4
university clubs and organizations	0	1	2	3	4
extra-curricular activities	0	1	2	3	4
off-campus facilities	0	1	2	3	4

Output

Education:

Scholarly

At this college/university my intellectual/personal goals are met by:

course content	0	1	2	3	4
selection of educational programs	0	1	2	3	4
challenge of educational requirements	0	1	2	3	4
field and practical experiences	0	1	2	3	4
extra curricular activities	0	1	2	3	4
guest speakers/ colloquia	0	1	2	3	4
quality of faculty and staff	0	1	2	3	4

Job/Career

At this college/university my job/career aspirations are met by:

job skills training	0	1	2	3	4
on the job experience	0	1	2	3	4
job/networking contacts	0	1	2	3	4
selection of education programs	0	1	2	3	4
scientific, technical training	0	1	2	3	4
experience as teaching assistant	0	1	2	3	4
experience as research assistant	0	1	2	3	4

Appendix B

code _____

Demographic Data

Please answer the following questions:

Age: _____

Sex : Male Female

Please state your degree program: _____

Please state your Major: _____

Please state what year of your program you are in: _____

Is this your first degree: Yes No

How many years have you attended this college/university:

1 2 3 4 5 6 & up

Do you attend as : Part-time Full-time

Where do you live: Residence Off-Campus

Are you participating in Acadia Advantage program in any of your courses:

Yes No

Please state your cumulative GPA for the previous term _____.

Please state your average from your last year at high school _____.

Appendix C

Pilot Study Evaluation Form

Please answer the following questions while you are completing this survey:

- 1. Are all the questions and items clear? Please mark any questions/items you feel need clarification.**
- 2. Please rate the reading difficulty of the survey:**
easy moderate difficult
- 3. How long did it take you to complete the survey? in your opinion was this a reasonable length of time?**
- 4. Which question was most important?**
- 5. Which question was least important?**
- 6. Do you feel this is a comprehensive assessment of a university?**
- 7. Did I miss anything really important in assessing a university?**

Thank you for you participation. Please return this question sheet and the completed survey to Diane Williams

Appendix D

College and University Environment Inventory (CUCEI): Actual Form

Directions

The purpose of this questionnaire is to find out what your opinions about the class you are attending right now.

The questionnaire is designed for use in gathering opinions about small classes. It is not suitable for the rating of lectures or laboratory classes.

This form of the questionnaire assesses your opinion about what this class is actually like. Indicate your opinion about each questionnaire statement by circling:

SA if you **STRONGLY AGREE** that it describes what this class is actually like.
 A if you **AGREE** that it describes what this class is actually like.
 D if you **DISAGREE** that it describes what this class is actually like.
 SD if you **STRONGLY DISAGREE** that it describes what this class is actually like.

1. The instructor considers students' feelings.

SA A D SD

2. The instructor talks rather than listens.

SA A D SD

3. The class is made up of individuals who don't know each other very well.

SA A D SD

4. The students look forward to coming to classes.

SA A D SD

5. Students know exactly what has to be done in our class.

SA A D SD

6. New ideas are seldom tried out in this class.

SA A D SD

7. All students in the class are expected to do the same work, in the same way and in the same time.

SA A D SD

8. The instructor talks individually with students.

SA A D SD

9. Students put effort into what they do in classes.

SA A D SD

10. Each student knows the other members of the class by their first names.

SA A D SD

11. Students are dissatisfied with what is done in the class.

SA A D SD

12. Getting a certain amount of work done is important in this class.

SA A D SD

13. New and different ways of teaching are seldom used in this class.

SA A D SD

14. Students are generally allowed to work at their own pace.
SA A D SD
15. The instructor goes out of his/her way to help students.
SA A D SD
16. Students 'clockwatch' in this class.
SA A D SD
17. Friendships are made among students in this class.
SA A D SD
18. After the class, the students have a sense of satisfaction.
SA A D SD
19. The group often gets sidetracked instead of sticking to the point.
SA A D SD
20. The instructor thinks up innovative activities for students to do.
SA A D SD
21. Students have a say in how class time is spent.
SA A D SD
22. The instructor helps each students who is having trouble with the work.
SA A D SD
23. Students in this class pay attention to what others are saying.
SA A D SD
24. Students don't have much chance to get to know each other in this class.
SA A D SD
25. Classes are a waste of time.
SA A D SD
26. This is a disorganized class.
SA A D SD
27. Teaching approaches in this class are characterized by innovation and variety.
SA A D SD
28. Students are allowed to choose activities and how they will work.
SA A D SD
29. The instructor seldom moves around the classroom to talk to students.
SA A D SD
30. Students seldom present their work in class.
SA A D SD
31. It takes a long time to get to know everybody by his/her first name in this class.
SA A D SD
32. Classes are boring.
SA A D SD
33. Class assignments are clear so everyone knows what to do.
SA A D SD
34. The seating in this class is arranged in the same way each week.
SA A D SD
35. Teaching approaches allow students to proceed at their own pace.
SA A D SD
36. The instructor isn't interested in students' problems.
SA A D SD
37. There are opportunities for students to express their opinions in this class.
SA A D SD
38. Students in this class get to know each other well.
SA A D SD
39. Students enjoy going to this class.
SA A D SD
40. This class seldom starts on time.
SA A D SD

41. The instructor often thinks of unusual class activities.

SA A D SD

42. There is little opportunity for a student to pursue his/her particular interest in this class.

SA A D SD

43. The instructor is unfriendly and inconsiderate toward students.

SA A D SD

44. The instructor dominates class discussions.

SA A D SD

45. Students in this class aren't very interested in getting to know other students.

SA A D SD

46. Classes are interesting.

SA A D SD

47. Activities in this class are clearly and carefully planned.

SA A D SD

48. Students seem to do the same type of activities every class.

SA A D SD

49. It is the instructor who decides what will be done in our class.

SA A D SD

Appendix E

General Evaluation Measure (GEM)

Please use the following scale to rate to what extent you agree or disagree with the following items:

-2 - disagree

-1 - somewhat disagree

0 - not sure

1 - somewhat agree

2 - agree

I am satisfied with the education I am receiving at this college/university.

-2 -1 0 1 2

I am satisfied with my experiences at this college/university.

-2 -1 0 1 2

I will recommend this college/university to others.

-2 -1 0 1 2

I value, find important the courses I am taking at this college/university.

-2 -1 0 1 2

I value, find important the job training I am receiving at this college/university.

-2 -1 0 1 2

I value, find important a certificate, degree or diploma from this college/university.

-2 -1 0 1 2

My grades are what they should be at this college/university.

-2 -1 0 1 2

I am learning what I should be learning at this college/university.

-2 -1 0 1 2

I am studying as well as I can at this college/university.

-2 -1 0 1 2

Appendix F

Consent Form

Part A:

The purpose of this research study is to evaluate various aspects of a college and university environment scale. The results of these questionnaires will be used to complete the research requirements of Diane Williams' master's thesis. All information and completed questionnaires will remain confidential. The results will be used for group data only. I will be asked to complete questionnaires about this university and my experiences here. My participation is voluntary and I may withdraw at any time without reason or penalty. If you have any questions or concerns about how this study is conducted, please feel free to contact Dr. Peter Horvath, supervisor, at 585-1200.

Signature of Participant

Date

Part B:

The following condition is not required to participate in this study:

I grant permission for the researcher to get high school marks and cumulative GPA from my transcripts. I have been told I do not have to provide my name on any questionnaires. Instead, an identification number will be placed on the results. The answers will be combined to provide group results only.

Signature of Participant

Date

Thank you for your participation in this study.
Diane Williams

Appendix G

Debriefing

Thank you for participating in this psychology research study. The purpose of this study is to consider the usefulness of a college and university environment scale as an evaluation of your educational experiences. The present research is an attempt to measure the various aspects of the university environment, such as administration, curriculum, and technical support, that may have an impact on students' academic achievement or satisfaction. Your questionnaire responses and comments on this method of university evaluation are greatly appreciated.

Results of the study will be available in April 1997. If interested, you may receive a summary by contacting Diane Williams, Psychology Department (Tel # 585-1617).

Thank you for your time and participation.
Diane Williams

Appendix H

Item Characteristics of CUES

Items	Mean	SD	Corrected item-total correlation
Financial			
Financial support for my education is available from:			
1. self/family	3.13	1.01	-.03
2. community organizations	.57	.94	.38
3. business	.32	.78	.55
4. university (scholarships, bursaries)	.98	1.23	.18
5. government loans	1.68	1.71	-.08
6. trust fund/ benefits plan	.60	1.13	.17
7. bank/private loan	1.03	1.48	.11
Physical			
The college/university grounds, residences, classrooms and buildings are:			
8. conveniently located	3.24	.64	.43
9. open convenient hours	2.89	.75	.56
10. clean	2.85	.81	.56
11. reasonable size	2.99	.60	.54
12. barrier-free (handicap access)	2.73	.86	.48
13. suitable for learning and teaching	3.01	.66	.65
14. up-to-date, modern	2.71	.81	.51
Procedures			
Administrative services, such as registration and students accounts, are:			
15. efficient	2.37	.83	.50
16. clearly defined	2.42	.83	.50
17. flexible	2.08	.80	.52
18. reasonably priced (tuition, residence)	1.04	.84	.41
19. available (outside of office hours)	1.25	.96	.52
20. open to an appeal process	1.92	.88	.37
21. up-to-date (e.g., mail-in registration)	2.96	.74	.17

Items	Mean	SD	Corrected item- total correlation
Organization			
Student academic services, such as for extra help and course selection, are available from:			
22. administration	2.18	.94	.28
23. professor office hours	3.12	.70	.32
24. academic departments	2.89	.78	.25
25. support services (library, computer centre)	2.59	.99	.37
26. organized help sessions (labs, tutorials)	2.70	.80	.38
27. campus societies	2.04	.96	.40
28. counseling centre	2.59	.95	.24
Teaching Facilitation			
Teaching is facilitated by:			
29. traditional methods (lectures, overheads, chalkboards)	3.17	.74	-.13
30. computer technology	2.31	.82	.30
31. audio and video technology	2.41	.69	.54
32. resources outside the classroom (library, computer lab)	2.11	.88	.42
33. extra curricular activities	1.57	1.08	.41
34. up-to-date reference material	2.30	.98	.32
Technical			
The following technical support is up to date:			
35. computer facilities (programs, software)	2.77	.92	.55
36. audio resources	2.58	.78	.51
37. video resources	2.51	.84	.58
38. library holdings and services	2.22	.96	.38
39. internet, world wide web, e-mail, etc.	3.12	.91	.51
40. lab equipment	2.60	.80	.49
41. telephone, TV cable, etc.	3.00	.87	.48

Items	Mean	SD	Corrected item- total correlation
Professor Evaluation			
Professors are evaluated by students, departments or both:			
42. on a regular basis	2.38	1.17	.58
43. in a fair manner	2.61	.93	.55
44. in a variety of ways	1.72	.94	.30
45. on a standardized format	2.83	1.14	.49
46. with adequate feedback	1.87	1.11	.61
47. for their teaching style	2.61	1.17	.53
48. for their research projects	1.64	1.13	.26
Student Evaluation			
Students are evaluated or graded in courses by professors:			
49. on a regular basis	3.10	.79	.42
50. in a fair manner	2.66	.76	.56
51. in a variety of ways	2.59	.89	.32
52. on a standardized format	2.63	.88	.33
53. with adequate feedback	2.33	.87	.50
54. with an opportunity for appeal	2.27	.98	.54
55. similar to other colleges/universities	2.66	1.06	.48
Curriculum			
Courses are available at this institution on the following topics:			
56. computer technology	3.42	.73	.62
57. on the job training/practical experience	2.01	1.00	.33
58. business management, commerce, etc.	3.44	.67	.58
59. theoretical/scholarly issues	2.99	.95	.64
60. lab work	3.20	.75	.61
61. arts (languages, history, etc.)	3.58	.65	.67
62. sciences (biology, chemistry, etc.)	3.66	.56	.62
Learning Style			
Students can select courses based on:			
63. course content	3.25	.76	.44
64. schedule format (1& 1/ 2 hr, 3 hr)	3.31	.83	.57
65. grading method	1.58	1.08	.37
66. teaching format(correspondence, lecture)	2.48	1.10	.62
67. educational/training requirements	3.04	.86	.42
68. time of day/week/term	3.21	.76	.49
69. full-time or part-time status	2.89	1.12	.40

Items	Mean	SD	Corrected item- total correlation
Effectiveness			
The instructors facilitate learning with:			
70. competent and effective lectures	2.59	.66	.51
71. sensitivity to student needs	2.18	.80	.48
72. up-to-date knowledge	2.97	.73	.61
73. availability during and after class	2.73	.87	.56
74. fair and consistent evaluations	2.63	.71	.50
75. personal interest in the course material	2.88	.82	.62
76. practical experience in their field	3.04	.81	.58
Social/Academic Support			
Support services available include:			
77. career counseling	2.94	1.03	.74
78. peer counseling	2.97	.94	.73
79. academic counseling	3.16	.86	.69
80. personal counseling	2.87	1.01	.71
81. study skills training	2.44	.98	.66
82. financial counseling	2.07	1.11	.64
83. individual needs (interpreters, 2nd language tutoring, physical assistance, etc.)	2.21	1.10	.56
Influence			
Students have a say in:			
84. course selection	3.01	.94	.06
85. program requirements	1.19	.96	.53
86. course content	1.04	.86	.70
87. evaluation method	1.24	.92	.58
88. teaching style	1.00	.84	.58
89. learning style (assignment selection)	1.37	.93	.53
90. university issues and policies	1.37	.98	.28

Items	Mean	SD	Corrected item- total correlation
Social/Recreation			
Social and recreational opportunities are available in the following settings:			
91. classrooms	1.89	1.01	.13
92. residence	3.45	.72	.63
93. sports activities	3.47	.67	.70
94. recreational facilities	3.33	.72	.65
95. university clubs and organizations	3.13	.73	.66
96. extra-curricular activities	3.30	.76	.69
97. off-campus facilities	2.45	1.16	.41
Scholarly			
At this college/university my intellectual/personal goals are met by:			
98. course content	2.72	.68	.39
99. selection of educational programs	2.77	.84	.38
100. challenge of educational requirements	2.86	.76	.54
101. field and practical experiences	2.37	1.02	.38
102. extra curricular activities	2.51	1.05	.43
103. guest speakers/colloquia	1.91	.95	.25
104. quality of faculty and staff	2.84	.85	.42
Job/Career			
At this college/university my job/career aspirations are met by:			
105. job skills training	1.35	1.17	.68
106. on the job experience	1.07	1.11	.67
107. job/networking contacts	1.23	1.15	.63
108. selection of educational programs	2.53	.92	.40
109. scientific, technical training	2.04	1.26	.40
110. experience as teaching assistant	1.18	1.35	.54
111. experience as research assistant	.98	1.25	.56

Appendix I

Factor Structure of CUES Elements

Element Factor	Items	Loading	Percent of Variance
Financial			
Factor 1	community organizations	.61	
	business	.78	
	university (scholarships, bursaries)	.64	
	government loans	.35	26.9
Factor 2	self/family	.76	
	trust fund/ benefits plan	.48	19.9
Factor 3	bank/private loan	.92	14.9
Physical			
Factor 1	conveniently located	.57	
	open convenient hours	.70	
	clean	.70	
	reasonable size	.69	
	barrier-free (handicap access)	.62	
	suitable for learning and teaching	.78	
	up-to-date, modern	.67	45.9
Procedures			
Factor 1	flexible	.54	
	reasonably priced (tuition, residence)	.74	
	available (outside of office hours)	.79	
	open to an appeal process	.69	38.2
Factor 2	efficient	.84	
	clearly defined	.86	
	up-to-date (e.g., mail-in registration)	.39	17.1
Organization			
Factor 1	administration	.50	
	professor office hours	.80	
	academic departments	.84	30.3
Factor 2	support services(library, computer centre)	.83	
	organized help sessions (labs, tutorials)	.82	20.3
Factor 3	campus societies	.82	
	counseling centre	.87	15.3

Element Factor	Items	Loading	Percent of Variance
Teaching Facilitation			
Factor 1	computer technology	.65	
	audio and video technology	.77	
	resources outside the classroom (library, computer lab)	.67	
	extra curricular activities	.66	
	up-to-date reference material	.55	36.9
Factor 2	traditional methods (lectures, overheads, chalkboards)	.93	17.8
Technical			
Factor 1	computer facilities (programs, software)	.57	
	library holdings and services	.62	
	internet, world wide web, e-mail, etc.	.81	
	lab equipment	.72	
	telephone, TV cable, etc.	.56	43.4
Factor 2	audio resources	.94	
	video resources	.88	17.0
Professor Evaluation			
Factor 1	on a regular basis	.77	
	in a fair manner	.82	
	on a standardized format	.78	
	with adequate feedback	.49	
	for their teaching style	.69	42.0
Factor 2	for their research projects in a variety of ways	.82 .69	18.6
Student Evaluation			
Factor 1	in a fair manner	.60	
	in a variety of ways	.68	
	with adequate feedback	.80	
	with an opportunity for appeal	.69	39.5
Factor 2	similar to other colleges/universities	.74	
	on a regular basis	.65	
	on a standardized format	.71	14.7

Element Factor	Items	Loading	Percent of Variance
Curriculum			
Factor 1	computer technology	.74	
	on the job training/practical experience	.42	
	business management, commerce, etc.	.72	
	theoretical/scholarly issues	.74	
	lab work	.74	
	arts (languages, history, etc.)	.83	
	sciences (biology, chemistry, etc.)	.79	52.0
Learning Style			
Factor 1	course content	.71	
	schedule format (1& 1/ 2 hr, 3 hr)	.82	
	time of day/week/term	.71	
	full-time or part-time status	.66	41.7
Factor 2	grading method	.86	
	teaching format (correspondence, lecture)	.77	
	educational/training requirements	.62	17.2
Effectiveness			
Factor 1	competent and effective lectures	.65	
	sensitivity to student needs	.61	
	up-to-date knowledge	.78	
	availability during and after class	.69	
	fair and consistent evaluations	.64	
	personal interest in the course material	.76	
	practical experience in their field	.72	47.3
Social/Academic Support			
Factor 1	career counseling	.83	
	peer counseling	.83	
	academic counseling	.79	
	personal counseling	.81	
	study skills training	.75	
	financial counseling	.72	
	individual needs	.65	
	(interpreters, 2nd language tutoring, physical assistance, etc.)		59.5

Element Factor	Items	Loading	Percent of Variance
Influence			
Factor 1	program requirements	.78	
	course content	.85	
	evaluation method	.81	
	teaching style	.78	
	learning style (assignment selection)	.47	44.4
Factor 2	university issues and policies	.90	17.4
Factor 3	course selection	.93	15.0
Social/Recreation			
Factor 1	residence	.82	
	sports activities	.88	
	recreational facilities	.82	
	university clubs and organizations	.89	
	extra-curricular activities	.83	54.0
Factor 2	off-campus facilities	.76	
	classrooms	.85	18.0
Scholarly			
Factor 1	course content	.81	
	selection of educational programs	.82	
	challenge of educational requirements	.74	
	quality of faculty and staff	.58	36.4
Factor 2	field and practical experiences	.61	
	extra curricular activities	.79	
	guest speakers/colloquia	.79	21.8
Job/Career			
Factor 1	job skills training	.86	
	on the job experience	.89	
	job/networking contacts	.80	
	selection of educational programs	.37	
	scientific, technical training	.39	48.4
Factor 2	experience as teaching assistant	.86	
	experience as research assistant	.87	14.9

	Per	Inv	StC	Sat	Task	Inn	Ind
Finance							
Factor 1	.06	.08	.05	.18	.13	.08	.02
Factor 2	-.11	-.09	-.02	-.01	-.10	.00	.03
Factor 3	-.12	-.12	.02	.05	-.01	-.14	-.01
Physical	.08	-.07	-.01	.00	-.10	.12	.10
Procedure							
Factor 1	.04	.21*	.17	.21*	-.10	.17	.32**
Factor 2	-.06	.01	-.03	.14	-.05	-.10	.12
Organization							
Factor 1	.24*	.11	.21*	.21*	.03	.12	.26**
Factor 2	-.02	.18	.19*	.09	.06	.14	.24*
Factor 3	.05	.04	.19*	.24*	.02	.07	.20*
Teaching Facilitation							
Factor 1	.04	.12	.23*	.15	.02	.16	.16
Factor 2	.04	.11	.14	.17	.15	.10	.12
Technical							
Factor 1	-.04	-.02	.17	.13	-.04	.15	.11
Factor 2	.16	-.01	.24*	.05	-.10	.20*	.18
Professor Evaluation							
Factor 1	.24*	.09	.19*	.17	.05	.16	.17
Factor 2	-.07	-.01	.11	-.04	-.02	.13	.15
Student Evaluation							
Factor 1	.19*	.28**	.29**	.46**	.09	.15	.29**
Factor 2	-.01	-.02	.10	.19*	.21*	.06	.07
Curriculum	.13	.05	.21*	.17	-.01	.08	.14
Learning Styles							
Factor 1	.12	.05	.07	.04	.02	.10	.15
Factor 2	-.01	.02	-.02	-.06	-.10	.07	.07
Effectiveness	.20*	.24*	.36**	.35**	.01	.24**	.37**
Support	.05	.01	.22*	.13	-.02	.16	.24*
Influence							
Factor 1	.16	.11	.22*	.13	-.09	.13	.28**
Factor 2	.09	.17	.00	.05	.02	.06	.02
Factor 3	-.04	.07	.12	-.06	.05	-.10	.06
Recreation							
Factor 1	.17	.04	.24*	.11	-.03	.10	.13
Factor 2	.22*	.10	.26**	.10	.02	.19*	.18*
Scholarly							
Factor 1	.26**	.18	.28**	.23*	.09	.21*	.17
Factor 2	.02	.02	.16	.13	-.10	.16	.17
Job/Career							
Factor 1	.06	.05	.24**	.06	.02	.10	.11
Factor 2	.11	.04	.09	.14	.04	.00	.03

Per - Personalization
Task - Task Orientation
Ind - Individualization

StC - Student Cohesiveness

STUDENT CHECK/ANSWERS