VARIABLES AFFECTING PERSISTENCE IN DISTANCE EDUCATION IN THE NATURAL RESOURCE SCIENCES

by

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Abstract

This research was undertaken to clarify the nature of barriers to persistence in natural resource sciences distance education at the tertiary level in order that participation through to completion may be improved. Its aim was to provide insights and theoretical concepts useful in clarifying distance education access as a whole, while also providing understandings helpful in improving education and communication initiatives concerning sustainable development and the environment.

Ethnography was used to illuminate the declarative and tacit understandings of withdrawal and persisting students. Ethnographic interpretations of student understandings were complemented by demographic and other data collected through questionnaires and the Myers-Briggs Type Indicator, a psychological survey instrument.

Statistical analysis of quantitative data yielded predictive relationships that accounted for 24-39% of the variability in student withdrawal/persistence. However, many variables defy meaningful measurement and quantitative analysis. Overall results suggest that student withdrawal is related to a set of complex multivariables that act additively and interactively in numerous context-dependent ways to result in a dropout decision that is almost idiosyncratic in nature. Nonetheless, important common barriers to persistence are evident.

Both withdrawal and persisting students experienced situational, institutional, dispositional and epistemological problems that acted as barriers. A number are relatively unique to second chance learners, who are effectively disadvantaged. Many of the problems students experienced reflect the social contradiction between their roles as students and their roles as mature adults.

The newly elucidated cluster of potential barriers to student persistence termed epistemological problems are the result of incongruency between the student's cognitive and affective perceptions of knowledge, and the nature of the knowledge presented in the courses. Although the courses mainly present hard, applied knowledge with a generally positivistic, empirical viewpoint, they also demand high levels of integration and inference,
as well as abstract and relativistic thinking. A number of students found the courses' diverse epistemological stances problematic: some thought the content too scientific and technical; a few found it too abstract and ambiguous. Some were challenged by demanding prerequisite knowledge requirements. Still others found it difficult, in the absence of face-to-face interaction with instructors and peers, to make the epistemological shift from learning by rote to higher level thinking.

It was concluded that more facilitative instructional design and student support are needed. Distance education persistence could be enhanced by providing students with all the resources and support they need in order to exercise personal control over their learning. A dialogic construct reflecting empathetic response to the views, values, frames of reference and varying dependency states of individual adult learners is suggested.

Elucidation of the epistemological problems also provides understandings useful in general improvement of natural resource management education and communication initiatives. Because the highly structured, technical and specific nature of the disciplinary content and the dense formal jargon of the disciplinary discourse in themselves impede effective communication, it appears that natural resource scientists could more effectively share their knowledge if they simplified it, assumed no prior understandings, and helped people learn by informally and subjectively putting it in a more holistic context for them, including making inferences to application and implication.
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Chapter 1

Introduction

The Need for Education in the Natural Resource Sciences

The Brundtland World Commission on Environment and Development recognized that achieving sustainable development on a global basis is predicated on an agenda for action which takes into account the interrelationships among people, resources, environment and development. Their report (World Commission on Environment and Development, 1987) calls for vast campaigns of education, debate and public participation in order to create the public awareness necessary to effect a sustainable course of development. Concern about our environment and natural resources echoes internationally. Among its recommendations the 1988 World Conference on The Changing Atmosphere included increased funding for environmental education and public awareness campaigns (Environment Canada, 1988).

Public awareness is a very important element of a society's capacity to deal with environmental and developmental issues. Resource development problems and the extent to which our well-being is dependent on the wise use of resources have been singled out...as key issues. According to some experts, the root cause of our environmental crisis lies in the fact that too many governments and people still tend to take the planet's renewable resources for granted.

This situation calls for greater efforts to increase public knowledge and public participation. Environmental progress requires the support of an informed and alert public opinion (Canadian International Development Agency [CIDA], 1986, p. 48).

Four centuries ago Francis Bacon said, "Knowledge itself is power" (Religious Meditations. Of Heresies). Knowledge provides the power to control and effect change in one's world. We are now in the midst of an information explosion, living in Toffler's (1980) Third Wave info-sphere. Information, however, does not become knowledge until its constituent beliefs meet public criteria of evidence and the individual mind wrestles with it, tries to make sense of it, and places it in a personal context (Apps, 1988); in brief, learns it. Education is "the organized, systematic effort to foster learning, to establish the conditions, and to provide the activities through which learning can occur" (Smith, 1982, p. 37).
Education is a powerful factor in national development, contributing not only to economic, cultural and social progress, but also to consolidation of cultural identity (Busshoff et al., 1981). Awareness of its importance has created unprecedented demand for education, particularly in the developing nations of the world. Young, Perraton, Jenkins and Dodds (1980) quote Julius Nyerere of Tanzania as saying in his Declaration of Dar-es-Salaam:

"Man can only liberate or develop himself. He cannot be liberated or developed by another. For Man makes himself. It is his ability to act deliberately for a self-determined purpose, which distinguishes him from other animals. The expansion of his own consciousness, and therefore his power over himself, his environment, and his society, must therefore ultimately be what we mean by development.

So development is for Man, by Man, and of Man. The same is true of education. Its purpose is the liberation of Man from the restraints and limitations of ignorance and dependency. Education has to increase men's physical and mental freedom -- to increase their control over themselves, their own lives, and the environment in which they live. (p. 1)"

Simpson and Sissons (1989) report that international requests for aid in education and training show increasing priority for such new sectors as energy and the environment.

It is in the context of international concerns about our common environmental future, as well as our local concerns about land, water, forests, energy, the ocean's harvest, and mineral resources, that education in the natural resource sciences assumes particular importance. People increasingly want information on resource issues to help guide them in making intelligent decisions. The "buzz" phrase "sustainable development" dominates our expressed philosophy in this regard. That the phrase is an oxymoron epitomizes our collective dilemma. Information and opportunities for adults to acquire knowledge about natural resources, their intrinsic value, their management, and the issues that surround their sustainable utilization are provided through post-secondary education, continuing education, and various communication vehicles.

One of the purposes of adult education is to help ensure an informed citizenry that can democratically effect change in a dynamic society by being knowledgeable about the issues, able to think clearly, and willing to participate in the process (Jimmerson, Hastay & Long, 1989; Smith, 1982). Rachal (1989) says,
on a societal scale, adult education in its multiplicity of forms should be a
central force in a democratic society for the planning and directing of desired
change; on a personal scale, it should be a vital and available means for
individuals to plan, direct, and improve their lives. (Rachal, 1989, p. 13)

It encourages

adult students to view knowledge and truth as contextual, to see value
frameworks as cultural constructs, and to appreciate that they can act on their
world individually or collectively and that they can transform it. (Brookfield,
1985a, p. 10)

Deshler and Hagen (1989) emphasize the increasing role of adult education as a central
strategy for public decision making in such areas as the environment movement. Blunt
(1988) says that

researchers are now moving beyond the concept of lifelong learning and
education to consider the concept of global learning. "Global learning"
requires the consideration of the learner within the total socio-cultural context
of family and community. (Blunt, 1988, p. 48)

Beyond a general need for a more knowledgeable populace, there is a specific need
for those with specialized education and training in natural resource management. Many
developing nations have agriculture education programs (Rivera & Schram, 1987) but there
is a shortage of professional and technical personnel to serve as agriculture extension agents;
those there are have an on-going need for in-service training and upgrading (Maalouf, 1987;
Olaitan, 1984; Young et al., 1980). Shute (1989) stresses the need for higher agricultural,
forestry and fisheries education in development, with more holistic curricula reflecting their
role in social and natural environments. Even locally, shortfalls in the number of
professional foresters and agricultural scientists are occurring (British Columbia Forest

The Role of Distance Education

Distance education, in which there is normally a time and/or space separation
between the teacher and the learner, is increasingly becoming an integral component of the
educational provision in many countries, particularly for adult learners. Communication
between teacher and learner occurs via print or the newer electronic communication
technologies; barriers of time and geography are lowered. Distance education is generally
perceived as a means to provide flexible access for the traditional student and an educational "second chance" for adults who were previously denied opportunities (Rumble, 1986; van Enckevort, 1986). An early distance education initiative was the creation of the British Open University in 1969. Its success, both in terms of enrolments and growing credibility (Perry, 1986), inspired other countries to follow suit (Reddy, 1988). Several years ago, Curtis and Bakshi (1984) identified the need for distance education programs in natural resources planning and management.

Rumble (1989a) says that, internationally, distance education is used to provide: (a) initial or extended formal education for large numbers of people; and (b) continuing, recurrent or life-long education. The courses provided may be academic, vocational, or involve professional development, rural development and community education. Many Third World countries are using distance education as a cost-effective, large scale vehicle to meet educational demands, particularly for the education of adults, that they are not otherwise able to satisfy (Daniel, 1988; Daniel, Stroud & Thompson, 1982; Reddy, 1988; Rumble, 1989a; Rumble & Harry, 1982; Shale, 1987; Young et al., 1980). In both developed and developing nations, the focus is on increasing adult access to educational opportunities with the goal of achieving greater social justice through equality of educational opportunity. Distance education could enable a critical mass of global concern to focus knowledgeably on the problems of resource management and the environment.

Inequality in Education Opportunity

"Knowledge is indeed power -- especially when some have it and others are intentionally deprived -- and education is a potent force for either distributing or perpetuating power" (Rachal, 1989, p. 13). The meritocratic ideal of advancement based on ability, hard work, and initiative must be founded on the egalitarian ideal of equal access and equal opportunity. Equality of access to post-secondary education in Canada became a particular focus for concern when it became clear that the policies formulated during the 1960s to provide a greater degree of educational equality for children from disadvantaged social and
racial groups were ineffective (Lessard, 1987; Pike, 1970, 1988). Concern regarding social justice reflects Canadians' belief that schools, especially universities, offer a direct route to social mobility, a means of improving the economic prospects of disadvantaged groups (Anisef, Bertrand, Hortian & James, 1985). In post-secondary education, the Government of Canada's declared policy is to co-operate with the provinces in supporting "excellence and equality of opportunity" (Secretary of State of Canada, 1988). In spite of the concern, post-secondary enrolments continue to reveal inequalities reflecting socioeconomic status, ethnicity, gender and region -- the latter disparity including an urban-rural gap in opportunity structures, particularly in some Western provinces, including British Columbia (Anisef et al., 1985). Results from a 1983-1984 national post-secondary student survey revealed that, while there has been some improvement, children from upper middle and higher class backgrounds continue to be over-represented (Porter & Jasmine, 1987). Moreover, more part-time students had a lower socioeconomic background than did full-time students. Women have made remarkable gains in participation in higher education but continue to be underrepresented overall at the graduate degree level (Porter & Jasmine, 1987). Says the 1991 Report of the Commission of Inquiry on Canadian University Education: "Universities continue to draw the large majority of their students from the financially advantaged socioeconomic classes in our society" (Smith, 1991, p. 96). Moreover, the most important barriers relate to cultural, family and individual expectations. Academic success and higher education are often seen as representing values that are alien, luxurious, or both, in families that are struggling financially to make ends meet. (Smith, 1991, p. 96)

Canada is not alone in facing these problems. One of the major thrusts of the United Nations Educational, Scientific and Cultural Organization's policies and actions in higher education since the early 1970s has been fostering the process of democratization by admitting non-traditional groups to study and by providing them with the support they need to complete these studies successfully (Goodridge & Layne, 1984). While continuing to combat the socioeconomic inequalities impacting the educational opportunities of young people, Canada, like other countries, is also seeking to improve lifelong learning.
opportunities for adults through new educational initiatives, such as distance education (Pike, 1988). Universities and colleges are being asked to serve the "learning society" by providing lifelong learning opportunities (Association of the Universities and Colleges of Canada, 1989). The British Columbia Ministry for Advanced Education and Job Training (1988) concluded that distance education can significantly increase access to educational opportunities. The Report of the Commission of Inquiry on Canadian University Education (Smith, 1991) praises the value and excellence of existing distance education efforts and urges expansion.

Distance education would seem able to respond to utilitarian needs for knowledge in a rapidly changing society, while serving democratic ideals and responding to a philosophy of lifelong learning. "The critical point in terms of a philosophy of distance education is the principle of equality of opportunity" (Gough, 1984, p. 23). Increased leisure time, unemployment, career changes, obsolescence of knowledge and skills, disparity in economic status, educational demands of the workplace, and higher initial levels of education are among the factors driving an increased demand for, and participation in, higher education by adults. Adults enter higher education for professional and work-related reasons, for other instrumental reasons, or to broaden their general education (Schutze, 1986). These adults face a number of specific obstacles, such as their life situation, work, family obligations, and distance, which often prevent their participation. Nevertheless, their number is significant (van Enckevort, Harry, Morin & Schutze, 1986). Moreover, the number enrolled in distance education universities is also impressive, with student demographics indicating that distance education is, indeed, providing access for some of those with life situation constraints (Graff & Holmberg, 1988; Schutze, 1986). Internationally, most of these distance education students are over 30, male, married and employed.

Inequality in Distance Education Opportunity

Morrison (1986) says that, in Canada, the barriers of geography, time and diurnal patterns, physical barriers encountered by handicapped people, psychological factors including confidence-building, and the needs of some learners for privacy and anonymity
can, indeed, be overcome by distance education, but he critically questions whether Canadian
distance education is redressing social inequality. Although there is a paucity of good
demographic data, it has become clear that the same hierarchical tendencies apply in distance
education as in traditional universities. Socioeconomic barriers have not fallen. Here in
Canada, as elsewhere (Schutze, 1986), distance education seems to be providing second
chances and more options for the socially and economically advantaged, while failing to
reach other segments of society. Educational deprivation is an enduring reality. Indeed,
while removing some old barriers to participation, distance education seems to have erected
some new ones, such as requirements for high technology communication equipment or
assumptions about the students' ability to be self-directed (Rubenson, 1986). Sweet (1989) is
blunt in saying that

merely providing greater opportunity to enrol has not broadened the social
base of accessibility to distance learning. Existing programs serve best the
educationally skilled; the educationally disadvantaged, if they do enrol, are
more likely to become attrition statistics. (p. 6)

For disadvantaged students, the "open door" can be a "revolving door" which rapidly returns
them to the outside (Harris, 1987). Those who most need liberation from the constraints of
their economic and social circumstances are those who are selected against. Clearly, the
concept of equality of opportunity must encompass more than equality of access, it must also
encompass equality of results, that is, equal opportunity for success. (Morrison, 1989; Sweet,

Harris (1987) draws on elements of critical theory to explore the construct of
"openness" in distance education, using the British Open University as the exemplar. Earlier,
Woodley and McIntosh's (1977) study of who decides not to apply to the British Open
University, and why, revealed that answers to these questions challenged its proclaimed
"openness". Harris (1987) exposes the complexities and contradictions of distance education
and some of the practices that actually lead to "closure" in such aspects as access,
instructional design, student assessment, and the teaching-learning process. These include
covered student selection in response to the need for academic credibility, a shift in priority
between ends and means with the smooth production of course materials taking precedence.
over the educational ends they are to serve, a gradual shift from diagnostic assessment towards grading for purposes of discrimination and selection, and the advantage of previous experience in knowing how to "play the game" with assessment procedures (Harris, 1987). Villaroel and Villaroel (1988) suggest that redefining distance to include other variables besides temporal and spatial remoteness should help increase equity. Evans (1989) responds by saying that distance education forms an intersection of spatial, temporal, social and cultural "distances", and that knowledge must be constructed and communicated across distances marked by class, gender, race, language, ethnicity and religious borders. Evans and Nation (1989a) criticize the "instructional industrialism " of distance education as bureaucratic and dehumanizing.

Moreover, those who deal with the role of distance education in national development are distressed by the gulf between what could be done and what is actually occurring (Daniel et al., 1982). Arger (1987) contends that, until the Eurocentric development paradigm within which distance education operates becomes more appropriate to Third World needs, there will continue to be a striking difference between distance education's promise of cheap, egalitarian, mass education of high quality, and the reality of what it is delivering. It can be used as just another way of dispensing Western education rather than locally relevant knowledge and there are almost insurmountable problems, such as irregular postal delivery, lack of electricity, poor language fluency, learners who are unprepared to study independently, and the high cost of introducing modern communication technologies. The target groups, if reached at all, are still the elite (Arger, 1987). Women, those from rural areas, and the lower classes are not participating. Jenkins (1988) admits that not as much has been achieved as hoped but challenges Arger's pessimism, saying that efforts are being made to design distance learning systems that suit local environments. Arger (1990) responds with specific examples and asserts that, with the exception of some developing nation institutions that critically reflect on their practice, distance education's promise of mass opportunity, national development, and high quality is not being delivered. Nonetheless, Penalver (1990) argues that distance education is a powerful instrument for change, offering the greatest hope
for development.

The Natural Resource Sciences

Not only is distance education failing to serve equally all segments of society, as one would wish not just on moral grounds but because any possible solution to our environmental and natural resource management crisis requires the involvement of all levels of society, but it seems to share with adult education in general, a particular ineffectiveness in attracting students to the scientific and technical subject areas. A study in Britain showed that 50% of students under 21 but only 24% of students over 25 were entering science and related subjects at university (Centre for Educational Research and Innovation [CERI], 1987). Studies from other countries confirm that adults, particularly women, seem disproportionately to favor the humanities and social sciences (CERI, 1987). An international study of distance education (Graff & Holmberg, 1988) revealed that only 15 of the 113 post-secondary institutions responding offered courses in agriculture, silviculture and forestry, and only 29 offered sciences. Moreover, the median enrolment was comparatively low for the agri-forestry programs (Graff & Holmberg, 1988). "Success rates" were lowest for the agri-forestry programs, and "dropout" rates highest for the maths, sciences and engineering, in comparison to other programs (Graff & Holmberg, 1988). Carr and Ledwith (1980) report that the negative consequences of British Open University student "disadvantage" in terms of academic under-preparedness and other factors is particularly noticeable in the maths and technology foundation courses.

Dropout

Attrition or dropout is a serious problem in distance education. Garrison (1987) says that no area of research in distance education has received more attention. Dropout or overall "wastage" has a number of components: 1. those who do not complete their final registration or who do not begin the course by submitting their first assignment (non-starters); 2. those who withdraw from the course or do not sit the final exam (withdrawals); and 3. those who sit the final exam but are unsuccessful overall (failures) (Woodley & Parlett, 1983). Reported rates, which usually exclude non-starters, vary considerably by
institution, subject area, and level of studies (e.g., Graff & Holmberg, 1988; Shale, 1982; Woodley, 1987; Woodley & Parlett, 1983; von Prummer, 1990). Of course, not all dropout is negative; students may achieve what they wish from a course and not carry on (Thorpe, 1988; von Prummer, 1990). Nonetheless, the concern has led to a search for concepts to explain dropout behavior and to guide research.

Kennedy and Powell (1976) propose a model to explain dropout which incorporates both student characteristics and circumstantial categories of variables. These include motivation, stage of adult development, educational background, personality, aptitude and educational self-concept. At the British Open University, Woodley and Parlett (1983) identify course, study environment, and motivational factors, such as student age, occupation, sex, region, credits held, educational qualifications, length of study, and workload, which contribute to dropout. Dille and Mezack (1991) report Grade Point Average, number of college credit hours completed, age and marital status as significant determinants, whereas sex, ethnicity, parental status, reason for taking the course, the importance of the course, learning style and previous distance education experience are not. The difficulty of the course and student perseverance, as influenced by the course instructional design variables and student support, were identified as central variables determining completion by Chacon-Duque (1985). Gatz (1985) derived a model for personal, instructional and environmental factors associated with completion and attrition in distance education. Her conceptual framework has five major dimensions:

1. significance and relative advantage of the course to the student's goal;
2. appropriateness of the independent method;
3. feasibility in time;
4. integration with interests and background; and
5. accommodation of learning style needs.

Each dimension has several variables. For instance, learning style materials support, personal support, and learning style needs in terms of content, presentation, structure, clarity and feedback compose the "accommodation of learning style" dimension. Unfortunately, her
attempt to confirm her model using data drawn from students registered in a wide variety of courses was confounded by differences among the courses, a significant factor she failed to separate in her study. Sung (1986) identifies student perceptions of course characteristics and the learning environment as important in persistence. Siqueira de Freitas and Lynch (1986), using student's educational background as a predictor variable, with institutional and noninstitutional factors as intermediate variables, found that student satisfaction with the course, frequency of visits to student drop-in centres, socioeconomic status, and perceptions of course materials were significant in explaining persistence. Powell, Conway and Ross (1990) say that life change variables, such as illness or altered employment status, institutional factors, such as the quality of the instructional materials and support services, and predisposing characteristics, like a need for success, marital status, and a need for support, interact to influence student persistence and success in distance education.

Sweet (1986) applied Tinto's theoretical model of dropout, relating the variables of student characteristics, academic and social integration, goal satisfaction, and institutional commitment to student persistence. The predictive validity of the model was relatively low ($R^2 = .19$) but Sweet did find that social integration in the form of direct telephone contact between faculty and students significantly influenced student commitment and persistence. In an international study involving several institutions, Taylor et al. (1986) also applied the Tinto model, finding that student success is associated with such factors as feedback and the amount of student-tutor interaction. Kember (1989) developed a linear-process model, based on Tinto, with components of individual background characteristics, goal commitment, the academic environment and integration, and the social and work environment and integration, that lead to a cost/benefit type decision on dropout or persistence. In a later model, Kember, Murphy, Siaw and Yuen (1991) identify four dimensions of a distance learner's experience: academic accommodation, academic incompatibility, emotional support, and external attribution. These are described as intervening variables between background characteristics as independent variables and persistence characteristics as dependent variables. Overall, they achieved an $R^2 = .80$ but a large proportion of this is due to inclusion of such
"persistence" characteristics as Grade Point Average in the model, the intervening variables have much lower Coefficients of Determination ($R^2 = .10$ to .24).

In contrast to these studies, which focus mainly on student and institutional factors, Bernard and Amundsen (1989) used Tinto's model to investigate the antecedents for dropout in courses that differ widely in content and instructional goals. They found the model a much more powerful predictor when courses in Communications ($R^2 = .40$), Business Administration ($R^2 = .50$), and Accounting ($R^2 = .58$) were examined individually. There were dramatic differences among the courses in the distribution of explained variance associated with background characteristics, social integration, academic integration, goal commitment and institutional commitment (Bernard & Amundsen, 1989). It is relevant to note that there are significant variations among the cultures of different academic disciplines in the epistemological properties of their knowledge forms and their modes of discourse (Becher, 1989). That is, their overall research paradigms, the role of theory, the extent of modeling and quantification, the generalization of findings, the degree of specialization, the level of jargon, the degree of teamwork, and aspects of communication approaches and styles differ among disciplines. Bernard and Amundsen (1989) have shown that these epistemological factors influence the variables that affect student dropout. Earlier, Woodley and Parlett (1983) had pointed out that a course's dropout rate is likely to be affected by the intrinsic difficulty of the subject matter while Chacon-Duque (1985) found perceived course difficulty a key predictor of dropout.

Saying that adult part-time students do not fit the Tinto model because social integration does not contribute in the same way to goals and institutional commitment, Brindley (1988) adapted for the distance education context the Bean and Metzer conceptual model of the attrition process for part-time students. This model proposes that withdrawal decisions are based on: (a) student background and demographic variables; (b) academic variables, such as study habits and course content; (c) environmental variables, such as hours of employment, family support and finances; and (d) psychological outcomes, such as perceived utility of the studies, satisfaction and personal realization. Billings (1988) also
proposes a model based on Bean, that includes background, organizational, environmental, outcome and attitudinal variables, with intention to complete an intervening variable in progress toward completion.

**Barriers to Participation in Distance Education**

It appears that, not only are there inequities in opportunity for adults to study at the post-secondary level, with distance education removing some barriers while erecting some new ones, but there may be some unique or specific problems associated with distance study in the natural resource sciences which impede successful participation. The goal of an informed citizenry that can democratically effect change cannot be met unless there is equality of educational opportunity: equality of access in entry and equality of access to completion. Effecting equality may require practicing equity, that is, applying differential procedures in order to be fair.

Rubenson (1986) provides a partial framework in which to examine some of the impediments to participation in distance education. Like Hammer and Shale (1981) earlier, he classifies them into situational, institutional and dispositional barriers. To these, since the research of Woodley and Parlett (1983), Gatz (1985), Billings (1988), Brindley (1988) and Bernard and Amundsen (1989) has shown that the nature of the course itself, that is, its disciplinary content, influences ability to participate, must be added epistemological barriers. A framework of situational, institutional, dispositional and epistemological barriers comfortably accommodates all the varying factors that have been identified in the previous discussion as important in students' ability to participate. Situational barriers stem from a person's life situation and could involve time constraints resulting from home or work responsibilities, or lack of money. Institutional barriers refer to those barriers to participation imposed, intentionally or not, by the institution offering the distance education opportunities. These can include the availability of courses, the adequacy of information dissemination about the opportunities available, policies involving such matters as admission qualifications and course pacing, transferability of credits, the provision of foundation or remedial courses
for those with insufficient background, requirements to meet at particular times and/or places for labs or audio-teleconferences, the technologies employed, and provision of student support services. Dispositional barriers are related to the students' psychological and sociological natures, their attitudes and perceptions about themselves as learners, their socialization through family and work, their learning styles, their purposes and motivation, and their degree of self-directedness. Epistemological barriers include the nature of the disciplinary knowledge, the role of theory, the extent of modelling and quantification, and the level of jargon in the course subject matter -- in other words, what some might call the course "difficulty".

In seeking to elucidate some of these barriers it is important to appreciate that people's actions, in this case, to dropout or persist, are based on their understandings, their "realities" of their experiences. Kennedy and Powell (1976) point out that students' "subjective views are the 'realities' which can often prove crucial in student progress" (p. 74). In a review of research on dropout in distance education, Munro (1988) recommends an inductive approach, drawing on theory from disciplines such as sociology, anthropology and economics, to help reconceptualize the problem and collect data that speaks less from the registrar's point of view and more about the experience of students. Knowledge about student understandings which affect their ability to participate in a particular course situation can help all those who design distance education programs to broaden participation and to lower the barriers that cause dropout, particularly the dropout of disadvantaged learners.

**Research Goal and Objectives**

The goal of this research is to clarify the specific nature of any situational, institutional, dispositional and epistemological barriers to participation in the distance delivery of natural resource sciences at the post-secondary level in order to assess if change is needed to increase access and completion rates. Its aim is to improve the effectiveness of international education and communication initiatives concerning resource management and the environment, while providing insights and theoretical concepts useful in clarifying the
nature of barriers to participation in distance education as a whole.

Specifically, the research goal will be addressed through two research objectives: elucidation of the nature of the experiences of various students (non-starters, withdrawals, incompleters, failures and completers) enrolled in University of British Columbia academic courses in the natural resource sciences; and illumination of student situational and dispositional variables, institutional variables and epistemological variables which may impede student participation through to course completion, particularly those that impact differentially and thus affect equality of opportunity. It will not address directly all aspects of equality of access (since the students have effected access through registration) but rather will focus on students' declarative and tacit understandings when they attempt to participate. It will, therefore, provide some insights concerning barriers to access from which inferences may be drawn, but will more directly provide information regarding barriers to completion, that is, those barriers encountered during participation that impact ability to persist.
Chapter 2

Literature Review

This chapter reviews literature relevant in addressing the research goal of elucidating the nature of any situational, institutional, dispositional and epistemological barriers that influence participation in natural resource sciences distance education. In any educational transaction there are four essential elements: the learner, the teacher, the course content (what is to be learned), and communication. As well, there is a context in which the transaction occurs. Distance education differs from traditional education only in that the four elements are rearranged (Wedemeyer, 1981) and the teacher may be an institutional team rather than an individual. However, because of these differences it is important in seeking an appropriate conceptual framework in which to address the research goal to first define distance education, review its theory and concepts, clarify the concept of open learning, and elucidate the institution's role in the educational transaction through distance education practice. Accordingly, distance education definitions, theoretical concepts, and practices are presented first.

Since the research on student dropout presented in the Introduction reveals the importance of such variables as the student's goals, background, responsibilities, socialization and learning style, understanding the student is also fundamental in clarifying the situational, dispositional and epistemological barriers they may experience. Because distance education students are mainly adults, some relevant adult education concepts and research are reviewed next. Particularly pertinent in terms of students' dispositional barriers are critical theory, which posits that the individual's understandings are molded by socioeconomic and political factors, and adult development and learning theories, such as andragogy, which ascribe unique characteristics to the adult learner. Accordingly, literature concerning critical theory, andragogy and learner self-directedness, learning styles, and motivation are presented. Finally, the chapter links the aforementioned literature and other
relevant research within a review of situational, institutional, dispositional and epistemological impediments to participation in distance education.

**Defining Distance Education**

Distance higher education is provided through autonomous Open Universities, through extension programs or departments within traditional institutions, through dual-mode institutions in which distance education is integrated within the general instructional milieu, or through various collaborations and consortia in which institutions cooperate to provide distance education opportunities (Rumble, 1986). In Canada, the dedicated distance education institutions are Quebec's Télé-université, Alberta's Athabasca University, and British Columbia's Open Learning Agency. In British Columbia, the University of British Columbia, Simon Fraser University and the University of Victoria all employ the extension model. As well, they are partners in the Open Learning Agency's British Columbia Open University (Mugridge, 1989a). Deakin University in Australia is an example of a dual-mode institution. Garrison (1989a) identifies another extension model, the use of distance education within private companies and agencies to serve their own people and interests.

Since such a diversity of non-traditional higher education models exists, and since technology is used in such a multiplicity of ways in different contexts, it is well to be clear about just what distance education is and what it is not. This is not as easy as it would seem since an acceptable, precise definition remains controversial within the field itself (e.g., Garrison & Shale, 1987; Thompson, 1986). Indeed, the disparity of programs, the innumerable permutations possible when combining different learners, different media, and different approaches, may militate against an acceptable definition of distance education. Moreover, Smith and Kelly (1987) say that the boundaries between traditional, campus-based education and distance education are becoming increasingly blurred.

Keegan (1988) has continued his synthesis (Keegan, 1980; Keegan, 1986) of the definitions of Holmberg, Peters, Moore and others to state that distance education is a form of education characterized by

* the quasi-permanent separation of teacher and learner throughout the
length of the learning process,
* the influence of an educational organization both in the planning and preparation of learning materials and in the provision of student support services,
* the use of technical media: print, audio, video, or computer to unite the teacher and learner and to carry the content of the course,
* the provision of two-way communication so that the student may benefit from or even initiate dialogue, and
* the quasi-permanent absence of the learning group throughout the length of the learning process so that people are usually taught as individuals and not in groups, with the possibility of occasional meetings for both didactic and socialisation purposes. (p. 10)

It is interesting to note that in refining his definition between 1980 and 1988, Keegan has separated Peters' (1973, as cited by Keegan, 1980; 1983; 1989) concept of distance education as a form of industrialised education from the definition and no longer refers to it, even as a socio-cultural determinant.

Nonetheless, the debate is not over. Rumble (1989b) responds with a new definition of distance education:

1. In any distance education process there must be: a teacher; one or more students; a course or curriculum that the teacher is capable of teaching and the student is trying to learn; and a contract, implicit or explicit, between the student and the teacher or the institution employing the teacher, which acknowledges their respective teaching-learning roles....
2. Distance education is a method of education in which the learner is physically separate from the teacher. It may be used on its own, or in conjunction with other forms of education, including face-to-face....
3. In distance education learners are physically separated from the institution that sponsors the instruction....
4. The teaching/learning contract requires that the student be taught, assessed, given guidance and, where appropriate, prepared for examinations that may or may not be conducted by the institution. This must be accomplished by two-way communication. Learning may be undertaken either individually or in groups; in either case it is accomplished in the physical absence of the teacher....
5. Where distance teaching materials are provided to learners, they are often structured in ways that facilitate learning at a distance. (p. 18-19)

This view, too, is challenged. Carl (1989) sees it as too institutionally oriented and not allowing for the situation in which the organization for learning emerges from and is controlled by learners. This criticism makes one wonder if the boundary of distance education is not also blurred at the other end of the spectrum, that of self-help learning. Verduin and Clark (1991) present what they consider a minimalist definition, with the four defining elements of distance education as follows:

1. The separation of teacher and learner during at least a majority of
the instructional process.

2. The influence of an educational organization, including the provision of student evaluation.

3. The use of educational media to unite teacher and learner and carry course content.

4. The provision of two-way communication between teacher, tutor, or educational agency and learner. (p. 11)

Mugridge (1989b) suggests that the long debate on definitions may have outlived its usefulness, that international distance and open learning systems take account of their widely different contexts, and that, providing the language of description and discussion is clear and precise, perhaps we should be content with the conclusion that distance education is what the authors, in their own backyard, say it is.

The concern on the part of some authors with precisely defining distance education is focussed around the ability to develop the conceptual frameworks and theory that are important in research and in the acceptance of distance education by traditional institutions. Perraton (1983) says that distance education has managed very well without any theory. He (Perraton, 1983; 1987) goes on, however, to suggest ways in which such theories may be derived.

In spite of the lack of a widely accepted definition of distance education, it is useful to examine its generally distinct characteristics in comparison to those of face-to-face instruction as these can contribute to our understanding of the educational processes involved and how these might pose barriers to participation. Cropley and Kahl (1983) say that, in comparison to face-to-face education, distance education has contact through communication media rather than immediate, personal contact; the teacher cannot immediately adapt to the learner's behavior; the learning environment is distracting; metacommunication is difficult; a personal relationship with the teacher is of little importance; the teacher's influence is indirect; learning materials must be of high didactic standard; learners experience a high degree of freedom; there are few opportunities for imitation/identification learning; communication is highly planned; information is mainly provided by content and organization; there is a comparatively low degree of evaluation and feedback from the teacher; internal motivation, self-direction, self-evaluation, planning ability, etc. must be high; and the willingness and ability of the learner to work without direct supervision must
be high.

**Distance Education Theory**

One of the earliest attempts to develop a theory of distance education, one with profound implications that may, indeed, have sparked the quest for alternatives, is Otto Peters' (see Keegan, 1980; Peters, 1983, 1989) description of distance education in industrial terms involving the principles of productivity, division of labor, mass production, mechanization, concentration and centralization. Peters really sees two kinds of education: personal, traditional education; and distance education, which is industrial and technological. Thus, for Peters, distance education is structurally different, a discrete genre. He characterizes the relationship between teacher and learner as (a) controlled by the rules of technology, not by social norms; (b) maintained by emotion-free language, not interactive speech; (c) based on a limited possibility of analysing students' needs and providing direction; and (d) achieving its goal by efficiency rather than by personal interaction. In his 1989 paper, Peters makes clear that he is not an advocate of this model, merely the "messenger".

Two major distance education theorists, Charles Wedemeyer and Michael Moore, have focussed on student autonomy and independence in developing their concepts. Both follow what they refer to as a "Copernican revolution" in education -- the conceptual shift from teaching to learning as the central concern. Wedemeyer (1981), using the metaphor "learning at the back door", bases his theory on the democratic, social ideal that everyone's needs for education should be met. He advocates a learner-oriented system of instruction that is characterized by availability anywhere that there are students; greater responsibility for learning placed on the student; teachers being free of all tasks but teaching; use of all available, effective media in an articulated way; and greater freedom for students in terms of choice of content, methods, and evaluation. As mentioned earlier, in his distance education teaching-learning model, the four essential elements (teacher, learner, communications system, course content) of any teaching-learning situation are present but rearranged.

Moore analyzed all structured learning in which there is a teacher-learner separation
and, over a decade, developed his "theory of independent study" (Moore, 1983a). He identifies two significant concepts in the classification of programs, distance and learner autonomy. According to Moore (1983a), distance is a function of (a) the structure in the teaching program, that is, the degree to which it is flexible and responsive to the learner's needs, and (b) dialogue, the extent to which two-way communication between the teacher and learner is possible. For instance, a program that is highly individualized to the learner's need is low in structure. The dialogue dimension is largely determined by the medium of communication used, says Moore (1983a). Teleconferencing is high in dialogue and thus less "distant" than broadcast television or print. Both structure and dialogue determine the distance between the teacher and learner. A program that is high in dialogue and has no structure is said to be least distant. Moore's second variable, learner autonomy, refers to the extent to which the learner rather than the teacher determines the goals, learning procedures and resources, and assessment parameters. Learner autonomy is considered to be the extent to which the learner is self-directed and able to take responsibility for the learning program. The success of a learner in a program that has high distance will depend on their competence as an autonomous learner. Thus, programs that are low in distance and low in autonomy are the least independent, those with high distance and high autonomy are the most independent (Moore, 1983a).

In contrast to Wedemeyer and Moore, two other theorists, Baath and Holmberg, focus more on teacher-learner interaction and communication. Baath (1979) relates what he calls correspondence education to a number of contemporary educational theories, models or approaches. He examines their applicability, and their implications for development of course material, for non-contiguous two-way communication and for supplemental face-to-face contacts. Baath (1979) finds that Skinner's behavior control model, Rothkopf's model for written instruction, Ausubel's advanced organizer model, Egan's structural communication model, Bruner's discovery learning model, Rogers' model for facilitation of learning, and Gagne's general teaching model are all applicable to distance education but that they vary in the extent to which they can be applied smoothly and naturally depending on the
educational goals and the extent of control over students' work towards these goals (Baath, 1979). In a later work, Baath (1980) stresses the importance of two-way communication between the learner and teacher. Effective counselling, well-designed learning materials, and satisfying two-way communication with an instructor, regardless of how effected or the medium used, are all important in ensuring perseverance and successful student outcomes (Baath, 1980).

Holmberg (1985) sees distance education as a method of real and simulated "guided didactic conversation" with the presence of typical traits of such conversation facilitating learning. His is a prescriptive theory postulating

1. that feelings of personal relation between the teaching and learning parties promote study pleasure and student motivation;
2. that such feelings can be fostered by well-developed self-instructional material and suitable two-way communication at a distance;
3. that intellectual pleasure and study motivation are favourable to the attainment of study goals and the use of proper study processes and methods;
4. that the atmosphere, language and conventions of friendly conversation favour feelings of personal relation according to postulate 1.;
5. that messages given and received in conversational forms are comparatively easily understood and remembered;
6. that the conversation concept can be successfully translated for use by the media available to distance education;
7. that planning and guiding the work, whether carried out by the teaching organization or the student, are necessary for organized study, which is characterized by explicit or implicit goal conceptions (Holmberg, 1985, p. 26).

Holmberg's view of distance education is quite institutional, with the independent learner guided through personalized communication. Guided didactic conversation, according to Holmberg (1985), uses clear, somewhat colloquial language, has a personal style, contains explicit advice and suggestions, invites response, and attempts to involve the student emotionally.

Evans and Nation (1987) recommend countering the "multi-national instructional industry model" by invoking critical theory concepts (to be considered later) of Anthony Giddens in developing distance education theory. Giddens' view that people construct meaning within their social context, and that the structures of systems they create in their social lives can constrain them, should be fundamental in educational theory, say Evans and Nation (1987).
Giddens provides us with a richer and broader theoretical approach which can be used to extend the "cognitive" approach to teaching and learning and which allows us to understand these processes within the social contexts which shape them. (Evans & Nation, 1987, p. 51)

Other theories, concepts, models and approaches for distance education have been and continue to be suggested. Some of these will be presented in their relevant context in the sections following.

Sparkes (1983) raised the issue of the disciplinary status of distance education, saying that more research and experience in distance education were needed to provide insights into such aspects of the educational process as how students learn and the effectiveness of different materials before distance education could become a discipline. However, Rumble (1988) examines the basis upon which claims for disciplinary status might be justified and concludes that, while distance education has many of the extrinsic characteristics of disciplines, such as teaching and research activities, and relevance to real problems, it lacks intrinsic characteristics, such as autonomy and independence of knowledge domain, theoretical and conceptual depth, and the presence of a unique "culture". He says distance education shares these intrinsic characteristics with education as a whole and thus it can not be regarded as a separate discipline. This appears unlikely to change.

Since distance education is not a unique discipline but rather part of education as a whole, it is entirely appropriate to draw on other education literature, particularly adult education literature, as will be done later in this review, for insights which may be helpful in clarifying a conceptual framework in which to address the research goal.

**Distance Education And Open Learning**

While "distance education" and "open learning" are sometimes used synonymously, they are definitely not the same. Understanding this distinction is important in any consideration of barriers to participation. Rumble (1989c) says that distance education is a method of education that differs from contiguous education, whereas open learning is a concept involving removal of barriers to student choice; the former stresses means, the latter the objectives and character of the educational process. However, as the varying definitions above suggest, distance education is also a concept; the difference lies in the fact that open
learning is a value term used to advocate ease of access and student choice, whereas the term distance education, in itself, does not imply a particular set of values. The two may overlap, that is, a distance education institution may have an open philosophy, but the terms are not equivalent. Open learning refers to student freedom related to access, time and place constraints, resources, structure, strategies, dialogue, and support services. In other words, open learning advocates such things as removal of entrance requirements, with flexibility and student-centredness in the learning program. Some of these values are based on adult learning concepts such as andragogy which will be considered later. Lewis provides a comprehensive definition of open learning, indicating that students may be given choices in one or more of why they learn, what they learn, how they learn, where they learn, when they learn, how their learning is measured, who can help them, and what they do next. There is a continuum from closed to open regarding each of these aspects (Lewis, 1986). Thorpe and Grugeon (1987) say that a basic requirement of open learning is that institutional barriers are sufficiently reduced so that some learners who would not otherwise do so are able to participate.

Boot and Hodgson (1987) describe two orientations to open learning, one of dissemination and the other of development. In dissemination, knowledge is considered a valuable commodity that is to be disseminated; learning involves the acquisition of facts, concepts and skills; the learner chooses from a cafeteria-style selection of course offerings which are based on a syllabus; the application and transfer of knowledge is what is considered relevant; student independence involves individualization; other people are seen as a source of moral support for the student; the tutor is considered a subject expert; and student proficiency is assessed against an externally recognized standard (Boot & Hodgson, 1987). In the development model, knowledge is seen as a process of engaging in meaning; learning involves elaboration and change in the meaning-making process; education is concerned with development of the whole person; student independence involves autonomy; the course structure is based on a process of planning, deciding and experimenting; the participants' working lives are considered the main source of learning material; other people
are seen as an inherent part of the learning venture; the tutor acts as a facilitator; and student assessment is collaborative, based on mutually agreed criteria (Boot & Hodgson, 1987).

Open learning can occur in any educational situation. Indeed, Thorpe and Grugeon (1987) say that some distance education programs form a subset of open learning, a particular example of one type. This is so because, at a minimum, the barriers of geography and time are usually absent in distance education. Hodgson, Mann and Snell (1987), Race (1989), and Thorpe and Grugeon (1987) provide guides to the concepts of open learning and their application in practice.

Much of the misuse of the term open learning in reference to distance education systems which are relatively closed results from the political and economic advantages that may accrue from such apparent open status (Rumble, 1989b). Both the British Open University and the British Columbia Open University are open in the sense that they are dedicated distance education institutions that do not require entry qualifications, but are closed in that courses are paced, there are limits on completion times, and course content and requirements are fairly fixed so as to ensure academic credibility. The distance education units of traditional universities, such as the University of British Columbia, tend to demand that their distance and on-campus students meet the same requirements; they are relatively closed. Keegan (1988) says that the Italian Consorzia per l'Universita a Distanza imposes more stringent requirements for students to attend study centres than do conventional universities. Even the spatial-time aspect is closed in this case.

**Distance Education Practice**

The practice of distance education is formed and constrained by a number of different factors: philosophical, political and economic. Internationally, distance education systems vary considerably according to available resources and their educational or political purpose, be it broadening provision of education at reduced cost, egalitarianism, modernization, rural development, continuing adult education, social control, or innovation (Rumble, 1986; Rumble & Harry, 1982). An international study of distance education is reported by Graff
and Holmberg (1988). It includes such aspects as institutional characteristics, purposes, teaching modes, flexibility, subject areas offered, media used, and provision for two-way communication and tutoring/counselling. Some institutions, such as the Sukhotai Thammathirat Open University in Thailand and the Chinese Central Radio and Television University, have over 500,000 students enrolled (Graff & Holmberg, 1988).

Rumble (1986) identifies three models of distance education: a systems model which has materials and student subsystems and is reflected in Peters' industrial theory of distance education; a holistic model, such as that proposed by Perraton (1983), which identifies various activities, influences, alternatives and feedback; and a transactional model, which focuses on the constituents involved in the process (developer, tutor, materials, student, counsellor) and the relationships or transactions between them. As well, Rumble (1986) says there are three general models of education that underpin the various distance systems. The institution-centred model emphasizes effectiveness and efficiency of educational practice; the person-centred model has a humanistic perspective with emphasis on the learner; and the society-centred model is based on social action and interaction to bring about societal changes. This latter model is commonly reflected in community education projects. Verduin and Clark (1991) suggest a fourth model for organizing distance education, a transaction-centred model that calls for a balance between dialogue and instruction in a systems approach.

The mission of the distance education institution or unit, its organizational form (i.e., extension, dedicated, dual-mode, consortium), its philosophic underpinnings, and the ways and means available to achieve its aims determine the way the institution views its mandate to serve students at a distance and the strategy it employs in delivering courses (Rumble, 1986). Most have an academic unit responsible for curriculum planning and development of courses and materials; a unit (linked to the academic one) for such student services as tutoring, counselling and provision of local support services; various production and distribution departments (i.e., publishing, video production), depending on the media employed; and an administrative unit (Rumble, 1986).
Mugridge and Kaufman (1986) and Sweet (1989) provide information on distance education practice in Canada. They, and others such as Holmberg (1985), Thorpe (1988), and Howard (1987), provide information on such aspects as evaluation and learner feedback; only instructional design, communication technologies, and student services will be considered here.

**Instructional Design**

Smith (1980) has identified a number of approaches to instructional design:

1. the course team model -- the systems approach used by the British Open University in which a team of academics, media specialists, editors, and other professionals work together to produce a course.

2. the author/editor model -- in this model, a content specialist/author is contracted to supply the course content, which is then edited by a distance education specialist. This model is common in North America and is the one generally employed by the University of British Columbia. Its focus is on print materials.

3. the contract author/faculty model -- used at the FernUniversitat in West Germany, this model involves the contracting of an outside expert whose material is then vetted by the regular faculty of the University.

4. the educational advisor model -- this model, in which an independent author writes a course with the advice of distance education specialists from the institution involved, is used in Australia and at some of the dedicated distance education institutions in Canada.

5. the intuition model -- used at some older institutions, this model involves only an author, who presumes to know what is best for the distance education student. It is no longer considered appropriate.

Holmberg (1985) recommends a systematic approach to the planning and development of courses which involves

1. defining the study goals and objectives
2. studying the target audience
3. determining the content and structure
4. determining the appropriate organization and administration
5. choosing the appropriate media
6. providing for two-way communication
7. constructing the course
8. evaluating both formatively and summatively
9. revising.

Echoing educational jargon of two decades ago, Holmberg (1985) says that objectives should be defined in specific behavioral terms related to the cognitive, psycho-motor and affective learning domains, but that these should be tempered by an awareness of the deficiencies of this approach in terms of student autonomy. The University of British Columbia's distance education course objectives are usually framed in behavioral terms.

Answers to questions about the learning goals, the students, and the course content provide direction in the selection of appropriate educational technology to effect both one-way and two-way communication.

**Communication Technologies**

Application of the new communication technologies is what has allowed distance education to emerge from its lowly beginnings as correspondence courses. While the print medium, in the form of texts or study guides, remains central because of its low cost and learner convenience (portable, built-in speed control and "instant replay", privacy, breadth and depth of information, familiarity), multi-media courses are "enriched" by additional provision of one or more of: terrestrial television and radio broadcasts, cable television, satellite television as well as audio and video teleconferencing, videotape programs, audiotapes, computers, videodiscs, telephone systems, and videotext (Bates, 1984, 1988; Niemi & Gooler, 1987; Shobe, 1986; Zigerell, 1984). A number of telecommunication networks, such as British Columbia's Knowledge Network, have been created to provide delivery technologies for educational institutions. Consideration of communication technologies is important in clarifying barriers to participation in distance education because the substitution of print and electronic communication for face-to-face oral communication is
a distinguishing aspect of the educational transaction.

Larsen (1985) synthesizes the commonalities of various communication theories (i.e., general systems theory which emphasizes the interrelationships of components through feedback; symbolic interaction theories which focus on self, society and mind; rule theories which involve beliefs about how to achieve a given objective; theories of persuasion which relate to perceived consistency with already established beliefs and attitudes; information processing theories which focus on varying levels of cognitive integration ability; and various theories that are concerned with interpersonal relationships [Littlejohn {1983} provides a comprehensive review]) to derive this definition: "Communication is the process of two or more interactants engaging in a flexible and interdependent exchange of coded messages to achieve one or more goals" (p. 17). He emphasizes that (a) communication is an on-going dynamic process, (b) it need not involve two or more people but does require two or more interactants that share an interdependency in a flexible relationship, (c) the two interactants must share the same coding scheme for symbolically presented messages, and (d) the communication process is goal-oriented (Larsen, 1985).

Garrison (1989a) presents a conceptual ordering of the modes of communication as follows:

I. One-Way Communication
   1. Direct (no electronic transmission)
   2. Mediated (electronic transmission)

II. Two-way Communication
   1. Direct
   2. Mediated
      i) Real
         a) Immediate
         b) Delayed
      ii) Simulated (p. 21).

The simulated category is to account for impending intelligent computer assisted learning.

Pratt (1987) says that

one form of technology is not inherently superior to any other form; the test of effectiveness lies not in the form but in the ability of technology to serve specific instructional functions. (p. 85)

Salomon (1979) has studied media in terms of cognition and learning. Reminiscent of Marshall McLuhan's "the medium is the message" (McLuhan, 1966) but in a more learned
approach, Salomon (1979) argues that there are essential differences among media in the ways in which they structure and convey content, that the symbol systems of various media differ because they call for different kinds of mental activity in the acquisition of knowledge (thus benefitting different learners) and because they cultivate different kinds of mental skills (thus benefitting different kinds of mental processes). (p. xviii)

Pratt (1987) says that

each medium or technology may be likened to a culture that has its unique language and norms. Information originated in one form can never be quite the same in another form...This "transmediation" -- the transfer of information from its original form into a different form for instructional presentation...implies a potential change in meaning. (p. 76)

Any medium can convey any form of knowledge; the choice lies in determining which can best convey a particular message (content), using a specific instructional process, to a particular group of students. For instance, television can be used to provide a stimulating overview for further reading or to present highly visual lab and field work that cannot be experienced directly, while audioteleconferencing provides for interaction and discussion of issues. Cautioning that knowledge cannot simply be transmitted but must be induced in the learner, Larsen (1986) says that attention must be directed to the interface of information technology and human activities like discussion, explanation and personal understanding.

Shobe (1986) says the suitability of the various communication technologies should be judged by criteria of responsiveness to learner needs, program quality, interactive components, reliability of the system, cost and accessibility, student support systems, and institutional commitment. "Getting the mixture right" (Daniel and Marquis, 1983) is the overriding consideration.

Student Support Systems

Student support systems vary from institution to institution, with their nature dependent on the institution's philosophy, funding and organizational structure. In general, they include registry functions, such as admissions, registration, records and examinations, information services, advising and counselling, tutoring and instructional support, library service, and student advocacy (McInnis-Rankin & Brindley, 1986; Thompson, 1989).
Increasingly, student support services are being seen as necessary in assisting a unique set of learners with well justified needs and as being an important part of the learner's educational experience (McInnis-Rankin & Brindley, 1986).

Particularly vital is the tutoring/instructional support system. Scales (1983) provides a typology of increasing levels of tutoring/instructional support for distance education students:

Type 1. Instruction is delivered through any one or a combination of one-way non-interactive media, such as print, audio or video.

Type 2. Provision is made for delayed two-way communication, by mail for instance, between learner and tutor.

Type 3. Provision is made for coincident two-way communication between learner and tutor, such as by telephone or computer.

Type 4. Provision is made to permit remote group interaction among learners, tutor and others through such means as teleconferencing or live interactive video.

Type 5. Provision is made for occasional face-to-face interaction through seminars, on-campus labs, etc.

Type 6. Fully supported instruction is supplied at a location nearer the learner than the "mother" institution. This involves an extension program or lecture series in a distant community, or a satellite campus. (There is some question as to whether this type qualifies as distance education according to the definitions considered earlier.)

The University of British Columbia uses Type 3 support routinely, with Types 4 and 5 added depending on the course content. Thompson (1989) says that institutions tend to employ uniform student-support strategies, such as systematic telephone tutoring; these do not respond to students' varying needs and preferences. Moreover, he says that

the process of self-selection by which some students elect to register for distance-education programs, while others do not, may mean that the need for student-support service is greater among those who tend not to register for distance-education programs than among those who do. If educational institutions seek to attract and serve large numbers of those students unable to attend on-campus classes, they may have to develop increased and highly visible student-support services. (Thompson, 1989, p. 43)
The University of British Columbia has no specific provision for counselling support for distance education students. They can receive help and advice of this sort only from their tutor, from UBC Access staff, from Faculty advisors or from the University's general student counselling office.

Distance Education in the Context of Adult Education

Within a decade, distance education will have become a very significant part of the universe of adult, continuing and higher education. It will cease to be a subject of special comment and be no longer a curiosity. The distinctions between distance and traditional education, adult, continuing and higher education will become blurred and recede into memory. This will coincide with the growing acceptance by both educators and public of the notion of lifelong education. (Moore, 1987, p. 39)

Indeed, while distance educators increasingly draw on the literature in adult education for greater insight into their own practice, there is greater attention being given to distance education in the mainstream adult education literature (Hayes, 1990). In the Handbook of Adult and Continuing Education, Garrison (1989b) says that communication technologies have shifted the focus from distance education to education at a distance, providing adult educators with new means for reaching out to adult learners through access and support. Since typically one is meeting the needs of voluntary learners who are adults, understanding the adult learner is a key prerequisite to successful distance education.

The Purposes and Philosophies of Adult Education

The purposes of adult education are the basic reasons why it is undertaken, while the philosophies are the beliefs that guide practice. Saying that adult education serves a vital social function, Beder (1989) groups its purposes into four interrelated categories:

1. Facilitating change in a dynamic society -- Adults need to adjust to keep up with rapid changes in social roles and expected behaviors as values, attitudes and beliefs shift, and to keep up with the rapid changes that are occurring in the knowledge that is required to perform specialized tasks.

2. Supporting and maintaining the good social order -- Maintaining and supporting the "good" social order in Western societies is seen as promoting the democratic order.
Inherent in the concept of democracy is an informed, critical-thinking citizenry that participates in the affairs of society and has equal socioeconomic opportunity.

3. Promoting productivity -- Adult education is used, first, for human resource development, to promote productivity at the organizational level through training for job performance, education for advancement or new requirements, and development for general growth of the individual and organization, and, second, at the societal level, where human capital theory (which says that human skills and knowledge acquired through education are vital to economic growth) is applied. For instance, adult literacy is necessary for good communication systems, in turn necessary for economic growth.

4. Enhancing personal growth -- Here the purpose of adult education is to facilitate the adult's growth and development through achievement of spiritual, physical, vocational, political and cultural goals. Concepts that are relevant include self-actualization (becoming all one is capable of becoming) and Mezirow's (1981) perspective transformation in which adults undergo shifts in consciousness that result in them perceiving themselves and society in more productive ways.

The philosophical underpinnings for these purposes of adult education include the liberal-progressive tradition, humanism, and countercritique (Beder, 1989). The liberal-progressive tradition sees adult education as having a decided social role in abetting the democratic order, addressing the problems of social change, and cultivating the intellect. Some philosophers advocate a liberal education approach while others believe education should proceed from experience. Humanism focuses on the philosophy that adult education should assist learners in making choices that maximize their potential. Here the emphasis is more on the individual's personal growth than on society. Griffin (1987) sees this philosophy in market models of social welfare which are now associated with a form of individuality, a philosophy of freedom, and anticollectivist ideology. Particularly relevant to concern about participation is the third philosophy, countercritique, which focuses on the relation of adult education to society, seeing capitalist democracy inherently flawed by structural inequalities that can only be redressed through reordering of the social system (Beder, 1989). This
philosophy, variously called countercritique, critique, critical reflection and critical theory, is concerned with social justice. Since critical theory would seem to provide understandings relevant in clarifying some of the barriers that adults with varying socioeconomic backgrounds may face when they attempt to participate in academic distance education, it will be considered next in some detail.

Critical Theory

Educational sociologists are concerned about the ways in which society classifies, transmits and evaluates knowledge. In recent years, the major focus of their concern has centered on two interrelated questions, "to what extent does education make society better by making it more egalitarian, and to what extent does education legitimate, and even enhance, existing social and economic inequalities" (Rubenson, 1989, p. 51)? While most critical theories and concepts have been based on the education of children, Rubenson (1989) says that not only are the principles underlying theories on the relationships among education, social structure, and society equally true for preadult and adult education, but the two are mutually dependent. The commonalities have not eluded adult educators (see, for example, Griffin, 1987; Jarvis, 1985; Mezirow, 1981).

There are two main contrasting paradigms within the sociology of education: the consensus paradigm, which says that social inequality is inevitable and necessary for the benefit of society as a whole; and the conflict paradigm, which sees social inequality as an expression of the struggle for power, privileges, and goods and services that are in short supply (Rubenson, 1989). The latter is characterized by competing interests, elements of domination, exploitation, and coercion. The consensus paradigm reflects a structural-functionalist view that social inequality is fair if there is equality of access to opportunity and meritocratic selection for differential rewards. Implicit in its assumptions is the belief that all classes of society, and the education system as a whole, work together in a neutral, harmonious, consensual way to transmit cultural heritage. In contrast, conflict theorists believe that there is not equality of opportunity, that the structures of symbols and knowledge in schools are those of the dominant culture and serve to reproduce and legitimate the power
structure. This conflict paradigm and the concepts of critical theory, which attempt to understand and explain education in terms of the larger conflicts of society, have come to dominate and are of concern here.

The economic theory of Marx, that the rich and powerful elite govern the infrastructure of society, using their control over the means of material production to exploit and constrain the proletariat, is a key concept in critical theory. Reproduction theorists see capitalist society as reproducing the class structure, skills, values and belief systems upon which the system depends (Beder, 1989). Schooling is seen as the filter through which children acquire the varying amounts of cultural capital (forms of knowledge, language practices, values, and ways of acting and socializing) which determine their position in the social order. Thus, education is seen as reproducing the inequities of society; it is not neutral.

Fundamental to an understanding of reproduction theory is Italian Antonio Gramsci's concept of hegemony. Hegemony refers to the consensual maintenance of views of the dominant group as taken-for-granted, commonsense beliefs and practices which are lived daily (Apple, 1981; Entwistle, 1979). It reflects the establishment of a moral or cultural influence by one social class over other classes, or one sex over the other, rather than physical coercion or political power. Hegemony is what determines the expectations of teachers and students, the hidden curriculum, the selective traditions of textbooks, and other factors through which the dominant beliefs of society are reproduced in schools. Rubenson (1989) points out that formal adult education is subject to the same hegemony that governs pre-adult schooling. Gramsci saw counterhegemonic education as involving the political education of adults (Entwistle, 1979).

Reproduction theory has evolved into several schools of thought. Some economic correspondence theorists, such as Bowles and Gintis (1976), maintain the Marxist view that the economic structure of society, that is, the division of labor involved in material production, is the key determinant. They see the structural correspondence between social relationships in the educational system and relationships of production in the economy as
serving to integrate students into capitalist society. Their viewpoint is very deterministic and pessimistic in terms of the possibility for change. Cultural reproduction is espoused by Bourdieu and Passeron (1977) who examine the role of culture in the reproduction of class hierarchies. They link culture, class and domination, saying that the culture of the school system is that of the dominant class, those who control political, economic and social resources. Others, "cultural Marxists" such as Gramsci, Apple, Giroux, and McLaren, consider both economic and cultural systems to be determinants. Besides social class, they believe gender, race, religion and other cultural hierarchies are reproduced in the schools. In their writings (e.g., Apple, 1982, 1986; Giroux, 1981, 1988; McLaren, 1989), they claim to have exposed the prevailing ideological and social practices at schools which favor the existing social order. They espouse a neo-Marxist, radical pedagogy, encouraging social reforms through educational transformations.

Anyon (1981) examined elementary schools in contrasting social class settings and found that, while there were similarities in curriculum topics and materials, there were also both subtle and dramatic differences in the curriculum and the curriculum-in-use among the schools. Indeed, social stratification of knowledge was occurring; knowledge was being used as a form of social control. For instance, children in working class schools were being taught facts and mechanical, practical behaviors while those in affluent professional area schools were being taught how to use concepts and ideas, to think for themselves and be creative. Some aspects of knowledge were reproductive, that is, they contributed directly to the legitimation and perpetuation of ideologies, practices and privileges constitutive of present economic and political structures, while other knowledge was non-reproductive and could lead to social transformation (Anyon, 1981). Moreover, she identified resistance as a dominant theme in the working class schools.

One of the major contributions in understanding social and cultural reproduction in the context of resistance theory is Paul Willis' (1977) study of a group of working class schoolboys. He found that "the lads" resisted by flouting classroom convention and rejecting the mental work of the classroom, which they considered weak in comparison to manual
work, which they considered masculine and strong. By rejecting mental labor so vehemently, the lads freely implicated themselves in their own domination, ensuring their position in the working class. In this way, resistance serves to reproduce the class system of society (Willis, 1977).

The concept of Marxist humanism, the belief that humans possess the power of choice and can therefore determine their own fate, is a dominant theme in the adult education literature related to critical theory (Beder, 1989). Key in this regard are the theories of Paulo Freire. Freire's work with illiterate adults in Brazil led to his theory of liberating disadvantaged people for change and self-determination through "conscientization", a process in which the teacher helps people to transcend false consciousness to an awareness of themselves as individuals, of the social, economic and political forces which shape their lives, and of the challenges these present both individually and collectively (Freire, 1970). Freire rejects the "banking" concept of education, in which knowledge is deposited, as creating externally-controlled "adapted man", in favor of "conscientization", a process which involves reflection and action, to create "integrated man". His is a strategy-based radicalism, developed for peasants who were truly oppressed. Even Giroux (1981) cautions that it would be misleading and dangerous to extend without qualification Freire's theory and method to Western societies. Giroux was speaking in the context of schooling, however, and Freire, who was concerned with adults, has some validity in the context of adult education, particularly of the disadvantaged. Moreover, Freire has turned some of his attention to Western society and, in one of his more recent publications (Freire, 1985), goes beyond class oppression to argue that society contains a multiplicity of social relations (gender, race, age) which contain contradictions and can serve as a basis for organized reform. Here, Giroux (in Freire, 1985) says Freire has combined the language of critique with the language of possibility.

Also espousing the idea of adult empowerment through critical consciousness is Mezirow (1981), who developed a critical theory of adult learning and education based on the concept of perspective transformation. He draws on the work of the seminal critical
theorist Jurgen Habermas, a social philosopher and member of the Frankfurt School. Geuss (1981) and Carr and Kemmis (1986) provide useful reviews of Habermas' critical theory. Habermas distinguishes among scientific theories, interpretative theories and critical theories. He rejects positivism in developing a theory of knowledge in which knowledge is the outcome of human activity that is motivated by natural needs and interests (Habermas, 1978). These "knowledge-constitutive interests" guide and shape the way knowledge is formed in different human activities. Habermas differentiates three generic areas in which human interest generates knowledge. The first, the technical interest, is the human interest in acquiring knowledge that will help in controlling and manipulating events and objects. This interest involves "instrumental action". The second, the practical interest, generates knowledge in the form of interpretative understanding which can inform and guide practical judgement. It involves "communicative action" through social interaction. The third knowledge-constitutive interest is the emancipatory interest, a basic human concern for rational autonomy and freedom. It involves an interest in knowledge gained through self-reflection within one's social context. Essentially, emancipatory awareness allows one to perceive and be released from the hegemony of one's situation. Habermas (1978) proposes "critical social science" as serving the emancipatory interest. A critical social science involves critical theory and the method of critique. Mezirow (1981) draws on Habermas' emancipatory domain, the most distinctly adult domain of learning, in developing his concept of perspective transformation. He says that

perspective transformation is the emancipatory process of becoming critically aware of how and why the structure of psycho-cultural assumptions has come to constrain the way we see ourselves and our relationships, reconstituting this structure to permit a more inclusive and discriminating integration of experience and acting upon these new understandings. It is the learning process by which adults come to recognize their culturally induced dependency roles and relationships and the reasons for them and take action to overcome them. (Mezirow, 1981, p. 6-7)

In simple terms, adults no longer blame their problems on their own inherent inferiority and instead take steps to improve their situation. Relating perspective transformation to Freire's conscientization, Mezirow (1981) asserts it is a central function for adult education. Moreover, he links the adult educator’s role in developing students' perspective
transformation to the concept of learner self-directedness as both the means and ends of education. According to Mezirow (1981),

a self-directed learner must be understood as one who is aware of the constraints on his efforts to learn, including the psycho-cultural assumptions involving reified power relationships embedded in institutionalized ideologies which influence one's habits of perception, thought and behavior as one attempts to learn. A self-directed learner has access to alternative perspectives for understanding his or her situation and for giving meaning and direction to his or her life, has acquired sensitivity and competence in social interaction and has the skills and competencies required to master the productive tasks associated with controlling and manipulating the environment. (p. 21)

The concept of the self-directed adult learner is central in much of the current thought in distance education and is, as mentioned earlier, a fundamental premise in the concept of open learning. It is derived mainly from Knowles' (1970) system of andragogy, the art and science of facilitating adult learning, which posits itself between adult development and adult learning and so will be considered within this larger view.

**Adult Development and Learning**

Adulthood is defined by biological, social, behavioral, psychological, existential and other indices of age, while adult development implies changes of a fairly lasting nature in these indices (Boucouvalas with Krupp, 1989). A major theme in the literature of adult developmental change concerns predictable sequential progressions in an individual's life. These sequential perspectives have been categorized by Kohlberg and Armon (1984) as three types of stage models: nonhierarchical functional models in which a new set of functions, that is, actions and purposes, emerges at each period as the adult experiences new sociocultural spheres and roles; and hierarchical soft and hard structural stage models which involve an invariant sequential progression with qualitative differences in structures that still serve the same basic function at different points in development. Each stage represents a different and integrated structure. The Piagetian model of cognitive development (e.g., Piaget, 1973) is the best example of a hard structural model. Each stage represents qualitatively different ways of thinking. Soft structural models follow the structural stage model criteria less closely and contain affective elements of self-reflection, with each stage associated with a different perspective on reality. An example is Kegan's (1982) helical
evolution of the various "constitutions of the self" -- the incorporate, impulsive, imperial, interpersonal, institutional and, finally, interindividual self. He says that the way individuals respond to a particular life event is based on their own reality of that event, that is, its meaning in terms of the event itself and its meaning for the self in relation to the event. Boucouvalas with Krupp (1989) say that, for adult educators, the soft structural models have more promise than the hard structural models in addressing the wisdom and experience of adulthood.

Boucouvalas with Krupp (1989) provide a summary of some of the expanded perspective on development stages beyond that of Piaget, called postformal thinking. They explain that beyond formal thought lies relativistic thinking and beyond that, dialectic thinking. Postformal thinkers can reconcile contradictions and understand knowledge as temporary. Hayes (1990) says these theories describe the individual's progress from simplistic, stereotypic thinking to greater awareness of multiple perspectives, conceptual complexity, and increasing tolerance for ambiguity. Moreover, Boucouvalas with Krupp (1989) cite some of the work in transpersonal development and conclude that the structures of cognition are only one way of knowing, that there is a balance between cognitive, analytical, and intellectual ways of knowing and the contemplative approach. Both may have relevance to a more comprehensive understanding of the adult learner, as does consideration of the learner's environment, relationships and other social, historical or cultural factors (Boucouvalas with Krupp, 1989). Linking adult development and learning theory to critical theory, they speculate that social class itself may militate against an adult's development and further learning.

Hayes (1990) says that adult development theories can inform distance education practice by providing insight into how an adult may behave in a learning situation. Moreover, education can impact the developmental changes that adults undergo. Smith (1982) found that adult learning capacity increases as one learns how to learn. Merriam (1987) delineates three types of models adult educators use to understand and explain adult learning: those, such as Knowles' (1970) andragogical model and Cross' (1981)
Characteristics of Adults as Learners (CAL) model, that are based on adult characteristics; those that are based on adult life situations (e.g., Knox, 1986); and those that involve changes in consciousness (Freire, 1970; Mezirow, 1981). Brookfield (1989) summarizes the behaviorist, humanistic and critical approaches to facilitating adult learning, saying that different approaches will be called for, depending on the class, ethnicity, cultural conditioning and personality characteristics of the learners. Smith (1982) says that adult learners differ from children in four critical characteristics:

1. a different orientation to education and learning (i.e., the adult is a volunteer with a unique self-concept);
2. an accumulation of experience which can be a base for new learning or a source of obstacles;
3. special developmental trends (as previously discussed); and
4. anxiety and ambivalence, related to an adult's need for independence and autonomy, as modulated by their insecurities regarding content and techniques, and their needs for assistance in learning.

Schlossberg, Lynch and Chickering (1989) say that adult learners differ from traditional aged higher education students as follows:

* A wider range of individual differences, more sharply etched
* Multiple demands and responsibilities in terms of time, energy, emotions, and roles
* More -- and more varied -- past experiences
* A rich array of ongoing experiences and responsibilities
* More concern with practical application, less patience with pure theory, less trust in abstractions
* Greater self-determination and acceptance of responsibility
* Greater needs to cope with transitions and with existential issues of competence, emotions, autonomy, identity, relationships, purpose, and integrity. (p. 20)

Their learner agendas centre on identity, achievement, change, generativity and competency, and they have a particular need to matter, to be noticed and appreciated (Schlossberg et al., 1989). These authors suggest that providing environments that make adult learners feel they matter can be a means of removing dispositional, situational and institutional barriers to involvement in mainstream higher education.
Smith (1982) proposes six optimum conditions under which adults learn best:

1. They feel the need to learn and have input into what, why, and how they will learn.

2. Learning's content and process bear a perceived and meaningful relationship to experience and this experience is effectively used as a resource for learning.

3. What is to be learned relates optimally to the individual's developmental changes and life tasks.

4. The amount of autonomy exercised by the learner is congruent with that required by the mode or method used.

5. They learn in a climate that minimizes anxiety and encourages freedom to experiment.

6. Their learning styles are taken into account.

Brookfield's (1986) six principles of effective practice in facilitating adult learning overlap in some ways but also embody some new concepts:

1. Participation is voluntary; adults engage in learning as a result of their own volition.

2. Effective practice is characterized by a respect among participants for each other's self-worth.

3. Facilitation is collaborative. The enterprise is cooperative in terms of leadership, setting objectives, curriculum development, determining methods, and selecting evaluation criteria.

4. Praxis is placed at the heart of effective facilitation, with a continual process of activity, reflection upon activity, collaborative analysis of activity, new activity and so on.

5. Facilitation aims to foster a spirit of critical reflection.

6. The aim of facilitation is the nurturing of self-directed, empowered adults.

In considering barriers to participation in distance education, the concept of the self-directed learner suggested by these various authors and embodied in the assumptions of andragogy is particularly relevant, as are learning style and motivation. These will be considered in some detail next.
Andragogy and the Self-Directed Learner

Brookfield (1986) says that andragogy is the single most popular concept in adult education, while Merriam (1987) says that it has caused more controversy, philosophical debate, and critical analysis than any other idea in adult education. The writer most often associated with the concept of andragogy is Malcolm Knowles. He defined andragogy as the art and science of teaching adults (Knowles, 1970). Based on the premise that learning activities for adults must address the needs, interests and expectations of adults, andragogy has at least four crucial assumptions:

That, as a person matures,
1. his self-concept moves from being a dependent personality towards one of being a self-directed human being;
2. he accumulates a growing reservoir of experience that becomes an increasing resource for learning;
3. his readiness to learn becomes oriented increasingly to the developmental tasks of his social roles; and
4. his time perspectives change from one of postponed application of knowledge to immediacy of application, and accordingly his orientation towards learning shifts from one of subject-centeredness to one of problem-centeredness. (Knowles, 1970, p. 39)

Originally, Knowles viewed pedagogy and andragogy as a dichotomy, one concept for children and one for adults, but he came to see them as extremes of a continuum with the reality for a particular learning situation existing somewhere between the two poles (Knowles, 1980). More recently, Knowles (1984) says that he sees the pedagogical and andragogical models as parallel, not antithetical, and that the educator would draw on one or the other depending on the situation, not the age of the learner. For instance, adults confronted by strange content may be truly dependent on didactic instruction before they can take much initiative in their own learning. Jarvis (1985) draws interesting parallels between pedagogy and "education from above" which assumes a classical curriculum, and between andragogy and "education of equals", which reflects a romantic curriculum. It should be noted that, in the andragogical model, the educator is not seen as a teacher but rather as a facilitator assisting adults to meet their educational needs.

Whether andragogy is an empirically accurate construct, a verifiable theory of adult learning, or a philosophically based prescriptive concept is highly controversial (e.g.,

> debate about research, like debate about andragogy, involves philosophical as well as empirical issues. Since philosophical questions are answered ultimately by beliefs and purposes, practitioners should be wary of covert epistemology and values underlying adult education research -- whether about andragogy or any other topic. (Podeschi, 1987, p. 16)

Brookfield (1986) questions the assumption of adult self-directedness in learning situations as opposed to social roles. He comes to the conclusion that if self-directedness is seen as a mark of adult maturity rather than being related to chronological age, then it is appropriate that adult education be concerned with nurturing the prescriptively desired, mature characteristics of adulthood. Thus, self-directedness is seen as a goal rather than as an assumption in adult education (Brookfield, 1986). This echoes Mezirow's (1981) assertion that

> central to the adult educator's function is a goal and method of self-directed learning. Enhancing the learner's ability for self-direction in learning as a foundation for a distinctive philosophy of adult education has breadth and power. It represents the mode of learning characteristic of adulthood. (p. 21)

The concept of encouraging self-direction to facilitate adult learning is one that has attracted many adult educators, including Mezirow (1981), Cheren (1983), Brookfield (1985b; 1986), and Boud (1988a). However, Apps (1988) says "self-directedness is probably less common than Knowles maintains" (p. 100). As Birkey (1984) points out, "...andragogy assumes a need for self-directedness that often gets translated into an assumption about the reality of self-directedness in all adult learners" (p. 27).

Nowhere does this seem more true than in distance education (for example, see Coldeway, 1982; Cropley & Kahl, 1983; Hayes, 1990; Hodgson et al., 1987; Hough, 1984; Moore, 1983a, 1986; Taylor & Kaye, 1986; Wedemeyer, 1981). Moreover, the concept of the self-directed learner is pervasive in practice. Holmberg (1986) says that some 40% of distance education institutions largely expect and base their work on the assumption that students are able to work independently, while others, through varying degrees of support, endeavor to develop a degree of independence not expected to be common among new
students. Completion rates are significantly higher in institutions that provide student support (Holmberg, 1986). Tait (1990) says that

the earlier model of the autonomous adult student being taught by the perfect course package has given way, but the concept of individualism, often masked as independence, has continued to dominate implicitly and explicitly. The model of the independent learner often appears to deny the reality of the social making and remaking of knowledge that constitutes learning, and is failing to provide the fullest range of learning opportunity and associated student progress. The concept is ideological in nature, and in part underlies the enthusiasm of governments in the UK and elsewhere for distance education and open learning. (abstract)

Unfortunately, decisions regarding the blend of interaction and independence are often based on the reality of the economies of scale that can be achieved with the independent learning approach (Daniel & Marquis, 1983).

Moreover, as Brookfield (1985b) points out, it is uncommon to find details of how adult educators promote self-directed learning in their students, in contrast to just providing support. For instance, Moore (1986), in a paper promoting learner autonomy in distance education, says that there may be some students who are not self-directed, who still have an emotional need for dependence. The tutor should not reinforce this dependence and instead should encourage them to become self-directed, says Moore. How this should happen is unclear. For those that are instrumentally dependent, that is, unable to undertake a learning activity without seeking help, Moore (1983b) suggests they might seek a different program, one in which distance is low. However, more recently, Wright (1987) proposed a model showing how various aspects of academic support can contribute to a student's learning and increased capacity for independence in learning. Elton (1988) specifies the use of learning methods that are different from those in traditional adult and distance education. Inglis (1988) used "hermeneutic interpretation and explication" to conclude that the promotion of affective elements in distance learning will enhance growth of learning autonomy. Paul (1990) says that open universities may do less than campus-based ones in promoting independent learners. He advocates a strong strategic plan that integrates instructional design, course delivery systems, and student support services into a coherent whole that focuses on developing students' attitudes and skills.
Although she acknowledges criticisms of Knowles’ prescriptions and assumptions, Burge (1988) says that many implications drawn from the concept of andragogy, particularly the wider learner-centred view, need to be better integrated within distance education to balance the strengths of the instructional technology and systems approaches. She says that this means that the central focus should be on the learner, not on the instructor or content. Questioning Burge’s concept, Garrison (1988) says that teaching and learning are inseparable in a proper and holistic view of the educational transaction, and to accept andragogy’s view of the instructor as a guide, catalyst and co-inquirer is to seriously diminish the role of the teacher. He adds,

the self-directed assumption of andragogy suggests a high degree of independence that is often inappropriate from a support perspective and which also ignores issues of what is worthwhile or what qualifies as an educational experience. (Garrison, 1988, p. 124)

Burge (1989) defends her position, saying that what matters in learner-centredness is not learner self-directedness but learner self-responsibility.

This exchange points out some of the semantic problems associated with use of terms such as self-directed, learner-centred, student autonomy, independent learning, and, as pointed out earlier, open learning. Wedemeyer (1981) says that the terminology for non-traditional learning is disunifying and divisive. Cheren (1983) questions the meaning of the label "self-directed learner", while Evans and Nation (1989b) profess a relaxed attitude to the definitional disputes over nomenclature in distance education (Nation [1990] later changed his mind) and go on to advocate a philosophy which recognises student autonomy (exactly what they mean by that is left to the reader) and strives for dialogue. Morgan (1985) says, independent learning means all manner of things. Like so much educational language, "independent learning" is not so much a technical term as a slogan. People use it differently with different meanings and connotations. Some people mean the separation of teacher and learner -- the beavering away at home by himself or herself. Independence in this sense is a basic characteristic of distance education....A shift towards independent learning here may simply mean providing fewer specially prepared learning materials and cutting back on tuition and counselling support -- "independent learning" is being used as a disguise for a general worsening of our teaching and learning provision. For other people, independent learning means something quite different -- namely, students taking responsibility for what and how they study -- developing greater autonomy and self-direction in learning. A change in this direction with more of the content of learning controlled by students immediately raises questions about assessment, curriculum and standards. (p. 38)
Garrison (1989a) adds,

if independent learning means isolation from learning resources and being able to decide what to study without normative advice, then it does appear to be limited as a guiding educational philosophy or theoretical concept. (p. 26)

Sammons (1988) provides an epistemological justification for the teacher mediating the learner's perceptions and ensuring broader educational goals in a way that acknowledges learner independence. Garrison (1989a) argues that the issue is one of control — the degree that the teacher and student share control of the educational transaction. He suggests that control is a triadic relationship consisting of independence, proficiency and support that exists within the larger relationship among teacher, learner and content (Garrison, 1989a). Pratt (1988) says that not all adult learners are willing or able to exert control over instructional functions. What is important is the element of informed choice, learners deciding, first, if they value control and, second, if they will do anything to establish or relinquish control. Their decision will depend on situational, learner and teacher variables (Pratt, 1988). The sharing of control is negotiated through dialogue, says Garrison (1989a). Evans and Nation (1989a) argue that dialogue is the essence of practice, research and theory in distance education; it is crucial for quality learning. Boud (1988b) suggests that a mature autonomy does not involve isolation but rather has a social context of interrelations with others. To him, development in learning involves moving from dependence to counterdependence to independence and, finally, to interdependence (Boud, 1988b). Graff and Holmberg (1988) found that personal communication, even mainly noncontiguous communication, had great impact on students' success and the possible development of independence. Even Moore (1983a) says that autonomous learners are not to be thought of as intellectual Robinson Crusoes, cast-away in self-sufficiency, that they must have recourse to teachers, resources and even contiguous learning situations.

It should be noted that Morgan (1985) is speaking of the meaning of independent learning in the context of the British Open University; the program context in which others are speaking is often ambiguous. Is it the self-teaching informal types of activities of Tough (1979) or post-secondary academic education, and in which field? Brookfield (1985b) says
that no adult can be fully self-directed while working within an accredited educational institution. He also questions the latter two assumptions of Knowles' account of andragogy, saying that programs that are problem-centered around developmental tasks with immediacy of application can lead to a highly reductionist view of learning that ignores aspects of reflection and the adult's fascination with new, unrelated knowledge (Brookfield, 1986).

Leslie (1987) says that learners who enrol in formal courses do not want flexibility and "learner choice" in materials, they want unambiguous directions, with clear objectives and direct routes to achieve them. "If they wanted 'learner autonomy', they would go to the library, telephone a friend, rent a tape, or buy some new software" (Leslie, 1987, p. 61).

Daniel and Marquis (1983) warn that

remote learning systems must beware of the illusion of solving problems with flexible rules which make the staff feel liberal and warm inside but which do not of themselves help the student attain his goals. (p. 347)

In the context of barriers to participation in distance higher education, the concern regarding self-directedness, of course, is that it is those adults who are unfamiliar with systematic learning and whose needs are somewhere between those assumed in andragogy and those in pedagogy -- in other words, disadvantaged learners -- who are not served by a learner-centred approach which assumes student independence. Brookfield (1985a) points out that most research in self-directed learning has involved samples from middle-class, educationally-advantaged populations; the resultant generalizations are thus culture and class specific, indeed, "dangerously ethnocentric" (p. 11). Paul (1990) refers to the "myth" of the self-actualized learner, saying that there are large numbers of students who do not cope effectively with the demands for independence, time management and self-direction posed by open learning. As Rubenson (1989) states,

a system of adult education that implicitly takes for granted that the adult is a conscious, self-directed individual in possession of the instruments vital to making use of the available possibilities for adult education -- a system that relies on self-selection to recruit the participants -- will by necessity widen not narrow, the educational and cultural gaps in society. (p. 65)

Learning Styles

As noted earlier, Smith (1982) pointed out that allowing for their varying learning
styles helps adults in learning. Loesch and Foley (1988) suggest that "if students are provided with the opportunity to choose between various teaching methodologies, they will select those which are congruent with their learning preferences" (p. 230). Daniel and Marquis (1983) say that part of "getting the mixture right" in distance education is providing a healthy degree of redundancy in learning systems so as to accommodate differences in learning style.

Ehrman (1990) described some of the major learning style models and speculated on their applicability to distance education practice and research. Learning styles can be defined as the individual's characteristic ways of processing information, feeling and behaving in learning situations. Keefe (1987) uses the National Association of Secondary School Principals' definition: "Learning styles are characteristic cognitive, affective and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" (p. 5). Saying that learning style and cognitive style have been used synonymously in the literature but are decidedly not the same, Keefe (1987) uses Messick's definition that cognitive styles are information processing habits, "stable attitudes, preferences, or habitual strategies determining a person's typical modes of perceiving, remembering, thinking, and problem solving" (Messick et al., 1976, p. 5). In view of these definitions, one might question whether these are "learning" styles or "studying" styles.

Citing over 30 learning style dimensions in all, Keefe (1987) says that cognitive style includes such dimensions as field independence vs. dependence (an analytical as opposed to a global way of experiencing the environment), perceptual modality preferences (preferred reliance on one of the sensory modes for understanding experience), and constricted vs. flexible control (individual differences in susceptibility to distraction and distortion in tasks with conflicting clues). Affective styles, the second dimension of learning styles, encompass those aspects of personality that have to do with attention, emotion, and valuing; motivation is one of their determinants (Keefe, 1987). These include persistence or perseverance (variation in a learner's willingness to labor beyond the required time, to withstand
discomfort, and to face the prospect of failure), and risk taking vs. cautiousness (individual differences in a person's willingness to take chances to achieve some goal) (Keefe, 1987).

The third type of learning styles are physiological, the biologically-based modes of response that are founded on sex differences, personal nutrition and health, and the accustomed reaction to the physical environment. They include time-of-day rhythms and need for mobility (Keefe, 1987). It is important to distinguish learning styles from learning strategies, although the two are intimately related, with learning style and motives tending to determine learning strategy. Learning strategies are the sequence of procedures (tactics) students use to accomplish learning; they involve conscious decisions and are relatively specific and concrete. Schmeck (1988) provides a detailed discussion.

A number of psychometric instruments have been developed to assess the various dimensions of learning style. Three of the most commonly used will be reviewed next in some detail in order to provide background for the choice of instrument with the best potential utility in providing insight into the construct of learning style as a dispositional barrier that may face distance education students during participation.

Before turning to these models, however, it is important to note that the concept of learning style has both promise and problems associated with it (Claxton & Murrell, 1987). Promise in its potential to inform practice but problems with the conceptual construct of learning styles as a whole. Claxton and Murrell (1987, p. 1) quote Curry as saying that researchers "have not yet unequivocally established the reality or utility of [the] concept."

Shipman and Shipman (1985) say that

styles have been defined at different levels of discourse and as operating at different levels of generality. Although as a class of constructs cognitive styles are considered to refer to a broad range of human functioning, few of the identified styles have been studied over a wide range or would even be expected to remain stable over a great variety of situations. Similarly, styles vary in the extent to which the underlying construct has been conceptualized as basic to the individual's personality. (p. 232)

They attribute these problems to the varied theoretical proclivities among the researchers involved and the differing phenomena included as styles. Jensen (1987) comments that "'learning styles' can mean anything from hemisphericity to one's method of sharpening
pencils" (p. 182). Moreover, many cognitive style variables may be different measures of a single bipolar dimension. Kirby (1979) suggests that the many different conceptions of style may only be correlates of a few basic styles that fall under "lumper" and "splitter" types. Schmeck (1988), summarizing his work and that of other authors in the same volume, suggests a similar underlying dichotomy, global/holistic/field dependent/right-brained vs. analytic/serialist/field independent/left-brained as the extreme ends of a continuum.

Nonetheless, a number of learning style models have been extensively researched and some seem to provide utility. These include field dependence-independence determined by the Embedded Figures Test, the Kolb Model, and the Jungian psychological model embodied in the Myers-Briggs Type Indicator. Models such as the National Association of Secondary School Principals' Learning Style Profile, which is a second-generation instrument with 23 scales representing four higher order factors (cognitive styles, perceptual responses, study and instructional preferences) (Keefe, 1987), do not seem appropriate.

Field Dependence-Independence (Embedded Figures Test)

The most researched learning style dimension, field dependence-independence, refers to the ability to overcome an embedding context, specifically, in the Embedded Figures Test (EFT) (Witkin, Oltman, Raskin & Karp, 1971), to find a simple figure within a more complex design. Field independents see things apart from the background field while dependents are influenced by the organization of the background; they have more difficulty disembedding a figure. The dimension and test were defined by Herman A. Witkin and his associates (see Bertini, Pizzamiglio & Wapner [1986] for a history). The concepts "field dependence" and "field independence" were originally used by Witkin to describe tendencies to rely primarily on visual or gravitational cues (external or internal referents) in determining the upright in space (Witkin, Moore, Goodenough & Cox, 1977). The Embedded Figures Test measures the same dimension: the extent to which the surrounding visual framework dominates the perception of the item within it; more simply, the extent to which a person perceives analytically (Witkin et al., 1977) or the degree of psychological differentiation (Witkin, 1978).
In later work, Witkin and Goodenough (1981) altered their conceptions of the constructs involved in field dependence-independence by linking performance to cognitive restructuring, the ability to restructure initial perceptual experience. They propose a hierarchical model in which autonomous functioning is a broad superordinate construct with cognitive restructuring skills and interpersonal competencies as subsidiary constructs. Shipman and Shipman (1985) say that this model is more in agreement with their concept of a true learning style. Claxton and Murrell (1987) say that field dependence-independence may be the two most fundamental learning style dimensions, perhaps an overarching construct. They suggest that traits at this level are intrinsic and thus less susceptible to modification.

In general, field independents are characterized as being autonomous, analytical, better able to impose structure on unorganized material, preferring a lecture format, and having an impersonal orientation with a strong sense of self-identity. Field dependents, on the other hand, have a more global perspective, prefer a group discussion format, have an interpersonal orientation, are more socially adept, more sensitive to social reinforcement, and pay selective attention to social cues (Even, 1982; Witkin et al., 1971; Witkin et al., 1977; Witkin & Goodenough, 1981). Measures of field dependence-independence bear little relation to college Grade Point Average, reflecting their value-neutral character (Witkin, 1978), but do affect choice of courses and career interests, with field independents favoring the impersonal domains which require competence in cognitive articulation, such as mathematics, the natural sciences and engineering (where they do perform significantly better than field dependents), while field dependents tend to favor interpersonal domains, such as the social sciences and business (see Witkin et al., 1977 for numerous citations). Ramsden (1988) says that systematic differences in learning styles are to be expected and do occur among professional, science, and humanities students. Learning tasks in science are typically described as hierarchical, logical, heterogeneous, and rule and procedure governed, with faculty likely to use more formal, didactic teaching methods; humanities and social science tasks are seen to require interpretation, comparison, generalization, and self-direction
Brookfield (1985a) says that, if we relate the idea of self-directed learning to cognitive styles, then field independence is the concept that seems to hold the most promise. One might expect field independents to be more comfortable with distance education and, indeed, Moore (1983a) reports that students in a more distant form of independent study were more field independent than the norm. Chickering (1976) hypothesized that the low persistence in correspondence courses was the result of withdrawal of field dependent students while Thompson (1984) suggests that field dependent students may be more vulnerable than field independent students to dropping out of correspondence courses. However, although Thompson and Knox (1987a) found that students who register for correspondence study are more likely to be field independent, there were no differences in the persistence behaviors between those with field dependent and field independent cognitive styles. Moreover, Thompson and Knox (1987b) found no difference between field dependent and field independent learners in the importance that they placed on systematic telephone tutoring. It is most pertinent here to recall points made earlier in the Introduction: that, in distance education, relatively fewer students are attracted to the natural sciences, maths and engineering, in comparison to the social sciences and humanities; and that completion rates are lower in these programs (CERI, 1987; Graff & Holmberg, 1988). These facts are inconsistent with the predictions of the field dependence-independence concept.

The Embedded Figures Test (Witkin et al., 1971) itself is objective and relatively easy to administer. However, besides the concern just raised regarding incongruency between the predictions of the concept of field dependence-independence and actual participation in distance education, there are two additional, inter-related, concerns regarding the test itself. The first is that the test measures a specific ability rather than anything that could be construed as a style. The second is that the test, by measuring the ability to disembed a figure from a complex background, is really a test of field independence or lack thereof; field dependents may perceive themselves as "failing" the test.
The Kolb Model

David Kolb (1981; 1984) drew on the work of Dewey, Lewin, Jung and Piaget in developing a theory of experiential learning. Kolb declares that his model of the learning process is consistent with the structure of human cognition and the stages of human growth and development. Its emphasis on the important role that experience plays in the learning process distinguishes it from other cognitive theories. Kolb describes learning as a four-stage process in which learners have:

1. immediate concrete experience, which is the basis for
2. observation and reflection, leading to
3. abstract conceptualization and, finally,
4. active experimentation.

The result is another concrete experience, but at a more complex level, so that the model can be visualized as a narrowing helix spiralling to higher levels of complexity. In cross section, the helix is a circle with two dimensions: the "grasping" dimension of concrete experience at one end and abstract conceptualization at the other, and the "transforming" dimension, with active experimentation at one extreme and reflective observation at the other (Kolb, 1984).

In Kolb's Learning Style Inventory (Kolb, 1984), subjects rank-order words concerning learning preferences along the two basic dimensions of abstract-concrete and active-reflective. Individuals exhibit four types of learning style, one for each quadrant (Kolb, 1984):

"Convergers" grasp experience through abstract conceptualization and transform it through active experimentation. They can apply ideas practically in focussing on specific problems and are relatively unemotional.

"Divergers" are best at transforming concrete experience through reflective observation. They are imaginative, emotional, and interested in people.

"Assimilators" grasp experience through abstract conceptualization and transform it through reflective observation. They excel at inductive reasoning and can assimilate diverse data into an integrated whole. They are good at creating theoretical models, less concerned
about people, and more interested in abstract concepts.

"Accommodators" are best at transforming concrete experience through active experimentation. They are intuitive risk takers who like to do things and have new experiences, and are skilled at adapting to specific circumstances.

It is worth noting that Kolb's diverger-converger dimension would seem to fit comfortably within Schmeck's (1988) underlying global/holistic/field dependent/ right-brained vs. analytic/serialist/field independent/left-brained dichotomy.

In a study of disciplinary differences, Kolb (1981) found that undergraduate business majors tended to be accommodators, nurses and engineers were convergers, history, English, political science and psychology majors were divergers, and mathematics, chemistry, economics and sociology majors were assimilators, while physics majors were very abstract and fell between convergers and assimilators. He mapped data from a 1969 Carnegie Commission of Higher Education study in two-dimensional (abstract-concrete, active-reflective) space and found that the natural sciences and mathematics academic fields were clustered in the abstract-reflective quadrant, the science-based professions such as engineering in the abstract-active quadrant, the social professions such as education, social work and the law in the concrete-active quadrant, and the humanities and social sciences in the concrete-reflective quadrant (Kolb, 1981).

There are, however, a number of problems with Kolb's Model and Learning Style Inventory. Fundamental is the shift to centrality on the "style" continuums (abstract-concrete, active-reflective) that occurs as an individual develops. Claxton and Murrell (1987) provide a useful discussion of some of the concerns in the literature about the validity and reliability of Kolb's model and inventory as a guide to educational design. The model's utility seems to rest in its application in collecting aggregate data on student styles for dialogic purposes rather than in individual prescription (Claxton & Murrell, 1987). Dille and Mezack (1991), for instance, found that Kolb's Learning Style Inventory score measuring concrete experience was significantly related to student success in telecourses. While they concluded that "the less concrete one's learning style, the better suited one is to learn in the
telecourse format" (Dille & Mezack, 1991, p. 30-31), they were unable to show that learning style type (i.e., converger, diverger, assimilator, accommodator) per se was a significant variable in predicting telecourse success.

*The Myers-Briggs Type Indicator*

The Myers-Briggs Type Indicator (MBTI) provides a measure of personality dispositions and preferences based on Carl Jung's theory of psychological types (Myers & McCaulley, 1985). As such it assesses personality orientation more than style and presents some conceptual problems for those committed to the construct of learning style as a whole.

The MBTI has four separate dichotomous preference scales:

Extraversion-Introversion (EI). The EI index is designed to reflect whether a person is an extravert or an introvert...Extraverts are oriented primarily toward the outer world; thus they tend to focus their perception and judgement on people and objects. Introverts are oriented primarily toward the inner world; thus they tend to focus their perception and judgement upon concepts and ideas.

Sensing-Intuition (SN). The SN index is designed to reflect a person's preference between opposite ways of perceiving; one may rely primarily upon the process of sensing (S), which reports observable facts or happenings through one or more of the five senses; or one may rely more upon the less obvious process of intuition (N), which reports meanings, relationships and/or possibilities that have been worked out beyond the reach of the conscious mind.

Thinking-Feeling (TF). The TF index is designed to reflect a person's preference between two contrasting ways of judgement. A person may rely primarily on thinking (T) to decide impersonally on the basis of logical consequences, or a person may rely primarily on feeling (F) to decide primarily on the basis of personal or social values.

Judgement-Perception (JP). The JP index is designed to describe the process a person uses primarily in dealing with the outer world, that is, with the extraverted part of life. A person who prefers judgement (J) has reported a preference for using a judgement process (either thinking or feeling) for dealing with the outer world. A person who prefers perception (P) has reported a preference for using a perceptive process (either S or N) for dealing with the outer world. (Myers & McCaulley, 1985, p. 2)

More simply, the MBTI provides information about learner preferences in perceiving meaning (Sensing vs. Intuition), expressing values and commitment (Thinking vs. Feeling), interacting with the world (Extraversion vs. Introversion), and about whether they have a cognitive or affective approach (Judging vs. Perceiving). Because there are four bipolar dimensions, there are sixteen MBTI types.

Claxton and Murrell (1987) say that the MBTI is a very comprehensive instrument
with high face validity. Provost and Anchors (1987) provide reviews of applications of the MBTI in higher education: Lynch (1987) links it with student development theories; Kalsbeek (1987) with models of attrition such as that of Tinto where the MBTI is said to be useful in describing individual students and the nature of their educational experience in terms of their congruence with the academic and social environment; and Jensen (1987) relates it with learning style, where the MBTI is described as allowing one to penetrate through the veil of behavior, which may be learned or be determined by other factors, to underlying cognitive functions. Citing the considerable research on the MBTI, Ehrman (1990) states that this is perhaps the most versatile of the cognitive and learning styles models because it addresses cognitive, affective, general personality, and behavioral factors in learning performance. However, there are some problems with reliability; the test-retest data reported by Myers and McCaulley (1985) are not particularly impressive. Their data show that there is some consistency, but hardly replicability, with time. The MBTI's self-reporting aspect is problematic. Strength of preference and mood at the time of testing are apparent factors in reliability (Myers & McCaulley, 1985).

In a comprehensive review of MBTI literature, Myers and McCaulley (1985) report several research studies in which students electing independent study had definite tendencies to be intuitive, feeling and perceptive types. Masson (1987) hypothesizes that distance education is more appropriate for students of the introvert type. However, Atman (1988), addressing the relevance of psychological type indicators such as the MBTI in distance education, suggests that extraverts, intuitives, thinkers, and judgers may have an advantage in distance study because of their goal accomplishment capacity.

Because the MBTI is self-reporting, it is easy to administer and score. It has the advantage of being less threatening than a test of ability to accomplish a task. Overall, the MBTI would seem to be the survey instrument most likely to provide insights into student personality dispositions and preferences within the construct of learning style that could be useful in clarifying the nature of their experience in distance education study.
Motivation

Because adult learning is usually voluntary, there is considerable interest in, and concern about, what motivates adults to begin formal learning and to persist in this learning. Ehrman (1990) says that motivation is often described as being of three types: instrumental motivation, which refers to the desire to achieve an external goal, such as a new job; intrinsic motivation, which is the desire for some form of personal satisfaction or growth; and integrative motivation, which involves the desire to communicate with or be part of a new community. Boshier (1985) produced an "Education Participation Scale" which allowed him to conclude that adults enrolled for six reasons: social contact, social stimulation, professional advancement, community service, external expectations, and cognitive interest.

In distance higher education, the purposes and motivations of adults are somewhat narrower. Schutze (1986) categorizes them in a simplified fashion as follows:

* those who enter or re-enter higher education as adults in order to pursue mainstream studies leading to a full first degree or diploma ("delayers" or "deferrers").
* those who enter to up-date their professional knowledge, or seek to acquire additional qualification, in order to change occupations or advance their career ("refreshers", "recyclers").
* those without previous experience in higher education, who enrol for professional purposes, especially in short programs, such as languages or computers.
* those, with or without previous experience in higher education, who enrol with the explicit purpose of personal fulfilment.

Cross (1981) provides a review of some of the theories and models that have been developed to explain adult motivation to participate in education. She draws on the theories of Lewin, Miller and Maslow to assert that

the needs hierarchy would predict that members of the lower social classes will be interested primarily in education that meets survival needs, mostly job training and adult basic education, while the upper social classes will have fulfilled those needs and will seek education that leads to achievement and self-realization. (p. 112)

Rubenson (1976) developed an "expectancy-valence" paradigm as a framework for
understanding the competing forces at work in an adult's psychological field that motivate him/her to participate in adult education. Rubenson's "expectancy" component has two parts: the expectation of personal success in the educational activity, and the expectation that this success will have positive consequences. "Valence" is concerned with the consequences of participation and can be positive (e.g., higher pay), indifferent, or negative (e.g., less family time). The force motivating an individual is determined as a multiplicative function of expectancy and valence (Rubenson, 1976). However, Greenberg (1981) applied expectancy theory of motivation in a study of distance education completion and found that expectancy variables had minor impact on persistence.

Cross (1981) draws on models such as Rubenson's, Boshier's Congruence Model and Tough's Anticipated Benefits concept to develop a Chain-of-Response Model. In this model, forces for participation begin with the individual (self-evaluation, attitudes about education), move to goals and expectations as influenced by life transitions, then move more externally to opportunities and barriers as influenced by information, and, finally, to participation, which feeds back to the first point of the individual.

In a study of the motives and orientations of adults in non-traditional learning, Houle (1979) came to the conclusion that a much more complicated relationship exists between motives and educational content than had been thought to be true. He suggests that

1. Participation in any type of educational activity is undertaken for a number of different motives which operate collectively....
2. In most cases these motives reinforce and supplement one another....
3. ...in some cases motives and content diverge so greatly that it is hard to discern any relationship between them....
4. People vary greatly in their educational orientation. (Houle, 1979, p. 31)

After years of theory building in the area of adult motivation for learning, Boshier (1985) says that while "the structure of participants motives is reasonably clear, people enrol for reasons that are only marginally related to socio-economic and life-style variables" (p. 151). Reinforcing and strengthening even the most fragrilely motivated adult to persist in the learning task is perhaps more important. He concludes that "one way adult education instructors can diminish dropout rates is to treat motivation as a hypothetical construct and concentrate on the creation of optimal conditions and consequences that motivate learners"
Neil (1981) says that motivation to start learning tends to be relatively high, rather widespread, and is "not particularly difficult to translate into action. Motivation to persist, however, especially in circumstances of intellectual, cultural and/or logistical difficulty, is rarer. But for the distance learner, particularly, it is vital" (p. 76).

Atman (1987) provides an interesting point of view. She says that success for distance learners depends on the interaction of a good curriculum and specialized conation (striving) skills, such as energy mobilization, information management, and time control. The conative domain deals with striving, volition, and the will. Atman (1987) defines conation as vectored energy, that is, personal energy that has both direction and magnitude. It seems, therefore, closely related to intrinsic motivation. There are five conative stages:

Stage 1. Perception -- where the individual intelligently discerns the environment.

Stage 2. Focus -- when the individual brings something into clear relief and sets a goal.

Stage 3. Engagement -- here the goal-focussed individual begins to work with all available information and forms a plan of action.

Stage 4. Involvement -- this can be at five attention levels (minimal, cursory, perfunctory, thorough, and absorbed) depending on the levels of involvement at previous stages.

Stage 5. Transcendence -- when the individual is fully immersed in the task in such a manner that mind/body/task become one. High energy is involved, with the individual drawing on and feeding into the energy that is generated from the activity itself (Atman, 1987).

She says that knowledge of the conative stages allows a learner to develop consciously the skills attending each stage, thereby assuming an active rather than passive role in intrinsic motivation.

The conscious management of information as an external resource and one's own energy as an internal resource results in feelings of satisfaction, competence, and a growing sense of self....This "joyous sense of mastery" is particularly important for adults who enroll in distance learning courses,
where students must demonstrate not only their knowledge of course content but their ability to manage themselves throughout the length of the term or semester. (Atman, 1987, p. 19)

When careful attention is given to the conative domain, as well as the cognitive and affective domains, in instructional design, then learners can be drawn through to the thorough/absorbed and transcendent levels of learning (Atman, 1987). This means encouraging goal-setting, providing reinforcement, timely feedback, and mentoring. Gitau (1987) suggests application of achievement motivation principles, such as the use of explicit verbal cues to arouse achievement behavior, in distance education.

**Barriers to Participation in Distance Education**

The reviews of literature that have been presented on distance education theory, practice and dropout, critical theory, adult development and learning theories, learning style, and motivation provide a foundation for a more comprehensive review of barriers to participation in distance higher education.

Recall from the Introduction that impediments to participation in distance education can be situational, institutional, dispositional or epistemological in nature. They can include both barriers to access and barriers to completion. Situational barriers stem from a person's life situation and could involve lack of time due to home or work responsibilities, money, and so on. Institutional barriers have to do with such things as entrance requirements, the availability of suitable courses, and technologies employed. Dispositional barriers are linked to the student's motivation, self-concept, and attitudes. Epistemological barriers are related to the nature of knowledge in the content disciplinary area. Aspects include the overall research paradigm, the role of theory, the degree of quantification and modelling, and the modes of discourse typically used.

participate. These include course and instructional factors, institutional factors, study environment factors, student background and demographic factors, time factors, learning style, socioeconomic status, personal blame, motivational and other factors; all fit within a broader framework of situational, institutional, dispositional and epistemological impediments to participation in distance higher education. Note that some factors may not be mutually exclusive in terms of the type of barrier they may impose but may interact or impact in different ways. Time, for instance, can be an institutional barrier resulting from particularly demanding course requirements. This in turn can interact with the situational barrier of how much time a student has available, or the dispositional barrier of motivation, in terms of how much time they are willing to spend. Moreover, Powell et al. (1990) point out that institutional and situational barriers do not, in most cases, act as direct causes of dropout but do so primarily in interaction with predisposing characteristics, affecting students differently depending on their disposition. The notion that the barriers to participation impact students differentially is key in this research.

**Situational Barriers**

**Time**

Although distance education may remove some of the constraints of fixed class times and does allow for choice in course load, it does not remove the overall barrier of time — time to do assignments and time to study. Sung (1986) says that most distance education students need more time than regular students to complete courses. For some finding this time is more difficult than it is for others. This is because they rarely have the single role of student; most have multiple roles, which may include being spouse, parent, family provider, caretaker of dependent parents, or may involve social and community responsibilities. Rubenson (1986) says that parents in families with three or more children, and those with irregular working hours are worse off than others. So, one would expect, are working mothers and single parents. Too, the multiple roles of the distance education student often result in changed circumstances that impact the time they have available (Brindley, 1988). Change in circumstances is a key variable affecting student dropout (Gatz, 1985; Kennedy &
Powell, 1976). However, in her study of distance education attrition, Brindley (1988) found that course completers and non-completers experienced similar hindering or facilitating incidents in their learning environment (e.g., changes in time available or circumstance) but that completers responded differently to these incidents. This suggests that the difference between dropout and completion may have more to do with the ability to cope with problems than with the problems themselves. Holmberg (1988) quotes Bartels, Helms, Rossie and Schormann as saying that dropouts have "greater problems coordinating their study and are less capable of sustaining heavy workloads and changes in job situation" (p. 5) than are completers.

Courses that demand attendance at particular times and/or places for such events as audioteleconferences or laboratory sessions present traditional time constraints, as well as possible transportation or cost constraints (Daniel & Marquis, 1983). Woodley and McIntosh (1977) found that 29.4% of those who decided not to apply to the British Open University cited inability to attend summer school as a reason, 29.3% said they would not have enough time for study, and 24.6% said the financial commitment was too great. Nonetheless, for many it is a matter of how one chooses to use time rather than a lack of time.

Gatz (1985) identifies feasibility in time as a key dimension in determining distance education dropout. Feasibility in time has four variables: course time requirements (an institutional factor), time available in terms of other commitments such as work and family (a situational factor), willingness to devote time (a dispositional factor), and time management skills, that is, the ability to schedule time, distribute time appropriately, and to make good use of available time (a dispositional factor). Athabasca University students with concrete study habits and good time management skills were found more likely to succeed in their studies (Powell et al., 1990), while telecourse students identified time management as the key challenge to their success in courses (Hezel & Dirr, 1991). Procrastination seems to be an important part of the problem (Wilkinson & Sherman, 1990; 1991).
**Cost**

Cost is a very real barrier for those pursuing higher education, even when true costs are heavily subsidized by government. Rubenson (1986) says that studies have shown that cost is a higher impediment among women than among men and that the lower socioeconomic groups say that it is a greater impediment than do those who are better off. Particularly relevant is the fact that part-time students, enrolled via distance education or otherwise, are discriminated against in financial aid (CERI, 1987).

**Study Environment**

A student's study environment is important to his or her ability to participate in distance education (Gatz, 1985; Kahl & Cropley, 1986; Singer, 1982; Sung, 1986; Woodley & Parlett, 1983). There are two situational aspects: having a quiet place to study, and being in or near a community which provides such opportunities as additional library resources and appropriate people with whom the student can talk about matters such as goals, course relevance and the course itself.

**Institutional Barriers**

**Courses Available**

Rubenson (1986) reports that, in spite of a wide selection of courses offered, many adult learners stated that they had no opportunity to study the course they desired. He concluded that, although there was some ignorance about the range of opportunities available, there were also some very real deficiencies in the range of opportunities provided. Woodley and Mcintosh (1977) found that 18.8% of those who decided not to apply to the British Open University did so because there was no course in the desired subject. Bartels (1982) reported that the limited range of available subjects is geared to the more traditional male disciplines. Graff and Holmberg's (1988) summary of distance education internationally reveals the restrictions in the courses offered by individual institutions. It should be noted that some courses are more difficult to mount than others. Some may have limited target audiences which restricts their cost-effectiveness; others, such as some science subjects with "wet" laboratory components or requirements for sophisticated equipment, are
a considerable challenge in distance delivery (Holmberg & Bakshi, 1982; Kember, 1982).

Related to course availability is the adequacy of information dissemination about the courses. Particularly relevant in terms of barriers to participation is selective marketing, in which an institution may promote its course offerings to target audiences selected on the basis of socioeconomic or other characteristics. Gatz (1985) reveals, for instance, that one of the reasons for her study of distance education dropout was to identify "appropriate" target audiences for promotion.

**Policy**

Restrictions, such as in the range or promotion of courses available, may reflect internal institutional constraints but may also reflect policy, the greatest institutional influence limiting participation. Particularly relevant is the institution's policy regarding "openness". The degree to which an institution facilitates the entry of adults without conventional entry qualifications is reflected in the number of mature students who are able to enrol (CERI, 1987). However, when entry is open, selection essentially occurs after rather than before admission; attrition rates can be high (CERI, 1987). Woodley (1987) reports that the lower the qualifications of British Open University students, the less likely they were to gain a course credit. Perry (1976) reported that, since the British Open University began, the "discrimination factor", or difference in performance between qualified and unqualified students, increased steadily and was greatest in the maths and sciences. Enoch (1990) found that, while previous education is associated only with course grades in the social sciences, it is a predictor of both grades and course outcome in the natural sciences.

Some institutions, such as the British Open University, provide "foundation" or remedial courses for those without the prerequisite knowledge. These courses are designed to help students without sufficient background to familiarize themselves with both the basics of a particular field of study and the methods of academic teaching and study. Provision of such courses would seem particularly relevant for those interested in the maths and sciences because these subject areas, unlike most of those in the arts and social sciences, are not ones that can easily be pursued informally; they require both language and numeracy skills.
Graff and Holmberg (1988) report that institutions differ in the flexibility they offer students regarding the pacing of assignments and exams, different teaching methods, and different choice of media. The relative merit of pacing, that is, having a number of motivating intermediate deadlines that a student must meet, versus allowing student independence remains problematic (Daniel & Marquis, 1983). Pacing definitely increases completion rates but constrains the degree of openness and thus is a barrier for students who are unable to meet the imposed schedule (Paul, 1990). Students in paced courses do complain about not having enough time (e.g., Bartels, 1982).

**Instructional Design**

The new communication technologies effect pedagogical improvements by enriching distance education courses and making them more interactive. Satellite television, computers, video tapes, video discs, and other new technologies are generally considered powerful educational tools, particularly in their ability to reach into the home. They permit interactivity between learner and teacher and the more social learning that comes through contacts among fellow students. Of course, instructional design barriers such as lack of congruency between content, choice of media, and the cultural context, as well as the amount of redundancy, interrelate with the impact of such dispositional barriers as learning style and motivation.

Some people are less than positive about the impact of the new communication technologies on accessibility. Robert Pike says that

> there is a distinct possibility that social inequalities in opportunity of access to the new technologies may...become a new form of educational inequality....Usually, educational innovations which yield social advantage are exploited for the benefit of those who are already socially advantaged, rather than those who have the greatest need. (Pike, 1983, as quoted in Anisef et al., 1985, p. 44-45)

Bates (1984) questions whether distance teaching institutions should use media which are not universally available. Niemi and Gooler (1987) ask, "will technologies expand the gulf between those who have and those who do not" (p. 105)? Schutze (1986) suggests that the
new technologies pose two barriers: the cost of the sophisticated equipment required, and the inability to use it because of lack of familiarity with the technology. These socioeconomic aspects of equality of opportunity are of particular concern in light of the fact that many distance educators embrace interactive electronic media as the preferred method of delivery (e.g., Boyd, 1989; Kaufman, 1986, 1989). Kirkwood (1988) reports that there are great disparities in access to microcomputing equipment in terms of gender, occupation and household income of students. Only about one third of British Open University students had microcomputer access, men more so than women, with access rising with income. Kirkup (1989) says that the British Open University has always had courses, mainly in maths and sciences, where students were obliged to use the computer for assessed work; this widened the "gender gap" in women's participation in these subject areas. Moreover, in questioning Pelton's (1990) view that "tele-education", the application of new tele-communications and computer technology to education, is the future hope for global education, Bates (1991) cautions that, while there is great promise, there are also problems in terms of relevance for developing nations and teaching effectiveness. He suggests that tele-education should be only one of a number of distance education models employed so as to ensure that "learners are not mowed down by the technology" (Bates, 1991, p. 10).

Consideration of communication barriers must also include discussion of language as a barrier, particularly since print remains the main medium employed. Perry (1986) cites the case of one graduate of the British Open University,

...a thirty year old deep sea fisherman in Stonehaven who spent his life trawling for cod off the coast of Ireland. When he got his degree, he was asked on television what books he had used the most. He didn't hesitate, he said "An English Dictionary, because I didn't know the meaning of the words in my teaching texts". (p. 19)

Language barriers include more than just vocabulary or the use of foreign words, however. Syntax may be even more important. In this regard, we can distinguish between "formal speech" and "common speech", with the former grammatically complex and the latter grammatically simple (Pfluger, 1979). Formal speech is the language of education. Kember (1990) says that authors use a complex, impersonal style because they feel it is appropriate to
academic writing. Since there are social group differences in speech habits, the formal language of instruction has a socially differentiating effect (Pfluger, 1979). Holmes (1982) used the Cloze Procedure for readability and found that many distance education assignments were written at too difficult a level for the majority of students. Powell et al. (1990) were able to relate student literacy, as measured by the Cloze test, to student completion. Moreover, as Kennedy and Powell (1976) point out, "the student does not only have to learn new vocabularies; he must learn to debate and communicate in a manner acceptable to the academic community" (p. 69). This suggests epistemological barriers in terms of modes of discourse.

Gatz (1985), Chacon-Duque (1985), Sung (1986), Kahl and Cropley (1986), Parer (1988) and others have emphasized the importance of such course quality characteristics as clear instructional objectives, facilitative instruction, use of simple, lucid language, personal relevancy, and concreteness. Davis (1990) says that those preparing self-instructional print materials should reduce the cognitive load required for comprehension by simplifying vocabulary and syntax, and by facilitating the integration of text with prior knowledge. The latter can be accomplished by identifying important ideas in text, organizing the ideas, helping the reader recognize the relationships among ideas in text, and integrating text ideas with prior knowledge.

A problem related to that of the use of formal language in instruction, in that it also involves the authors' natural quest for academic credibility and requires a strong editorial policy to keep in check, is the tendency to overdo a course, to include far too much "nice to know" detail, or to provide bibliographies the overly conscientious adult student cannot possibly pursue but which are great sources of anxiety or frustration (Daniel & Marquis, 1983; Paul, 1990). Authors often consider other university colleagues rather than students to be their target audience (Bartels, 1982). Paul (1988) reports that students frequently complain that distance education courses are too long and that they have to work twice as hard as they do in traditional courses.
**Student Support Services**

Information, guidance, counselling and study preparation have been identified as key needs of prospective adult students (CERI, 1987). Once the student is enrolled, tutoring and other instructional support become the most vital services required. The institution's perception of its students, along with its philosophy, financial constraints and organizational structure, often determine the amount and nature of the support services provided. On the basis of evidence showing that many students do not take advantage of opportunities for tutor interaction, and other studies or theories, such as Knowles' andragogy, some institutions perceive the distance student as independent and autonomous (Thompson, 1989).

Institutions that wish to meet the needs of those with less well developed learning skills are obliged to provide increased support services as these are the students who need help and encouragement the most (Daniel & Marquis, 1983; Thompson, 1989). Students who declare a need for support and discussion are more likely to be unsuccessful at distance education studies (Powell et al., 1990). Bure, Howard and Ironside (1991) found that 74.8% of distance education students expressed a need for support and encouragement from a tutor via comments they received on their assignments. Enoch (1990) reports that intensive tutoring significantly increased grades in the natural sciences. Academic competence, initiative, empathy, helpfulness, genuineness and an unconditional regard for the student are all required of tutors and counsellors (Daniel & Marquis, 1983). Paul (1988), on the premise that the notion of the self-actualized learner is more myth than reality, presents a strong argument for the retention and development of student support services. These should play a student advocacy role and address such problems as the isolated learner with poor self-concept, the insidious reification of knowledge that can occur with a slick printed package, student personal circumstances, and the gap between student expectations and realities, he says. Brindley and Jean-Louis (1990) advocate a proactive approach which involves making such student support services as pre-admission advising and counselling compulsory for "at risk" students. However, Thompson (1991) cautions that such compulsory intervention may serve as a barrier to access.
Another concern regarding support services is raised by McInnis-Rankin and Brindley's (1986) report that the trend in student support, as well as in instruction, is to growing use of technology to deliver services to the distance learner. It will be unfortunate if the socioeconomically disadvantaged student, whose need for support services is likely the greatest, is required to have access to high technology equipment in order to receive these services.

**Dispositional Barriers**

These barriers, related to the students' psychological and sociological natures, their attitudes and perceptions about themselves as learners, their purposes and degrees of motivation, are the most problematic, both to identify clearly and to resolve. Students tend to cite institutional or situational barriers as reasons for not participating or for dropping out. While many of these are very plausible, they are also more socially acceptable for adults to cite than others, such as lack of self-confidence or ability, fear of failure, or lack of interest (CERI, 1987; Kennedy & Powell, 1976; Rubenson, 1986; Woodley, 1987). Dissatisfaction with the study materials, academic problems with the subject matter, and problems interacting with the tutor are often revealed in deeper discussion (Rekkedal, 1982; Woodley, 1987). It is also possible, of course, that students stretched to the limits academically or emotionally are far more vulnerable to a new situational problem, such as reduced time; for them, the new time constraint is the "final straw" and this is what they cite as the reason for discontinuing study. Recall that Brindley (1988) found that course completers and non-completers in general experienced similar hindering or facilitating incidents but that completers seemed better able to cope with these problems.

Snell (1987) discusses the problems of detecting and addressing the painful and unpleasant emotions of students in distance education. While some emotional pain or discomfort is a normal part of learning and development as new personal insights are gained and students move from the familiar into the unknown, he says some painful feelings, such as those of past memories of unsatisfactory learning experiences, new awareness of their strengths and weaknesses as learners, and the social context of their learning, may be
dysfunctional; these are particularly difficult to detect and respond to when communication is mediated.

Socialization

The OECD (1979) report on non-participation by adults in learning opportunities states that it is well established that non-participation is closely correlated with social and educational status. The lower the status the less is the inclination to engage in organized learning activities. In social terms this implies that those members of society who would seem to have the most to gain from furthering their education are precisely those who shun it, either because they see no utility in it or because they believe that they were failures at school and do not wish to risk the humiliation or failure for a second time. (p. 5)

It is dispositional barriers that have confounded the functionalist's view that equality of educational opportunity can be achieved by removing external barriers, such as geography and economic background, so that the individual can then aggressively take advantage of educational opportunities (Anisef et al., 1985). As previously discussed, a more critical view has emerged which stresses the role of education in replicating, exacerbating and legitimizing structural inequalities in society at large. These understandings about the social reproduction which occurs in school are relevant in terms of the dispositional barriers that adults bring to the opportunity that distance education may afford. Many feel that they lack the ability, that their background knowledge is inadequate or obsolete, that they will fail (again?) and be humiliated, that higher education is not for them. Kennedy and Powell (1976) say that British Open University students with low educational qualifications and working class backgrounds "often have a demoralizing history of educational failure and bring feelings of insecurity and educational and intellectual inferiority to their studies" (p. 69). Note that although many authors (e.g. Billings, 1988; Perry, 1976; Woodley, 1987) have related level of previous education or measures such as Grade Point Average to student completion, Powell et al. (1990) found that formal educational preparedness was not as good a predictor of student outcomes as the students' subjective ratings of their educational experience. Recall that Boucouvalas with Krupp (1989) speculate that social class itself may militate against an adult's development and further learning. Meighan (1986) says that
school pupils are able to recognize some aspects of the hidden curriculum and some of the labelling processes, and are able to express their feelings of alienation. This alienation can be carried into adult life as an on-going form of resistance; adults may want nothing to do with "school" ever again.

Besides the socialization which takes place in the school system, socialization within the family and in working life results in adult education becoming part of the value system of certain groups but not of others (Rubenson, 1986). Certainly, as is evident in the relationship between educational status of parents and participation rates in higher education (Porter & Jasmine, 1987), family values are important determinants. The socioeconomic influence of the workplace is also an important factor for adults. Impressions and experiences gained at work influence an individual's private life. Manual laborers have a work environment where few fellow workers are involved in education, where there are few hopes for advancement, and where there is an acceptance that they belong to the lower level of society. They do not perceive education as relevant to them or recognize its possibilities (OECD, 1979).

Moreover, lack of support from family and significant others, such as an employer or peer group, has a significant impact on dropout (Bartels, 1982; Brindley, 1988; Sung, 1986; Woodley & Parlett, 1983). Recall that Blunt (1988) says, "'global learning' requires the consideration of the learner within the total socio-cultural context of family and community" (p. 48). Rubenson (1986) says,

a person's decision whether to participate or not will, to a large extent, depend on earlier socialization, the hierarchical structure of work, values of member and reference groups and the way the demand governs the supply of adult education. (p. 51)

Van Enckevort (1986) raises the issue of the social individual in contrast to the disciplined individual in distance education. The disciplined individual can organize knowledge according to well-defined rules, accepting the objectified and simplified completeness; the social individual is concerned with the investigation of areas of personal significance and with the interrelationships of social experiences, preferring to spend time in talking and discussion with other people (van Enckevort, 1986). This concept seems to relate to that of learning style, discussed previously. Note that Kirkup and von Prummer (1990)
reported that women distance education students were more interested than men in shared learning and thus more inclined to use local study centres to effect interactive learning. Particularly affected in regard to social needs is the "second chance" student, the individual for whom this is all new and who wants and needs the reassurance of social contact. Morrison (1986) says,

let us recall that as adults we learn from each other. We learn as members of a group. This is the social side of adult learning. We learn affectively as well as cognitively. This is particularly true amongst those who lack "learning skills". And such people are concentrated among the lower educational and income groups. (p. 166)

The distance education student's experience may be modulated by course content and instructional design features that permit a high degree of interactivity but, generally, distance education does not provide an environment for social individuals; they are effectively selected against. The "loneliness of the long distance learner" can be a very real and challenging experience for the social individual. Thorpe (1987) notes that the need for a variety of stimuli and some social contact during study is felt by most students and not just a minority of "gregarious learners". Most adults have some need for affiliation. Kahl and Cropley (1986) report that distance education students, in comparison to face-to-face learners, feel more isolated and experience lower levels of self-confidence. This results in a greater desire for structure in their learning materials as a mechanism for reducing anxiety.

Motivation

As discussed earlier, students enrol in academic distance education courses for instrumental, professional or personal reasons. Recall that Gatz (1985) identified five dimensions in her model of course factors related to completion and attrition in distance education. The first, significance of the course to the goal, includes goal clarity, goal strength and, particularly, urgency of the goal, and is related to student motivation, both to begin and to persist. The other four dimensions (appropriateness of the independent method, feasibility in time, integration of interests and background, and accommodation of learning style needs) particularly impact persistence. The importance of the goal can overcome such negative influences as stress or dissatisfaction with isolated learning (Gatz, 1985). Billings
(1988) and Brindley (1988) also report the motivational importance of the goal in course completion but Sung (1986) found that motivational factors such as interest in the course and belief in the importance of course completion did not impact dropout rates. Similarly, Dille and Mezack (1991) report that student reasons for taking the course and the importance of the course are not significant factors in predicting completion.

Related to the importance of the goal is the competitive need for academic achievement, the "willingness to extend effort" identified by Gatz (1985), and the need for success (Powell et al., 1990), all of which are related to student persistence characteristics and may be linked to Atman's (1987) conative domain.

Marks received for assignments are an important predictor of completion (Bernard & Amundsen, 1989; Brindley, 1988; Woodley & Parlett, 1983). Moreover, Pratt (1987) says that "any perception that the system, whether personal or technological, does not understand the difficulties a learner may be experiencing can have serious effects on the learner's motivation to continue" (p. 84). Distance learners have to rely more on their intrinsic motivational resources to persist than do conventional students because, while face-to-face students are in a classroom environment where learning is the natural thing to do, distance education students are in an environment, usually the home, where different behaviors are more usual (Cropley & Kahl, 1983).

The lack of a peer group is also relevant in the context of motivation to persist. Distance education students are disadvantaged in terms of having no benchmark of achievement (Sewart, 1983). While they have self-assessment feedback from their instructor they lack it from their peer group. This type of self-assessment is an important component of "expectancy" in Rubenson's (1976) model of student motivation to participate and to persist.

Herrmann (1988) reports that interviews asking distance education students for their current reasons for continuing study revealed a shift from the instrumental reasons for beginning study to more intrinsic reasons, such as the value of the education itself, and the psychological commitment in terms of self-esteem, the sacrifice of other family members, and the expectations of co-workers. Kennedy and Powell (1976) tie in the concept of what
Mezirow (1981) calls perspective transformation (discussed earlier) when they say "a number of students recognize that the perception (through study) of a new synthesis of personal experience can mean a cathartic release with a consequent strengthening of will for further study" (p. 74).

**Epistemological Barriers**

A number of authors have identified the course content itself as an antecedent to dropout in distance education. Brindley (1988) says the subject matter can present hindering incidents to completion while Bartels (1982) says that dropouts were less satisfied with the contents of their courses. Woodley and Parlett (1983), reporting that about one quarter of British Open University students cited their course's form and content as reasons for dropping out, say "a course's dropout rate is likely to be affected by such factors as the intrinsic difficulty of the subject matter" (p. 13). On deeper probing, Rekkedal (1983) found that students reporting situational reasons for dropout also revealed study-related reasons such as subject matter and instructional design factors. In her study of variables affecting attrition, Gatz (1985) tried to account for differences between courses by separating instructional design factors such as the number of lessons, but she found that she could not generalize across subjects and that differences between courses confounded her elucidation of the "personal study needs" variable. This interactive effect she attributes to differences in course difficulty. Chacon-Duque (1985) has also identified course difficulty as a variable in dropout.

"Difficulty" is a value term, however, which, in this context, reflects a subjective view of the disciplinary content, specifically a lack of congruency between the learner's affective and cognitive characteristics and those reflected in the subject matter. In their study of the variables in the Tinto model which are antecedents to dropout, Bernard and Amundsen (1989) examined three courses that differed widely, but along a continuum, in content and instructional goals. One, a communication course, described as process-oriented, addressed topics related to interpersonal communication and self-development, and reflected multiple perspectives. Another, in business administration, was based on informal case studies of
business situations and allowed for creativity within the confines of accepted business practice. The third, an accounting course, described as product-oriented, followed a traditional curriculum requiring quantitative skills, as well as precise and logical thought processes, to derive single correct answers.

Background characteristics and Institutional commitments contribute to the explanation of dropout in the communication and business administration course, while Goal commitment appears only in the accounting course. Academic integration is important in all the courses, but it dominates in the accounting courses, is less important in the business administration course, and even less so in the communication course. Social integration appears only in communication and primarily on the strength of one item -- peer contact. (Bernard & Amundsen, 1989, p. 40)

They conclude that any model of attrition must take into consideration factors related to the nature of the learning tasks in individual courses. In their model, Kember et al. (1991) found that academic incompatibility -- what they describe as a student's difficulty in coming to terms with academic norms, conventions and expectations -- leads the model path to lower Grade Point Average and a greater likelihood of dropout. Moreover, building on Moore's theoretical base, Verduin and Clark (1991) propose that distance learning, a broader concept than distance education, can be represented by a three dimension model in which the first dimension is dialogue/support, the second is structure/specialized competence, and the third, general competence/self-directedness. Their view of structure differs from that of Moore, who sees it as the degree of flexibility and responsiveness to student needs. Verduin and Clark (1991) see structure as a function of the formality of the subject matter, reflecting, for instance, the degree of hierarchy of the knowledge in the field. The say that a high structure field, such as mathematics, requires more specialized knowledge/competence on the part of the learner. Their structure/specialized competence dimension, then, is related to the epistemological properties of the content itself.

Becher (1989) clarifies some of the significant variations among the cultures of different academic disciplines in the epistemological properties of their knowledge forms and the social aspects of their knowledge communities. They vary in "their traditions, customs and practices, transmitted knowledge, beliefs, morals and rules of conduct, as well as their linguistic and symbolic forms of communication and the meanings they share" (Becher,
1989, p. 24). He says that the nature of what is considered knowledge in a discipline and the cultural aspects, that is, the workings of an academic community in terms of their modes of discourse, its style and accessibility, are closely intertwined, with the sociological aspects reflecting the epistemological. That is,

the attitudes, activities and cognitive styles of groups of academics representing a particular discipline are closely bound up with the characteristics and structures of the knowledge domains with which such groups are professionally concerned. (Becher, 1989, p. 20)

In an effective analogy, Becher mentions a genotype and phenotype distinction to clarify the differences between the cognitive and social characteristics of a discipline.

The disciplinary variations in epistemological properties, the cognitive aspect, include differences in their overall research paradigms, the inquiry processes employed, the role of theory, the extent of modelling and quantification, the degree of specialism, and the generalization of findings. Becher describes the knowledge forms as varying in two main dimensions: hard-soft and pure-applied. According to his classification, the natural resource sciences would fall in the hard, applied domain, which Becher links to the Kolb learning style dimension of abstract-active, where Kolb (1981) did, indeed, place the science-based professions.

The disciplinary sociological aspects include the modes of discourse, that is, the type of communication favored by those in a discipline (technical journal articles or books, for instance), and the style and accessibility of this communication in terms of its particular symbolism, the use of specialized terms, and the formality and density of the language employed. The natural resource science disciplinary areas generally reflect a positivistic paradigm, an experimental research methodology, an emphasis on scientific facts, the publication of articles in research journals, dense, objective language full of jargon and specialized symbols drawn from the natural sciences and mathematics.

Because of their close links, both the cognitive and social aspects of disciplinary cultures will be considered as "epistemological barriers" in terms of participation in academic distance education. Note that a course's disciplinary content does not present an epistemological barrier per se but does so only in interaction with the student's disposition.
and ability. As mentioned earlier, course "difficulty" is a relative term, reflecting the degree of incongruity between the cognitive characteristics, beliefs, orientations, interests, and modes of discourse reflected in the subject matter and those of the student.

Consideration of possible epistemological barriers is particularly essential in seeking explanations for the relatively poor participation and lower success rates, reported by CERI (1987) and Graff and Holmberg (1988), in international natural resource sciences and related science-oriented distance education courses. Barriers associated with institutional policies and procedures, and the student's disposition and situation may also be involved, but understanding what possible unique aspects of the natural resource sciences subject matter content and its presentation by distance delivery are "difficult" or pose problems may suggest changes that could improve not just participation and success in these courses but the effectiveness of international education and communication initiatives concerning resource management and the environment in general, one of the aims of this research.

Summary

This chapter has reviewed the theory and practice of distance education, and other literature pertinent to a concern regarding equality of opportunity for adult students to participate in distance education. Relevant literature concerning distance education theory, practice and dropout, open learning, adult development and learning, critical theory, learning styles, and motivation has been woven into a consideration of the situational, institutional, dispositional and epistemological barriers that may impede participation through to completion. Although they are not necessarily mutually exclusive, key possible barriers that have been identified can be grouped under these headings, as follows:

Situational barriers

* the multiple roles of adult students, which constrain the time they have available
* changes in circumstances
* absence of a good study environment

Institutional barriers
selective dissemination of information about courses
the degree of "industrialization" in the distance education program
policies regarding "openness" and course pacing
instructional design, including the inappropriate application of communication technologies to moderate the effective distance, overwriting, and the presence of inappropriate vocabulary and grammatical complexity in written materials
lack of appropriate support services for students who are not self-directed learners

Dispositional barriers

fragile motivation, reflected in such factors as poor goal clarity and an unwillingness to devote time
lack of good time management skills
lack of self-confidence in themselves as learners, which may result from previous socialization, related in turn to socioeconomic and ideological factors
current socialization, including such aspects as lack of support from significant others
personality and learning style
lack of appropriate educational background and experience

Epistemological barriers

disciplinary differences in epistemology
disciplinary differences in modes of discourse.

Of particular import is the concept that many situational, institutional and epistemological barriers to participation impact not directly but rather interactively with a student's predisposing characteristics, thus affecting students differentially depending on their disposition. It is this differential impact on students that results in unequal opportunity to participate, the fundamental concern in this research.
Chapter 3

Conceptual Framework and Research Questions

Conceptual Framework

A conceptual framework focuses, guides and bounds research by providing a construct of ideas which identify and explain the "main dimensions to be studied -- key factors or variables -- and the presumed relationships among them" (Miles & Huberman, 1984, p. 28). Since concepts subsume the particulars of specific situations, a conceptual framework allows the researcher to treat the particulars of a specific situation as instances of more general cases, in other words, to transcend a particular context to a broader theoretical construct (Miles & Huberman, 1984; Hills, 1987).

The review of the literature revealed no such generally accepted paradigm for distance education, although some concepts useful in this study are apparent. These include Peters' industrial model which focuses on the institution, Moore's concepts of student autonomy and distance (as dependent on structure and dialogue), Holmberg's concept of the "guided didactic conversation", Verduin and Clark's structure/specialized competence dimension, and the importance Evans and Nation ascribe to the conceptual interrelationships between individuals and their "societies". Particularly salient is Wedemeyer's clarification that, in distance education, the four essential elements of any teaching-learning situation (student, teacher, content, communication) are present but rearranged from the classroom norm. All of these concepts are relevant but incomplete in illuminating the experience of the individual distance education student, who has a unique milieu and personal characteristics, and whose interaction with the course content is mediated by the institution through its philosophy and policy, as expressed in such variables as instructional design and student support. In addressing the objectives of elucidating students' understandings of their experiences in distance education in the natural resource sciences and illuminating any situational, institutional, dispositional and epistemological barriers that may impede their
participation through to completion, the following concepts, drawn from the distance education, adult education and other literature, seem particularly relevant:

1. The student comes to the experience with a particular life situation, as well as learning style, goal, degree of self-directedness, set of expectations, attitude, set of proclivities and temperament, as influenced by personality, maturity, previous schooling, socialization, and other characteristics.

2. While undergoing the experience, the student continues to be influenced externally by changes in life situation and by socialization at home and at work. These factors may affect students differently, depending on their disposition. ¹

3. The institution providing the distance education course, depending on philosophy, and political and economic factors, sets policies and procedures regarding "openness", and student support and counselling, that impact both directly on the student and interactively, depending on the student's disposition.

4. The course content itself presents a specific disciplinary epistemology and mode of discourse.

5. Through its instructional design model, philosophy regarding appropriate interactivity, individual perspectives, and available choice of media, the institution provides an instructional course package which may modulate course content in different ways.

6. The student's interaction with the course content is mediated by the communication technologies employed, with varying degrees of interactive instruction provided by the course tutor.

7. Depending on personal proclivities as well as those reflecting institutional philosophy and the communication technologies employed for interactive communication, the tutor may modulate the student's interaction with the course content.

8. There may be varying degrees of compatibility between the needs of the student and the institution's policies and/or response in meeting these needs.

¹ As used herein, the term "disposition" goes beyond its standard definition encompassing mood, attitudes, proclivities, temperament and personality, to include such additional characteristics as learning style, goals, previous experience and expectations.
9. There may be varying degrees of compatibility between the mediated course content and the student's disposition and epistemological stance.

10. There may be varying degrees of compatibility between the instructional design of the course and the student's life situation and disposition.

11. There may be varying degrees of compatibility between the student's disposition and needs, and the tutor's disposition and response to these needs.

Three main areas of focus are the student, the course content and the institution. The latter includes the tutor; as a unity it replaces the teacher in the teaching-learning relationship. Interaction between the student and the institution, and interaction among the student, the institution and the course content, all of which is effected through communication and occurs within a societal and individual context, are of special concern in their relevance to the student's ability to persist. The relationships between and among these main concepts may be depicted diagrammatically (Figure 1). In this figure, the areas of overlap indicate interactivity with the arrows indicating directions of influence. Note that the student and institution may interact directly, and that the institution acts directly to influence the course content in the course instructional design and development process, but that the student's interaction with the course content is mediated by the institution through its policies, the instructional design of the course package, and, at the interface, additionally by the course tutor. The student may interact directly with the course tutor but both this interaction and interaction with the course content are "filtered" through the institution's influence.

Since this research is concerned with students' declarative and tacit understandings, and with the situational, institutional, dispositional and epistemological barriers that may impede their participation through to completion, the characteristics the students bring to the experience (their disposition and situation), the external influences on the students during the study program (their situation in terms of social context and life changes which impact during participation, shown separately in the diagram), and the students' interaction with the institution, with institutional effects exerted directly and through the mediated course
Figure 1. The Conceptual Framework
content, and interaction with the course content, which presents a particular epistemology, as mediated by the institution, are all relevant areas of concern. Together, these concepts and the presumed relationships among them form the framework of the study. This construct permits detection and clarification of the nature of barriers to student persistence so that these impediments can be addressed, both in the context of improving access to completion in this and other distance education programs and in the broader context of improving international access to knowledge about resource management and the environment, the aims of this research.

**Research Questions**

"It is a direct step from the elaboration of a conceptual framework to the formulation of research questions" (Miles & Huberman, 1984, p. 33). The overall research question is:

What, if any, are the student situational and dispositional variables, the institutional variables and epistemological variables, and relationships between and among these variables, which may impede students' ability to persist through to completion in distance education in the natural resource sciences?

A sub-question is:

Do these variables act differentially, affecting equality of opportunity?

These questions can be addressed through answers to the following questions:

What are students' declarative and tacit understandings when they participate in natural resource science distance education?

Do students who are non-starters, withdrawals, incompleters, failures and completers have different understandings?

As well, there are a number of supplementary questions related to explaining student participation:

How do the socioeconomic backgrounds of the students relate to national norms?
Do students who are non-starters, withdrawals, incompleters, failures and completers have differing socioeconomic backgrounds?

Do students who are non-starters, withdrawals, incompleters, failures and completers have different demographic characteristics or sets of circumstances?

Do students who are non-starters, withdrawals, incompleters, failures and completers have different psychological perspectives?

Are students' understandings influenced by institutional philosophy, policies and procedures, as reflected in degree of "openness", student support services, and instructional design? Are these related to ability to persist?

Are different student understandings related to disciplinary epistemological factors? Are these related to ability to persist?
Research Theory and Perspectives

A theory is a set of assumptions for use in thought and/or research, on the basis of which data are defined, discovery and analytical procedures chosen, and conclusions or generalizations derived. Ethnography is the discovery and description of culture, that is, elucidation of the acquired knowledge or systems of meanings that insiders use to determine their behavior and interpret their experience (Spradley, 1979). It posits that people's beliefs and the meanings things have for them can be inferred from what they say and do. Literally, ethnography means "writing about people" (Goetz & LaCompte, 1984, p. 245). Its goal is "to grasp the native's point of view, his relation to life, to realize his vision of his world" (Malinowski, 1922, p. 25). Since ethnography involves gaining understandings about the meanings that give form and content to social processes, and the way that people make sense of their everyday world (Hammersley & Atkinson, 1983), it has found wide application in anthropology and sociology research. Educational ethnography's purpose is "to provide rich, descriptive data about the contexts, activities and beliefs of participants in educational settings" (Goetz & LeCompte, 1984, p. 17). At its core, ethnography is a process of mediating what Giddens calls "frames of meaning" (Agar, 1986).

Since this research is concerned with the declarative and tacit understandings (what some may call their "realities" of their experiences) of various students enrolled in distance education in the natural resource sciences and how these understandings affect their behavior, ethnography provides a suitable theoretical framework for the study. Ethnography can be "macro" in nature, that is, applying to large scale systems of social relations that link many different settings through causal networks, or "micro", where the concern is analyzing more local forms of organization, or particular types of encounters (Hammersley & Atkinson, 1983). Micro-ethnography is thus the model of choice for this research. Minnis
(1985) advocates the appropriate application of qualitative methodologies such as ethnography in distance education research.

Different assumptions about the world are reflected in different research paradigms, the overarching constructs of aims, beliefs, values, standards, methods and procedures that shape and guide research. The focal research traditions are generally called positivism and naturalism. Some (e.g., Carr & Kemmis, 1986) consider criticism a third major construct. Positivism reflects a world view that there is an ultimate, measurable and universal reality independent of the observer; naturalism a view that there are multiple, socially constructed realities that depend on the observer; and criticism a view that these realities are molded by socio-political factors (Carr & Kemmis, 1986; Guba & Lincoln, 1989; Hammersley & Atkinson, 1983; Leahy et al., 1987; Owens, 1982). Central to positivism is the natural sciences' concept of theory testing using the experimental method, while naturalism is an interpretive paradigm with the premise that the social world should be studied in its natural state, undisturbed by the researcher, so that there is "ecological validity" (Hammersley & Atkinson, 1983). Although the tenets of positivism were so deeply rooted in our idioms and culture as to be hegemonic in nature, they have increasingly fallen into disfavor. Now opinion regarding these two paradigms is sharply divided, even across and within such diverse disciplines as sociology, biology, art, physics, film, philosophy and theology (Leahy et al., 1987).

Ethnography is characterized by and distinguished from other research models by its assumptions. Goetz and LeCompte (1984) suggest conceptualizing these by framing them in four dimensions which generally delineate the common distinction between qualitative and quantitative research: inductive-deductive, subjective-objective, generation-verification, and construction-enumeration. Deductive researchers begin with a theory with which they hope to match their data; inductive researchers collect data from which they hope to develop a theory. The generative-verification dimension refers to the position of evidence within a study as well to the degree to which results can be generalized. Generative research is concerned with using data to discover constructs and propositions; it can be described in
terms of Glaser and Strauss' (1967) "grounded theory". Verification research is concerned with verifying or testing propositions and determining their degree of generalizability. The constructive-enumerative dimension reflects a continuum, from research that aims to discover what analytic constructs can be elicited from the stream of behavior, to research involving enumeration of previously established units of analysis. The objective perspective is concerned with the external, unaffected by one's point of view, while the subjective perspective reflects the individual's point of view. The latter is more congruent with the notion of "reflexivity", that is, that we are part of the world we study (Hammersley & Atkinson, 1983). Moreover, the theoretical assumptions of ethnography do not preclude incorporating concepts from critical theory within the research.

Goetz and LeCompte (1984) characterize ethnography as using strategies which elicit phenomenological data, which are empirical and naturalistic, which are holistic in nature, and which are multimodal or eclectic, that is, which use a variety of research techniques so as to effect triangulation, the systematic comparison of different kinds of data for corroboration.

Cultural reconstructions that require congruent research strategies -- phenomenological, empirical, naturalistic, holistic, and multi-modal -- are more likely than other research products to reflect assumptive modes of induction, generation, construction, and subjectivity (Goetz & LeCompte, 1984, p. 7).

Thus, ethnography falls within the naturalism paradigm and can generally be considered qualitative in nature. However, triangulation does not preclude the inclusion of quantitatively derived data. In spite of the "paradigm wars", there is now considerable support for the view that quantitative and qualitative approaches are complementary and can be usefully combined in the study of human subjects, in educational or other settings, in order to derive the most meaningful insights (e.g., Bryman, 1988; Fetterman, 1988; Firestone, 1987; Gage, 1989; Howe, 1988). Shulman (1988), for instance, advocates an eclectic approach, saying that "the best research programs will reflect intelligent deployment of a diversity of research methods applied to their appropriate research questions" (p. 16). Indeed, as indicated by Goetz and LeCompte (1984), "quantitative research" and "qualitative research" are no long viewed as a dichotomy but rather as poles of a number of descriptive
continuums. Kember et al. (1990) found the naturalism paradigm powerful in distance education research, especially when teamed with the appropriate methodology. This can be a judicious combination of quantitative and qualitative methodologies to generate a more potent analysis than either approach alone (Kember et al., 1990). Rothe (1985) says that a "complementarity" of quantitative and qualitative perspectives is a conceptual requirement in distance education research.

Participants in distance education endeavors engage in program activities which can be generalized according to quantitative, or outside view categories such as skill acquisition, achievement of cognitive objectives, psychological traits and sociological trends. However, from a qualitative, or inside point of view, students assign meaning to their jobs, families, mentors, professors and distance study materials and assignments. While studying, they interact meaningfully with their local environments. They are constantly influenced by situational variables such as politics, finances, neighborhoods and friends. To attain a holistic picture of student-distant study participation the inside data should be related to the outside data. (Rothe, 1985, p. 5)

A multi-modal approach which includes quantitative and qualitative methods gives ethnography validity and reliability since there is repeatability of observations through multiple data sources, construct validity between data and concepts through a "grounded theory" approach, development of thick description, transferability, and the ability to confirm behavior and concepts with the informants themselves through a circular process of discovery and verification (Goetz & LeCompte, 1984; Guba & Lincoln, 1989; Owens, 1982).

The "new" ethnography or ethnoscience is based on the assumption that how people construe their world of experience can be discerned from the way they talk about it (Pelto, 1970). It is founded on a relational theory of meaning which says that cultural meaning systems are encoded in symbols, that language is the primary symbol system that encodes cultural meaning, and that the meaning of any symbol is in its relation to other symbols. The task of the ethnographer, then, is to decode the cultural symbols and identify the underlying coding rules. Simply, it involves making inferences from what people say and what is assumed to what they know, to their psychological reality. This semantic analysis can be done by discovering the "taxonomic" relationships among symbols, that is, their relationship through inclusion and exclusion (Pelto, 1970). Spradley (1979) provides an operationally explicit methodology that involves componential analysis of semantic domains.
A key assumption in ethnoscience is that there is one "right" description of, or logical organization of, a given semantic domain (say, kinship or plants), and that all or most of the members of a given society "know" that particular system. (Pelto, 1970, p. 75)

Ethnoscientists, therefore, are relatively unconcerned with sampling or representativeness of informants in the culture they study. To use an analogy, they assume that, if they want to learn Spanish, they can be taught by only two or three Spaniards. They acknowledge, however, that there is always some differential sharing of knowledge; sampling thus proceeds until no further insights are gained.

As well, ethnography can include a hermeneutic approach. This complements the ethnoscience derivation of meaning from what people say by helping to illuminate implied, hidden and connative meanings and intentions. Hermeneutics, both a theoretical construct and an analytical, interpretive approach, involves a circular engagement with meanings in text in which one's own subjectivities and understandings are brought to bear on the presumed meaning in the text in a process of ever expanding horizons of understanding through reflection (Watson & Watson-Franke, 1985). Grace (1990) makes a case in distance education research for treating the tape-recorded and then transcribed interview conversation as text which can then be interpreted using a hermeneutic methodology in order to enrich the construction of knowledge about students and their learning experiences. Indeed, hermeneutics was applied to the language of the ethnographic interview by Inglis (1988) in a study of the development of learning autonomy by tertiary distance education students.

Unlike the positivist approach in which researchers address their subjectivity by trying to expunge it, ethnographic researchers admit the subjective experiences of both the investigator and the participants into the research frame (Goetz & LeCompte, 1984). They examine their subjectivities and incorporate them into the design through a more self-conscious effort to control observer bias, by attempting to suspend preconceived notions, and by examining their own subjective reactions, both alone and in their interplay with the informants' subjectivities, during the research process (Goetz & LeCompte, 1984).²

² Accordingly, I acknowledge having been previously trained in the "agricultural-botany" experimental paradigm, but, like many "reformed positivists", to now favoring the naturalism
Research Methodology

The naturalistic perspective and qualitative methodologies of ethnography dominate in this study although some complementary quantitative research was undertaken and statistical methods used to analyze some of the data. This blend of qualitative and quantitative methodology, with inductive and deductive approaches, was pragmatic and intended to provide the greatest diversity of data that could contribute to meaningful insights. The understandings of students in the study group were determined through ethnographic interviews. These ethnographic interpretations were complemented by demographic and other data collected through questionnaires, student "learning style" data as determined by the psychological survey instrument, information provided by the course tutors, and data concerning variables related to the course content and instructional design.

The Study Group

The study group includes all students registered for credit, whether through UBC Access/Guided Independent Study (the University of British Columbia’s [UBC] administrative unit for distance education) or the British Columbia Open University, in offerings of some introductory UBC courses in the natural resource sciences. Introductory courses were selected because the study is particularly concerned with the understandings of students who are new to distance education, not those who have been successful in previous experiences. The courses included in the study are:

Agricultural Economics 258 (Introduction to Agricultural Economics) (3 credits), May to August, 1991 course offering;
Animal Science 258 (Introduction to Animal Production Systems) (3 credits), January to April, 1991 and May to August, 1991 course offerings;

Forestry 111 (Dendrology) (6 credits), September, 1990 to August, 1991 course offering;

Plant Science 259 (Introduction to Plant Science) (3 credits), January to April, 1991 course offering; and

Soil Science 200 (Introduction to the Study of Soils) (3 credits), January to June, 1991 course offering.

Students registering for these courses can do so either through the UBC, in which case they must meet UBC admission standards, or through the British Columbia Open University, in which case there are no admission requirements. Regardless, students are made aware of the need for appropriate prerequisite knowledge through the course descriptions and any information or advice they seek from UBC Access or the course instructors. As well, students can audit the courses, either as academically-registered auditors or as informal, non-academic auditors. Auditors were not included in the study group.

The University of British Columbia has developed these, and other courses in the natural resource sciences, to meet the needs of a number of specific target audiences. These include (a) students who wish to begin their Bachelor of Science in Forestry or Bachelor of Science in Agriculture degrees in their own community by taking first and/or second year science at their local college and the introductory UBC forestry or agricultural sciences courses through distance education, prior to transferring to UBC to complete their degree; (b) mature students who have a qualification or degree in a related disciplinary area but who wish/need to complete specific course requirements in order to qualify for the professional credentials of Registered Professional Forester (RPF) or Professional Agriculturist (P.Ag.), also known as an agrologist; (c) on-campus full-time UBC students who have timetable conflicts or who transfer into Forestry or Agricultural Sciences and need to make up introductory courses while minimizing the length of their program of study; and (d) mature
students beginning a degree program through home study or wanting these courses for general interest or personal development.

The number of students registered for academic credit in these courses offerings was 63; since six students enrolled in two courses, there were 69 actual course registrations. It should be noted that ethnography is a fluid process; it proceeds until no further useful insights are gained and then it stops. The number of students in this study group was more than adequate for ethnographic analysis while providing sufficient quantitative data for meaningful statistical analysis. For the statistical analyses, the study group is not considered a finite population but rather is conceptually considered a random sample of similar people from a larger population of inference.

Each student's status was noted initially as non-starter (they register but withdraw almost immediately or are assumed to have not really started the course because they do not submit the first assignment), withdrawal (they formally withdraw after submitting at least one assignment), incompleter (they submit all assignments but do not write the final exam), failure (they write the final exam but fail the course overall), or completer (those who successfully pass the course).

**Course Content**

UBC Access descriptions of the distance education course offerings are provided in Appendix A. Note that Forestry 111 was first developed and offered in 1985 with revision in 1987 and 1988, Soil Science 200 offered first in 1987 with minor revision in 1990, Animal Science 258 launched in 1988 with minor changes the following year, Plant Science 259 developed and offered first in 1990, and Agricultural Economics 258 was being offered for the first time.

UBC uses a course author/editor approach in the development of its distance education courses. The course author is an academic, usually an instructor in the on-campus version of the course, and the editor a professional member of UBC Access/Guided Independent Studies staff. Together they develop the instructional design for the course, involving a media specialist as required for audio-visual components. Note that student
support comprises telephone support (usually at specific times only) and written feedback from the tutor. No distinct counselling for distance education students is available.

The individual course instructional packages, including any audio-visual or broadcast components and supplementary materials, were carefully examined to clarify their instructional design and their underlying epistemology, including both the nature of the disciplinary knowledge involved, and how it is communicated.

Cognitive aspects related to the nature of the disciplinary knowledge include the role of theory, the research paradigms employed, the modes of inquiry, the generalization of findings, and the conceptual structure of the knowledge involved; sociological aspects of a knowledge domain include the communication approaches and styles employed (Becher, 1989). These comprise the extent of modelling and quantification, the amount of jargon, the reflected values and beliefs, academic conventions in terms of the complexity of vocabulary and syntax, and the integration of new and prior knowledge.

Biglan (1973) says that three main dimensions characterize subject matter: whether or not it is paradigmatic, its requirements for practical application, and whether or not it is concerned with life systems. Becher (1989) proposes four knowledge forms: hard/soft, pure/applied, convergent/divergent and urban/rural. The first two, similar to Biglan's paradigmic and practical application dimensions, involve the cognitive aspects of knowledge, the other two the social aspects. Hard pure knowledge has relatively steady cumulative growth, relative clarity of the criteria for establishing or refuting claims to new knowledge, clearly defined boundaries, relatively direct channels of implication, a reductionist analytical approach, relatively strong explanations, and an impersonal, apparently value-free nature.

On the other hand, soft pure knowledge has a more recursive and reiterative pattern of growth, a diversity of criteria and a lack of consensus about what constitutes an authentic contribution, loosely defined boundaries, fuzzier lines of implication, a synthesis approach which includes a tendency to value complexity and holism, weaker explanations involving more judgement and persuasion, and a personal, value-laden nature.

Applied knowledge is, of course, concerned with practical as well as theoretical
knowledge. Hard applied knowledge is amenable to heuristic, trial and error approaches; its outcomes are products and techniques. Soft applied knowledge, in contrast, is built up to a great extent on case law; its outcomes are protocols and procedures.

According to Becher (1989), the social dimensions, reflected in research and communication styles, are convergent/divergent and urban/rural. Convergent knowledge forms or disciplines have tightly knit, well defined boundaries and a mutually held disciplinary ideology. In divergent disciplines, a clear sense of mutual cohesion and identity is lacking, the boundaries are ill-defined and there is a much more open-ended epistemological structure. The urban/rural dimension contrasts fields in which there are many people working on a few well-defined problems with fields in which relatively few people are addressing each of a great many questions.

Verduin and Clark (1991) see course structure as a key aspect of distance learning. For them, structure reflects the degree of hierarchy of the knowledge in a field. The knowledge structures of course content can be explored by examining the set of concepts in a course and their relationships (Donald, 1983). These concepts can vary in number, be at different levels of abstraction, vary in their degree of inclusiveness (in other words, have a hierarchy), differ in their modes of representation (enactive, iconic or symbolic), and have differing relationships to each other, that is, have associative, functional or structural similarity relationships, or procedural, logical and causal dependency relationships.

These authors, and others, provided some criteria by which to examine the epistemology and related communication style of the courses in this study. These criteria included:

1. determining the degree to which it is hard or soft knowledge, including assessing the underlying paradigms, role of theory, inquiry processes employed, generalizability of findings, and the particular set of values and beliefs involved;

2. determining the degree to which it is pure or applied knowledge, including aspects of relative direct practicality for the learner;

3. assessing the number and types of concepts in the course content, their modes of
representation and degree of abstraction, their relations to each other and their degree of hierarchy;

4. assessing the relative amount of modelling and quantification, and the use of technical symbols and jargon;

5. determining the communication style employed, its formality, complexity, density, and whether or not it is personal or impersonal; and

6. assessing the degree to which the courses present knowledge as information to be learned by rote or as understandings to be derived through active abstraction of meaning, including relating this meaning in a broad context.

**Conducting the Research**

Each student was assigned a coded number, used in recording and documenting all student responses in order to maintain confidentiality. The researcher had the only record of this code for the student names. Students registered in more than one course were coded for, and considered registrants in, the first completing course, not the second, except for analyses involving all registrations, in which case they were counted in both courses.

The initial approach to the students was not made until their status (i.e., withdrawal, completer) regarding the course was known in order to avoid any possible "Hawthorne effect", a confounding outcome in which people behave differently when they know they are involved in a study. This first approach, made as soon as possible after their status was known in order that the experience was fresh in their minds, was by letter (Appendix B), with the questionnaire enclosed, followed by a telephone call approximately ten days later to solicit the student's cooperation and arrange a personal visit in their own locales. The purpose of the personal visits was to assure completion of, and follow up on, the questionnaires, to administer the psychological survey instrument, and to carry out the ethnographic study. The latter included conducting the interviews as well as making note of the student's life style and situation, attitude, personality and other information that helped provide a more complete interpretation of their understandings and experience. The initial telephone call and follow-up calls made to complete and confirm arrangements for the visit
also allowed the researcher to provide the student with more information about the study and the student's role in data collection. As well, the calls sometimes elicited volunteered information from the students (e.g. "I don't know if I can help you with your study -- I've dropped out already because I just didn't have time"). Notes were kept of all these conversations.

The personal visits were arranged at the convenience of the students although, particularly for locales distant from UBC, the logistics of travel and coordination of several visits in an area sometimes placed minor constraints on this process. The students usually invited the researcher to their homes but sometimes preferred to meet at their offices or in a restaurant. Some Lower Mainland registrants, whether they were on-campus students or not, chose to meet in a restaurant or lounge at UBC, or in the researcher's office at UBC. As suited the students, the visits were held any day of the week and at any hour of the day or evening. The meetings usually lasted one to two hours, with an informal format of general introduction and information sharing, completion and collection of the questionnaire with follow-up as necessary to clarify responses, followed by explanation and administration of the psychological survey instrument, and finally the ethnographic interview. With the student's permission (only one refused), the interview was tape-recorded.

Personal visits were arranged with 47 of the 56 co-operating students. Face-to-face meetings with the other nine students were not possible for a number of reasons: one student prevaricated until it was clear she did not want to meet although she was willing to help by phone and mail, one had no telephone but did respond by mail, one had had a recent serious accident and wanted no visitors, another was just leaving for an extended vacation, and others could not be visited because of the researcher's personal time and travel constraints at the times the students were available. However, only one of the nine students not visited personally was a non-completer; this was the prevaricating student. All of these students did complete the questionnaire and the psychological survey instrument and did provide additional information by telephone or in writing.

The tutors, too, were approached, first by letter (Appendix B) and then by telephone,
to arrange a personal interview. These interviews, conducted at either their offices or the researcher's office at UBC, provided information on student achievement and on student-tutor interaction, as well as the tutor's perceptions of the student's experience. With permission, these too were tape-recorded.

Questionnaires

The students responded to the usual UBC Access Course Evaluation self-report questionnaire, which was modified to incorporate additional questions. The modified questionnaire used in this research in presented as Appendix C. The standard UBC Access course evaluation questionnaire provides information about student demographics and their purposes in taking the course, marketing information, and, using 5-point Likert scales, student opinions on student services, course delivery factors, the course tutor, the course work, the relation to classroom learning, and the student's preferred mode of instruction. As well, information is elicited regarding television viewing modes, preferred television viewing times, an overall rating for the course, possible improvements, and other suggestions and comments.

The added questions (numbers 11 to 20) were designed to elicit further information about the students which might be useful in the study. The first three questions, numbers 11, 12, and 13, concerning marital, parental and employment status, provided additional life situation information. Question 14 regarding educational background, provided information on academic preparedness, while Question 15 clarified the student's academic background in the relevant basic sciences. Questions 16, 17 and 20, regarding the father's and mother's levels of education and typical occupations, provided socioeconomic information. The parental education levels can be compared to those published in Porter and Jasmine (1987). As well, the parents were assigned socioeconomic scores according to their occupations using a socioeconomic index (Blishen & McRoberts, 1976). Information on ethnicity was solicited in Question 19 while Question 18 provided additional information relevant to the student's motives. Note that this question was quite different from Question 4 regarding purposes. The modified questionnaire was reviewed by UBC Access staff and others but was
not pilot tested.

**Psychological Survey**

For a number of reasons discussed earlier, the Myers-Briggs Type Indicator (MBTI) was the psychological survey instrument of choice. The MBTI provides a measure of personality dispositions and preferences based on Jungian psychological types. This psychological differentiation would seem to provide a fairly credible indication of "learning style". The MBTI (Form G Self-Scorable Version) assessment package was used. Each individual MBTI package consists of the Question Booklet, the Self-Scorable Answer Booklet, and the Report Form. The latter includes descriptions of the various psychological types for the respondents' information. The package was introduced to the student with information about the MBTI, its use in research, and a statement to the effect that it may provide information about their personalities that may be helpful in understanding their experience as distance education students, and that they may, indeed, find it of interest themselves. The students were allowed to peruse all the materials before they began and any questions they had were answered. When the instrument was completed and scored, their personality type preferences were discussed and the students specifically asked if they agreed with the results. Every one of them acknowledged that they were in general or complete agreement with the personality preferences that the instrument had disclosed.

**Ethnography**

The ethnographic interviews with the students were conducted last in order to allow time to establish the comfortable rapport that facilitates the process. The interviews were conducted following Spradley's (1979) guidelines and were audio-taped. Ethnographic explanations were provided, and descriptive, structural and contrast questions mixed with appropriate repetition and incorporation of informant terms, as well as friendly expressions of interest. An inductive approach was used; the initial question to the student was only about their experience as a distance education learner in the (specified) course. However, some students spontaneously began to talk about aspects of the course or their experiences; often the interview flowed naturally from conversation about the questionnaire and the
results of the MBTI. Regardless, both questions and answers were developed from the informants themselves. This open-ended, unstructured approach allows people to talk about those things that matter most to them.

Extensive field notes were made immediately after each interview while details and impressions were most easily and accurately recalled. Noted were life situation aspects such as family interaction, apparent job status, and social milieu, as well as personal observations of the informant's non-verbal behavior, subjective reactions, initial thoughts regarding the data, ideas for follow-up, and any other relevant thoughts or insights. The audio-taped interviews were fully transcribed.

Data Analysis

Ethnographic Analyses

Analyses of the interviews were conducted following Spradley's (1979) view that ethnographic analysis is the search for the parts of a culture and their relationships as conceptualized by informants. His operational guidelines for data analysis, which reflect his ethnoscience view, were followed. Spradley (1979) proposes employing four kinds of ethnographic analyses sequentially as strategies to uncover cultural meaning. The first is domain analysis which involves the search for cultural symbols which are included in larger units (domains) of cultural meaning by virtue of some similarity. The second is taxonomic analysis which involves the search for the internal structure of domains and leads to the identification of contrast sets. The third is componential analysis which is a search for attributes that signal differences among symbols in a domain. Fourth is theme analysis which involves the search for the relationships among domains and discovery of how they are linked to the culture as a whole. This last analysis leads to the discovery of meaning.

In domain analysis, the researcher seeks to find semantic relationships between "folk terms". The various possible semantic relationships include strict inclusion, spatial, cause-effect, rationale, location for action, function, means-ends, sequence, and attribution. As an example, "lack of time is a reason for withdrawal" is a rationale semantic relationship that is particularly pertinent to this research's interests. A single semantic relationship at a time was
examined to find (from what informants said) as many possible included terms (in the example, the "reasons") within the cover term "withdrawal". Subsets among the included terms were then sought in the taxonomic analysis. Semantic relationships that were evident included "...is a reason for withdrawal", "...is a kind of problem in distance education", "...is a kind of difference in distance education", "...is a kind of goal", "...is a kind of emotion experienced" and "...is a reason for not contacting the tutor".

The ethnographic data analysis proceeded as the interviews were conducted in order to augment the data, explore relationships, and clarify insights. Note that the different student groups were analyzed as separate "sub-cultures".

Hermeneutic analysis involves submerging oneself in the transcribed interview text, intensively working with the material in a recurrent manner as insights are gained, and relating each part to the overall context. The transcribed interview text was examined in this way. As suggested by Grace (1990), the text was also studied in dramaturgical terms, involving staging, role playing, and the kind of language used, while also being alert for instances of ambiguity, incongruity and contradiction.

The "thick" descriptions of the understandings of the various student groups derived from the ethnographic interviews, the hermeneutic analyses, and other qualitative data were further complemented by relevant information derived from the MBTI, the questionnaire, and the examination of the course content.

Analysis of Quantitative Data

Data from the questionnaire was numerically coded to enable statistical analysis. Only responses to the first 20 questions from the questionnaire were included in this analysis. Since most incompleting students were unable to answer, either fully or in part, sections/questions 21-30 concerning specifics of the course and its delivery, this data was not included in the statistical analysis but rather was used only as supplemental information.

Student status was coded as 1, nonstart; 2, withdrawal; 3, failure; and 4, completer. Question 4 on student purpose was coded as 1, for credit toward a degree; 2, for credit toward a fifth or qualifying year; 3, for professional development; 4, for general interest; 5,
for a professional credential, i.e. RPF or P.Ag.; and 6, for practical application. Question 7 as 1, male; 2, female. Questions 8 on age, 14 on highest level of education, and questions 16 and 17 on parental education levels were coded 1-9 for the nine increasing education levels. For question 10 on occupation, the coding was 1, student; 2, homemaker; 3, professional or semiprofessional; and 4, non-professional. Question 11 on marital status was encoded 1, married; 2, single; 3, widowed, separated, divorced. Question 12 on children was 1, yes, living with me; 2, yes, not living with me; and 3, no. Hours of paid employment (question 13) was 1, none; 2, less than 10 hours per week; 3, 10-20 hours per week; 4, 20-35 hours per week; and 5, 35 or more hours per week. Question 18 was difficult to disentangle because students were able to choose more than one motive. Based on these responses and clarification in person, responses were coded as 1, to get a job; 2, for job security or to get a better job; 3, to increase job-related satisfaction and competence; 4, for personal development and interest; and 5, for practical application. Ethnicity (Question 19) was coded as 1, English-Canadian; 2, non-English but Caucasian Canadian; 3, visible minority Canadian; and 4, non-Canadian. The question that asked for information on the student's prerequisite background in terms of the highest levels of math and various sciences courses they had completed (Question 15) was coded by assigning an overall value: 1, for students with no or very little math/science background, even at the high school level; 2, for those with prerequisite knowledge but not at a university level; and 3, for those with at least introductory university level courses. The socioeconomic scores were taken directly from the Blishen and McRoberts (1976) scales, then multiplied by ten to eliminate a decimal point and facilitate analysis. For student-identified occupations that were not listed, the closest apparent equivalent was used or, in some cases, the scores for more than one similar sort of job were averaged. The occupation "homemaker" was scored as 350 based on taking an average score for such similar responsibility occupations as secretary, laundress, babysitter, nursing aide, food and beverage service, hostess or steward, receptionist, seamstress, and hotel management.

Data from the MBTI was treated in four separate ways. First, the students were
analysed by each personality preference alone for each of the dichotomous preference scales, that is, as extrovert or introvert, for instance. Second, the 16 possible personality MBTI personality types were considered. Third, the raw scores for each of the eight personality type scales were used for the analysis. Fourth and finally, the results were analysed using the MBTI linear data transformation convention (Myers and McCaulley, 1985) to generate continuous scores from preference scores.

Frequency distributions were determined for the nominal (MBTI personality type, sex, marital status, status as a parent, purposes, motives, previous UBC Access experience, occupation, ethnicity) and ordinal (MBTI personality preference raw and linearly transformed scores, age, hours of employment, educational background, parental socioeconomic status indicators) data, with means and standard deviations determined for the latter. Data was examined overall, by course, and by student status overall and by course. For analyses by course, data from all 61 registrations was included (that is, data from the five cooperating students who registered in two courses each was included for both courses), whereas analyses over all the courses included data from only the 56 cooperating students. Relationships between variables were determined by calculating the Pearson product-moment correlation coefficient $r$, differences between and among groups determined using Chi Square, t-test and Analysis of Variance, and predictive relationships among variables determined using step-wise backward Multiple Regression Analysis. Chi Square tests differences in distributions and is used for nominal data. The t-test, used for ordinal data, tests differences between two means. Analysis of Variance permits testing of differences among several means. Multiple Regression analysis allows the examination of linear relationships among variables. Glass and Hopkins (1984) provide details of these inferential statistical methods. The Statistical Package for the Social Sciences (SPSS/PC+ version 4.0) was used to effect the analyses.
Chapter 5

Results

This section presents results of the research undertaken in this study. First, information on the study group itself is presented, followed by results of the epistemological analysis of the courses involved. Although the demographic data and student psychological profile information are intended as complements and clarifiers within the main ethnography, these quantitative analyses are presented next as they provide a valuable understanding of who the students are before the presentation of the qualitative results of the ethnographic interviews and analyses, which clarify what they say and the understandings that they have. Overall discussion of results will be presented in Chapter 6.

The Study Group

As explained earlier, students were approached regarding participation in this study when their status as non-starters, completers, etc. was known. A few cancelled their registration very shortly after the course began, others withdrew after several weeks or months without ever submitting an assignment, and a few others who had been submitting assignments withdrew relatively late during the course. None of the students in this study group did all the course work and then did not write the exam; that is, there were no incompleters, as previously defined. Moreover, while those who withdrew immediately were clearly non-starters, and those who withdrew after actively working on the course were clearly withdrawals, the status of those who did not immediately withdraw but who appeared not to have started the course was unclear. By the definition being used, they were non-starters. However, since almost three quarters of the course fee is refunded if students withdraw within 30 days of the start of a course, they had a financial incentive to withdraw promptly and had not done so. Some were not heard from at all until they received the routine letter sent by UBC Access to students who have not submitted assignments. This
letter encourages them, offers assistance and reminds them that neglecting to withdraw before the final examination would result in a fail grade. As well, the interviews with these students revealed that they were not really non-starters. Some had continued to be committed to carry on with the course while procrastinating about getting the assignments done. Others had done a fair amount of work but had run into trouble doing the first assignment and had not submitted it. With such evident blurring of status and with the very small number of students who seemed to be true non-starters (only four), it was decided to eliminate this somewhat artificial distinction and consider all students who did not continue to the end of the course to be "withdrawals". Gatz (1985) had also found the population of dropouts too broad to be differentiated from that of non-starters.

For the purpose of this study, the difference between failures and completers was also somewhat confounded. Only 4 of the 56 participating students failed their courses. In each case, they failed because they did not pass the final exam. In one case, for instance, a student who had demonstrated B-grade competence up to the final exam apparently completely misread a major final exam question, gave a fine answer to the wrong question, and failed. This student, however, was one of those registered in two courses; the second course was passed. Two of the other three failed students were allowed to write supplemental exams. One passed while the other failed again. All four failed students were interviewed before they knew their final mark. None appeared to be any more concerned than other students about their grade; indeed, they were indistinguishable from completers in terms of their attitudes and persistence regardless of constraints and problems. A decision was made, therefore, to consider all those who had carried on through to the final exam, regardless of outcome, to be "persisters".

This study, therefore, focuses on possible differences in student understandings related to participation of two student groups: "withdrawals" and "persisters".

As indicated earlier, there were 69 enrolments in the courses in this study. Since six students were enrolled in two courses each, there were 63 students. Only 56 participated in this study. Table 1 presents information on the status of students enrolled in the courses.
Table 1
Status of Students in the Study Group

<table>
<thead>
<tr>
<th>Course</th>
<th>Student Status</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lost</td>
<td>refusal</td>
<td>withdrawal</td>
<td>persister</td>
</tr>
<tr>
<td>FRST 111</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>SOIL 200</td>
<td>1</td>
<td>4</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>ANSC 258</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PLNT 259</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>AGEC 258</td>
<td>2</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3</strong></td>
<td><strong>5</strong></td>
<td><strong>18</strong></td>
<td><strong>43</strong></td>
</tr>
</tbody>
</table>

Number and Status of Students

<table>
<thead>
<tr>
<th>Course</th>
<th>Student Status</th>
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<tbody>
<tr>
<td></td>
<td>lost</td>
<td>refusal</td>
<td>withdrawal</td>
<td>persister</td>
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<tr>
<td>FRST 111</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>14</td>
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<tr>
<td>SOIL 200</td>
<td>1</td>
<td>4</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>ANSC 258</td>
<td>2</td>
<td>1</td>
<td>3</td>
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</tr>
<tr>
<td>PLNT 259</td>
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</tr>
<tr>
<td>AGEC 258</td>
<td>2</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3</strong></td>
<td><strong>4</strong></td>
<td><strong>17</strong></td>
<td><strong>39</strong></td>
</tr>
</tbody>
</table>

Note. Six students were registered for two courses.
involved in this study. Three were "lost", that is, two of these were withdrawals who could not be contacted because they had moved with no forwarding address or telephone number, while the third was a completing student who agreed to help by mail when arrangements could not be made to meet in person but who, in spite of phone reminders and apparent good intentions, never returned the questionnaire and MBTI score sheet. Four other students refused to participate in the study; two of these were withdrawals and two were completers. One of these withdrawals, a professional man near retirement, had registered in two courses as a credit student but appears to have done so for the purpose of establishing credibility with the tutor, with whom there was a lot of contact. This student likely had no intention of ever doing the assignments or writing the final exam; he only wanted the knowledge the courses provided.

Students could register for these courses either through UBC or through the B.C. Open University. Seventeen of the 69 registrations, representing 15 of the 63 students, enrolled via the B.C. Open University. One of these became "lost", 3 were withdrawals and 11 were completers. There are no differences between the institutions through which the student had enrolled in the relative number of students who were withdrawals or persisters.

The participating students lived all over the province: 21 lived in the Lower Mainland area, 2 in the Sunshine Coast area, 2 in the upper Fraser Valley, 6 in the Okanagan, 3 in Victoria, 5 in other Vancouver Island locales, 4 in the Cariboo region, 4 in the Kootenays, 5 in Central B.C., 2 in the north coast area and 1 in the Peace River region. One student lived in Alberta.

Epistemology of the Courses

All of the courses present hard, applied knowledge, although there is some variation in degree. Almost one half of the content of Soil Science 200 is applied physics, chemistry and biology; this course is somewhat more "hard" than are the dominantly biology-based Forestry 111, Animal Science 258 and Plant Science 259. Becher (1989) describes biology as more descriptive in nature in comparison to other natural sciences and, because it tends to
be between the physical sciences on one side and the human sciences on the other, more heterogeneous and unrestricted, less tied to theory, and therefore less paradigmic than the other sciences. This seems true here. Economics is considered a social science but, since it has become more strongly theory-oriented and mathematical, can no longer be considered so soft (Becher, 1989). Indeed, Agricultural Economics 258 has a strong mathematical foundation and a firm theoretical stance. A key course goal is stated as "analytical methods will be developed to study different issues;" this approach is reflected throughout the course manual in the mathematical relationships, models and formulas presented. Thus, this course has to be considered more hard than soft. Inherent in the hard nature of these five courses is a generally positivistic viewpoint, a quantitative nature and an experimental research approach. Indeed, two of the courses, Forestry 111 and Soil Science 200, have short-term, intense on-campus laboratory components that include experiments.

All are applied courses by definition in that each is concerned with the application of basic scientific or economic knowledge to practical problems related to effective stewardship of natural resources. None is directly practical in the sense of providing simple "how to" information, although Forestry 111, with half the content focussing on tree identification, is close. Instead, since they are introductory courses at a university level, they provide foundation knowledge that can be related to a broader, real world context. They lay the groundwork for more senior courses that do provide the deeper understandings that allow students to make discoveries and to address applied problems. Moreover, the Forestry 111, Soil Science 200, Plant Science 259 and Animal Science 258 courses are particularly amenable to the heuristic, trial and error approaches described by Becher (1989).

All present a great number of concepts. Most of these are symbolic, mainly in language form, much of it specialized, technical language. There is also a strong presence of the unique symbols of chemistry and mathematics. Agricultural Economics 258 has more abstract concepts than do the other four courses but, on the whole, the concepts in the courses are fairly concrete in nature. Moreover, all the courses exhibit considerable hierarchy in the relationships of the concepts to one another. There are closely patterned sequences of
explanation. Many of the conceptual links are dependency or causal relationships. Moreover, each of the courses builds on fundamental concepts from mathematics, chemistry, physics or economics. These concepts are generally not presented; the fundamental understandings are assumed. Some are briefly referred to but there is little integration of prior knowledge with new concepts. As a consequence, each of the courses, particularly the Agricultural Economics 258, based in economic theory and mathematics, and Soil Science 200, based heavily in physics and chemistry, demands considerable prerequisite knowledge on the part of the student. As Donald (1983) points out, this type of content, in which there is a tight structure with links between concepts, tends to support an all or nothing learning pattern. They teach effectively only to the initiated. This is so because new information can only be transformed into knowledge when it has been critically analyzed in terms of other information, screened through values and beliefs, related to other knowledge and experience, reworked, and made personal. Information that cannot be linked to prior understandings remains in limbo, meaningless.

The highly technical language typical of biology-based courses is evident in Animal Science 258, Plant Science 259 and Forestry 111. There are a great number of terms with discipline-specific meaning and, in the botany-based courses, considerable emphasis on the scientific names of plants and their taxonomy. These courses also contain the unique symbolism of chemistry when discussing nutrition and physiology and draw on mathematics for such aspects as growth rates. Soil Science 200 contains specialized, technical language with a considerable amount of the jargon of chemistry, physics and mathematics. The greatest mathematical component is, however, present in Agricultural Economics 258 where well over half the conceptual content involves models, formulas and other mathematical relationships.

The courses' readability and ease of comprehension are negatively affected not only by the use of a great deal of specialized jargon but also by the authors' styles. Each has followed the disciplinary communication conventions typical of scientific papers, with succinctness and precision overshadowing stylistic quality. The writing is fairly dense and
formal, with grammatical complexity, and an objective perspective. Although some of the videos are less formal, only two of the course manuals, those for Forestry 111 and Soil Science 200, both written by multiple authors, use personal pronouns at all. There are occasional uses of "we" or "us" in written instructions to students in these courses, with the Forestry course also having the odd first person aside.

The courses vary considerably in the degree to which they present knowledge as information to be memorized or as understandings to be derived through active abstraction of meaning in a broader context. Since they are university level courses, all make demands (apparent in the assignments, for instance) upon the students that go beyond what could be considered rote learning. As instructions to students in an assignment in Animal Science 258 put it: "Answer all questions briefly and concisely. Answers to several of the questions will not be found directly in the reference material. These questions will require some thought."

Although most of the knowledge demands involved do reflect fairly rote learning with the student required to regurgitate scientific names, descriptions, and functions and to be able to apply formulas, etc. in solving problems, students must also be able to integrate knowledge, make inferences, conceptualize and hypothesize. Some of the Agricultural Economics 258 assignment questions, for instance, demand a broader perspective through applied questions which have multiple possible answers and which are somewhat more abstract. Plant Science 259 goes even further, however, in demanding some quite abstract and broad application of understandings gained from the course content. For instance, after a comprehensive, specific and highly technical unit on plant metabolism which contains a lot of biochemistry and includes such topics as photosynthesis and photorespiration, one of the assignment questions is "'Plants harvest the sun.' Explain the significance of this statement." This is quite a cognitive leap and requires the application of understandings at the highest cognitive levels. It entails the type of thought that is usually not demanded of students until the senior undergraduate or post-graduate level.

Moreover, the courses are very discipline-specific; their focus is narrow and reductionist in nature. Agricultural Economics 258 has a short chapter illustrating the
economic analysis of environmental issues but otherwise there are very few links to concepts from other natural resource disciplinary areas or to the relevant social sciences and humanities. Rather, each course is monodisciplinary, following its distinct specialization. Missing is the interdisciplinarity which provides students with the holistic view necessary to understand environmental issues and address the goal of sustainable development. Labeyrie (1973) points out that students are incapable of grasping links between subjects when environmental studies are taught as juxtapositioned disciplines, as is the case here.

The World Commission on Environment and Development (1987), which so clearly linked environment and economics, declared:

education should provide comprehensive knowledge, encompassing and cutting across the social and natural sciences and the humanities, thus providing insights on the interaction between natural and human resources, between development and environment. (p. 113)

Indeed, environmental education programs are characterized as needing to be holistic, interdisciplinary, problems and issues-focused, and having a decision-making component (Cowan & Stapp, 1982; Korts, 1990). The intellectual underpinnings for interdisciplinarity may best be provided by systems theory and decision theory, with a problems and issues orientation, says Francis (1973). Baerwald (1991) urges a strong input from the social sciences because it is peoples' relationship, be it economic, political or esthetic, with natural resources that is central.

In summary, it is apparent that the courses reflect the cognitive and affective characteristics typical of the applied natural sciences. The content is discipline-specific, empirical in nature, and is highly structured, full of closely linked technical concepts with some abstraction. This content is presented in dense, formal and complex language full of specialized jargon. It demands considerable prerequisite knowledge as well as literary and numeracy skills.

Quantitative Results

Demographic Variables

There were 20 women and 36 men enrolled in the courses; most were in their 30s,
married, were pursuing a degree or professional qualification, and had full-time professional or semi-professional employment. Seventeen of them already had degrees. Crosstabulation tables and results of the Chi Square test of independence of the nominal variables for the different courses are presented as Tables D-1 to D-18. Note that there is some missing data; this is because some students did not know the educational or employment backgrounds of one or both of their parents.

Table D-1 reveals that there are significant gender differences in the enrolment in the various courses. More men were enrolled in Forestry 111 and Soil Science 200 whereas there were more women than men in Plant Science 259. As well, Table D-2 shows that only 3 out of 37 registrants in Forestry 111 and Soil Science 200 were of visible minority ethnicity whereas 6 out of 18 enrolled in Plant Science 259 and Agricultural Economics 258 were members of a visible minority. The proportionally higher number of degree-holding registrants in Forestry 111, most of whom had different backgrounds but were seeking RPF status, is reflected in the significant difference in the educational background of those registered in the various courses (Table D-3).

There were no significant differences among the courses in the proportion of students who had previous experience with UBC Access distance education courses (Table D-4), the students' age distributions (Table D-5), their purposes in taking the course (Table D-6), their occupations (Table D-7), their marital status (Table D-8), whether or not they had children (Table D-9), the time they spent at paid employment (Table D-10), their motive for taking the course (Table D-11), their father's (Table D-12) and mother's (Table D-13) level of education, their prerequisite knowledge (Table D-14), or their MBTI psychological types (Tables D-15 to D-18).

**Student Withdrawal/Persister Status in Relation to Other Variables**

Of particular interest, of course, are possible differences among the courses in the proportion of students who were withdrawals. Table D-19 presents the results of the

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3 Note that some data has been treated both as nominal data, with Chi Square analysis used, and as ordinal data, with t-test and Analysis of Variance employed to detect possible differences.
crosstabulation of student status by course and the Chi Square statistical analysis. No differences in the proportion of student withdrawals to persisters among the courses are revealed.

Possible differences among the courses for the ordinal data were determined using Analysis of Variance (ANOVA) with student status as a variable. Means and the ANOVA tables are presented as Tables D-20 to D-25. There are no significant differences among courses in student age (Table D-20), the student's educational background (Table D-21), their father's level of education (Table D-22), mother's level of education (Table D-23), father's socioeconomic index score (Table D-24) or mother's socioeconomic index score (Table D-25). Nor are there any differences in student status as withdrawals or persisters, or any interaction effects among these variables and student status as a withdrawal or persister for the different courses.

Since there are no significant differences among the courses in the proportion of students who withdrew, data can be combined over all the courses (eliminating, of course, the duplicated data for the double registrants, so that n=56) to determine if there are demographic-type variable effects related to the students' status as withdrawals or persisters. No significant effects of gender (Table D-26), purpose (Table D-27), occupation (Table D-28), marital status (Table D-29), having children (Table D-30), hours of employment (Table D-31), motive (Table D-32) or ethnicity (Table D-33) on withdrawal/persister status are evident using Chi Square statistical analysis. Nor does age (Table D-34), educational background (Table D-35), father's educational level (Table D-36), mother's educational level (Table D-37), father's socioeconomic index (Table D-38), or Mother's socioeconomic index (Table D-39) influence withdrawal/persistence as determined using t-test.

Note that 27.5% of fathers and 7.8% of mothers of students in the study group have university education. This compares with 1974-75 and 1983-84 figures where 25% and 34% respectively of fathers of full-time B.C. undergraduates had university degrees compared to 10.3% and 13.6% of men in the general B.C. population, according to the 1976 and 1981 censuses (Porter & Jasmine, 1987). In 1983-84, 14% of Canadian mothers of full-time
undergraduates had degrees. The numbers are difficult to compare directly because the study group students are not typical undergraduates in terms of age, they are older, and the proportion of people with university degrees has increased with time. Overall, however, these results suggest that the students are of a similar socioeconomic mix as those who typically attend university. In this case it is apparent that the availability of these courses by distance education has not improved access for the socioeconomically disadvantaged.

**The Myers-Briggs Type Indicator Psychological Survey**

Although Chi Square analysis reveals no significant differences among the courses for the student's psychological types as determined by the MBTI, and no significant differences in personality types between withdrawals and persisters, it is far more sensitive to consider the student's actual scores for the various MBTI personality scales. Results of ANOVA for the extroversion, introversion, sensing, intuitive, thinking, feeling, judging and perceiving scores by withdrawal/persister student status and by course are presented as Tables D-40 to D-47. These analyses reveal no significant differences between withdrawals and persisters for the various personality scales, no differences among courses for the MBTI values, and no significant interaction between student status and course for the personality scale scores.

Making the comparison of MBTI scores between withdrawals and persisters over all the courses using t-test reveals exactly the same results: no significant differences in personality type scores based on student status (Tables D-48 to D-55).

Nonetheless, any possible predictive relationship was sought using step-wise backward multiple regression analysis. In this analysis, all possible variables, that is, the eight MBTI personality scale scores, were included in the regression equation. The least significant of these variables was then dropped one at a time with a new regression equation calculated each time. The step-wise dropping of variables proceeds until each remaining variable in the equation is making a significant (p<.05) predictive contribution.

This analysis provides some very interesting results. With withdrawal/persister status the dependent variable and extroversion, introversion, sensing, intuitive, thinking, feeling,
judging and perceiving scores the independent variables, the resulting equation has a
goodness of fit, $R^2$, of .240, which is almost significant ($p=.0897$). Perceiving and judging
scores make significant contributions to the regression equation ($p=.0069$ and $p=.0032$
respectively). After two steps, in which feeling and then sensing scores were dropped, the
equation has a $R^2=.239$, and is significant ($p=.0303$). The variables thinking, intuitive, and
extroversion were then successively dropped from the equation as not making statistically
significant contributions, with the $R^2$ value lower each for each new regression equation but
the significance higher. At this point the equation has the following form:

\[ Y(\text{status}) = 0.096685(\text{perceiving score}) + 0.108092(\text{judging score}) -
0.016044(\text{introversion score}) - 1.906059 \]

with $R^2=.2076$ ($p=.0067$)

Since the introversion score was not making a statistically significant contribution ($p=.0721$)
in comparison to the perceiving score ($p=.0024$) and judging score ($p=.0012$), it was dropped
and the final equation is:

\[ Y(\text{status}) = 0.090165(\text{perceiving score}) + 0.099411(\text{judging score}) - 1.928116 \]

with $R^2=.156$ ($p=.0111$)

This is a rather unusual result and means that while neither the perceiving score nor the
judging score itself is related to student withdrawal/persister status, added together they
explain almost 16% of the variability in status, and with the introversion score included,
21%. This is a significant, although not particularly useful, predictive relationship.

Using the sum of the perceiving and judging scores as a variable confirms this result:

\[ Y(\text{status}) = 0.097098(\text{sum of perceiving and judging scores}) - 0.014596(\text{introversion score}) - 1.757774 \]

with $R^2=.183$ ($p=.0067$)

and

\[ Y(\text{status}) = 0.090990(\text{sum of perceiving and judging scores}) - 1.804179 \]

with $R^2=.140$ ($p=.0045$)

A check using the variables (judging score X perceiving score) or (judging score / perceiving
score) did not reveal any non-linear significant relationship with student status. The variable (judging score - perceiving score) was also calculated and included in a step-wise backward multiple regression. The results were identical to those using (judging score + perceiving score) except that the judging score itself was also significant in the equation. This indicates that, indeed, it is the additive effect of the judging and perceiving scores which is key.

The correlation matrix for student status and MBTI personality scale scores, including the sum of perceiving and judging scores, is presented as Table D-56. Note that student status is significantly correlated with the combined judging and perceiving score ($r=.3740$) and that the paired scales for each of the four dimensions are highly significantly related to each other. Additionally, the thinking and feeling scores are significantly related to the judging and perceiving scores, indicating that they reflect some linkage in personality traits.

Analyses using the extrovert-introvert, sensing-intuition, thinking-feeling and judging-perceiving scores generated by standard MBTI linear transformation of the data did not contribute additional useful information. There were no differences in the four scales of personality type between withdrawals and persisters. Since the data transformation is based on the differences between the paired scores rather than their sum, this result is not unexpected, considering aforementioned results. Only a highly significant relationship between thinking and feeling, and judging and perceiving scores was revealed. No linear relationship between student status as withdrawals or persisters and their personality type on continuous scales was indicated by stepwise backward multiple regression.

Although student numbers are small for quantitative analysis, a comparison between withdrawals and persisters for the 16 possible MBTI types revealed no significant differences.

The overall data for student types in terms of the four dichotomous scales does provide some interesting information, however. Myers and McCaulley (1985) provide rankings of occupations by MBTI personality preferences for comparison. Students in the study group were 43% extroverts, 48% sensing, 82% thinking and 63% judging in their
personality preferences. These proportions are fairly typical of those reported by Myers and McCaulley (1985) for life and physical scientists, biological scientists and computer specialists, for instance; they differ from the proportions found in social workers or in artists and entertainers. Type theory (Myers and McCaulley, 1985) does suggest that technical/scientific aspects will be more important to thinking types and communications/interpersonal aspects more important to feeling types. As an example, they report only 36% of social workers as having a thinking personality preference in comparison to feeling. The results found here would seem to confirm that the MBTI is, indeed, as stated by Kalsbeek (1987), a useful tool in portraying and understanding the relationship between personality preferences and academic and career interests. The students in this study group seem to be typical of those whose personality types are common in technical/scientific fields.

**Relationships Among Variables**

The correlation matrix for the MBTI and demographic-type data is presented as Table D-57. The matrix is based on 55 or 56 cases except for the correlations involving mother's and father's educational levels and mother's socioeconomic index where there are only 49 cases because some students did not know this information. Values based on the maximum number of cases are presented because there were notable differences in a few r values depending on whether n=49 or n=55.

For the demographic-type data, some of the relationships that one might expect are evident. They were elucidated, as appropriate, using Chi Square analysis, t-test and Analysis of Variance. There is some relationship between gender and purpose, with proportionally more women taking the courses for general interest rather than for a specific qualification. As well, proportionally more women participants than men were of non-English ethnic heritage. Student age is related to their occupation, purpose, marital status, whether or not they have children, their hours of employment, and their motive. This reflects the fact that more of the younger registrants were fulltime students, unmarried, without children, and pursuing their degrees with the purpose of getting a job. Interestingly enough, but not unexpected since women have increasingly pursued careers in the last two or three decades,
age was also related to the mother's socioeconomic status, with younger students, those 20-34, having mothers with higher socioeconomic indices. Marital status and having children are linked, as are hours of employment and occupation. The latter quite naturally reflects the fact that full-time students are generally unemployed. Motive and occupation are linked, with full-time students seeking the degree, while those working in professional or semi-professional occupations are much more often seeking a professional qualification.

Prerequisite knowledge is somewhat tied to occupation, with full-time students having the best prerequisite knowledge base. Father's socioeconomic status and father's level of education are related to marital status. These results are somewhat confusing, however, because those whose fathers had the lowest educational levels strongly tended to be married, but overall those who were married had fathers with significantly higher socioeconomic indices. The father's and mother's educational level are linked, tending to vary together, while both the father and mother's educational levels are linked to their respective socioeconomic status, with the mother's educational level additionally positively linked to the father's socioeconomic status. Prerequisite knowledge is positively related not only to the student's previous education level, as expected, but also to the father's educational level.

There are no significant relationships detectable between the MBTI variables and the demographic ones with the exception of student purpose, which is linked to sensing, judging and perceiving personality scores. Those pursuing a professional qualification tend to have higher judging and sensing scores and lower perceiving and intuition scores than those pursuing a degree.

A step-wise backward multiple regression of the demographic-type data and the MBTI judging, perceiving and introversion scores as independent variables and student withdrawal/persister status as the dependent variable produced some rather interesting results again. With all 17 variables in the regression equation, the goodness of fit, $R^2$, was .40661 but was not significant ($p=.2866$). With six variables dropped out step-wise, the equation then included mother's socioeconomic score, employment hours, motive, father's socioeconomic score, purpose, mother's educational level, occupation, father's educational...
level and the three MBTI scores and had a $R^2=0.39029$ with $p=0.0404$. As more variables were dropped the $R^2$ values decreased while the significance increased. When all variables that were not significantly (at $p<0.05$) contributing to the regression equation were eliminated, introversion score being the last, the equation is as follows:

$$Y(status) = 0.093322(\text{perceiving score}) - 0.170320(\text{occupation}) + 0.107077(\text{judging score}) - 1.647529$$

with $R^2=0.237$ ($p=0.0065$).

Again, while highly significant, the predictive power of the equation is relatively low (only 24%) and thus it is not a particularly useful tool for detecting students who might be at risk in not persisting.

**Ethnographic Results**

**The Withdrawals**

Students who had withdrawn from the courses invariably provided an explanation for their withdrawal early in the course of communication. Some provided it during the introductory phone call, others almost immediately on meeting face-to-face, and some during the course of discussion of the questionnaire and psychological survey instrument. Those who had not volunteered the information previously did so as their first response to the initiating question of the ethnographic interview, "what was your experience as a distance education student?" Many seemed somewhat anxious to provide their explanation and concerned that it be accepted, as it unequivocally was, with the natural expressions of empathy, and reassurances that the purpose of the study was to determine ways in which development and delivery of distance education courses could be improved, if such reassurances seemed appropriate. The only questions asked regarding these explanations were for clarification. Indeed, as the interview proceeded and the student became more comfortable, revealing further reasons for withdrawal or problems, these were always contextualized by the interviewer within, or as addenda to, the overt explanation for withdrawal. For instance, a student who cited time constraints as the reason for withdrawal
and who later revealed problems in doing the assignments, was not challenged as to which was the most compelling reason for withdrawal but rather the problem with the content was accepted and discussed as a compounding circumstance which exacerbated the time constraint. This was an important aspect of the ethnographic technique because 13 of the 17 withdrawal students initially cited some sort of time constraint as their reasons for dropout. The interviews revealed, however, that the students' circumstances that led to withdrawal were much more complex. Problems with a lack of prerequisite knowledge, with the course content itself in terms of both understanding and relevance, lack of support from peers and family, stress, poor marks, lack of time management skills, weak goal commitment, a fear of failure, and other explanations became evident during the interviews. The reasons for non-completion and the problems experienced by these students are so pertinent that they are shown on an individual student basis in Table 2. The table presents the student's initial declarative reason for withdrawal, as well as additional reasons for withdrawal or problems they encountered that were revealed during the in-depth interview. These are grouped by the overt reason for withdrawal under headings descriptive of the type of barrier encountered.

As is clear from the above and additional information gleaned during the ethnographic interviews and hermeneutic analyses of the transcribed tapes, there is considerable blurring between the student's declarative reasons for withdrawing and the diverse problems they experienced. In considering appropriate semantic relationships that would provide insights relevant to this study, the cause-effect relationship "withdrawal is a result of ______" seemed too limiting, as did the rationale relationship "______ is a reason for withdrawal". For these reasons and additionally because of its symmetry with the understandings emerging from the simultaneous analysis of the ethnographic interviews with persisting students, the strict inclusion semantic relationship "______ is a kind of problem experienced by those who withdraw" was chosen as the focus of analysis. It should be noted that many other interesting domains of personal knowledge were also evident, e.g., differences between distance education and on-campus study, reasons for not contacting the tutor, kinds of experiences in distance education, and the positive aspects of distance
<table>
<thead>
<tr>
<th>Student Code</th>
<th>Overt Reasons for Withdrawal</th>
<th>Problems Revealed During Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>111-10</td>
<td>lack of money and time to attend the lab.</td>
<td>lack of prerequisite knowledge, lack of peer and family support, not scientifically oriented, content not personally relevant, changing view re goal.</td>
</tr>
<tr>
<td>111-06</td>
<td>change in circumstance (started a business but it was a stress not time problem).</td>
<td>lack of prerequisite knowledge, problems with theory or abstraction, lack of practical relevance, found the course very difficult: &quot;I just couldn't do it.&quot; changing view re goal.</td>
</tr>
<tr>
<td>111-04</td>
<td>change in circumstance affecting time (got a field work job out of town, couldn't make lab).</td>
<td>decreased motivation (had enrolled to get a professional qualification in order to help get a job but now had a job anyway).</td>
</tr>
<tr>
<td>852-02</td>
<td>lack of time, &quot;I was moving and didn't really seem to have the time, not the mental energy&quot;.</td>
<td>wanted a discussion format as had an oral/social/peer support learning style, problem with technical content, &quot;I decided to drop the course after that because of the questions I didn't quite finish.&quot;</td>
</tr>
<tr>
<td>258-04</td>
<td>lack of time (working full time and had to do housework).</td>
<td>[unclear but time constraints unchanged from when enrolled].</td>
</tr>
<tr>
<td>200-03</td>
<td>lack of time (contract extended and health problems).</td>
<td>conflicting [student has very confused goals, priorities and views].</td>
</tr>
<tr>
<td>259-04</td>
<td>lack of time.</td>
<td>took more time than expected to achieve high standards set for self, fear of letting achievement slip, unclear goal.</td>
</tr>
<tr>
<td>259-03</td>
<td>lack of time/course arrived late.</td>
<td>doing extra work trying to figure out assignments,</td>
</tr>
</tbody>
</table>
Table 2 cont'd

<table>
<thead>
<tr>
<th>Code</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>200-02</td>
<td>change in circumstances affecting time (spouse got full time job, undertaking a part-time job as well as unexpected work responsibilities).</td>
</tr>
<tr>
<td>200-15</td>
<td>lack of time (new baby, start of busy work season, new bosses).</td>
</tr>
<tr>
<td>200-01</td>
<td>lack of time (signed up for 2 courses, dropped this one).</td>
</tr>
<tr>
<td>111-03</td>
<td>lack of time (field job out of town).</td>
</tr>
</tbody>
</table>

Institutional Reasons

<table>
<thead>
<tr>
<th>Code</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>111-01</td>
<td>course arrived late, lack of time to catch up.</td>
</tr>
</tbody>
</table>

problems understanding content, poor mark on first assignment, negative attitude about tutor.

taking one course then signed up for second, got behind in both, course not practical, relevant, [spouse also a distance education student with higher achievement], problems with study environment, problem with time management.
lack of prerequisite knowledge, problems understanding content, lack of relevance, lack of clear goal, didn't think could pass exam, [knew time constraints when started and had allowed for them].

concern about personal free time: "I have become somewhat lazy and worried whether I could carry it out", dropped this one because of epistemology, thought would be too much rote memorization, terms and description, wants theory, abstraction, freer thinking.

procrastinated, "I had more important things to do at the time," admits "I had the place to work and I had the time but I didn't think it was worth it...I had no interest in doing anything academic... I didn't feel like doing it," didn't think course was interesting, had an on-campus option [questionable motivation].

[course arrived 2 weeks late, not the 6 weeks initially stated]. problem of time priorities re. established routine, social life, "I wasn't prepared to do the extra work", thought it looked big and hard, having problems with concurrent college courses, unclear on career goal, a social learner wanting peer support,
Table 2 cont'd

<table>
<thead>
<tr>
<th>Code</th>
<th>Reason</th>
<th>Additional Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>852-01</td>
<td>course arrived late, lack of time to catch up.</td>
<td>had an on-campus option [questionable motivation]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>had 3 weeks of vacation planned, problem with mathematical and technical content, wanted global, applied issues-oriented content, with immediate practical application, problems understanding content, concern with marks, goal unclear.</td>
</tr>
<tr>
<td>259-01</td>
<td>failed first assignment and offended by tutor's comments.</td>
<td>epistemological problem with course expectations, wanted high marks, need for independence -- didn't want to have to rely on tutor's help.</td>
</tr>
<tr>
<td>111-05</td>
<td>lack of self-discipline.</td>
<td>time constraints, was an oral learner, procrastinated and preferred to do other things.</td>
</tr>
<tr>
<td>259-02</td>
<td>course too technical, not practical.</td>
<td>[no additional problems evident].</td>
</tr>
</tbody>
</table>

**Note.** Remarks in [ ] brackets are those of the researcher based on observation and inference, not student declarations.
education, but these were not analyzed because they were not particularly relevant to this research's concern about student's understandings related to their ability to persist through to completion.

The rich taxonomy provided through taxonomic and componential analysis of the domain "problems experienced by those who withdraw from distance education in the natural resource sciences" is presented next. It is worth reiterating at this point that the analysis was performed from the bottom up. That is, all possible stated or inferred problems were first identified; then they were grouped into subsets and contrast sets. The analysis led quite naturally to a construct in which problems were identified as situational, institutional, dispositional or epistemological in nature. Explanations are provided to clarify many of the identified problems, as are direct quotes from the students themselves. Not all relevant student quotes are given, only those that provide additional insights. Many were repetitious. As expected, many of the identified problems overlap or interact. This is particularly true for some of the problems identified as situational or institutional in nature; they were often problems only in the context of the student's disposition. In some cases, these overlaps or interrelationships are noted.

Note that quotation marks enclose direct unedited statements made by the students, who are identified by their 5-digit (xxx-xx) codes. Phrases in brackets are the interviewer's comments to provide clarification or to maintain confidentiality. Quotes separated by four periods are not continuous in time but were made at separate times in the interview.

**Problems Experienced by Withdrawals**

1. **Situational**

   1.1 **Poor Environment**

       1.1.1 **Lack of support**

       1.1.1.1 **lack of peer support**

       "I had a lot of discouragement from the people and staff (where she works). Their attitude was, you know, why are you doing this, you don't need to do this, you're going to stay (a clerk) sort of thing"...."They weren't encouraging you to, and they said they were"...."I didn't get any encouragement from the people in my office that are at a higher level than I am. What they say, not come right out and say, but what they mean is, don't bother, don't waste your time, you know"...."Maybe they are being kind in telling me
this, maybe they just don't want to see somebody get ahead, there are people like that. Most people in general are supportive of this kind of thing but I could definitely notice, there was an underlying, uh, well, I knew it was there. Maybe because I was so discouraged that's what showed up. Well, one fellow came right out and he said, 'maybe you should cut your losses and run.' Nice. 'If you can't go down there and you're not going to go any further, why put out $500 when its already cost you $400. Nothing to say that you're going to pass the course. Nothing to say you're going to get your money back.' That's what it all boiled down to, getting the money back." (111-10)

1.1.1.2 lack of family support

"My kids wouldn't let me use the VCR, I was overruled." (lack of support of spouse also inferred from the absence of comment about him and by his somewhat disparaging manner) (111-10)

1.1.2 Poor study environment

1.1.2.1 community

"You're cooped up in the bunkhouse all week and the last thing you want to do on the weekend is sit around and study -- I'd come to Vancouver for the weekends (for fun only)." (no library access, relatively poor telephone and mail access) (111-03)

1.1.2.2 home

"I struggled. I found it very difficult to get away from the normal environment and sort of set time aside and there was another set of deadlines and scheduling into, you know, what was already a busy family life and busy work life." (200-02)

1.2 Lack of Time

1.2.1 Change in circumstances

"I found myself, out of necessity, starting a business and its very hard to continue an education and start a business, all at the same time...You need a stable life." (111-06)

"I withdrew because of personal circumstances, my wife also had a full-time job which we hadn't counted on, we were also caretaking a (multiple-unit property), my own job -- the number of hours I was working per week jumped significantly, etc. and what happened was it just snowballed and all of a sudden I was just too far behind to really comfortably catch up without sacrificing some family goals and at that time we decided that for now it would be best to pull back and that's what my decision was." (200-02)

"I was moving and didn't really seem to have time." (852-02)

"When I registered for the course I didn't have a job. I ended up getting a job in (a small Interior town) and so I couldn't take the course. I was staying in a motel and doing field work 12-14 hours a day." (111-04)

"Being independent and working, if your contract gets extended and you find yourself all of a sudden over your head with work, coinciding with course responsibilities and everything comes together at once, you can find yourself with a real problem"...."Things got changed." (200-03)

1.2.2 Took more time than expected

"I was basing it on 10 hours a week but found I was spending much more than 10 hours a week on it." (259-04)

"It consumed more of my time, like I was trying to keep up with my
correspondence course but it didn't seem to work out"....I think if I'd only been taking this one course things would be different"...."I spent whole weekends doing it, about 16 hours" (259-03)

"I didn't have the time really, not the mental energy"...."If I had done a bit every day, it would have been a fine course in terms of time, except for those few questions that I (was going to have to do extra work on to find the answers)." (852-02)

1.2.3 Overcommitted, multiple roles

"I like to be busy, this is part of my problem, and I sometimes take on more -- but then everybody is like that -- they think they can do yet one more thing and then you just find out that you can't"...."I had too much to do, I was into too many other things. I thought I could do one more thing, but I found that I just didn't have the time, plus working full time, to do it adequately, which is what I wanted to do." (259-04)

"I put in long days, 18 hours a day, day after day from May to November. I put in long days and it's tough to come home after 14 hours and struggle with, you know, to sit down for 2 or 3 hours and study cause you want to go to sleep so you can get up the next day and do it all again." (111-05)

"I made a mistake. I started one course last September and I carried through until Christmas and I was comfortable with it and I was enjoying it and everything was going fine time-wise. I made a decision in December to take the second course in January and I think if I'd just stayed with the one it would have been fine but when I took two"...."Basically, I guess, I just got stubborn, you might say, and I decided I was going to push through and do both of them. I knew I was going to be really pushed for time but I just said to hell with it, I'm going for it and it eventually became impossible. What happened is basically that I just got behind in both of them and at the time maybe I could still have pulled one out I don't know, it's hard to say. It was a personal decision based strictly on family, we decided it was not fair to continue. I pulled out of both I guess because I was equally behind in both of them." (200-02)

(course arrived late, going on holidays, didn't have time to get the reference books, a lot of extra work because) "I needed to review a some of the economics again." (852-01)

"I just didn't have the time. A new baby and three new bosses and getting bogged down with the (field-work) season and we're out for a couple of weeks and this and that"...."It just got so disrupted that I wasn't able (to carry on)." (note: had planned for all of this and had worked hard to get ahead at the beginning of the course) (200-15)

1.3 Health Problems

(change in work circumstances) "compounded by a problem of health"....(got behind on course due to chronic fatigue syndrome) "a hole of exhaustion." (200-03)

2. Institutional

2.1 Cost

2.1.1 General cost

"The other problem is that school is so expensive, school is pricey -- its getting more so all the time" (111-06)

2.1.2. Cost of attending the lab

"We were having a lot of financial difficulties at that time"...."It was going to cost me cause I had to fly down and back. I had to take two days off work as well. It was going to cost $500 just to get down there and to stay at UBC as well, the costs are quite high there. I just couldn't come up with the money right then." (had to pass course
before employer would reimburse) (111-10)

2.1.3 Cost of materials

"Some of the texts, for the price a student has to pay for these texts and
use maybe three pages out of them, it was ridiculous." (111-10)

2.2 Problems with Institutional Procedures

2.1 Delay in getting started

2.1.1 Delay in registration

(needed tutor's permission and he was away). (111-10)

2.1.2 Late arrival of course materials

"I found that on top of my other course work, I didn't have time
to catch up because, like, I received my materials late." (259-03)
111-01 and 259-02 also cite late arrival of course materials

2.1.2 Poor communication with the institution

"I couldn't seem to break through the bureaucracy to find out what was
going on"....(caused frustration but) "those are just stumbling blocks." (259-02)

2.3 Problems with Course Pacing

2.3.1 Problems with the course scheduling

Forestry 111 spanned the busy field season, as did the lab and final
exam in Soil Science 200.

2.3.2 Course paced too slowly

"The course was quite strung out. The course was just too long. I
think it should have been half that, cause going from September to August is just gruelling,
really hard, just because it was over such a long time. It was always hanging over me and
actually having something due sooner, a faster pace, is much more my style. I like things to
move along. If I have to do it, I'd much rather do it, get it over with, (otherwise) its
painful"...."Allowing time for studying is fine but when you've got that hanging over you for
11 months, its very difficult." (111-10)

"I found the time limits are too long. The course begins in September
and ends in August. Now that gives someone like myself who's not very disciplined, a lot of
time to try to avoid it. "Okay, in the last four months I'll work really hard and get it done, I'd
say." (111-05)

2.4 Problems with the Tutor

2.4.1 Tutor was unavailable

"He wasn't available initially, he had someone who had taken it under
their wing but I never did get to hear back from him." (259-02)
"The only time I can call him, he's not there"...."If I was right there in
Vancouver, I would have gone there and said I want an appointment with you in the morning
and I don't care what your normal schedule is or not. I would have said what are you talking
about, had a one-to-one together and got to an understanding, right, but I couldn't do that."
"He wasn't available when I needed to talk to him about the lab"...."They didn't know when he'd be back, and that was difficult." (111-10) "...Not available time-wise when you wanted to talk to them but when you talked to them they were very available." (200-02)

2.4.2 Calling the tutor was intimidating

"I think though also that phoning up the tutor and asking for help, that's a bit intimidating, when it's one-on-one. If you can sort of drop in at their office or something, it's much easier." (852-02)

(re. videos) "It was very helpful to put a name and a face together"...."He seemed like he was very personable and you don't feel so intimidated phoning busy people that are teaching and doing all kinds of other things"...."You're probably taking up some valuable time." (259-04)

"If contact was made by the tutor, I'd find it much easier to talk to him"...."I have a hard time initiating contacts"...."It would have been helpful if the tutor had called and and said, 'hi, how are things going, I noticed you had a problem here, you know, do you need some help or some ideas?' So that's what I mean, it would have been nice if it had been more two-way." (200-15)

2.4.3 Poor communication with the tutor

2.4.3.1 personality/communication conflict

"I go, I go, I'm sorry, this is not for me -- like I'm not on the same wavelength as this guy and I withdrew"...."No, I'm not going on until April, when this man tells me its late. This man barked up the wrong tree when he took me on." (she paid $7 to courier an assignment in. The UBC received date stamp indicates it arrived on the due date)...."I couldn't believe it, $7 and he says to me its late -- what's this man's problem"...."He says 'slow down and read the questions carefully before you write. Think first, write second' -- I thought that was really rude, I took offense to that"...."I spent four solid days doing this assignment, checking it in and out, making sure I'd dotted my i's and crossed my t's, so I thought it was rather presumptuous of him to say 'think first, write second' and then he goes 'why don't you give me a call, so we can talk about it' and I thought that's all very well and good, to put that on the end, and I felt he covered his ass by saying that, to put it bluntly. He doesn't even know what my schedule is -- like, why didn't he phone me, if he's supposed to be my tutor?"...."Like all this made me mad, for him to come back with comments like this, like, I did work hard, I did think before I wrote"...."Like, I thought how rude of you"...."Those are the things that happened that turned me off"...."I was really very upset about this." (259-01)

(tutor wanted a more specific term paper topic) "I felt I can't be more specific because I haven't done the research on it and I found that kind of annoying cause I did make a point of saying I couldn't be more specific until I did some reading on it -- that was another thing too -- an attitude when I was talking to him, he'd tend to go around in circles and not be to the point with what he wanted, and so along with what other (on-campus) students had been saying about him..." (259-03)

2.4.3.2 poor feedback

(when got assignments back from the tutor) "It didn't clear up the confusion a lot, some of it, yeah, but there was still some of it that I questioned, I said I'd of never got that." (259-06)

"Like he did say, 'this is what I'm looking for and this is what you should have written', so that was helpful in a sense but you still couldn't see where he had pulled them from." (259-03)
2.5 Instructional Design Problems

2.5.1 Problems with the on-campus lab

2.5.1.1 timing of the lab

"It was an awkward time for me to go down there." (111-01)
"I had to go out (in the field) again when the lab was
scheduled." (111-04)

2.5.1.2 lab content, set-up

"When I walked into the lab, it was so overwhelming as to
what they expected to accomplish in two days, and the way it was rushed through, like it was
almost here's the lab, just go through these steps and finish it, you know"...."There was no
understanding to be gotten out of it"...."A lot of people didn't know really what was going on,
I certainly didn't"...."It would be better to have a number of labs spread over time and fit it in
with the subject matter rather than try to cram it into two days"...."The lab didn't tie in well
for me. There were a number of physical things to do but it didn't to me tie in well with what
the course was building up to"....(not knowing the people there), "I thought it was really
awkward, people were wandering around aimlessly and you only have two days." (200-15)

2.5.2 Problems with the distance delivery instructional design

2.5.2.1 phone call inadequate for problem solving

(so overwhelmed and confused, didn't know what to ask on the
phone), "I didn't feel comfortable about phoning the tutor - I didn't quite know what to
ask"....(felt) "I should know this." (852-02)
"I really didn't know what to ask him, I guess, like some of the
concepts I was having trouble with but at the same time I wasn't sure that I'd get what I
wanted on a phone call." (200-15)
"I didn't quite know what to ask...sometimes the problems, (if
you can drop by their office its much easier), you can see their face, which is hard on the
phone." (852-02)
"When you get into abstracts and theoretical, when you're
trying to work on it by yourself, it doesn't exist"...."When it starts to get real abstract, you've
got no one to explain it to you"....(talked to the tutor by phone and read his comments but)
"not a whole lot of help that way." (111-06)

2.5.2.2 need for other media/learning resources

"I think (you need additional course materials) for this course,
for any course actually. It helps to be able to -- not everyone pictures things the same way
when they are presented to you in a certain way. It helps to have other sources to draw from.
One of the sources is probably going to hit you in a way that you are going to understand it,
simplify it." (852-02)
"...is a field of study that requires both discussion and lots of
supplementary reading in order that it can be understood properly. A few of the questions on
the first assignment, I think that more discussion and examples were required in the reading
materials so that these questions, which required extrapolation, could be understood and
answered." (852-02)

2.5.2.3 need for unavailable equipment/media

Reference materials were unavailable from the extension
library. (852-01)
2.5.2.4 problems with the quality of the materials

2.5.2.4.1 course manual

"You couldn't compare what the video was saying with what the diagram was asking for...I think the diagram was poorly drawn, it wasn't drawn truly or correctly, I guess." (111-06)

"The study guide, in some areas, there could have been more build-up to it, somehow putting it together a bit better." (manual started off) "very technical and specific to me and it seems to me its something we should build up to rather than the other way around. I found the beginning stuff much more difficult to comprehend than at the end of the course. I found as it went along it got easier and easier." (200-15)

2.5.2.4.2 textbooks

"There was one text there, it was all too technical. You read it and you didn't understand it what you were reading anyway cause it was way, way too technical for me. I didn't enjoy that book at all." (111-10)

2.5.2.4.3 videos

"I really didn't even look at them. I put them on for about two minutes. I found them boring." (111-10)

"Not all were as beneficial or interesting, some were more basic, some dead boring...not all were as useful as I had anticipated." (259-04)

2.5.2.5 problems with language, style

"The course manual presents it as extremely formal, so rigid, and I should know this"...."I did find it quite stiff"...."With the manual its very cut and dried so it makes tiring reading." (852-02)

"In other words, I found the 'lectures' too concise." (852-02)

2.5.2.6 course focus and expectations were unclear

"I don't like it when you have to study on your own and not know what to study and stuff like that." (111-01)

"If you actually went to a class, you kind of gain more insight as to what the tutor focuses on, rather than when you're doing it yourself, you have to guess what the focus might be, in the overall scheme of things and what might be on the final exam, which is kind of what you work towards, I suppose." (259-04)

2.6.2.7 course was overwritten

"The course was a lot of work, as I think correspondence courses are." (259-04)

"Its pretty big and hard and a lot of work." (111-01)

"It took more time (in comparison to on-campus courses) because I found you'd have to read the text, then you'd have to read the manual and then watching the videotapes and, along with the assignments, like I said, I went to the library and did some research -- I just found that very time-consuming." (259-03)

3. Dispositional

3.1 Lack of a Clear Goal
"I haven't really made up my mind which way I want to go, but I do want to go for a degree of sorts." (111-10)
"I've never really known what I wanted to do -- I was always a little fuzzy"...."Now I'm back to not really knowing what I want to do at this time." (852-01)
"I had thought about the degree for sure but not really as a clear goal." (259-04)

"This is a bit of a trial effort for me and something, although I've dropped the courses, I haven't sort of given up on the idea of either the degree or the RPF and its partly a personal interest and partly a professional interest, a career interest, I guess, but what I wanted to was, I had toyed (note past tense) with the idea of going back to school eventually but initially finishing some of the degree requirements by distance education and then completing it at university as well." (200-02)

"I was looking at the RPF but its too overwhelming with the amount of work I have here, so that's what I was looking at, but now I'm just looking at professional development, just cause now that I have my (another professional qualification) papers, I feel that's sufficient"....The rest of the courses now are just for my own development." (200-15)

3.2 Stress of Multiple Roles

"You know, it takes a stable life. When you don't have that, you couldn't concentrate. You sit there (working on the course) and just feel guilty and start to concentrate on what you should be concentrating on (work, business)"...."Unfortunately, I had time but the stress was a big problem. You'd sit down and stress out about your job and you wouldn't work on your course." (111-06)

"I'm working, doing research and at the end of the day, I'm brain-dead, if you can say that, and so I didn't really feel like starting up more mind things"...."If I worked in a more physical job, a mindless job, I think I could have completed the course successfully." (852-02)

3.3 Time Management Problems

3.2.1 Time priorities/procrastination

(course arrived late) "I was already into all these other courses, I already had things to do (sports, social life). Mainly the only reason I dropped it was I wasn't prepared to do the extra work"...."I would have had to sacrifice too many things." (111-01)

(signed up for two courses and dropped this one when contemplated loss of personal free time) "I have become somewhat lazy and was worried as to whether I could carry this out." (200-01)

"I had more important things to do at the time I felt (field job, social life)"...."I could have made the time, of course, anyone can make time for anything if they want to"...."I didn't think it was worth it." (111-03)

'I'd rather go out and go windsurfing or playing soccer, just about anything"...."If its up to me its by the wayside"...."I'm too busy working my dog, riding my bike, going for a run, you know, just generally goofing around so I can't find the discipline to really work hard"...."There's social time and then there's loaf time." (111-05)

"I'll just put it on the back burnet until its too late." (852-02)

"I got the course and said 'I'll work on it next weekend' and next weekend and next weekend -- tomorrow never comes"...."When it came time to do it, I said, 'nah, I'll do this later'"...."I said, 'okay, I plan to do this, this and this,' but when the time came I didn't feel like doing it. I lost sight of the big picture there for a while and didn't do it." (111-03)

"I'll say, 'I'll do twice as much two weeks from now' -- why would I study for an hour or two and drag all my fun down"...."And I'm sure that's true for 80% of the people that drop it, they -- us -- just don't have enough self-discipline to say, 'hey, its Tuesday night or whatever night it is, and I'm going to do this, I have to do this to get through.'" (111-05)
3.3.2 Need for structure

"I have to do it in a more structured way. I can't do it any other way, I've tried it"... (suggests one night a week at the local college for all distance education students) "It has to say '7-10 you're going to be here, I have a few things I have to discuss with you or whatever', then I'd commit to it, I'd be there". "If there was a time once a week when I had to be there, you can schedule your work around, I'd be there, you can make sure you're free by 7 o'clock to be there..."I really wanted to complete this one but I couldn't. I just don't have the self-discipline to do it, so I won't do it again." (111-05)

3.4 Learning Style Problems

3.4.1 Need for face-to-face, oral and visual learning

3.4.1.1 general

"I think you get much more out of it if you do it right on-campus cause there's the interaction, the sharing of ideas, and there's time to go talk with them. If you've got a problem you can go talk to the person right there and then and work it out one-on-one, you talk about, show them on the blackboard and work it out whereas to do these courses, I think you really have to have a good grasp of the subject." (200-15)

3.4.1.2 with instructor

"I find sometimes, the problems, you can see their face which is hard on the phone." (852-02)

(personality conflict/communication problem with tutor) "I don't want to be up against all this, not from a distance." (259-01)

"(on campus), I would have the professor right there, I could ask him questions." (111-01)

"I'd taken a broader scope and he'd narrowed it down but you don't get to know that unless you have personal contact with him to say, 'where are you coming from, what's your way of thinking?'" (259-01)

"Just like everyone else, 90% of my learning is not through reading. My reading skills are extremely poor. I read things over four times and it doesn't come out right and so the actual studying phase comes from a professor who will stand up and say this is what we're talking about today and this is what I'd like to teach you, it goes in and I remember it"...."I'm not very good at reading and comprehending it and that's where I fall down -- I can't get enough to put it all together to get the gist of it, the paragraph, the page, the topic, you know -- it's odd, but that's my weakness"...."My memory is good and I enjoy learning but I have to have someone teach it to me rather than doing it myself." (111-05)

3.4.1.3 with peers

"I enjoy discussion and what my friends have to say"...."Often your peers will ask things that you couldn't quite vocalize but they can ask the question and that's helpful, too." (852-02)

"It would be better if I had someone to do it with, to ask questions and stuff"...."I'm used to having a lot of friends to help me through it -- I could talk to them about it, but this course, I couldn't talk to anybody about it, like to ask a quick question, to just get me on the right track." (111-01)

"When I was at university, I enjoyed being with other people, sharing the common experience. We worked hard but not alone. We had the same level of motivation and dedication. You feed off your peers (group motivation, interactive nature). I knew that would be lacking and I'd have to rely solely on myself"...."When you have
problems, you have peers you can talk to about it and an intellectual interaction." (200-01)

3.4.2 Need to know how to "play the game", be in a learning mode

"I think when you do it full-time at a university or college, you are in the learning mode and when you do it part-time, like when you're taking a correspondence course, or even one course of something else when you're working fulltime, then you're not always in that mode and I think that you learn differently -- yeah, I think you really do -- like your whole thoughts aren't focussed on just learning, they're focussed on all the other things that are going on in your life, working and other things. Its not the same. Like when I was a fulltime student that was all I had to think about, being a fulltime student. I found it took a long time just to kind of get back in that mode." (259-04)

"Maybe it would make a difference if I was 20 taking this course, I mean its been a few years since I've been out of school you know, and I think its something you lose practice in too, just going to school and answering questions." (259-04)

Comments in section 2.5.2.6 on course focus are also relevant here.

3.4.3 Studying style problems

"I just started to realize 2 months into the course that it was impossible to make the detailed notes I was making and yet when I study I find that's how I learn best and I retain the most information if I write everything down, so it could very well have been my own study habits (that made it more time-consuming than she had anticipated) "...."The volume of material I found difficult to get through the way I was doing it." (259-04)

3.5 Adult Pride

3.5.1 The need for achievement

3.5.1.1 marks, self image

"I could probably have completed it, but not with the marks -- it wouldn't have helped me go on because I wouldn't have understood it." (852-01)

"As a mature student, I wanted good marks, I didn't want to scrape by" ...."Like, I looked at the mark, ha, I'll have to withdraw." (failed first assignment) ...."There's no question that I'm at fault in this, I interpreted the questions wrong and I deserved the poor marks pretty much. Look, it was not here, right?" ...."I said, 'holy cow, I didn't tie this all together right'" ...."It would keep me on a university level" ....(in comparison to college courses) "Rigid quality, structure, discipline and good material." (talking about the courses with university graduate parents and with work peers was very important to this student) (259-01)

"I didn't have the time to do it adequately, which is what I wanted to do." (this student had the highest assignment marks before withdrawal, maintaining this standard was the concern) (259-04)

"It was a passing mark, barely. And I thought I knew the material pretty well. It was very disappointing." (259-03)

Students 111-06 and 200-02 seemed to be in competitive situations of achievement with spouses. 200-02's spouse was in a more senior course and achieving higher grades.

3.5.1.2 fear of failure

"You don't want to struggle through it and fail the exam." (259-01)

"You still in the end don't know exactly what's going to be on the exam." (259-04)

"To get such a bad mark on the assignment (after all the hard
"I felt after I got the assignment back, it was kind of a lost cause." (259-03)
"I didn't really give it an honest effort (failed first assignment). I had a deadline and I rushed it in, I didn't give it any sort of effort. I felt really bad because I'd wasted some people's time and I'd wasted some money and, I don't know, I kind of felt I'd let myself down, I really wanted to continue with this one." (111-05)
"I was just too overwhelmed by it. I'd rather not get a failure, I'd rather go for an incomplete and then be able to go do something later on or whatever, rather than struggle through and get an F or something like that" (200-15)
"I knew about my past failure (to complete a distance education course)." (111-05)

3.5.2 The need for independence

"I felt I should be able to do it without leaning on the tutor too much"...."I thought I'd be capable of doing the course without tutoring"...."You really shouldn't have to depend on phoning him and saying 'interpret this for me'"...."I'd assumed I wouldn't need personal contact with him, I wanted to go about this and do it on my own"...."You are forced to contact your tutor and I don't think all people want to"...."I didn't want to have to contact him. If I had known I wouldn't be able to go about it without requiring assistance, I would have cancelled right away"...."I hadn't planned on having to draw on him." (259-01)

3.5.3 The need for respect

Student 259-01 was extremely distressed regarding the tutor's attitude, comments, apparent insensitivity, and felt that he didn't understand a distance education student's constraints (see 259-01's comments under 2.4.3.1)

3.6 Previous Sociological, Psychological and Economic Factors

"I was a high school drop-out"...."When I grew up in (small Interior town), the realities there, even if you had the marks, the realities there were very slim (to go to university). There just wasn't a whole lot of reality to send you to university for four years"...."Unfortunately, I know quite a few smart people and very few made it to university because of money. You're govemed by what your parents can or can't afford, unfortunately." (111-06)

4. Epistemological

4.1 Content Lacked Personal Relevance, Interest

"I can't apply it to the job I'm doing now. If I was able to go on, to go further and get a job on the field service side, then it would be useful." (111-10)
"When it comes to the natural resources or the trees, you know, I never pay too much attention to that sort of stuff, so its not just something I would go out and learn on my own, cause it doesn't matter to me, its a nice tree." (111-10)
"If it could somehow be more directly integrated with an actual work experience." (200-02)
"Perhaps programs about agriculture in different parts of the world, economics in different parts of the world would have been interesting." (in the context that this content wasn't interesting) (852-02)
"It wasn't what I was interested in at all. I was more interested in how the soils fit in with forestry, and for me, hazardous slopes and things like that, erosion, and the lab was very titration, measure this, and it just didn't fit in with what I was trying to do"...."There was very little in it that a forester would use"...."It was out of sync with the other programs I was on as far as forestry goes"...."It appeared to be more of an agriculture-oriented course than a forestry-oriented course, so I found it quite off-base"...."I learned more
than what I wanted to learn"...."If there had been more detail in the course description, I might not have signed up for it, cause I'm really more interested in the forest ecology and how that ties in with recreation and wildlife, to try to make some sense of whether we're doing the right things or whatever -- what's realistic and what isn't -- so it didn't tie in very well as it turned out." (200-15)

"The part that appealed to me was the idea of projects, the application, something that would actually have immediate benefit (in international development)"...."I was interested in applied economics (but not the underlying mathematics, statistics and formulas)." (852-01)

"It wasn't interesting." (111-03)

4.2 Epistemology of Course Differed From Student's Epistemological Stance

4.2.1 Content was too technical, scientific

"It was all too technical, you read it and you didn't understand what you were reading anyway, cause it was way, way too technical for me." (111-10)

"I think you should learn economics more as a discussion-type subject." (852-02)

"I was becoming aware of how many math and statistics courses were involved and then I started to get worried." (852-01)

"If they were to do a lot of number crunching really quickly or something, they would lose me." (852-02)

"I thought it would have basic, rote memorization, terms and description, the kind of education I was glad to leave behind. I enjoyed the move up to theory, freer thinking, discerning the essence of the literature." (200-01)

"For a farmer, it certainly contains too much biology, class names, its not a course that's really practical and basically that's what I was looking for (wanted to be able to grow a better plant)"...."It was too technical, too broad spectrum for what I wanted"...."Its just that when I read the introduction or overview (course description) I thought 'wow' that's exactly what I need"....(but it was) "very structured and technical -- I mean, I've got a practical operation." (259-02)

"Maybe I'm just not a scientific-type person, you know, I seemed to handle the course okay but, its funny, you know, I didn't really feel comfortable with it. I feel more comfortable with something to do with business or accounting." (111-10)

"I had a really hard time comprehending how everything fit together, like it was really physical and chemical-oriented...very technical and specific." (200-15)

4.2.2 Content was too theoretical, abstract

"A course that's practical is much more useful than a course that is theory. I'd think, why do you need to know this anyway, what good does this do me?"...."These courses have to be more on the practical side more than on the ethereal side, you know."(111-06)

"Working in forestry especially, its more of a reality situation and learning all these theories which I know don't apply to a work situation, maybe sometime in the future they do, but I have no use for courses that are pretty much not reality-based -- they're all full of grand theories but when you get out to work they just don't come into play." (111-03)

"I have trouble in theory, like the hypothetical part of life, I can't understand"...."I don't personally see the sense in hypothetical if you'll never find it, so why study it -- like it doesn't make sense, I think its got to be more realistic"...."If you're trying to get through a course and trying to learn the knowledge, the knowledge is important but the theory isn't. Like not the theory but the abstract. Like I don't see the tie-in, maybe I'm missing something"...."Unless you think that way, I guess, its really difficult"...."Like it doesn't make sense to me if there's two different types of plant, put two different plants down and have you explain the two different types, don't combine them as if this would be a
mythical plant. If it doesn't exist, how do you describe it?" ...."I don't like hypothetical situations but I don't like that anywhere"...."I enjoy education that's straight forward, like this is what you need to know and learn it." (111-06)

4.3 Internal Epistemological Gap Between Presented Course Content and Course Expectations

"I interpreted the questions wrong...look, there's nowhere in my handbook for question 1, nowhere in my course materials, nowhere in my textbook, absolutely any idea that would tell me to set this up this way and yet that's what he wanted and that's what he expected"...."The questions can be challenging but the answers should be there available somewhere"...."I took the questions literally -- I took a broader scope and he'd narrowed it down"...."I don't think the same as this man. I don't think his expectations matched the course." (259-01)

"I found in the questions that I couldn't answer because you had to extrapolate to a certain degree and I didn't feel that the course material had really covered what I needed to know enough to be able to extrapolate, to be able to do the questions"...."I decided to drop the course after that because of the questions I didn't quite finish." (852-02)

"I'm sort of into a scientific, cut and dried, scientific field myself and some of the questions were more abstract and I found them more difficult to do because they required more thought and more preparation than was actually given in the material. Like you had to think about them, which is good, I mean, you presumably take these courses to learn something, but I found that it took a long time, just to kind of get back into that mode, thinking of things that were not always necessarily cut and dried and that were kind of abstract"...."So even though its a science field and I suppose its fairly cut and dried when it comes down to it, some of the questions weren't -- you know, they were more abstract." (259-04)

"I really found that the course materials, the books, the videotapes didn't seem to help much with the assignments, they tended to be way off-base, you know"...."He had questions and you just couldn't figure out where he got them from"...."They seemed to be a bit left field, you know"...."Like he did say, 'this is what I'm looking for, this is what you should have written', so that was helpful in that sense but still you couldn't see where he got them from. Yeah, he has the knowledge and the background given the situation, but I couldn't find it anywhere, maybe I wasn't looking hard enough, or maybe its real intuitive or something, I just don't know." (259-03)

"Some (of the assignments) were tough. Some I just didn't understand but, once you get a handle on them, they were quite interesting. I just had to sit down and really think about them, they weren't that easy." (111-10)

"I felt the assignments were tough for what they gave you as information." (852-02)

4.4 Lack of Prerequisite Knowledge

"I had no background or preparation and that made a lot of pressure too, not having that background"...."I knew what it would be about, I knew what would be expected of me but I was hoping that I'd be able to handle it better than I did. Yeah, I had great high expectations of myself." (111-10)

"I have no academic background. My background is all practical experience, working in the industry." (111-06)

"I was never strong enough in economics to just spin it out, without really understanding it"...."I didn't understand the first assignment very well and knew it was going to be even more difficult (because of time) to get the second one done and I was having trouble." (852-01)

"I didn't have a strong background." (259-03)

"The course itself had some physical concepts that I had difficulty with"...."It was very physically and chemically oriented, not my strong subjects"...."It jumped in really quickly into things like the bonding of different clays, complex cations, ions, and all that --
there could have been more build-up to it, somehow, putting it together a bit better -- that's how it started off and then it ended up with the different types of soils, which is much easier." (200-15)

The Persisters

As mentioned earlier, there was striking congruency between the problems revealed by the students who were withdrawals and those who were persisters. Results of the analysis of the ethnographic data for the persisting students in the domain of "problems experienced by those who persist in distance education in natural resource sciences" are presented next.

Problems Experienced by Persisters

1. Situational

1.1 Poor Environment

1.1.1 Lack of support

1.1.1.1 lack of peer support

"I felt disadvantaged in comparison to RPF's who are working out in the field and who have mentors." (200-06)

1.1.2 Poor study environment

1.1.2.1 community

258-07 was in a remote location planting trees with no telephone access, etc.

111-24 was working out in the field at varying locations on contract and was cut off from access to library materials and the tutor.

852-04 tried to find a tutor locally and couldn't.

"The local library is crummy." (200-06)

1.1.2.2 home

"When I'm at home, if I don't feel there's a deadline hanging over my head and I can procrastinate, then I will. I'll sit back with a book that's more recreational and enjoy reading it when I really could at the time be catching up on some of the work I'm behind on." (200-13)

"I should have spent more time in the office working on the course (away from home)." (200-05)

1.2 Lack of Time

1.2.1 Change in circumstances

"You're just not sure when someone else is going to throw something at you and that's usually when you've got your assignments due" (was taking college courses too). (259-09)

"At that time we had, here at the office, a whole bunch of evening meetings and I sort of got behind." (200-12)
1.2.2 Took more time than expected

"I guess it actually took more time than I thought it would." (259-09)
"I found it more time-consuming than I anticipated." (259-07)

1.2.3 Overcommitted, multiple roles

"Its extra work to whatever else you're doing in your life, you know, it's an add-on. Its something that you do at the end of the day, when you're fighting to get the assignments in." (111-25)
"I had trouble finding time" (852-07)
"I have a heavy workload. Maybe if I wasn't as tired at night and I didn't have so much going on during the day, maybe I wouldn't find it as overwhelming as I did." (200-09)
"You're trying to work, you've got a mortgage, a wife and a kid -- its difficult." (200-13)
"This is too much, its too much work, too much work with working full time. Sure if I wanted to come home every night and just do homework I probably would have aced it then because the material wasn't that difficult but with everything else"...."These courses were kind of a sideline." (111-16)
"You're not totally immersed in it and you don't have the time to dig deeply, read the textbooks inside out and things like that...The course is an add-on after everything else in your life" (111-17)
"I work full time and have overtime, too. It was really difficult to slot in blocks of time and I needed blocks, I just couldn't do 5 minutes here and there." (259-07)
"I work for a consulting firm. As all consulting firms are, there's a lot of pressure in that. I really enjoy my job and I have a young son, he's 2 1/2 now and I like to see him and I'm away a lot, so, and as I said I'm not that well organized anyway. I just didn't have a lot of time to do this course"...."Its a completely different ballgame compared to on-campus as a young student with no family, no job. I mean, you know, you've got exams coming and you've got to study but you can actually sit down and study for a week, you've got that week." (200-05)

1.3 Health problems

"I threw my neck out and I went into the exam with a neck brace on and I was just a mess -- I didn't think I would pass the exam because I was in such bad shape and I was quite worried." (200-09)

2. Institutional

2.1 Cost

2.1.1 General cost

"I think when I add it up, education's just expensive now. $275 bucks a semester tuition -- its, like, quite different now, you pay that for a course." (200-16)
"Everything cost extra, there were constant requests for more money." (111-22)

2.1.2 Cost of attending the lab

"I was getting reimbursed by my employer and I have a feeling if you weren't in that boat, the whole course would be quite expensive"...."Cause I think the cost, probably when you look at the plane fare and all, the whole bit, you're probably looking at 600 bucks for four days, but my employer covered it so it wasn't a problem, but I can see it being a problem for other people." (111-25)
"Going to the lab was expensive." (111-23)

2.1.3 Cost of materials

"I spent this outrageous sum of money on textbooks and hardly used them at all. I didn't use them really at all. They weren't relevant." (111-16)

"Is the $75 deposit fee for the video component necessary? Although the staff collecting this collateral were most gracious and understanding, I felt insulted and offended at having to bare my money woes to be exempt from paying." (259-08)

2.1.4 Cost of writing the exam

"It cost $10 to take the exam, $50 if you were out of town"...."I mean you have to take the exam, it should be included in the fee." (852-07)

2.2 Problems with Institutional Procedures

2.2.1 Delay in getting started

2.2.1.1 delay in registration

"UBC is as bureaucratic as any government body" (had a problem getting the permission of the instructor to take the course conveyed to GIS). (111-17)

"There's great delays usually from the time you send the stuff down to the time they actually process it and get it back to you. Its very frustrating." (200-07)

2.2.1.2 late arrival of course materials

"The course materials were late. It was an administrative problem." (852-07)

"These course materials were sent out two weeks late and I had wanted to get started." (852-08)

2.2.2 Poor communication with the institution

"I thought you had at least six months to finish the course...I thought I had a choice, that I could take the exam later, so basically I did the whole course in two weeks. There was no choice about the exam time in spite of them implying that there was"...."Why send me the form when there was no choice -- this wasn't made clear. Distance education is supposed to be more flexible." (852-07)

"The one thing that's an absolute pain is to phone long distance during the day, because you can only phone places like the Registrar's Office from 8 to 5 when the phone rates are the highest and to be going off onto different paths"...."You should be able to contact a human being"...."I was put on hold and hung up lots of time and I just thought it was dumb"...."It was frustrating to go off on the telereg, you know, especially admissions and administration and that, and be constantly put on hold and listen to elevator music, long distance. You're on hold forever, and on lunch time." (111-20)

GIS office didn't keep student informed about tutor being absent for a while. (111-22)

"I didn't know how long the exam was going to be until I got there. That kind of thing would have eased me a little bit. I just didn't have any idea. I didn't even know what the format was going to be -- was it going to be multiple choice or essays? I think would have helped me to prepare a bit" (there was a problem at GIS concerning this student's mail and no information on the exam was sent out). (258-02)

"One thing kind of ticked me off -- my name was put on a list with my
phone number for this forestry course, for all the other students, and they could phone me or whatever and I didn't give my approval that I wanted people to be phoning me and stuff. I didn't get any calls though so it was no big deal" (111-02)

"They wrote me a letter saying it was a 3 hour exam and when I got there, it was a 2 hour exam. It was upsetting and confusing that it was different than I had anticipated." (200-05)

2.2.3 Problems with exam procedures

"There were exams for about 40 courses in one room at the same time. You had to line up to go to the front to pick up your exam and there were only two people there to invigilate, it took about 40 minutes." (111-21)

"I didn't like the way the exams were set up, the mechanics of how they were given out, a big room, 20 other courses, a very time-consuming exercise and you're nervous." (258-03)

"The people in charge of the exam didn't seem to know what was going on, there was a lot of confusion. It started 20 minutes late and we didn't know if we'd get the extra time and the exams were different lengths and so it was disruptive when other people's time was up." (259-11)

"The all or nothing final exam is very stressful." (200-05)

2.3 Problems with Course Pacing

2.3.1 Problems with course scheduling

"The final exam came at the worse possible time, in the middle of my crucial field season when I was out of town working 10-12 hours a day and seeing my family weekends." (200-05)

"Getting away to attend the lab was very difficult, it was the busiest time of the year. We were right in the middle of serious planting as were most people and the exam was right in the middle of it, too. It was poor timing for most of the forestry people, I guess aggies too cause they're right in the throes. If it had ended in April it would have been perfect. And as a matter of fact this has deterred me on several occasions from taking courses, because of the timing." (200-09)

2.3.2 Course paced too slowly

"It went for a whole year, you know, where I'd almost forget about it for a month, it seemed to go on forever"...."It was a lot too long"...."For the material they covered, it could easily have been done in a semester and, you know, gotten it over with"...."A year it too long, spreading it out like that." (111-25)

"I don't think its best to stretch them out too long because what happens is you lose your momentum." (200-09)

"I though actually there could have been even more assignments"...."I paced myself to the assignments and so I could have got a lot more out of the course if I was pacing myself to additional assignments as well." (111-14)

"I'd prefer to accelerate the course to four and a half or six months, I'd retain more for the exam. If its too long, its hard to stay motivated." (111-23)

"Forestry 111 is not really a full year's work." (200-13)

"I don't know if everybody's the same but I pace better with some more deadlines"...."I think weekly assignments would help." (200-06)

"I would have found say 6 assignments, slightly smaller in size, maybe more motivating for me in terms of getting them in cause all of us, most of us distance education students are delinquent, we're always running behind so instead of just putting in 3 massive assignments every six weeks, I would have been better off, been happier, with one assignment every 3 weeks so I would have had half the stress twice as much." (200-05)
2.3.3 Course paced unevenly

"It was sometimes sporadic with large readings all at once." (111-14)
"I couldn't follow the course schedule. If I did follow it, I probably
couldn't complete the course, there was just too much towards the end." (259-06)
"I'd end up having these hoards of material that I had to do all at once
because the assignments were so irregularly spaced." (111-16)

2.3.4 Course paced too quickly

"They were like, it was too quick, too much, too much too soon."
(regarding the first two assignments) (200-09)
"They really set a pace for you and I found it hard to keep up"...."I
found the pace really tough." (259-09)

2.4 Problems with the Tutor

2.4.1 Tutor was unavailable

"I tried to reach him and he was relatively unavailable, he moved a lot
and his phone changed, even GIS didn't know how to reach him." (111-21)
"I called during his scheduled times and I don't know if he's supposed
to be in his office or not, but he wasn't there a couple of times." (259-11)
"You kept frying to get him but he wasn't always there." (200-07)
"Twice during the lab, the instructor left the lab for two hours at a time
while we were working. We were all on our own." (200-10)

2.4.2 Calling the tutor was intimidating

"I suppose I could have made that initial contact but I was a little
reluctant to do so. I think I would have felt a little easier if he had contacted me initially and
maybe we could have developed some rapport but I just felt that, at a distance, I was doing
this on my own." (258-02)
"You have the feeling you're cutting into his time"...."Cause its very
difficult to call a stranger"...."(another student) is a very open sort of person, he would call
anyone to ask a question. I'm not sure the rest of us would have." (200-06)
"The tutor could possibly initiate contact." (200-05)

2.4.3 Poor communication with the tutor

2.4.3.1 personality/communication conflict

(during the lab) "All these things made me angry -- the lack of
preparation, the disappearing, but the attitude that came across. You could not ask a question
without being made a fool of. It was rude. He did not want to be teaching. I've taught a lot
of years with different people and when someone doesn't want to teach they treat students
badly whether they are 5 years old or 30 years old and that's what he was doing. And it was,
like he would ask questions on material we had covered on our own (early in the course) and
many of us couldn't bring it up fast enough to answer his questions and he would just -- there
was this constant sarcasm 'with your great knowledge you should be able to figure out such
and such' and you couldn't." (200-10) (note that this student achieved one of the highest
course marks)

Note also the next two student's comments for clarification of some of the interaction
that was occurring.

"He was a very casual sort of guy, seemed to be on Caribbean
time"....(in the lab) "I wasn't sure how to take him, whether his comments were meant to be
funny or if he was being cynical. If I had more time to get to know him probably I would
have had no problem but as it was I was uneasy and uncomfortable with him." (111-21)

"We had some dumb students in the class (at the lab) that had no idea and you could tell that he (the tutor) kinda shook his head at them or wondered about them because we were, you know, in this course, you're supposed to know what you're doing and some of the questions he was asked were questions that you'd ask on the second day." (111-20)

"He would phone me back and ask me for marks that he had sent me because he forgot to record them and had lost the assignment"...."It bothered me -- like we only had four assignments all year and he phoned me back three times for marks and he just never seemed too keen." (111-15)

"He was always brief and curt." (111-15)

"I guess its more of a personality thing, between you and I"...."I've heard certain things about (the tutor) before I even took the course and that was part of the reason I wanted to take it by correspondence as, well, I'd heard that his course was very unsatisfactory person-to-person, taking it on-campus. I just found (the tutor's) attitude very irritating. He was quite condescending to students, so sometimes his comments were, I felt them to be more critical than constructive"...."Its kind of irking. He's not saying 'this is what you could do better next time and this is what you should be looking at,' its more 'silly you'." (259-11)

"One thing that really choked me up -- I repeated his answer to my question on an assignment and he said it was wrong and I'm really careful about things like that." (111-23)

2.4.3.2 poor feedback

"I would contact him but, probably after the first few times, I didn't seem to get much help so I just turned off." (111-15)

"My assignments were very, very briefly marked"...."For a distance course, I really expected a page but it was like a spelling correction, 'no, this happens in July', 'good point' 7/10. I was really no further ahead from doing the exercise. Of course, you stay current, but he didn't come back to me saying 'you've realized this and this but you've missed this and this and this'. So I thought they were really brief cause that's where I expected the feedback, on the assignments"...."That was his only chance to let me know if I was right or wrong. I guess 7/10, I've mastered 70% but what have I missed, what didn't I get?" (111-15)

"The assignments were late coming back, like five weeks in one case, two and a half to three weeks on average versus three or four days for all the other course I've had. And then the comments were horrible -- illegible -- and then there wasn't enough there, like there were a few scribbles here and there and that was it." (852-03)

"We didn't get our assignments back very quickly so we weren't able really to see how we were doing." (259-11)

"I had written three assignments before I got anything back at all. I was quite excited after handing in my first assignment and working fairly hard at it and waiting and waiting for it to come back, hoping it would come back before the second one was due so knew I was on the right track, never having done a course by distance education before" (got the first three in a batch and the last two assignments after the exam)...."I was very disappointed in that because that I found that a lot of the material covered on those assignments was covered on the exam. It just would have been helpful to me, it would just have made me work a little bit harder I think if I'd gotten more feedback. The comments when they did come back were difficult to read, illegible. Had I been able to read them I'm not sure that they always made sense to me. "....I was never able to tell how much a question was worth either so I didn't know if there was a comment beside it that I hadn't gotten full marks. If I was able to score three out of three I could have seen that I got full marks on that question and maybe on another question I got zero out of three but there was always just a two or a one so I didn't know how that question was rated and so I didn't know how much of the question I had missed, had I bombed it completely or had I gotten part of it?" (258-02)

"He just marked it and didn't really leave a comment or tell you..."
what you should have wrote. I find that irritating because you can't go back and learn from what your mistakes were. He wouldn't elaborate on where you lost your marks or anything. You didn't know what you'd missed, you didn't know how you should answer the question later on cause often its the same style of question. You should know what you did wrong or what you got right so when you answer a question on a test or just another question in the manual the same way, you know what the right way to answer it is." (200-07)

2.4.3.3 problems understanding the tutor's speech

"He's hard to understand"...."But as the lab went on you then it got quite good, you got used to his accent." (111-25)
"He was quiet, he didn't talk loud enough"...."It seemed to me like he needed to take a public speaking course or something"...."To me the accent was absolutely no problem, he was just soft-spoken." (111-20)
"He was very quiet at the beginning of our lab. You could hardly hear him. He was very shy. He became more loud and boisterous as he got comfortable with the crowd." (111-16) Note the last sentence in the context of student 200-10's comments in 2.4.3.1

"In the lab, he talked in a monotone, he needed to speak up." (111-23)
"The instructor has a very thick accent"...."Its the wrong person to be on a phone conversation with"....(in the lab) "nobody made any complaints, once in a while people would ask him to speak up but I know its because he was foreign and people are afraid they will be considered prejudiced if they make remarks about a foreign person. I mean, I was just as bad. I mean, I was furious because I knew he was not teaching appropriately but I couldn't say it to his face either." (200-10)
"He was hard to understand, had an accent, and took a long time to come to the point." (111-23)

2.5 Instructional Design Problems

2.5.1 Problems with the on-campus lab

2.5.1.1 timing of the lab

"They were long days" (111-20)
"the assignments are all over with." (200-09)
"It was a very rapid thing, a two day crash." (200-09)
"I would have appreciated another day, by the end of two days my brain really hurt, it just really hurt and I couldn't concentrate any more." (200-10)
"I think the lab was 4 days and I thought for that amount of material you could have had 2 - 5 day labs even...It would have been nice if it had been broken into two parts cause there was like kind of two distinct areas in the course, a practical side and a theoretical side." (and it would be better integrated with the content as you went along) (111-14)

2.5.1.2 lab content, set-up

"It was not really well prepared." (111-25)
"It was useful but too much material was crammed into two days " (111-16)

"Probably in most of the natural resource sciences you're going to need as many opportunities as you can to really get out and look at stuff in the field. The lab helps but for me it's not enough. The lab in soils helped me clarify some of the concepts we talked about, whether it was cation exchange or water retention, but I would really have liked to have seen more dirt, got dirty." (200-13)
"The first lab was not prepped for. He said someone had goofed and so the materials were not there." (200-10)
"You could have skipped the lab and done just as well in the test, like to complete the course. For the lab, I mean, you'd be better served to just have videotapes of the procedures, stay at home, save your hundreds of dollars, watch them a couple of times, watch what's done and do the work." (200-07)

2.5.2 Problems with the distance delivery instructional design

2.5.2.1 phone call inadequate for problem solving

"No matter how many questions you ask the tutor (by phone), you're still not going to learn anything." (852-07)
"I find it very difficult over the phone. I can't communicate what it is I don't know because usually I wait until I'm in such a bind that I don't know why I'm in trouble." (200-09)
"The telephone is cold and telephone tag is no good"...."It's hard to solve problems by phone, its even hard to explain what the problems are." (111-19)
"Any questions you had you could clear that up all in a batch (at the lab) rather than over the phone which is a kind of scattered way of doing things." (111-17)
"I had difficulty with fundamental concepts which you couldn't solve over the phone"...."It's hard over the phone to work through a problem. (The tutor answered but it was unclear how you got to the answer." (852-04)
"I found particularly with a science course, there's a number, a point where I had trouble with matrix pressure and the various equilibria that affect water table underground and, speaking to the tutor over the phone, he was very helpful but we were talking about a graph, setting it up using these equations, and without seeing it, it was very difficult." (200-16)
"I think some of the stuff, the background to the questions would have required or at least in order to get up to speed on the question, I would have had to do more preparatory work (before phoning)." (200-12)
"I had difficulty working over the phone with the tutor. It wasn't his fault. Again a lot of it was visual and him trying to verbally tell me something I had to see visually was very difficult. He did the best he could and was always available." (200-10)

2.5.2.2 need for other media/learning resources

"There's somethings you could do yourself, at home. Like you can go out and find a forestry road that's been cut in the hillside. There's a lot of things we could do. I don't think there's enough suggested field work, experiments that we could do that could be suggested." (200-06)
"There was a lot of reading. I could have used more self-quizzes, more practice between the assignments where I was forced to think things over"...."I wasn't just taking courses to pass, I wanted to learn." (852-04)
"They could have had more visual things on videotape to show people and stuff"...."There's more that they could do on videotape than they have there"...."More visual complements would have been useful to the course." (111-25)
"We didn't have a textbook. Like, the manual was fine, it had to be, we had no textbook. Like, I like to supplement my own reading with, like, other books." (852-07)
"The audio went with the slides and that was okay but just to listen is very difficult for me." (200-09)
"You hear it and it sinks in, you're getting it a second way and then you've got it. Otherwise you can read it, read it over, its the same process of learning but hearing someone say it reinforces it somehow." (200-07)
need for more interactivity) "A face-to-face earlier in the course, even if its just an orientation, would have been useful. Even a teleconference, that would be good enough." (200-06) 
(the suggested readings) "A lot of times the book wasn't available, like there was only one copy and it was checked out and other people had a hold on it." (852-07)
"I couldn't keep the extension library books long enough." (852-04)

2.5.2.3 need for unavailable equipment/media

259-08 had to buy a VCR and had financial problems. "We have no cable here and so I didn't see them -- I'm not a TV person." (200-16)
200-10 and 111-26 did not have phones. 111-16 had no VCR.

2.5.2.4. problems with the quality of the materials

2.5.2.4.1 course manual

"Its been 10 or 11 years since I graduated so when you talk about chemistry or physics, some of the areas they gloss over, I'm going to point out that if they could have said that extra sentence, sometimes when you have a paragraph, sometimes if you just put in that extra sentence explaining something"...."The physics section was just two paragraphs but there were ten questions on the assignment. They just listed a whole set of formulas, so there could have been more examples there." (200-05) 
"The manual seemed inconsistent to me in some areas, you know"...."It kind of wandered"...."It didn't seem to be consistent or parallel." (111-20) 
"The manual had things that weren't explained clearly. It was the first offering of the course." (852-06) 
"There were a lot of small mistakes all around (in the manual). Like in a graph, sometimes they graph in the wrong direction and its sometimes confusing and I needed to clarify with the instructor over the phone." (852-08) 
"The animal science manual was kind of mediocre"...."There were some technical mistakes, blatant in a couple of places"...."I would say that they're not bad but they could definitely use some polishing." (852-03)

2.5.2.4.2 textbooks

"The texts were out of date and four of them don't flow together that well -- one book to use would be better." (111-13) 
"The textbooks were not relevant. I had too much to do to waste time reading excess material." (111-16)

2.5.2.4.3 videos

"The videos weren't that interesting, they didn't add a new dimension to the content, it was all there in the books and manual anyway." (111-21) 
"I didn't watch the videos at all. There were no real questions on them or when to watch them or why to watch them." (111-13) 
"I didn't bother watching them at all. Realistically I could have done quite easily without the videotapes. I ended up watching half of them, if that." (111-16)
"I don't find them (the videos) informative. They're not useful. They turn on your alpha waves and you don't do much about learning. I find if you're taking something factually difficult or conceptually difficult its better just to hammer
away at it and not watch TV, its an easy way out"...."When you sit and watch TV you tend to
veg out a bit." (111-17)

"Its just slides on the video -- 'this is a podzol' -- its
kind of dry, it doesn't get you there." (200-13)

"The 111 videos were kind of hokey, you know, one's
twigs, one's bark, stupid jokes"...."I didn't really need it." (200-13)

"I found the videotapes a bit out of date and not in
depth enough." (259-07)

"I didn't even watch all the videos"...."Some of it was
like a culture study cause you got to see people from the 60s and 70s and some of it wasn't all
that relevant and some of it was hard to see (what they were pointing out)"...."The tutor said
he wasn't all that happy with it either and once he said that I thought well I won't bother
watching the rest of them." (259-11)

2.5.2.5 problems with language, style

"The manual is pretty general and because of its tight writing,
its black and white, there are no red underlines anywhere" (can't determine course focus).
(200-06)

"The materials are well-written most of the time but there are
instances, again, where it has obviously been written by someone where English is not their
first language, so there are a lot of convolutions and I have to be able to go back over it to be
able to figure out what the person is trying to say." (200-10)

2.5.2.6 course focus, expectations were unclear

"For the laboratory exam, I assumed that on these 100 trees
you had to know the full Latin name for all of them, like, you know, they never said you had
to but they always talked in the Latin name, so I spend all this time looking over the Latin
names before I went to the lab and then the instructor said 'oh no, as long as you can identify
them, the common name is okay'. Of course, that's getting away from the course objectives." (111-25)

"You had all the information there but I had no idea if I was to
know all of this and then you go to your reference material and you find there's so many facts
in there, you know, until, finally, when I got to the lab and found out actually how easy it
was going to be." (111-20)

"You've got to know where they're coming from and when you
don't know until the lab -- there's a lot that goes in between, because you do have to know
where the professor's coming from and you can't tell from the courses because they may not
be the one who put the course together. You don't know what they're concentrating on and
what they want out of the answers. I find that you need that and getting that at the lab stage
is great but its not nearly early enough for me"...."It should be with the bulk of the course,
midpoint or something like that, towards the toughest parts." (200-09)

(student wanted copies of past exams but they were not
available) "I think that a pretty standard question and especially for a course where you're not
given any exams all year, that would have been the best preparation I could have had, cause
you just didn't know the expectation, what the level of expectation was." (111-15)

"On-campus you get a pretty good idea of what the profs going
to want, through midterms, through lectures"...."You can get a little bit of an idea where
things are going when you go to the lab and if they're forthright." (111-17)

"Not attending classes, not having access to the instructors, it
was really very difficult to study for the final exam. I constantly questioned whether or not I
had missed something or misinterpreted something in the course material that would be
tested or whether I didn't spend enough time on a specific topic"...."Like, what is the focus of
this course? If its going to be on theoretical things that fine, if its going to be more on
mathematical or biochemical things, ok, that's another section you've got to start thinking
about. That's the thing I found the most difficult -- where should I put the emphasis?"...."The
assignments were really very general, they didn't give you a sense of focus, as to where the important parts were." (259-07)

"In the lectures you're able to, you know, a few questions here, a few questions there, you start to understand what the prof's perspective is, you start to notice"...."Because in that broad a course, especially an introductory course, sometimes a prof is selective where he wants to go. You can understand after a while what it is he's going for, just from hearing him talk. That is something you can't possibly just get from the manual....no 'make sure you memorize this', which can happen directly in class, you realize"...."Sometimes you just realize from his speech, a lot of times, a principle, a formula, or a theory is the foundation for the rest of the course and its like you have to grasp this or you're not going to go anywhere with the rest of the course"....(getting copies of old exams) "helps me, its real important to me in being successful in the course." (200-06)

"You study the whole manual thinking any of this could be on the test. You don't know the weighing of anything"...."There's certain things that you should make sure you know and it doesn't tell you what those are, it tells you know it all." (200-07)

2.5.2.7 course was overwritten

"It definitely took more time than I expected it to, more than my college courses"...."Like, at first I was thinking a couple of hours a night but it took more time than I thought." (259-09)

"More work than it should have been." (259-06)

"The particular course had a lot of material you had to cover, and there was the practical side and the theoretical side, too -- it was a hard course, I found." (111-14)

"There was an incredible amount of material." (111-16)

2.5.2.8 inappropriate grading

"Its inequitable that the assignments count for so little when they are so much work and then so much is given for the lab quizzes." (111-21)

"The division of grades is ridiculous. You went to a lab for 4 days, you do a lot of work at that lab and you had to do a huge write-up that counts for nothing. You had 3-20 minute identification exams at the end of the lab and that's 40% of your grade. You do 4 assignments but only one counted for 10% and the rest is your final. For a years work to take a grade from just that"...."I was so angry at the end of the lab to discover that, cause they didn't tell us we had a huge lab write-up, I thought there was only the exams, and I hadn't allotted for that in my schedule and then to be told that it wouldn't even count toward your grade, that was ridiculous." (200-10)

3. Dispositional

3.1 Lack of a Clear Goal

"I'd decided I wanted to go into forestry but I hadn't went (sic) to school for, you know, ten years so I just wanted to get my feet wet and see how it went." (111-20)

"There is a reward there for me but not even career-wise, I don't think of it that way. The only reason I want to finish is because I started. Its personal satisfaction." (200-09)

"I really don't have a clear firm goal, its more of a personal development thing although the RPF might be useful in the future, so I might as well do it." (200-13)

"I felt that there was only a 50:50 chance that I could do this course because its been a long time since I've done any school -- it was kind of a watershed. If I could do it, I'd like to go on and try to get my degree"...."Its sort of more a hobby than a career goal although it certainly would be nice, that bachelor's, too." (259-08)

"I do not have a clear goal. My original motivation was, I just wanted to do something different. I thought a degree would be kind of fun to have, along with the initial
curiosity"...."Let's start off doing something easy (student makes a face), something I know about and I'm interested in, and soil science is something I really wanted to know more about and I figured, because I'm actually quite passionate about landscape and soil and the whole thing like that, I could use it -- so I dove into it." (200-16)

3.2 Stress of Multiple Roles

(student explains couldn't be a full time student, work and have a personal life too because of the stress) "Plus I don't learn as well, and I don't understand the concept of that much pressure, so I'd rather take my time." (259-08)

"It was stressful, very stressful" (filling so many roles)...."It was just always that one thing that was in the back of my mind that I always had to do, was the course...So I found it quite stressful and was really glad I finished it." (200-05)

3.3 Time Management Problems

3.3.1 Time priorities/procrastination

"I've had a lot of time and I've used none of it" (200-13)
"She gave us a list of textbooks but I never got any of them cause you had to go to the library or something and get them to mail them to you or something and I couldn't be bothered." (852-06)

"Actually, I probably did have a bit of a problem with self-discipline, just due to other work I was doing, my actual work, preparation for classes I teach at (local college), and then, uh, so I'd be doing some homework for that in the evening, plus the family, or mowing the lawn, or whatever other thing"...."Now and then I found it cut into the time I could do recreation sort of, that kind of time -- if I did no recreation and just sat in front of the books, yeah, other than that it was no problem". (111-25)

"I always leave it till the last minute." (852-07)

"The problem with me is, I procrastinated a lot"...."I usually did the assignments at the last minute"...."I was usually rushing to finish them cause I didn't want to hand them in late but I did hand them in late a couple of times" (852-06)

"I'm a bit of a procrastinator so its partially my own fault." (111-16)

"I took three courses this spring and I worked on them intermittently and I kept convincing myself I was in good shape but it always came down to the last minute and I'd cram it in"...."That's more of a personal thing, I'm a procrastinator." (200-13)

3.3.2 Need for structure

"I work much better under a set schedule." (111-16)

"I still find this difficult because its not a nice structured, all immersion environment and it can't be." (111-17)

3.4 Learning Style Problems

3.4.1 Need for face-to-face, oral and visual learning

3.4.1.1 general

"I need that visual. Someone talking to me doesn't do any good. I need it described in great circles (on a blackboard) and things, you know, I need to know from beginning to end, not just some little piece and its very difficult for somebody over the phone to do that." (200-09)

"I tend to be more a visual person and perceive more visually than just ideas, although ideas are there too but when it comes to concrete things I have to see them and then once that impression is there its there forever, while if its just spoken about its more abstract." (200-16)
"Its the interaction with people, its the most important part of any course. You saw a lot of things that were just open-ended. They're very important, very important, you just couldn't do without them." (200-09)

"The face-to-face stuff is so important because you have other people that are studying at the same time, you have professors who are usually working with some type of research or who are aware of new research and its all of that. Its just like a little gathering of the minds sort of, I guess, and I like that. I can put it in a work context, its not just theoretical." (200-09)

"The interaction at the lab was important. You know, you found you worked together a lot more, sort of as a team all doing the same thing. When you're not in a lab situation, you're very much on your own." (111-14)

3.4.1.2 with instructor

"Like when you're face-to-face with a prof you have way more opportunity to interact." (852-07)

"Water potential -- a simple component in the course but a lot of people were having trouble, its not hard -- but to have someone say it to you it suddenly clicks." (200-06)

"I need to be with an instructor, face-to-face with a personal approach." (852-04)

"Meeting the instructor, just to talk to him and to see where his emphasis is, and being able to ask questions on the spur of the moment, something that just pops into your head. If you hear it, if someone says something to your face, you memorize it, its in there. You can get to know where his emphasis was and the problems that you would generally have were the same that someone else in the class would have and they would be asking the same thing and it would be way clearer." (200-07)

3.4.1.3 with peers

"(in the classroom) you have other students showing you what to do, usually you have friends, you know, in classes to compare notes with, to ask questions." (852-07)

"I personally learn much better in a classroom setting and I like to learn and its kind of nice that you can learn with people beside you that you can bounce ideas off of." (111-16) (re. on-campus lab)

"There were so many people there, all in the same boat and, you know, where everybody helps each other out and you learn a great deal from each other, it was great"...."Realizing that they are having the same sorts of difficulties you are, that you're not the only dumb one." (200-12)

"It was good to get out there (to the lab) and find out how you were doing in comparison to the other students." (111-20)

"Fellow students are important for comparison and, well, they also assist you. You help each other"...."That interaction is really necessary because you can interpret things differently from the questions and if you can share, just to get an idea what the question is really asking, that sorts most of the problems out themselves. What is this question really asking me?" (200-09)

"Its hard when you don't have classmates to discuss them (hard assignments) with. You can call the tutor and ask but (the tutor) can't give you the answers to the questions." (852-06)

"Its good to see what different levels people are at. There are people without any degrees and people there with different ideas, so it was useful. If not just to make me feel better about what things were." (111-17)

"I wondered if I was alone but it turned out a lot of people were having trouble"...."I missed the peer feedback, you don't know how you're doing"...."I think that makes a big difference, meeting people, meeting the prof." (200-06)

"You did talk to some people and found out that they were
behind in the assignments or did poorly on the assignments or else were having trouble with the lab. That was useful." (200-05)

3.4.2 Need to know how to "play the game", be in a learning mode

"I got better marks as it went along as I sort of knew what was expected of me." (259-08)
"It took me over half the course to know that there was a way of answering these kinds of questions and giving the kind of answers that got a good grade"...."I probably would have done much better if there had been some training in how to be a student." (200-16)
"I think the first course I took, I did all the readings, then the next course I did not quite all the readings and then you become like a student again, and then you focus on just what you think you're going to need and then you read that. If you have too many courses going at once you just do information key to the course and to yourself in terms of your personal interest." (200-13)
"Not having written an exam for so long, it was a bit of a challenge, it took me quite awhile for me at my age to collect myself." (200-12)
"I didn't pace myself that well, I hadn't written an exam in awhile." (258-02)
(regarding getting ahold of old exams) "I know there were some things I would not have studied just from my experience in the assignments and the manual. I'm thinking there was one vital question on the exam, particularly, that I scored much higher on it simply because I happened to think, simply because it was on two other year's exams, yeah, it could be on it -- it certainly wasn't mentioned in the labs." (200-06)

3.4.3 Studying style problems

"Psychologically, I can't skip. I have to complete the readings and then go on cause I feel I'm going to miss a big chunk." (259-08)
"Once you get in there you find its going to take more time, specially if you write out notes the way I do, rewrite and sometimes type them too, so it took a lot more time than I thought." (259-09)

3.5 Adult Pride

3.5.1 The need for achievement

3.5.1.1 marks, self-image

"I didn't do any great shakes I know because I crammed, but I easily could have." (111-15)
"The only thing was, I'd promised myself an A in this thing and I don't think I did it. I had to change my objective on that one and, well you know, I thought let's just try to enjoy it rather than trying to achieve an A, you know"...."Cause I'm not really a good student, I never was"...."I wanted to prove to my self that I could be a good student"...."I thought, well, if you're going to do it, do it, and do a good job at it. I think I did a good job at it, you know, I mean it was reasonable"...."I chose not to have any great onerous kind of result that I'd have to maintain. You know, if I don't get this, I won't have that. So I eliminated the pressure on myself." (200-16)

3.5.1.2 fear of failure

"I was quite worried -- I phoned (the tutor) three times, he told me I passed." (200-09)
"I'm unorganized -- in a way, I deserve what I get in this course, because the course, you need to spend a lot of time on a daily basis. I'm energetic
and hardworking but a bit unorganized"...."I was delinquent in not applying myself early enough." (200-05)

3.5.2 The need for independence

"I had no use for calling the tutor...If I had a problem, I was able to figure it out myself basically." (111-25)

"I think I learned quite a bit and I think, I haven't got my marks back yet, but I have an idea they're pretty good and I did that on my own." (111-20)

"With a science course you have all the material there and you have all the books there, what's the difference if someone tells you what's already written down." (111-20)

"Generally I try to do things on my own steam, my own initiative and I have to be in a real snarl before I'll phone, same thing for all my courses, I tend not to use it, I know its available but I tend to stay away from it. I probably should use it." (111-17)

"I was wanting to do things myself. I attempted to do everything myself and I didn't use the tutor like I should have. I should have phoned him and asked 'dumb' questions on a regular basis because I was behind the eightball. I should have phoned him more often and asked him quote dumb unquote questions to get me through difficult parts of my assignments but I was personally reluctant to do that." (200-05)

"I like to do it kind of all on my own rather than get involved." (200-11)

3.5.3 The need for respect

"I felt kind of dumb asking what I thought were sort of stupid questions. Maybe I felt a little bit inadequate or embarrassed perhaps but anyway that's a problem for some students. You're hesitant to ask, you don't want to embarrass yourself or at least you feel that way." (200-12)

"An attitude has come through right from the beginning and I don't know if its the instructor or the department -- that students are something you put up with and you really don't want much to do with them"...."Students are not what we're here for, we're here for something else'." (200-10)

3.6 Previous psychological, social and economic factors

"I've done a couple of correspondence courses before, two or three, and never ended up getting through them"...."I just dropped them after a little while." (852-03)

"When I went to school, I was an honors student but there's no university around here, very few people from (Interior city) took to university out of my high school and that's because there's no university here and I thought that's its criminal that there's no university here"...."I've been and done a lot of things and been a successful businessman and I've sold out and now I want to get my university degree, that's kind of the next thing"...."I just wanted to get my feet wet and see how it went." (111-20)

"My family, you know, well, we were immigrants and there's no history of education in my family really and being a bright kid you're always encouraged to carry on and not work with your hands -- (student laughs) I think I'd rather work with my hands -- so there was this kind of focus. But I know I've watched friends of mine with their children now and a (friend) sending her daughter off to school and I realized because the mother had had university training and it meant something to her, that all of those structures and the way of looking at things, like I didn't even know what declaring a major was, I mean, I just sort of fell through all that stuff, so that's kind of what I mean, if I'd had a better foundational work as to how to approach a higher education, I probably would have done much better at the time" (had dropped out of university)..."I'm not really a good student. I never was. Maybe its just my own nonstructured nature." (200-16)

"I'm not a quitter, so I'm stupid. I would have been better to get out." (200-05)
"You've got to be the kind who's not a quitter to do these." (111-17)

4. Epistemological

4.1 Content Lacked Personal Relevance, Interest

"I had a hard time seeing how it was going to be of use in the future". (111-25)

"I don't know how that would ever help you in a practical sense." (111-25)

"I'm not saying most it wasn't worthwhile but a lot of what is being taught is not practical for forest use, or, as far as that goes, probably for some agricultural situations". "The lab, except for some of the acidity and whatnot, was more what I could sink my teeth into sort of, but I expected more of that." (200-09)

"I'm not sure that all the time spent on tree identification, with the lab quizzes worth 40% of the mark, are that relevant to a working forester." (111-21)

"I don't think I'd take a course unless I liked it cause I'd never get through." (258-07)

(procrastinated a lot) "cause I'm not interested in economics that much." (852-06)

"I'd had it all before, it was boring, tough to take." (111-23)

"It did not relate to forest soils enough. It was too much to the agriculture, very much so. It didn't go far enough for me, it wasn't what I was looking for." (200-09)

4.2 Epistemology of Course Differed From Student's Epistemological Stance

4.2.1 Content was too technical, scientific

(other courses are) "more descriptive. I'm more comfortable with that. Even in the chemistry, if I can write it down and describe it, I'm fine, but when they ask you for a chemical equation, I was just totally lost". "I understand the concepts, that's no problem for me, because if someone describes it, it makes sense to me that water should do this and all these different things should or nutrients should do this. That all makes sense to me but mathematically to describe what is happening nutritionally, I don't like that." (200-09)

"They have to have the exact name for something while I'm more interested in generalities and how a thing works. It actually blows me away that they don't have a context a lot of times for things -- I mean these are fields they are working in but they don't have the contextual part of it." (200-16)

(the tutor) "said I could have used more scientific vocabulary but I'm rusty at that, you know, but I'm sure that it will come." (259-08)

"It was more the mathematical part of it that I was having trouble with. The theories and all, I was finding I could grasp the theories and concepts in this course and actually I was enjoying that part of it but a lot of the mathematical part of it, I did ok in it, but it was solely through a lot of studying. But the theories and concepts in this particular course went over with me better because that's how I'll be using them in the field". "I had to remember my algebra to start with but also formulas, lots of formulas and stuff like that. I find them boring actually and if I need to use them what I'll do is go to the books I have and dig it up and I'll probably forget it again". "The mathematical part of the course was really burdensome." (200-11)

4.2.2 Content was too theoretical, abstract

"The soil classification, chemistry and physical properties, etc. part of the course, I found that part of the course really conceptual". "I was groping for it a bit." (200-16)

4.3 Internal Epistemological Gap Between Presented Course Content and Course Expectations
"I felt the objective of the assignment was poorly understood...I didn't understand why they were asking me to make the interpretation." (111-15)

"Some of them (the assignments) I really had to sit down and think about -- sometimes the questions that were asked, the manual doesn't really explain and the book doesn't really explain and you try to tie the two together and, its just not, you're just not sure about it." (259-09)

"I guess it was just more the types of the assignments that we received in the course was unlike anything I've ever done in any of my on-campus courses -- more the depth to which we were supposed to answer was a little bit fuzzy"...."Like, it was a different way of thinking"...."I was really freaked out about this assignment"... "It was off the beaten track"...."Some of the assignments were really like theoretical, sort of, you know, you had to pull out abstract sort of knowledge with technical knowledge. Like one question on one of the assignments was 'plants harvest the sun, explain this statement'. You know, that's kind of way out there." (259-11)

"I didn't really feel that what he was asking and what he was looking for, from the comments I couldn't read, were necessarily the same thing. He was looking for more in the answers than I thought the question asked." (258-02)

"They expected critical thinking and that was appropriate." (259-10)

"Some of the questions in the assignments were supposed to refer to lessons but in some of the lessons I didn't see how they correlated with the questions. Like in one of them there were calculations on the assignment but there were no calculations in the chapter that was supposed to go with it so I wasn't sure what we were supposed to do." (852-06)

"In this course it seemed like there was no right answer a lot of the times, it was just what do you think, and using what you know, try to come up with some kind of answers and what's the reason for your answer. He didn't always give you an answer but he'd go, 'well, think about this and that.' So it helps clear up some things and lets you know that there's not necessarily a right answer. The questions, I didn't like the questions, because they're not really cut and dried." (200-07)

4.4 Lack of Prerequisite Knowledge

"In this course, you had to have had some previous knowledge, because you would have been dead in the water without some of the early economic theory"...."Like basic economics, supply and demand, if you didn't know it, its like 'uh'." (852-07)

"I have run into trouble with my limited background in some of the sciences"...."Its usually at the basic stage, cause once I get the basics I'm okay"...."I have had no physics, I have no chemistry, I have not had math since grade 10 in Manitoba a long time ago and even then I did poorly in it"...."And so my basics for when they started to get into more theoretical types of math like algebra and calculus, I have no background in it whatsoever, so it was a struggle. The chemistry for instance, in this course, there's very heavy chemistry and physics and I don't have any of that and, really, the first assignment was I believe physics and the second one was chemistry." (200-09)

"It was a real eye-opener from an economics point of view. I was in way over my head and it wasn't as productive as it could have been. It was kind of frustrating. I learned a lot though, so it was good in that way." (852-04)

"Its been 20 years since I've done chemistry"...."So I had to work a little bit to draw on memory, ditto for the physics which I never took but I knew enough just from experience that I was able to do the course." (200-16)

"The last time I took chemistry was in 1948 or something like that and I wasn't really comfortable with the chemistry part of it." (200-12)

Comparing the Problems of Withdrawals and Persisters

There were few differences between the problems identified by withdrawals and those identified bypersisters. Lack of family support was evident for one withdrawal student
but did not otherwise emerge. There may have been reluctance to mention this problem because of family loyalty or the problem may just not have otherwise been present in this study group. Problems understanding one of the tutor's speech came forward from persisting students but not withdrawals. Withdrawal students had much less contact with the tutor, however, and none got as far as attending the lab this tutor supervised. Also, as one persisting student pointed out, people may have been hesitant to vocalize criticism about a member of a visible minority ethnic group for fear of being considered racially prejudiced. Uneven or too quick course pacing was not identified by withdrawals either. Few of these students got far enough along in the course to have an overview of the pacing; many were, however, overwhelmed by the initial work load. Problems with the exam procedures or an appropriate balance in the course grading were, of course, not relevant to withdrawals.

Some possible factors came forward from both withdrawals and persisters that are not specifically identified in the taxonomic domain analysis but which are relevant to the concerns of this research. Two of the withdrawals had an on-campus option, that is, they were definitely planning to come on-campus in the future and could take the course then. Another two were already on-campus students. Having an on-campus option is not a problem per se but could have influenced a withdrawal decision by reducing motivation to complete because an alternative existed. However, four persisting students were also specifically planning to come to campus and eight were already on-campus, so a withdrawal decision does not appear directly linked to the availability of this option.

Another aspect that emerges from the interviews of both withdrawals and persisters, not identified separately as a problem but interwoven with other problems, particularly the dispositional problems, is self-blame. Students frankly blame their own procrastination, study habits, laziness, poor reading skills, disorganization, hesitance to ask for help, etc. for their problems. Again, however, this self-awareness, evident in the presented quotes, seems equally shared by both withdrawals and persisters. Self-blame does not, in itself, seem linked to ability to persist.
A Relevant Cultural Theme

Following through on the ethnographic analyses, some cultural themes emerge. Because of their remarkable congruence, the ethnographies of the withdrawals and persisters, focussing on the problematic aspects of their experiences as distance education students, reveal exactly the same themes. Conceptually they are unified in this. Indeed, no differences between the cultures of the two groups are evident in this admittedly limited analysis.

Central is the social contradiction between the role of student and the role of adult, that is, the conflict between the societally humble role of student and the study group's posture as mature individuals with needs: needs for status, as reflected in the needs for achievement and respect; needs for personal control, as reflected in needs for independence, for clear and appropriate learning tasks, and for a suitable environment; and needs for personal relevance and satisfaction. This conflict is expressed in the emotional nature of the students' experience. Many of the quotations presented earlier reflect its emotionally-charged nature. From these, and from other things that the students said, a list of emotional words, both positive and negative, was derived (Table 3) to illustrate this point. Once again it is relevant to note that the nature of the experience was similar for both withdrawal and persisting students.

It is appropriate to clarify at this point that, as reflected in the number of positive emotional expressions made by the students, most were satisfied with the courses overall. This research's concern with barriers to persistence has meant the focus has been on negative aspects, the problems that students encountered. It has thus ignored the many positive aspects of the students' experiences: the pleasure and satisfaction many derived, the comfortable relationships many had with their tutors, their appreciation of the opportunity to achieve their goals, and the interest, stimulation and relevance many found in the content. With the caveat that seven out of the seventeen withdrawals did not provide an opinion, feeling that they had not proceeded far enough in their course to judge, the students' overall ratings for the courses (in response to question 30 on the questionnaire "considering all aspects, how would you rate this course?") is summarized in Table 4.
### Table 3

**The Emotional Words Used by Withdrawal and Persisting Students**

**Withdrawals**

<table>
<thead>
<tr>
<th>Positive Emotion</th>
<th>Negative Emotion</th>
</tr>
</thead>
<tbody>
<tr>
<td>warmer, more personal</td>
<td>banging my head against</td>
</tr>
<tr>
<td>environment</td>
<td>a wall(2)</td>
</tr>
<tr>
<td>appreciated it(2)</td>
<td>discouraging</td>
</tr>
<tr>
<td>great(2)</td>
<td>upset</td>
</tr>
<tr>
<td>very/really good(6)</td>
<td>ticked off</td>
</tr>
<tr>
<td>helpful(2)</td>
<td>tense</td>
</tr>
<tr>
<td>very easy</td>
<td>gruelling</td>
</tr>
<tr>
<td>interesting(2)</td>
<td>painful</td>
</tr>
<tr>
<td>high expectations</td>
<td>(dead) boring(2)</td>
</tr>
<tr>
<td>very encouraging(4)</td>
<td>tough</td>
</tr>
<tr>
<td>didn't feel too isolated</td>
<td>hanging over you</td>
</tr>
<tr>
<td>pleased</td>
<td>difficult(3)</td>
</tr>
<tr>
<td>enjoyed(3)</td>
<td>ridiculous</td>
</tr>
<tr>
<td>fantastic</td>
<td>didn't enjoy</td>
</tr>
<tr>
<td>supportive</td>
<td>uncomfortable(2)</td>
</tr>
<tr>
<td>liked</td>
<td>disappointed(6)</td>
</tr>
<tr>
<td>excited(3)</td>
<td>a lot of pressure(2)</td>
</tr>
<tr>
<td>keen</td>
<td>confusing</td>
</tr>
<tr>
<td>glad(2)</td>
<td>stressful</td>
</tr>
<tr>
<td>excellent</td>
<td>felt guilty</td>
</tr>
<tr>
<td>impressed(2)</td>
<td>frustrating (4)</td>
</tr>
<tr>
<td>positive experience</td>
<td>fretting</td>
</tr>
<tr>
<td>did a hell of a job</td>
<td>intimidating(2)</td>
</tr>
<tr>
<td>effective</td>
<td>tiring</td>
</tr>
<tr>
<td>comfortable</td>
<td>felt badly(2)</td>
</tr>
</tbody>
</table>

**Completers**

| (really/very) good(14)   | not totally negative      |
| eager                    | useless(2)                |
| useful(5)                | problem                   |
| interesting(8)           | fighting                  |
| understanding            | choked up                 |
| enjoyed(5)               | tense                     |
| gung ho                  | uneasy                    |
| comfortable(5)           | uncomfortable             |
| helpful(10)              | inequitable               |
| highly motivated         | upset                     |
| liked(3)                 | offended                  |
| excellent(3)             | dumb(2)                   |
| satisfying(2)            | kind of strange           |
| great(4)                 | not good                  |
| screamed with glee       | dead in the water         |
| really positive experience| (had) trouble(2)         |
| beautifully done         | boring(3)                 |
| validating experience    | ridiculous                |
| incredible               | horrible                  |
| wonderful                | uptight                   |

Note: Words in parentheses indicate the frequency of occurrence.
Table 3 cont'd

<table>
<thead>
<tr>
<th>(well) pleased(2)</th>
<th>absolute pain</th>
<th>angry</th>
</tr>
</thead>
<tbody>
<tr>
<td>glad</td>
<td>frustrating(6)</td>
<td>furious</td>
</tr>
<tr>
<td>(absolutely) fantastic(2)</td>
<td>difficult(5)</td>
<td>pain in the ass</td>
</tr>
<tr>
<td>tops</td>
<td>bombarded</td>
<td>cold</td>
</tr>
<tr>
<td>boisterous</td>
<td>struggle</td>
<td>turned off</td>
</tr>
<tr>
<td>surprised</td>
<td>totally lost</td>
<td>surprised</td>
</tr>
<tr>
<td>fascinated</td>
<td>unfortunate(2)</td>
<td>caught me up</td>
</tr>
<tr>
<td>impressed</td>
<td>boggling</td>
<td>hard(4)</td>
</tr>
<tr>
<td>challenging(2)</td>
<td>drove me wonkers</td>
<td>gruelling</td>
</tr>
<tr>
<td>praise</td>
<td>overwhelming</td>
<td>a drag</td>
</tr>
<tr>
<td>raved</td>
<td>fuming</td>
<td>panic</td>
</tr>
<tr>
<td>fun(2)</td>
<td>cram it in</td>
<td>embarrassed(3)</td>
</tr>
<tr>
<td>felt encouraged</td>
<td>was smoked</td>
<td>hammer away</td>
</tr>
<tr>
<td>terrific</td>
<td>insulted</td>
<td></td>
</tr>
<tr>
<td>loved</td>
<td>offended</td>
<td></td>
</tr>
<tr>
<td>excited(2)</td>
<td>fear</td>
<td></td>
</tr>
<tr>
<td>passionate</td>
<td>tough</td>
<td></td>
</tr>
<tr>
<td>dove into it</td>
<td>nervous</td>
<td></td>
</tr>
<tr>
<td>stimulating</td>
<td>tense</td>
<td></td>
</tr>
<tr>
<td>enlightening</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Numbers in brackets are the number of students who used the emotional word.
Table 4
Withdrawal and Persisting Students' Ratings of the Natural Resource Science Distance Education Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Excellent</th>
<th>Good</th>
<th>Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Withdrawals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foresty 111</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Plant Science 259</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Animal Science 258</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Soil Science 200</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Agricultural Economics 258</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persisters</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foresty 111</td>
<td></td>
<td>10</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Plant Science 259</td>
<td>1</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal Science 258</td>
<td>1</td>
<td>2</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Soil Science 200</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Economics 258</td>
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Chapter 6

Discussion

This discussion will focus on identified barriers to the students' ability to persist. Be reminded that the study group has already leapt any barriers to entry access although some of these can be inferred and some, such as lack of time, cost, a requirement to attend an on-campus lab, and a need for prerequisite knowledge, are equally applicable to entry access and to perseverance. The focus first will be on the problems and barriers identified by the students and then on the multivariate aspects of student withdrawal or persistence. Discussion of the identified underlying cultural theme of the social contradiction between the study group's role as students and their status as adults will follow, with the topic of personal control addressed. The research questions will then be answered and, in light of these answers, salient issues considered.

Determining Student "Realities"

The ethnographic interviews revealed that the students' most common overt reason for withdrawal, "lack of time", was, in most cases, a simplified explanation of the difficulties they were experiencing (Table 2). As suggested by others (CERI, 1987; Kennedy & Powell, 1976; Rekkedal, 1982; Rubenson, 1986; Woodley, 1987), "lack of time" is a socially-acceptable explanation. It avoids criticism of the institutional provision and maintains adult dignity. Indeed, Kennedy and Powell (1976), questioning the validity of information given by students, base their analysis of dropout on the views of counsellors. The students' overt responses conform with the well-known phenomena in attribution theory that the actor tends to give reasons for his or her behavior in terms of external circumstances while the observer tends to give reasons in terms of inherent factors within the individual (Jones & Nisbett, 1972). Both viewpoints are valid; alone neither may paint a complete picture. As well, there is what is referred to as "hedonic bias" at work here, the tendency to attribute success rather
than failure to oneself (Weiner, 1990). Woodley (1987) says,

it seems likely that students who find the courses too difficult or who fail to put much effort into them will seek to protect their self-esteem by attributing their withdrawal to external pressures such as lack of time. (p. 65)

Elements of both self-deception and impression-management appear to have influenced the students' overt explanations of why they dropped out.

Time constraints are indeed a factor, but not necessarily the key problem. For students who were experiencing difficulty with the content that required them to do extra work, or those who preferred to use most of their time in other ways, lack of time was not the prime determinant. There were higher order reasons. The ethnographic approach has elucidated some of these. This is what ethnography does; it does not pretend to capture any ultimate "reality" but rather it penetrates facades to represent and elucidate cultural knowledge, what can and cannot be said, as influenced by subjectivity and power relationships.

This reflection quite naturally raises the issue of truth and validity in the ethnographic results. The "truth" is bounded by the theoretical assumptions and methodologies employed. These are well-accepted, have not been disproven, and provide results which have utility, that is, which provide insights that are useful. There is construct validity between the concepts underpinning the research and the data generated. Moreover, validity is assured through repeatability of observations, confirmation with informants, and through triangulation of data, for instance, from information provided by the tutors. As well, the results are intuitively satisfying; that is, they meet logical criteria of subjective probability. In other words, they make sense. They are likely as close as we can get to the "truth" of the "realities" of these students. Although the sample is small and the learning context specific, their "realities" resonate with experiences and understandings that we can relate to, that would be meaningful in a much broader context, and thus seem generalizable in providing useful insights for others concerned with issues of participation in distance education.

Teasing apart key reasons for withdrawal is extremely difficult, however, as there are more than one or interacting reasons. Indeed, for most withdrawals, there is a complicated
mix of situational, institutional, dispositional and epistemological problems which combined and resulted in an individual decision to dropout. As expected, many problems that were situational, institutional or epistemological in nature interacted with the students' dispositions, that is, their personalities, proclivities and attitudes, and with their needs, abilities and willingness to cope.

In a study of hindering and facilitating incidents elicited from students by telephone interviews, Brindley (1988) found that completers and non-completers experienced similar incidents but completers seemed better able to cope with problems. Eisenberg and Dowsett (1990) suggest that students with strong motivation and interest can overcome difficulties they encounter with distance study. Attribution theory again seems relevant here. This theory postulates that the individual's locus of control beliefs, that is, whether they perceive the causes of their problems as external or internal, controllable or uncontrollable, are linked to a specific set of emotional responses, such as hopefulness, hopelessness, guilt, shame, or anger, which, in turn, result in behavioral consequences, such as flight or fight (Weiner, 1990). In distance education, these coping behaviors would be withdrawal or striving.

Brindley's work is particularly germane to this study because the ethnographies extend and broaden her observations, revealing that withdrawals and persisters experience similar problems, including having similar dispositional problems. Most students persevered regardless of the potential barriers placed in their path. For easy reference, a summary of these barriers, for both groups since they are essentially identical, is presented in Table 5. Newly elucidated is the cluster of barriers termed epistemological problems, those obstacles more generally referred to by others (i.e., Bartels, 1982; Bernard & Amundsen, 1989; Billings, 1988; Brindley, 1988; Gatz, 1985; Kember et al., 1991; Rekkedal, 1983; Verduin & Clark, 1991; Woodley & Parlett, 1983) as course "difficulty", problems with subject matter, nature of the learning tasks, academic incompatibility, or course structure/need for specialized competence. These epistemological problems that pose barriers to persistence, along with others that are situational, institutional and dispositional in nature, will be considered in some detail next.
Potential Barriers to Persistence in Distance Education

1. Situational
   1.1 Poor Environment
      1.1.1 Lack of support
         1.1.1.1 lack of peer support
         1.1.1.2 lack of family support
      1.1.2 Poor study environment
         1.1.2.1 community
         1.1.2.2 home
   1.2 Lack of Time
      1.2.1 Change in circumstances
      1.2.2 Took more time than expected
      1.2.3 Overcommitted, multiple roles
   1.3 Health Problems

2. Institutional
   2.1 Cost
      2.1.1 General cost
      2.1.2 Cost of attending the lab
      2.1.3 Cost of materials
      2.1.4 Cost of writing the exam
   2.2 Problems with Institutional Procedures
      2.2.1 Delay in getting started
         2.2.1.1 delay in registration
         2.2.1.2 late arrival of course materials
      2.2.2 Poor communication with the institution
      2.2.3 Problems with exam procedures
   2.3 Problems with Course Pacing
      2.3.1 Problems with course scheduling
      2.3.2 Course paced too slowly
      2.3.3 Course paced unevenly
      2.3.4 Course paced too quickly
   2.4 Problems with the Tutor
      2.4.1 Tutor was unavailable
      2.4.2 Calling the tutor was intimidating
      2.4.3 Poor communication with the tutor
         2.4.3.1 personality/communication conflict
         2.4.3.2 poor feedback
         2.4.3.3 problems understanding the tutor's speech
   2.5 Instructional Design Problems
      2.5.1 Problems with the on-campus lab
         2.5.1.1 timing of the lab
         2.5.1.2 lab content, set-up
      2.5.2 Problems with distance delivery instructional design
         2.5.2.1 phone call inadequate for problem solving
         2.5.2.2 need for other media/learning resources
         2.5.2.3 need for unavailable equipment/media
         2.5.2.4 problems with the quality of the materials
            2.5.2.4.1 course manual
            2.5.2.4.2 textbooks
            2.5.2.4.3 videos
         2.5.2.5 problems with language, style
         2.5.2.6 course focus, expectations were unclear
Table 5 cont'd

2.5.2.7 course was overwritten
2.5.2.8 inappropriate grading

3. Dispositional
3.1 Lack of a Clear Goal
3.2 Stress of Multiple Roles
3.3 Time Management Problems
3.3.1 Time priorities/procrastination
3.3.2 Need for structure
3.4 Learning Style Problems
3.4.1 Need for face-to-face oral and visual learning
3.4.1.1 general
3.4.1.2 with instructor
3.4.1.3 with peers
3.4.2 Need to know how to "play the game", be in a learning mode
3.4.3 Studying style problems
3.5 Adult Pride
3.5.1 The need for achievement
3.5.1.1 marks, self-image
3.5.1.2 fear of failure
3.5.2 The need for independence
3.5.3 The need for respect
3.6 Previous psychological, social and economic factors

4. Epistemological
4.1 Content Lacked Personal Relevance, Interest
4.2 Epistemology of Course Differed from Student's Epistemological Stance
4.2.1 Content was too technical, scientific
4.2.2 Content was too theoretical, abstract
4.3 Internal Epistemological Gap Between Presented Course Content and Course Expectations
4.4 Lack of Prerequisite Knowledge

a did not come forward from persisters
b did not come forward from withdrawals
Situational Problems

The Learning Environment

The student's learning environment is a key situational variable. Note that Sung (1986) found that environmental variables (availability of free time, study time, a place to study, extra material and tutorial assistance, and support from significant others) accounted for 21% of the variance in course persistence. Family and peers who are supportive or otherwise are part of the student's environment. A lack of support is an environmental problem, albeit only a problem in interaction with a student's dispositional lack of self-confidence, or need for support. Bartels (1982) says, "students are less likely to complete their courses if their families, friends and colleagues do not support them" (p. 10). Under these circumstances, he says, they need a very strong will in order to finish. Student 111-10, who graphically articulated this lack of support, was doing quite well (according to the tutor) in spite of the challenges of a lack of prerequisite knowledge and an epistemological problem with the scientific nature of the course but was quite undermined by this lack of support, in part because she lacked the confidence that she could pass the course and be reimbursed for the cost. The latter was an important consideration because she had financial constraints. As well, the poor peer support she received was a presage of future barriers she would face:

"Its very difficult to get into the field services side, its male dominated. I just realized I was banging my head against a wall and I don't need to. I won't get anywhere that way anyway, I would like to, I'd really like to, but I don't see it happening." (111-10)

Bartels (1982) has identified dropout resulting from the realization that chances of expected career improvement were not high after all. This aspect may be relevant for student 111-10 as well.

More concrete as an environmental problem is the student's physical milieu, the resources, both material (e.g., library) and intellectual ("experts" who might provide tutoring or companionable discussion), available in the student's community, and the home environment, in terms of having a quiet place to study. This study group provided a striking example of the type of poor study environment that students may have. The nature of the courses themselves meant that many of the students were involved in forestry field work,
often out in the woods in camps, working long days, cut off from all external resources, with limited telephone access. Some withdrew and some persisted. Moreover, the home environment itself can present problems, as found by Heinze (1983), Kember (1989) and Singer (1982). A quiet place to study, away from the interruptions and distractions of normal family life, is required. A number of students found achieving this separation problematic.

**Time**

Lack of time was another major situational variable confirmed in this study although, as discussed earlier, it was not in itself necessarily a prime determinant in withdrawal. Persisters shared the problem. Here lack of time is related to time available, as impacted by changes in the student's circumstances, the fact that the course took more time than students anticipated (which may, in turn, be related to course demands, an institutional variable, or problems with the content that required them to spend more time, an epistemological variable, or study style, a dispositional variable) and the diverse demands of the students' multiple roles as spouses, parents and full-time employees that constrained the time they had available for study. This time variable has been identified by Gatz (1985) as part of her feasibility in time dimension, and as an important variable by Heinze (1983), Kahl and Cropley (1986), and Paul (1988). The last author says that for mature learners, their student identity may be relatively minor compared to their roles as worker, parent or homemaker. Sewart (1983) pointedly observes, "their work and families are of prime importance" (p. 51).

**Health**

Problems with health are to be expected in both withdrawal and persisting student cohorts and, indeed, were present. It must be noted, however, that the researcher views with some scepticism the rationale provided by the one withdrawal student who cited poor health. In this case, confused goals and priorities, and an inability to cope seem more fundamental reasons for dropout. Nonetheless, health problems are a legitimate situational problem encountered by distance education students and identified by others (e.g., Powell et al., 1990; Woodley & Parlett, 1983).
Institutional Problems

Institutional problems were the most extensive and varied of those cited by both withdrawal and persisting students. This was so in spite of the fact that institutional problems did not include such access barriers as limited course offerings and policies regarding entry qualifications. The study group had overcome these potential barriers already.

Cost

The cost of these courses was a problem for some students. Having accepted the initial cost of course registration, some found the additional costs to attend the lab and to buy materials of concern. For student 111-10, whose problems were discussed earlier, attending the lab became a cost-benefit decision.

Institutional Procedures

Institutional procedures presented problems that ranged from petty annoyances to true potential barriers. Paul (1988) says that a student's first contact with the institution is a critical one, with the quality of service received playing a critical role in that student's subsequent success in pursuing homestudy. Nonetheless, the problems identified by both withdrawal and persisting students suggest once again that the key aspect is the student's dispositional ability to carry on regardless. There were other interacting effects, as well. Delays in registration and late arrival of course materials, for instance, tended to exacerbate a student's time constraints. Noble (1989), using a marketing principle approach, found that restricted office hours, and difficulties reaching either administrative or academic staff were problems for part-time mature students, who felt that the university did not understand their needs. This perceived lack of understanding or lack of response to working students' needs is reflected here in the problems they identified. Note that many of these bureaucratic problems reflect the "industrialized" aspect of distance education.

Woodley and Parlett (1983) mention administrative errors as a contributing factor in dropout. Problems with exam procedures were, of course, only experienced by persisting students. Nonetheless, they were potentially severe as a couple of students received
misinformation about the location of their exam, while another had two exams scheduled simultaneously and had considerable difficulty getting this problem resolved. Problems at the time of the exam itself were procedural ones that augmented the stress of the situation.

**Pacing**

The relative merit of course pacing, problematic in that pacing limits access to those who anticipate being able to meet the imposed schedule but increases the completion rate of those who do participate (Daniel & Marquis, 1983; Paul, 1990; Shale, 1987), is unresolved by this research although some interesting results emerged. The identified problem of course scheduling seems related to institutional insensitivity to the needs of their students. Forestry 111 and Soil Science 200 spanned most of an aspiring or working forester's or agricultural scientist's busiest season. Indeed, the most demanding parts of the courses (attendance at two or four day on-campus labs and the final exams) were right in the middle of the field season. The timing, however, since the regular winter session was over, was convenient for the University. This problem clearly influenced persistence and was highlighted by those who, because the courses were required for professional qualification, were enrolled regardless but indicated it was a barrier to access as well.

Time problems related to the overall course length or course demands in terms of submitting assignments are somewhat intertwined. However, the rather natural expectation that the main problem (indicated by Bartels, 1982, for instance) is that students do not have enough time because the pace is too quick, with assignments, a pacing method used to control the rate student progress, perceived as coming thick and fast, was not found here. This problem was evident, as was the problem of uneven course activity pacing, that is, unusually high work load volumes at particular times in the course, but the main complaint expressed for these courses was that the activity pacing was too slow. This was identified particularly in the one course, Forestry 111, that was a year long (on-campus, it spans seven and one half months). Whether or not they thought the overall course duration was too extended, many students felt that the lengthy gaps between assignment due dates posed problems in maintaining interest and motivation, and encouraged procrastination. Eisenberg
and Dowsett (1990) had identified a need for more intermediate feedback in the long time interval between assignments.

Problems Concerning Tutorial Assistance

The problems some students experienced involving the course tutors were diverse and disturbing. Siqueira de Freitas and Lynch (1986), Sung (1986), Sweet (1986), Taylor et al. (1986), Woodley and Parlett (1983) and others identify inappropriate tutorial assistance as a variable in dropout but perhaps not so explicitly as some students have stated it here. In this regard, it must be observed that it is immaterial whether or not views expressed by the students, both withdrawals and persisters, are objective or fair evaluations of their tutor. The point is that the students' subjective views are the "realities" which may pose barriers to completion. Be reminded, too, that the focus in this study is on problems. Many students had no problems with their tutor. Indeed, most, at their own choice, had minimal contact with the tutor. Others found their tutor helpful and personable. Much of the positive emotional language used by the students (Table 3) refers to the tutor.

Nevertheless, one problem some of the students had was difficulty reaching their tutors. On the whole, the tutors invited calls at restricted times only, a problem for students if these times were not convenient for them. One student (259-01) was offended by the unavailability of the tutor and written feedback suggesting that she call him: "why didn't he phone me, if he's supposed to be my tutor?" As well, the tutors were not always available when they said they would be. These problems were more than just annoyances for some of the students. In the limited times that they were working on their courses they tended to want answers right then; their work was delayed or extended when they could not reach the tutor.

Tutor accessibility was also a psychological problem for some students who found calling the tutor intimidating and were hesitant to initiate contact. This problem is included here as an institutional barrier because it reflects UBC tolerance of a passive approach to tutorial assistance. Although UBC Access/Guided Independent Studies' written guidelines for tutors suggests that they place an introductory telephone call to students, this is not
reinforced or monitored and does not seem to occur. A number of distance education institutions (e.g., the British Columbia Open University) do provide more proactive tutorial support, with the tutor initiating contact with an introductory phone call and making follow-up calls if problems occur (Scales, 1984). In their study of disadvantaged British Open University students, Carr and Ledwith (1980) found that more of them stayed "invisible" and state:

It should not be left to student initiative to seek help; in that way more effort is likely to be devoted to those students who are better qualified and most likely to succeed. (p. 84).

It seems self-evident that those students with the least self-confidence would be the least likely to take the initiative. Scales (1984) found that the number of student-initiated telephone calls was related to persistence, as indicated by the number of assignments submitted, but the number of tutor-initiated calls was not, suggesting that student confidence may, indeed, be the key factor. Baath (1980) suggests tutor-initiated contact with the student in order that the tutor gets to know the student's needs and responds with appropriate help. Several students wished this had happened. In its absence, they were hesitant to call a presumably busy person, perceived as having better things do, with a possibly trivial question. Stone (1992) says that tutor contact in distance education helps counter procrastination because the tutor can influence students who have external loci of control, that is, those who are externally motivated and will respond to the tutor's cues.

Haughey (1991) has also reported students' perceptions that their problem was not worthy of their tutor's attention and that they were unwilling to take up the tutor's time. The ethnographies show that students were particularly hesitant to phone when they thought their question was "dumb", something they should know but didn't, or when they felt so overwhelmed by a lack of understanding that they didn't know where to begin. They couldn't ask for a whole chapter to be explained over the phone. Some may not even have mastered the verbal skills or technical jargon necessary to frame their question. It must also be observed that the tutor grades the student; this gives the tutor power, in itself intimidating, and also makes it more difficult for the student to admit to not understanding something.
The absence of desirable tutor characteristics such as unconditional positive regard for the student, trust, empathy, cordiality, encouragement (identified by, for example, Burge, 1988; Daniel & Marquis, 1983; Holmberg, 1985; Sewart, 1983) is reflected in the personality/communication conflict aspect of the poor feedback dimension clarified here. These students experienced no difficulty with the tutors' subject matter competence, it was some of their affective characteristics that were problematic. A good tutor must be able to fill both an instructional and collegial role. Inglis (1988) found that students were concerned that some tutors were not sensitive to the special needs of adult distance learners. Students in this study expressed this too but most of their comments are more specific. In one case, a tutor would seem to have belittled students' questions, responses or abilities during one of the labs, and had a phone attitude that was described as not too keen, brief and curt. The other specifically identified problem focussed around a perceived condescension on the part of one of the tutors. One student was so alienated by this manner that it was a contributing factor in withdrawal.

The timeliness, quality and quantity of feedback on marked assignments were all problematic for some students. Rekkedal (1983) concluded that low turnaround time is likely to increase persistence but Taylor et al. (1986) were unable to confirm this result in a multi-institutional study. St. Pierre and Olson (1991) report that students who receive corrected lessons back promptly, especially at the beginning of a course, are more satisfied than those that do not, while Roberts, Boyton, Buete and Dawson (1991) found that slow and poor feedback is a problem for distance education students. Here, slow turnaround time was certainly distressing for persisting students who did not know how they were doing. They reported that the feedback's tardiness, its illegibility or insufficiency in clarifying what proportion of their answer was correct and explaining what a "full marks" answer would be, both lowered their motivation and decreased their performance on the final exam. Atman (1987) says that distance education students need timely feedback to sustain energy mobilization. In one course, the tutor included prepared "answer" sheets with assignment feedback. Students enrolled in this course spoke most positively about this; none indicated
problems with feedback. Rekkedal (1983) has previously reported that students found pre-produced tutor comments useful. Store and Armstrong (1981) characterize good feedback as having immediacy, regularity, explanatory rather than judgemental characteristics, conciseness, clarity, and as a "people process" with a climate of supportiveness. This type of feedback was definitely absent in some instances here.

Problems understanding what one of the tutors was orally saying, both in the lab and on the phone, were related to soft-spokeness and an accent. While none of the students specifically mentioned any particular difficulty related to technical content, it is logical to assume that the technical jargon inherent in the courses, unfamiliar anyway, was especially troublesome in this regard.

**Instructional Design**

Both withdrawal and persisting students identified a number of problems related to the instructional design of the courses. Two of the courses had face-to-face components in the form of intensive on-campus labs. These posed the same access barriers of geography and time that the distance education student is typically trying to escape. Although students had anticipated being able to overcome these when they registered for the courses, sometimes their circumstances changed. The on-campus labs posed some barriers to persistence, too. While the labs were viewed most positively by the great majority of students because they provided the interactive component students needed to perceive the focus of course requirements and to benefit from spontaneous feedback from the tutor and their peers, there were, nonetheless, problems associated with the cost of attendance (previously discussed) which contributed to one student's withdrawal, as well as complaints about the intensity of the lab sessions.

The other instructional design problems relate specifically to the distance delivery mode. Problem solving, particularly for content that was abstract or technical in nature, was of particular concern. Some students wanted the visual channel, both to read non-verbal signals and in order to picture properly relationships expressed physically, graphically or as formulas. In discussing the problems of teaching without the visual channel, Short (1974)
suggests that more scientific subjects are less suitable for telephone teaching. This point seems well taken here.

Some of the problems posed by the lack of the visual channel are also reflected in the students' needs for other learning resources, for instance, their desire for additional videotaped material, books, field work assignments, more self-quizzes, and more readily available supplemental readings. Some of these are related to a need for more information, some for more personal feedback, some for increased relevance and some to a need for redundancy to accommodate different learning styles, including needs for the visual channel and for oral discussion, either face-to-face or by teleconference. The need for redundancy to accommodate learning style is a dispositional problem but is included here as well because of institutional decisions that were made regarding choice and diversity of media. Agricultural Economics 258, for instance, had no textbook or video component, only a course manual and supplemental readings which were not readily available.

While some students wanted more, and more varied, sophisticated communication media used in order to expand their learning opportunities, other students, conversely, were constrained by not having easy access to appropriate communication equipment, such as VCR's. Two students did not have telephones at home although both were able to make alternative arrangements.

Some students encountered problems with the course materials themselves. They found the course manual confusing, the textbooks inappropriate, and the videos boring. Comments about the latter problem were common and somewhat disconcerting because many students expressed a need for visual materials and because the video materials were the most expensive to develop and provide. However, the videos had been developed as supplements and complements to the print material. They are not intended to be stand alone teaching tools. The core content is in the manual or textbooks. This may explain why the majority of students found the videos fine but not particularly useful, while some found them trivial and boring. Student 111-17 vocalized one of the difficulties in educational TV or video programming, the problem that it is a one-way medium that people are accustomed to
watching for passive entertainment not active learning (Bates, 1984; Wiesner, 1987). This problem, of course, can be mitigated through more effective instructional design and higher production values.

Problems with the language and style of the some of the written materials were those that might be anticipated, and were related to the epistemology of the subject matter disciplines. Some students described the language as tight, formal, cut and dried, rigid; the style as stiff. Both language and style reflected a scholarly, erudite approach that lacked flexibility and a personal touch, as discussed earlier. This problem, reflecting the language and style "culture" of the disciplinary areas, overlaps with the epistemological barriers to be considered later.

Students did not comment directly on readability although this possible problem was alluded to in regard to a textbook that one student considered too technical to be understood, and in general concerns about the scientific jargon. Moreover, the importance of prior knowledge in reading comprehension was highlighted by a number of students who said they had problems with the manual jumping into very technical and specific content with a presumption of prerequisite knowledge on the part of the student. Davis (1990) says that those preparing self-instructional print materials should reduce the cognitive load required for comprehension by simplifying vocabulary and syntax, and by facilitating the integration of text with prior knowledge. The latter can be accomplished by identifying important ideas in text, organizing the ideas, helping the reader recognize the relationships among ideas in text, and integrating these ideas with other knowledge. Not all of these criteria were met here.

Related to unfacilitative writing is the problem that some students had in determining the focus of the courses. They wanted to know what the key concepts were, what they had to know, and what was just nice to know. (Note that students who expressed this as a problem knew how to "play the game". They didn't accept the premise that you had to know it all). Knapper and Waslyci-Coe (1982) had previously found that lack of personal contacts with instructors and tutors leads to some uncertainties about course requirements including those
for the exam. For some students, this problem was solved at the lab when, in a face-to-face mode with the tutor, they were able to sense better what they were expected to know. Others weren't so fortunate and agonized until the final exam. As indicated by the number of comments included in the results of the ethnographies presented in Chapter 5, ambiguous course focus was a very major student concern, a key problem they identified as related to the distance format. It exacerbated their time constraints and interacted dispositionally, contributing to stress and their fear of failure.

The problem was not just related to poor integration of prerequisite knowledge, or to lack of clear instructional objectives, lucid language, facilitative organization and logical linkages, but was also related to the problem of overwriting, briefly mentioned in the earlier discussion of time problems. Bartels' (1982) says that distance education is "transparent"; professors fear being checked up on and criticized by colleagues at other universities. In order to assure academic credibility, they tend to overdo a course, including far too much detail. This is a major defect of the course team approach to course design, according to Daniel and Marquis (1983). In the absence of clear written comments that distinguish integral course material from supplemental information, distance education students are often faced with an overload of material. The result is the problem reflected here in students' comments about the excess time required for the course and their related concerns about not knowing where to concentrate their efforts, specifically what content they were to be held responsible for and what they could consider supplemental. This result is congruent with Paul's (1988) report that students frequently complain that distance education courses are too long and more work than on-campus equivalents.

Only persisting students expressed concerns about the fairness of course grading in one of the courses (Forestry 111); they were the only ones who proceeded far enough along in the course to perceive this problem. The concern centred around demanding assignments and required lab write-ups that contributed only 10% to the final course mark. This problem reflected a policy decision that the grades in this course would be highly dependent on objective assessment of performance in lab quizzes and the final exam. Students were
annoyed and offended at the implication of possible cheating on their assignments and write-ups. As well, some reported that it lowered their motivation to do this work. The more instrumental students minimized their efforts on these course components.

Completing students were also distressed by problems at the time of the exam. These involved a late start, distractions, uncertain exam length, etc., all of which increased stress. Many were offended at being treated like cattle at the exam hall.

**Dispositional Problems**

**Lack of a Clear Goal**

The students were enrolled in these courses for a number of reasons: achieving their degree, acquiring a professional qualification, or increasing their knowledge and skill base for other instrumental reasons or just because of general interest. For some, a group that has been identified previously (e.g., by Kahl & Cropley, 1986), the course was a try-out to see if they liked it or if they could handle it. The long term goal of these students was less clear (or better hidden). Both some withdrawal and some persisting students cited uncertainty about their goal. A few had clearly adjusted their goal during the course of study. Billings (1988), Brindley (1988) and Gatz (1985) have linked the motivational importance of the student's goal to course completion, but Sung (1986) and Dille and Mezack (1991) found that a student's reasons for taking a course and the importance of the course were not significant predictors of dropout. These latter results are congruent with those found in this study.

That is not to say, however, that motivation is not a factor in withdrawal, it likely is. It is just that there are likely too many complex nuances, such as the strength of the motivation, related to other variables such as life or career stage, the degree to which the motivation is extrinsic or intrinsic, and such other interacting dispositional variables as the conative skills described by Atman (1987), and previous experience, as well as interacting situational, institutional and epistemological problems, to be able to tease this factor apart and link aspects to persistence. Personal goals themselves may be exceedingly ill-defined, even subconscious: a complex mix of values, perceptions of the future, dreams and
aspirations. For instance, two students (200-09 and 200-15) in the same course had very similar circumstances. They differed in gender but both were in their thirties, married and with professional jobs that involved field work at the time of the courses. In other words, both had somewhat extreme time and responsibility constraints. Both were aiming for a professional qualification but had already achieved their desired career development without this qualification. Both had previous successful experiences in distance education but in this course encountered a significant epistemological barrier in terms of their lack of prerequisite knowledge of chemistry and physics. One (200-15) was overwhelmed and withdrew late in the course. The other (200-09) hired local tutors, wrote the final exam in a neck brace because of an injury, and passed. Said she: "The only reason I wanted to finish is because I started. It's personal satisfaction." What are the differences? Certainly 200-09 exhibited strong conative skills and an apparently strong intrinsic motivation. Whatever her personal goals, nothing was going to stop this individual from completing the course successfully. However, exactly why she differed from 200-15 is clearly idiosyncratic. She had, apparent in the interview, however, gained considerable self-satisfaction, perhaps even what Atman (1987) refers to as a "joyous sense of mastery" through Mezirow's (1981) "perspective transformation". Recall that Herrmann (1988) says that students continuing distance study report a shift from the instrumental reasons for beginning study to more intrinsic reasons, such as the value of the education itself, self-esteem, and prestige with family and peers. These observations seem applicable here.

**Stress of Multiple Roles**

The problem of the stress of multiple roles is considered separate from that of the time constraints imposed by the student's multiple roles that were considered earlier. Here the students specifically indicated it was stress, trying to study effectively when one was under stress, not time, that was the problem. The problem of stress seems to have two aspects: the stress of their normal roles, often increased by the new role of student and its demands; and the stress of study itself.

Related to the first is Effah's (1991) finding that negative emotions such as sorrow,
anger, tiredness or emotional disturbance derived from external factors posed dispositional barriers to distance learners because they negatively impacted ability to learn. Also illustrating this point are student 111-06's comments that he would sit down to work on his course but instead worry about his job. The course-related stress experienced by the students is reflected in the emotional nature of their experience, as discussed earlier. The negative language used by students (Table 3) corroborates what Snell (1987) identified as the painful and unpleasant emotions of distance education students as they perceive their weaknesses as learners and the difficulties posed by their situational milieu. Nor is this problem confined to struggling students. As Candy (1988) points out, the early stages of learning something new can be particularly painful for the well-educated in terms of frustration and loss of esteem. Underlying this is the aspect of challenge to self-esteem resulting from the conflict of student role vs. adult role which the ethnographies additionally elucidated. Kirk (1977) says that the effect of distance education study upon a mature student may be very traumatic, that it can increase domestic stress for married students and impact withdrawal. Holmberg (1988) quotes Bartel, Helms, Rossie and Schormann as saying that dropouts have greater problems in coordinating and sustaining the requirements of work, family, study and the implications of changing circumstances than those who persist. The latter are more prepared to accept that their personal life suffers. This may be true but could not be specifically confirmed here. Clearly persisters also suffered the stress and other emotional trauma that was a problem for withdrawals. Their acceptance of this and ability to carry on is related to other dispositional factors.

**Time Management Problems**

The problems that students had with time management reflected their time priorities, that is, their willingness to devote time to study at the expense of using that time for other activities. Some withdrawals and some persisters had difficulty putting a high enough priority on their studies; they procrastinated. Wilkinson and Sherman (1990; 1991) have identified procrastination as a problem in distance education and this study confirms it is. As Gatz (1985) has found, both withdrawals and persisters are affected. However, persisters
managed eventually to put study ahead of other commitments while the withdrawals did not. Of course, other factors, such as finding the work boring, cognitive blocks, stress, or fear of failure, likely interacted in causing procrastination. Some withdrawals had made a decision early in the course that they just didn't choose after all to fit study into their lives, while others procrastinated until their study load was perhaps insurmountable. Distance education exacerbates the general problem of procrastination because the learner's separation from the instructor and class limits opportunities for motivation and encouragement.

Atman (1988) links the capacity for self-management to MBTI personality profiles and to goal accomplishment style, saying that the capacity for planning included in the judging personality type is a fundamental underpinning of the self-management necessary for goal-oriented behavior. The results herein are unable to confirm this. Indeed, there were no differences in the MBTI or demographic variables between withdrawals and persisters, and a trend related to withdrawal that does emerge is associated with the problem of time priorities and procrastination, suggesting that other variables may be more cogent.

Students 111-01, 111-03, and 111-05, withdrawals with procrastination an apparent key problem in their dropout decision, are all relatively young men, aspiring foresters or RPF candidates, who are unmarried. At this time in their lives, their commitment to their educational goals is apparently not as strong as their interest in their recreational and social lives (see withdrawal section 3.3.1 in Chapter 5). It is these types of interacting variables that confound generalities linking withdrawals to specific student characteristics or barriers to completion. Woodley and McIntosh (1981) have previously reported that younger British Open University students, up to about age 30, were less likely to complete as a result of instability, finances, time pressures, failure to "play the system", and an "easy come, easy go" attitude. The last was related to a lack of commitment to their studies. When problems existed, older students were more willing and able to overcome them, they found. Kennedy and Powell (1976) drew on Huberman's stages of adult development descriptions in explaining Open University student withdrawal. In the 18-30 age group "focussing one's life" stage, the concern with self-image and immediate personal life is noted. While not
revealed by the quantitative analysis, the qualitative study has confirmed this aspect of the "willingness to devote time" dispositional barrier. It is of interest because of the insight it provides in understanding the complexity of withdrawal/persistence. A few years from now, these students will likely have wives, children, mortgages and a different social milieu. While their personalities and propensity to procrastination will likely be unchanged in this new life stage, their time priorities and the importance of their goal likely will have altered, as may other factors, and they could be persisters.

Another problem related to time management was a need expressed by some of both withdrawal and persisting students for structure in the learning environment. Here structure refers to a set course schedule, a specific time daily or weekly to work on the course, as in an on-campus setting. Kahl and Cropley (1986) report that distance learners have less self-confidence as a consequence of their isolation and difficult learning situation, and that leads to a desire for highly structured learning, both in terms of materials and environment, as a mechanism for reducing stress. It provides an emotional crutch, they say. However, as expressed by this study group, it would also seem to function as a means of avoiding procrastination and achieving a semblance of control, of being able to deal with a stressful situation and conflicting time priorities in an apparently efficient and effective way, since they are freed from decisions about when and what to learn.

**Learning Style Problems**

While the students did not speak of learning styles per se, they did speak of needs or problems that revealed their varying approaches to learning. Some of both withdrawals and persisters expressed the need for face-to-face, oral and visual instruction. The persisters often expressed this in the context of how much they enjoyed and appreciated the on-campus lab, above and beyond its relevance in direct instruction. There are two aspects here: first is the face-to-face interaction; second is the need for alternative media, i.e., the spoken word, the drawn picture. Recall that Salomon (1979) says varying media structure and convey content differently, thus calling on different kinds of mental activity. As well, be reminded that it is not just the social individual or those with a need for face-to-face tuition who feel
isolated in distance education (van Enckevort, 1986), most students have a need for some sort of social affiliation (Thorpe, 1987). Oral learning, the ability to ask spontaneous questions, visual cues from the instructor, visual learning from drawings and illustrations, peer support, benchmark of achievement feedback, and the benefits of interaction including perceiving multiple viewpoints, an ability to discern focus, and problem solving were all identified as key positive aspects of the labs. Their absence was problematic.

The consequences of a face-to-face opportunity are not always positive, however. Most students expressed the view that they were relieved to find other students were having problems, too, but withdrawal student 200-15, whose relevant comments are included in the previous chapter under withdrawals' problems with the lab content and set-up (section 2.5.1.2), would seem to have been undone by the peer benchmark of achievement variable identified by Sewart (1983). Although he asserts, "a lot of people didn't know really what was going on, I certainly didn't," and that it was "really awkward, people were wandering around aimlessly," comments from other students reveal that most did understand what was required of them and that they effectively worked in small companionable groups to do the lab projects. It seems likely that 200-15 perceived that he was having more difficulty than most students and this contributed to his withdrawal decision.

Students also revealed a number of problems that can be loosely described as not being in a learning mode and not knowing how to "play the game". The latter, more clearly identified with the persisting students, reflects an awareness on the part of students, from past experience or cues from the instructor or materials, as to where to focus their study efforts, what can be safely omitted, and how to answer questions in order to maximize achievement while minimizing time and effort. Indeed, it might be inferred from the withdrawals' lack of comments in this regard (other than their concern about the lack of course focus) and the comments of persisters that it took them awhile to realize that there was a way to be more effective in their achievement, that many withdrawal students never reached the point of perceiving that there was a "game" to be played. Problems with not being in a learning mode seem related to the time they had been away from school, their multiple roles and their lack
of familiarity with effective studying habits, either because they had forgotten or because they never knew to begin with. Heinze (1983) reports that more than half of distance learners say that learning was easier earlier in life.

Similar to not being in an effective learning mode is the problem of having an inappropriate studying style or learning strategy. Both a withdrawal and persisting student, for instance, related the difficulty they were having because of a laborious writing-everything-out, again and again, studying style. This study habit is particularly burdensome when, as is the case here, some courses are overwritten and there is inadequate clarity concerning the relative importance of various concepts. Daniel and Marquis (1983) report that study habits are difficult to change. However, these students had been provided with no opportunity to change or to learn effective study habits. Indeed, 200-16 expresses a need for some training in how to be a student.

These learning style problems identified from the ethnographies have provided some insights into a few of the aspects of learning style identified in the literature but have hardly clarified this variable. Studying style, including the aspect of not knowing how to "play the game", is definitely a potential barrier. As well, the need for redundancy in learning systems to accommodate preferences for written, oral or visual perceptual modes is confirmed, while the dichotomous global/holistic/field dependent/right brained vs. analytic, serialist/field independent/left brained learning style dimension might be inferred from the incongruencies evident between the courses' epistemologies and the epistemological stance of some of the students, to be discussed later. Both of these latter aspects of learning style also seem to have some explanatory power in clarifying withdrawal or persistence.

**Adult Pride**

Problems that can be said to involve adult pride are another major dispositional barrier for mature students. Although there was a conspicuous fear of failure on the part of some, the students' needs for achievement went above and beyond passing to include a need for high achievement. One student, 259-01, expressed this directly: "As a mature student, I wanted good marks, I didn't want to scrape by." Another withdrawal student (259-04) had
achieved the highest marks on the first two assignments but time constraints imposed by a possibly overdone course, her overly conscientious studying style, and her busy, multiple-role life, made her feel that she could not maintain this standard: "I didn't have time to do it adequately, which is what I wanted to do." She withdrew. On the other hand, completing student 200-16, also striving for an A to prove he could do it, was able to rationalize settling for slightly less ("I thought let's just enjoy it rather than trying to achieve an A") and carried on to achieve a B. Other persisters also seemed more comfortable with their achievement: "I didn't say I had to have an A or a B, as long as I passed it" (259-06) and "My objectives were not to get a high mark but to learn more about soils." (200-12)

Fear of failure seems to be a definite component in several of the students' decisions to withdraw. It is, of course, interactive with other problems they were having, that is, the reasons why failure was a possibility. For many of them, the fear may have been a well-founded one. Indeed, the low failure rate in these courses can be explained by hypothesizing that several potential failures had already withdrawn. This does seems likely. Attributional egotism theory identifies defensive, ego-protective motives as the reason for withdrawal from tasks where the possibility of ego-threatening failure exists (Snyder, Stephan & Rosenfield, 1978). Brindley (1988) reports that the marks received in a distance education course can hinder or facilitate persistence. However, some persisting students were also afraid of failing. Like a few withdrawals, some of them had previously experienced failure.

One difference between the groups seems to be that some withdrawal students expressed a feeling of hopelessness at their situation. They either perceived the consequences of failure as too onerous and were afraid to take the risk, or else they considered the reasons for their poor performance, that is, the locus of the problem, whether internal or external, as something beyond their control. For some, this reflects a lack of self-confidence, for others, this may be a valid rationale. In Sweet's (1986) model, his student background characteristics variable includes the variable of student's locus of control. Recall that aspects of self-blame are evident in both withdrawal and persisting students' accounts of their problems. In most cases, this indicates that they recognize that some of their problems
are internal or dispositional. That they could exert control over these problems, however, apparently eludes some of them. The previously discussed problems of students 200-15 and 200-09 are relevant here, too. Both of these students were threatened with failure because of their lack of prerequisite knowledge of chemistry and physics. 200-15 felt the situation was hopeless and withdrew. 200-09 took control of the problem, hired tutors and persisted.

A need for personal control is apparent in another aspect which involves adult pride: the problem that some students had in rationalizing their desire to do the course independently and their need for tutorial assistance. This unwillingness to seek help, even when they needed it, affected both withdrawal and persisting students. It reflects a quite normal aspect of adult behavior, the reluctance to admit to or expose weaknesses in ability. This was partially discussed in the earlier section concerning problems with tutorial assistance. There the problem was considered mainly an institutional one because students wanted help but were reluctant to seek it and it was not proactively made available. While that clearly was a problem only interactively with the student's disposition, this is a different aspect. Here the students did not want help although they needed it. This is more strictly a dispositional problem. Potter (1983) reported that some distance education students don't want high levels of interaction and in particular do not welcome instructor-initiated contact. This definitely seems true for some students. Nonetheless, an unwelcome contact that can easily be rebuffed is unlikely to result in a student decision to withdraw. Overall, this possible problem seems minor in comparison to the merit of proactive tutorial support, which may provide help for those students who are willing to accept it.

Another aspect of adult pride, revealed mainly in terms of interaction with the tutor, was a need for respect. It is reflected in the section dealing with the students' personality/communications problems with the tutor, in which a few students revealed that they felt demeaned, and in the aforementioned student reluctance to seek help when they needed it. This aspect appears to revolve around a desire not to be perceived (or treated) by a fellow adult as "dumb" or needing assistance.
Previous Psychological, Social and Economic Factors

The socioeconomic indices employed in the demographic study revealed that withdrawals and persisters did not differ in socioeconomic background. Overall, this study group's status is typical of that of on-campus tertiary students. These results seem to confirm the comments of Schutze (1986) that distance education is providing second chances and more options for the socially and economically advantaged, while failing to reach other segments of society. Entry access has not been increased. However, many of the enrolled students do not have advantaged circumstances. Indeed, the socioeconomic background results can be rephrased to say that there are as many disadvantaged students studying by distance education as on-campus. The issue of concern here is not entry access, but rather access to completion, that is, whether or not during participation some students are disadvantaged relative to their classmates in ways that impact their ability to persist. The ethnographies suggest that this is so. A few of both withdrawal and persisting students orally revealed sociological, psychological and economic disadvantages in their backgrounds, including being high school dropouts, previous failures, or not being part of an academically-oriented milieu. They were, indeed, the second chance learners that distance education seeks to serve. However, at least based on the indices of socioeconomic status employed here, those of lower socioeconomic backgrounds did not disproportionately withdraw. These indices only provide an indirect indicator of background, though, and are not directly predictive on an individual basis.

Carr and Ledwith (1980) report that students disadvantaged in terms of prerequisite knowledge, occupation and other factors, "suffered the same 'buffetings of fate' as other students...but seemed to have less 'slack' to cope with these" (p. 80). These disadvantages, however, clearly result in additional problems for these students, besides any "buffetings of fate". As student 200-05 points out: "When you go to high school, they do everything for you. You go to university, they drop you on your own. A lot of people have trouble with that" (200-05). Clearly, these students were even more on their own studying in a distance mode. Those disadvantaged in academic experience, preparedness, and concept of
themselves as learners were certainly the most challenged by this.

Cost was an additional differentiating factor. Some students, depending on their current job status, had their fees paid by their employers, whereas others had to bear the considerable financial burden, particularly to attend the on-campus lab, themselves.

These additional problems are shared by withdrawal and persisting students, however. Teasing apart reasons why some students have less dispositional "slack" in ability to cope is problematic. The disadvantaged background of some was a definite factor in the problems they encountered and their decisions to withdraw; others, equally disadvantaged, persisted. Certainly Kennedy and Powell's (1976) finding that dropouts often have demoralizing histories of educational failures and bring feelings of insecurity and intellectual inferiority to their studies is true. The problem is that some persisters seem to share these characteristics. Student 111-17 said, "you've got to be the kind who's not a quitter to do these (courses)." While the word "quitter" is strong and unfair, it may serve to highlight an elusive, absent aspect of self-confidence, strength of will or resilience not explained by differences in apparent background or circumstances that contributes to a withdrawal decision. Of course, other aspects, such as the strength of the goal, can also interact to influence student persistence.

Epistemological Problems

The epistemological problems experienced by both withdrawal and persisting students reflect a lack of congruence between the student's cognitive and affective characteristics and perceptions of knowledge, and the nature of the knowledge presented in the subject matter. Simply, they are epistemological gaps. The student's epistemological stance is a screen through which new knowledge must be acquired. The screen can become a barrier when the epistemological stance of a course's content or expectations is incompatible with that of the student. The student's conceptual framework cannot easily accommodate it. Kember (1990), referring to the academic integration component of his model of distance education dropout, says,
many students new to tertiary study are therefore faced with the need to learn new conventions and recognize quite different conceptions of knowledge. Some unfortunately fail to realize that any reorientation is necessary so never integrate with the norms of academic study. The model suggests that they drop out. Others realize that new conventions need to be adopted and skills acquired but find the process difficult. (p. 15)

These comments are relevant here and seem to have partial explanatory value but, with both withdrawals and persisters able to identify these problems, it is unclear why some students can make the transition or adapt to the epistemological requirements of a course and some cannot. Again it does seem to come down to an individual willingness and ability to cope and to persevere in the face of challenge.

Personal Relevance

One of the epistemological problems encountered by the students in these natural resource science courses was the lack of personal relevance of the subject matter content. Gatz (1985) includes personal relevancy as a variable in her model of student dropout but has not identified this as an epistemological problem per se. Often it is considered an aspect of motivation. Some of the study group students found the courses uninteresting; that is, they just weren't interested in the subject matter itself, either because they were already familiar with it or because it didn't focus on aspects of their interests. Some foresters, for instance, found the Soil Science course too agriculturally-oriented while some of those enrolled in the Agricultural Economics course were interested in international development in a holistic way, not in the specifics of applied economics.

Other students found the course content lacked applied or practical relevance; they couldn't relate it to their everyday experience. This problem was also identified as a corollary in problems related to the epistemological stance of the course itself (i.e., too technical and scientific, not practical), to be discussed next. The concern of adult learners with practical relevance, in contrast to theory or abstraction, is well documented in the adult education literature (e.g., Brookfield, 1986; Knowles, 1970; Schlossberg et al., 1989; Smith, 1982). Moreover, the need to connect learning to the students' personal contexts, reflecting the social nature of knowledge itself, is not restricted to adult education. It is also evident in what is sometimes referred to as a postmodern educational approach, one based on the
premise that learning occurs best when new knowledge is built upon the practical and culturally-derived tacit knowledge the student already possesses.

Although the courses' lack of practical relevance was undoubtedly difficult for some students, particularly those whose backgrounds and current milieu are so oriented, there is no simple solution to this problem. This is because it is inappropriate to consider a practical application of knowledge approach in this context; it would deny the concepts of learning and the nature of appropriate knowledge that are the foundation of university level study. That is not to say that knowledge at this level cannot or should not be related to the students' practical world, either as part of the course content itself or in leading students to perceive these links, but conveying practical knowledge per se is not the purpose of tertiary education. Instead it seeks to provide the student with the tools -- the approaches to learning, the understandings, and the holistic concepts of knowledge and its interrelatedness -- that will serve them and society as a whole in their area of specialty and in their everyday lives. It does not aim to accomplish all this in one introductory course, however. Some students did not appear to understand this while others did but, because they were having epistemological difficulty with the courses themselves, still expressed a desire for a course epistemological stance (i.e., knowledge is practical information) with which they were more comfortable. It is interesting to note that one persisting student (200-16) was uncomfortable with the whole academic milieu. Says he,

"I realized in the whole process of the weekend lab at UBC that here are (sic) a whole section of society that does nothing else but think and I don't really see myself that way....they don't have the contextual part of it....there's a different mind-set, mostly in the atmosphere of the university itself, the people who were there." (200-16)

In this case it is clear that the course did not mediate between the contrasting culture of the university and the culture of this student.

Epistemology of the Course Differed from the Student's Epistemological Stance

One might anticipate that some students would have difficulty with the scientific, empirical nature of the courses themselves and, indeed, some did. They were apparently
comfortable with generalities, descriptives and broad context, but not with scientific, technical and mathematical specifics. What was less predictable was that some students, comfortable with the generally positivistic nature of the courses, that is, with the emphasis on scientific and technical "facts", were uncomfortable with course aspects that involved theoretical concepts and abstractions, particularly if they were required to extrapolate, make inferences, hypothesize, or think relativistically. Memorizing facts and developing abstract, holistic conceptions are quite different processes. It would be pretentious to argue that the epistemologically different paradigms, positivism and naturalism, are evident here in a higher order synthesis, perhaps even one reflecting a critical approach. What is apparent, however, is that today the sciences, certainly these applied natural sciences at this tertiary level, are more than immutable laws, inexorable facts, and a quest for "truth". Students with this exclusively positivist epistemological stance found themselves at variance with the knowledge content and expectations of these courses, their epistemological diversity. In this regard, the courses seem to provide exemplars of particular epistemological stances that have general relevance. They reflect differing thought processes and it is the development of these varying thought processes, regardless of content to which they are applied, that is the universal goal of education. It should also be observed that the students in the study group were demographically diverse and that they had varying reasons for taking the courses. These factors, too, are likely reflected in the differing epistemological problems revealed in this research.

The link between learning style and the epistemological stance of students, with some finding the content too technical, scientific and specific, and others having difficulty with abstraction, complexity and ambiguity, was briefly noted earlier. The apparent parallel between these epistemological stances and the dichotomous learning style dimension identified by Schmeck (1988) as analytic/serialist/field-independent/left brained vs. global/holistic/field dependent/right brained is intriguing in light of the fact that students had somewhat antithetical views of the same content. In this regard it is interesting to speculate if the Embedded Figures Test of field dependence-independence might, after all, have been a
more useful instrument to clarify some of these matters.

Confounding the problem of the varied epistemological stance evident in the content is the use of the behavioral model in the courses' instructional design. This model, reflected in the behavioral objectives set in these courses, is a mechanical one in which students are conditioned to specific new behaviors. It implies a fixed set of known facts to be learned or behaviors to be acquired, rather than the gaining of understandings of the complex, contextual and tentative nature of hypothetic knowledge, an actual learning objective. This somewhat misleading approach was also instrumental in exacerbating the next identified epistemological problem.

The Internal Epistemological Gap Between Presented Course Content and Course Expectations

The problems both withdrawal and persisting students had with epistemological diversity is particularly highlighted in the internal epistemological gap they encountered between presented course content and course expectations. In the assignments, most of the courses demanded synthesis, high inference, and an ability to make connections (note that the one course, Animal Science 258, in which this was not particularly evident, was criticized by a couple of students for being too regurgitative and lacking the rigor they expected). An internal epistemological gap existed because some course materials seemed to present the content as something mainly to be learned by rote whereas the assignments often demanded considerable abstraction of meaning. Aside from the tutorial assistance available, students were expected to make this transition on their own. The learning resources provided no help in terms of giving examples or identifying the types of inferences one might make from the content. Students who expected regurgitation, with simplicity and concreteness, had to make a virtually solo cognitive leap to complexity, abstraction, ambiguity and an appreciation of the contextual, interrelated nature of knowledge. This sort of difference in the learning tasks, requiring understandings at the highest level, can be very difficult for students both to recognize and to achieve.

Brew and Batten identified this problem with British Open University students. They
found that many could not distinguish levels of analysis differing in complexity (indeed, some students were not aware that this was an inherent requirement for academic study at this level), that they tended to view the ideas presented in text horizontally rather than vertically, and that they couldn't "see the wood for the trees" or pick out the main points. Some students could not distinguish theory from examples. These authors point out that, by its very nature, closely argued text requires students to read closely and consecutively and that they tend to conceptualize the subject matter in this way. The courses themselves made no effort to alter the students' conceptual frameworks, to foster an awareness of the status of ideas in text and to bring them to an understanding of what learning is about (Brew & Batten, 1981).

Some of the students in this study group had no problem making the epistemological shift, they were comfortable and familiar with this kind of thinking, the nature of knowledge at this level. Others were able to recognize and develop the necessary sophisticated conceptions of what learning involves. However, for four of the students who did not, this was a significant factor in their decision to dropout. From comments that they couldn't find the answers to the assignment questions in the course materials, it is clear that these students failed to perceive the nature of the understandings they were expected to have acquired. As Kember (1990) points out, some students don't even realize that reorientation is required. These students simply did not have the cognitive sophistication to make this leap on their own.

This problem was particularly evident in Plant Science 259, as discussed earlier, where, as an example, following a highly technical and specific chapter on plant metabolism, one of the assignment questions was "'Plants harvest the sun.' Explain the significance of this statement." Indeed, we can question whether or not the solo cognitive leap required to answer this type of question is an appropriate and reasonable expectation given that the course is introductory and that many of the students are inexperienced tertiary learners. Regardless, it would be helpful if students were provided with some advance notice of the kind of thinking expected, particularly since this is different from that they are led to
anticipate. This demands more than just a caution to "think about the answers". It requires the provision of specific examples and relevant discussion. As a reflection of the marked internal epistemological gap present in Plant Science 259, in which students were unprepared for the assignment demands, it is worth noting that students in this course expressed the greatest degree of anxiety and concern about failing the final exam. After the challenges of this course's assignments, and in the absence of any opportunity for face-to-face interaction with the tutor or their fellow students, they simply didn't know what to expect.

Gibbs (1981) of the British Open University summarizes some of the work of Saljo and others that helps further clarify these epistemological problems. Students' approaches to learning are described as a "surface approach", which is characterized by rote memorization, and a "deep approach", in which underlying meanings are sought. These can be related to Saljo's five conceptions of learning:

1. learning as the quantitative increase in knowledge;
2. learning as memorizing;
3. learning as an acquisition of facts, procedures, etc. which can be retained and/or utilized in practice;
4. learning as the abstraction of meaning; and
5. learning as an interpretative process aimed at the understanding of reality.

Conceptions 1 to 3 are consistent with the surface approach whereas 4 and 5 imply a deep approach. Gibbs (1981) says that for students whose epistemological stance comprises a view of knowledge and learning as conceptions 1 to 3 only, this orientation is deep-rooted. It changes slowly and with difficulty, depending on the limits of their intellectual development and may be based on powerful experiences from school. Relevant here is the work of Anyon (1981), who found that social stratification of knowledge was occurring in the schools. Her results suggested that children in working class schools were being taught facts and mechanical, practical behaviors whereas students in affluent professional areas schools were being taught how to use concepts and ideas, how to think for themselves and be creative. Certainly it is clear in the results presented here that students who had an entrenched rote
learning epistemological stance, who did not even perceive the abstraction of meaning required of them, were disadvantaged when faced with the epistemological demands of these courses. As Kember (1990) points out: "students who habitually rote-learned were unable to integrate with the higher order demands of tertiary study" (p. 15).

To address this problem, Gibbs (1981) has developed a set of exercises which aid students in understanding the processes of learning required. Sweet (1991) says that more interactive systems are necessary to allow the types of exchanges between instructor and student that lead to higher level cognitive skills and problem-solving strategies. In a paper proposing perceptivism as a guiding philosophy for distance education, Brauner (1989) argues that a human agent is required in the learner's act of perception itself in order to ensure that the student has acquired the actual perceptions fostered by the content's concepts. Of the nine modes of perceptions, for instance, the theoretical perceptions required in the physical and biological sciences, commonly at odds with standard perception (e.g., in setting, the sun does not drop below the earth's horizon -- the standard perception -- rather the rotation of the earth carries us away from the sun, with the curvature of the earth bringing up the horizon to block it from view -- the theoretical perception) often require the intervention of a tutor to ensure that students achieve the actual theoretical perspective required as part of the learning. These types of interventions by an instructor through the materials or feedback are absent in the courses reviewed here. Too, a student becoming aware of the interrelated and independent nature of knowledge and adopting a deep learning epistemological stance is a key aspect of the development of an active and independent learner. This notion will be elaborated later in this discussion.

Lack of Prerequisite Knowledge

The problems the students encountered with a lack of prerequisite knowledge are related to the structured, hierarchical nature of the knowledge presented in the courses and its grounding in the basic sciences and mathematics. This is specialized knowledge, not knowledge a person picks up in the course of their everyday lives. Nonetheless, as it is on-campus, this prerequisite knowledge is assumed. No provision has been made for students
who register without meeting prerequisite standards or for those whose prerequisite knowledge was acquired so long ago as to be mainly forgotten. Those without the prior understandings floundered because the hierarchical structure tends to make learning an all or nothing affair. Some of both withdrawal and persisting students encountered this problem. Persisters struggled through it, picking up what they could, brushing up their background knowledge, or hiring tutors. As pointed out in the discussion of the course materials, some students suggested that brief presentation of relevant prerequisite understandings would have been helpful. Realistically, of course, one cannot bring an uninitiated student to a comfortable familiarity with, say, chemical equations in a couple of paragraphs, but some transition information may be useful. Certainly making available supplemental "primers" in the basic sciences and maths could be helpful.

This epistemological problem is identified by Verduin and Clark (1991), who label one dimension of their model of distance education as structure/specialized competence. This dimension is based on the learner's expertise or lack of it, as related to the structure of the subject matter. A high-structure field, such as these here, requires more specialized knowledge on the part of the learner. If the course structure is high and learner specialized competence low, optimal learning is impossible. Verduin and Clark distinguish this type of competence from general competence or self-directedness, the latter an issue that will be addressed later in the discussion.

### Multivariate Aspects of Student Withdrawal/Persistence

Consideration of the situational, institutional, dispositional and epistemological problems experienced by these students has indicated that withdrawal/persistence is a phenomenon influenced by a number of variables acting together, either independently in an additive manner or synergistically. As well as the variables revealed in the ethnographies, those derived from demographic data and the MBTI personality profiles must be included in any consideration of the multivariate aspects of students' ability to persist. Although the review of the literature and discussion presented earlier indicated that many authors have
found demographic variables which they are able to link significantly to student withdrawal, the quantitative results presented herein are more in agreement with those of Chacon-Duque (1985) and Kember et al. (1991), who found that student background characteristics had little explanatory function in their models of attrition. Coldewey (1986), as well, found that none of the student demographic or personal factors he studied predicted distance education course completion. Nonetheless, the step-wise multiple regression analysis of the demographic and MBTI data for this study group did reveal a predictive relationship between withdrawal/persister status and the students' occupation and MBTI judging and perceiving scores which was highly significant. Eisenberg and Dowsett (1990) also found student occupation to be a significant factor in withdrawal from distance education courses. While it was never the intention in this study to seek a quantitative model that explained students' ability to persist, predictive relationships accounting for 24-39% of the variability in withdrawal or persistence emerged. The predictive power of these relationships, far too incomplete in terms of the variables under consideration to warrant the title "models", compares favorably with some of those reported in the distance education literature.

A number of authors have provided theoretical models of attrition/persistence in order to facilitate conceptualization and guide research. Some (e.g., Gatz, 1985; Kennedy & Powell, 1976; Siqueira de Freitas & Lynch, 1986) caution that the complexity of variables influencing dropout and their interplay defies quantitative analysis and present descriptive models. Others (Bernard & Amundsen, 1989; Kember et al., 1991; Powell et al., 1990; Sung, 1986; Sweet, 1986) have used multiple regression analysis or other statistical techniques to develop predictive models.

Using a descriptive approach, Kennedy and Powell (1976) identify student characteristics and circumstantial categories of variables. They say that, given knowledge of these for a particular student, a counsellor, while unable to predict dropout per se, at least has insight into the problems or conflicts that the student is trying to resolve. Woodley and Parlett (1983) identify a variety of course, study environment, and motivational factors which contribute to dropout. Gatz' (1985) model has five dimensions: (a) significance and relative
advantage of the course to the student’s goal; (b) appropriateness of the independent method; (c) feasibility in time; (d) integration with interests and background; and (e) accommodation of learning style needs. Each dimension had several variables. She says that attrition and completion are influenced by an intricate interplay of these variables. Brindley's (1988) adaptation of the Bean model identifies student background and defining variables, academic variables, environmental variables, and psychological outcomes. Similar background, organizational, environmental and outcome/attitude variables are proposed for a conceptual model by Billings (1988).

Among those with a quantitative orientation, Sung (1986) used regression analysis of course-related (i.e., quality of instructional materials, support services, reasonable instructional goals, etc.) and learning environment-related variables to account for 34.5% of the variance in course persistence. Motivational variables, such as interest, and entry-readiness and belief in the importance of course completion, the only dispositional variables he assessed, are not significantly related.

Siqueira de Freitas and Lynch (1986), using step-wise regression analysis of a wide number of student demographic, institutional and individual factors, found that four variables (the student's satisfaction with the course, frequency of visits to a local study centre, student occupation, and the student's perception of the content of the instructional material) account for 43% of the variance in dropping out or completing the course.

Sweet's (1986) adaptation of the Tinto model identifies various student characteristics, measures of academic and social integration, and attitude orientations (related to goal satisfaction and institutional commitment) that are related to persistence but, with a $R^2=.19$, his model provides only a partial explanation of dropout behavior. However, by separately studying different distance education course types, Bernard and Amundsen (1989), using the same Tinto-derived types of variables and discriminant path analysis, were able to increase dramatically the predictive power of the model ($R^2=.40-.58$). These authors caution, however, that their data is self-reported by the students, some of whom had already made a dropout decision.
David Kember and his associates have progressed from a descriptive model of distance education dropout which includes student characteristics, goal commitment, academic environment and integration, social and work environment and integration variables (Kember, 1989), to a more refined model in which academic environment and integration includes the epistemological variable of different conceptions of knowledge and approaches to studying (Kember & Harper, 1987; Kember & Gow, 1989; Kember, 1990), to a path model (Kember et al., 1991) which includes student background characteristics, intervening variables of emotional encouragement, external attribution, academic accommodation, academic incompatibility, and the persistence characteristics of Grade Point Average and previous proportion of failures. They achieved a high Coefficient of Determination, $R^2 = .80$, but themselves clarify that a large part of the explained variance is the result of including Grade Point Average in the regression, and that the other variables have much lower coefficients. Moreover, while they do not explain its specific contribution to the model, both their external attribution and academic incompatibility variables include a subscale of "considering withdrawing from the course". This variable is a logical component in a path model tracing student progress to a dropout or completion decision but hardly provides a useful explanatory function.

Predisposing characteristics, life changes and institutional factors all interact to determine persistence or success, according to Powell et al. (1990). Focussing on the student characteristics variable, they found, using step-wise discriminant analysis, that a model incorporating student persistence, marital status, need for success, need for support, Cloze Test literacy score, financial stability, concrete study habits, gender, and rating of previous education allows them to predict student pass or withdraw/fail status 68.7% of the time. This is quite impressive in comparison to the predictive ability of other models. Of course, the subjective nature of some of these parameters (they were self-rated by the students) may mean that they really provide more of a measure of the student's self-confidence or rationalizations than the variable ostensibly being measured.

As early as 1976, Kennedy and Powell had cautioned that the interplay of student
characteristics and circumstances may limit the distance educator's ability to define and forecast trends in students' dropout or persistence behavior. They say, "any penetrative study of drop-out must take account of what ultimately defies quantitative analysis, namely the complexity of student's motivation" (p. 73). Student motivation is, however, not the only complex variable involved. Others clearly defying analysis include learning style, aspects of adult pride including self-confidence and need for personal control, and values and attitudes, including epistemological stance. Student withdrawal is clearly related to a set of complex multivariables which defy meaningful measurement and fully predictive, schematic quantitative analysis. The various situational, institutional, dispositional and epistemological variables identified herein are important, as are some aspect of judging/perceiving personality type and occupation. Other variables, including demographic ones, are also likely significant in some circumstances. Bernard and Amundsen (1989) point out that while the elements of a single model may be appropriate to specifying the potential factors related to dropout, individual course considerations may dramatically alter their balance of importance. For instance, the results reported herein suggest that some courses in the social sciences could be expected to pose fewer types of epistemological problems since students are less likely to find the content "too scientific and technical" or to find the specialized prerequisite knowledge demands as onerous. On the other hand, one might expect more students to find them "too theoretical and abstract". Bernard and Amundsen's point is well-taken but considerations beyond those associated with just the courses themselves likely also influence the relative importance of different variables associated with withdrawal/persistence. Both Siqueira de Freitas and Lynch (1986) and Taylor et al. (1986) caution against extrapolating explanations of the withdrawal process across countries or institutions.

Overall, it seems that quantitative models have predictive usefulness only in their own limited context of specific institutional, course and student group parameters. Their main value is in identifying variables which may differentially influence withdrawal/persistence in a broader context. In other words, they contribute to our
descriptive understanding of the dropout phenomena, the most that can be hoped for. For instance, Roberts et al. (1991) used Kember's model as the theoretical underpinning in a qualitative study of student progress/attrition and found it useful as a framework in understanding students' problems.

The research reported herein and the conclusions derived suggest that the search for a comprehensive quantitative model of distance education dropout should be abandoned. Indeed, there seem to be so many variables with tangled permutations and interactions, some context dependent, that dropout can be considered an idiosyncratic phenomenon. Each student is subject to a complex interplay of positive factors encouraging persistence and negative factors promoting withdrawal. The balance tips one way or the other on an individual basis because each person is unique, possessing different values, beliefs, needs, attitudes, motives, self-concept, past experiences and abilities. Nonetheless, there are some trends, some commonalities, some broader concepts revealed in the literature and here in the ethnographic analysis, that provide some useful general understandings of withdrawal or persistence. The ethnographies identified specific problems that students encountered that could pose barriers to their ability to persist through to completion. Examining underlying themes which unite many of these problems helps us understand better why and how these problems act as barriers and how they interact.

The Problem of Conflicting Roles and the Issue of "Control"

The ethnographic analysis revealed a central cultural theme underlying the situational, institutional, dispositional and epistemological problems experienced by both withdrawal and persisting students: the social contradiction between the role of student and the role of adult. This insight, newly derived through ethnography, has cogent explanatory power. As stated earlier, many of the problems students experienced reflect the conflict between the societally humble, dependent role of student, whose needs are considered subordinate, and the societally honorable, autonomous role of mature adult, whose needs for
respect, personal control and fulfilment are considered paramount. Acquiring and maintaining status is a universal cultural theme. These students have acquired the status of adults; their problem is maintaining this status and power while undertaking the role of student. The adult need for respect underlies the problems the students experienced with a lack of peer support, the resentment they felt about bureaucratic procedures imposed by the institution which reflect a lack of consideration for their time and their situation, their unsatisfactory relationships with the tutor, and their need for achievement and fear of failure. Their need for personal control was challenged by bureaucratic and policy problems imposed by the institution, problems in wishing to be independent learners, with their unmet needs for clear and appropriate learning tasks with all suitable resources and interactive opportunities available, poor feedback, and problems with an unsuitable learning environment, a lack of prerequisite knowledge, an epistemological gap between presented course content and course expectations, and problems with time and time management. The need for personal fulfilment overlaps somewhat needs for respect and personal control but is also reflected in the problems the students experienced with unclear goals, stress, a lack of personal relevance in the content, and epistemological incongruence. It is no wonder many of these adult students found their experience as distance education students fraught with a great deal of anxiety. Those with the most fragile self-concept were the most sensitive to affronts to their adult dignity and had the greatest difficulty in handling it.

Besides problems associated with the distance mode per se, a number of the students' problems in terms of the psychological aspects of the conflict between their role as students and their role as mature adults seem to have been exacerbated by the distance mode, that is, by the fact that they were not necessarily perceived by the institution, course authors and tutors as mature adults. In the absence of face-to-face interaction, they seem to have been generally perceived, in spite of knowledge about the nature of the students who enroll in

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4 The term "personal control" is used here quite deliberately to try to avoid some of the semantic problems associated with other author's use of the word "control" to convey somewhat different meanings. As used here, personal control does not mean students being in control of the entire educational transaction but rather being in control of their personal learning situation.
these courses, as typical on-campus students. Without arguing the appropriateness of how 18-22 year old students may be treated, one can speculate that a visibly mature, competent-looking adult might be treated with more respect and consideration in a classroom situation.

Understanding and meeting adult needs is a major theme in the adult education literature. Particularly salient here are the points that adult learners have a wider range of individual differences more sharply etched (Schlossberg et al., 1989), an accumulation of experience which can be a base for new learning or a source of obstacles (Smith, 1982), anxiety and ambivalence as they cope with change and with existential issues such as competence, autonomy, identity, relationships, goals and integrity (Smith, 1982; Schlossberg et al., 1989), and their particular need to matter and be appreciated (Schlossberg et al., 1989). Meeting these students' needs for respect is fundamental. Sensitivity to these needs, consideration, empathy and unconditional positive regard can overcome bureaucratic or tutor-related problems that leave the student feeling offended, hurt or just plain angry. Similarly, many needs for personal control can be met through better instructional design and feedback. Personal fulfilment can be enhanced through encouragement and better links to the student's experience.

However, not all the felt needs of adults can or should be met. Even adults may not be the best judges of their own interests. The learning context here is formal instruction in a tertiary academic program. It is important to recall that Smith (1982) points out that the amount of autonomy exercised by the learner is congruent with that of the educational mode or method used. Brookfield (1985b) says that no adult can be fully self-directed while working within an accredited educational institution. The comments of Brauner (1989), Brookfield (1986), Garrison (1988) and Sammons (1988) regarding a proper view of the educational transaction, that is, the importance of appropriate knowledge, ensuring academic rigor, the provision of normative advice, and the role of the teacher in mediating student perceptions, negotiating meaning, and assuring the meeting of educational goals are particularly material here. The learner should not exert control over the knowledge requirement in this tertiary context. Nor do students expect to. In a formal education
situation, they expect the locus of control over knowledge expectations to reside with the provider. Their control should properly be exerted over their learning, problematic enough in itself.

Garrison's (1989a) concept of control is a triadic relationship consisting of independence, proficiency and support, existing within the larger relationship among teacher, learner and content. To him, independence means students are free to select learning goals, learning activities and forms of evaluation. Proficiency is the ability to learn independently, to have the intellectual, attitudinal and dispositional abilities to carry out the learning activity. Support is concerned with the range of human and nonhuman resources that guide and facilitate the educational transaction. The sharing of control is negotiated through dialogue, says Garrison (1989a). While proficiency and support are certainly key aspects of the educational transaction open to negotiation of control through dialogue, Garrison's independence dimension offers little relevance in the context of tertiary education. Nor should it. Indeed, there is tension within Garrison's own model for he is simultaneously an advocate of the necessary role of the teacher in the educational transaction. In spite of his attempts to rationalize, the essential ambiguity of the term "independent" in a distance education context remains. Certainly, students in a formal tertiary program of studies leading to a recognized qualification must relinquish most freedom to select learning goals, learning activities and forms of evaluation. They can assert their independence only by choosing whether or not to participate in a relatively pre-determined learning task.

So, while student control of the content, processes and goals of learning is inappropriate here, the adult need to be, or at least need to be perceived to be, what is variously called self-directed, autonomous, independent, or exerting learner control, in the more limited concept of personal control, is central to the problem of conflicting roles, and is a major concern in adult and distance education. The clearest example in this study of why personal control is of concern is provided by withdrawal and persisting students who wanted to do the course independently, without seeking the tutor's help, and found this problematic. This was particularly so if they also needed interactivity to facilitate their learning. As Smith
Smith (1982) says that adults have deep-seated needs to move towards autonomy and self-direction and to be so perceived by self and others, but that as we strive for independence, we retain throughout our lives our dependency needs -- for help, for approval and support, for leadership from others in areas that we lack experience or expertise, and for interdependency in terms of sharing efforts and responsibility. He points out that these can be as functional as independence and autonomy. They are the realities of adulthood, not the pretensions.

It has become clear, therefore, for more than one reason, that Knowles' (1970) original concept of andragogy, with adult learners self-directed, is not appropriate here. More relevant is his (Knowles, 1984) later view that the adult educator would draw on either a pedagogical or andragogical model depending on the situation, and the view that self-directed learning should be a goal rather than an assumption in adult education (Boud, 1988a; Brookfield, 1986; Cheren 1983; Mezirow, 1981). Beder (1985) clearly states that a pedagogical approach to teaching is required for formal/segmented knowledge, such as that studied here, with andragogy appropriate for problem-oriented knowledge. Pratt (1988) says that the adult educator ought to acknowledge states of dependency as potentially legitimate because dependency is a situational attribute, the product of a particular individual-learning situation interaction and is changeable. It is pertinent to observe, too, that in making choices as to whether to be dependent or independent learners based on how they perceive their needs, students are asserting a form of autonomy.

Recall that Leslie (1987) says that learners who enrol in formal courses do not want flexibility and learner choice in materials, they want unambiguous directions, with clear objectives and direct routes to get there. The adult is used to controlling his environment -- limiting the number and type of unexpected things that can happen to him -- and will feel less vulnerable in predictable situations. Daniel and Marquis (1983) say that if the student
can accept their learning role as part of their adult life, accept it and internalize it, then they will do better in their studies. These thoughts suggest some change of identity on the part of the adult learner, a reciprocal process of behavior modification and changes in personal context. It can involve pain and anxiety, even a temporary surrender of security, as they reorient themselves, both in seeing themselves in new ways and as they undergo the process of unlearning old ideas, ways of thinking and old skills, and develop both cognitively and affectively. It may even involve transformations such as Freire's "conscientization" and Mezirow's "perspective transformation". Related here, too, are broader aspects of stress, acceptance of suffering in their personal lives, and the student's locus of control beliefs and emotional responses that are linked to coping mechanisms. These were discussed in more detail earlier in the context of dispositional "stress of multiple roles" problems.

Heinze (1983) says that students adapt to the change in identity through:

* Processes of nihilism ("Everything else is not as important")
* Processes of segregation ("Others, who are not studying, are no longer so important")
* Processes of influence (The contact persons are being trained to adjust to the student's behavior)
* Processes of advancement of life's perspective ("I'm now studying under difficulties, but later all will be much better"). (p. 61)

These concepts may explain the approaches, the coping and striving mechanisms that persisters are able to employ when faced with the same sorts of problems as those encountered by the withdrawals.

Although Brookfield (1986) identifies one type of self-directed learning as involving specifying goals, identifying resources, implementing strategies and evaluating progress, he also says,

self-directed learning is concerned much more with an internal change of consciousness than with the external management of instructional events. This consciousness involves an appreciation of the contextuality of knowledge and an awareness of the culturally constructed form of value frameworks, belief systems, and moral codes that influence behavior and the creation of social structures. The most complete form of self-directed learning occurs when process and reflection are married in the adult's pursuit of meaning. (Brookfield, 1985a, p. 15)

What Brookfield is obviously talking about is the type of deep-learning that was discussed earlier, in which students become aware of the interrelated and interdependent nature of
knowledge, its relativistic and contextual nature, and adopt a deep-learning epistemological stance. This epistemological autonomy is different from situational autonomy, Brookfield says. Both are key in the development of active and independent learners. Candy (1988) ties the notion of autonomy more clearly to content when he says that autonomy is more than a student being able to find resources themselves, manage their time and set their own goals, it implies a degree of subject matter competence, having enough understanding to learn in a critical manner, distinguishing plausible from implausible knowledge claims or convincing from unconvincing evidence. Autonomy thus has both situational and epistemological components. Haughey (1991) uses the metaphor of travel to capture the epistemological autonomy under discussion here. She likens it to a learner's individual journey, albeit with travelling companions and guided by the instructor/tutor, along a curriculum route. This metaphor is in contrast to the metaphor of production, embodied in the industrial model of distance education, or the metaphor of growth, with the learner nurtured in the curriculum greenhouse by the careful attention of the instructor/tutor. The travelling guide's role is more challenging than that of the gardener because "the guide has to help place the traveller within the landscape, and yet provide the context for a transformation of the way the traveller understands what he or she thinks" (Haughey, 1991, p. 20).

It seems clear, as far as the epistemological problems are concerned -- closely interrelated to the educational transaction as a whole -- that this is another aspect in which not all adult felt needs can be met. Students should not be allowed to remain in their own comfortable ways of thinking but should be encouraged to explore alternatives. This is a fundamental premise of higher education. The adults' concern with the practical application of new knowledge, identified by Cross (1981), Knowles (1970), Schlossberg et al. (1989) and others, and found in this study, was previously discussed in terms of its inappropriateness in this tertiary educational context. More consequential overall is their epistemological stance, where it is important that they develop more flexibility and become able to cope with scientific and technical empiricism, as well as with holistic abstraction, and come to appreciate the interrelatedness of knowledge and its essentially reflexive and
The Issue of Personal Control

Because the issue of control is a complex one, confounded by semantic problems related to differing use of this word and other terms such as independent, some aspects of what has been identified in this study as personal control warrant further clarification.

In a distance education context, it is evident that student self-directedness should not mean self-reliant in the sense of excluding all external interaction or resources, nor should autonomy necessarily mean learner control over the content and methods of learning but rather, after the norms and limits of the learning activity are known, these terms should imply the student exhibiting an understanding and awareness of the range of alternate possibilities and being critically reflective. Both Boud (1988b) and Chickering (Schlossberg et al., 1989) say autonomy is a recognition and acceptance of interdependence. Recall that the interindividual self is the final stage in Kegan's (1982) evolution of the self. Key is the notion that students are learning individually not independently.

The ethnographies in this research suggest that, whether adult learners are independent, dependent or interdependent, they feel the need to be in personal control of their situation -- to be in control of their active involvement in learning, to be pro-active, empowered adults rather than reactive individuals, buffeted by uncontrollable circumstances. Being able to control a stressor makes it easier to cope.

This concept of a need for personal control provides considerable explanatory power in understanding the problems that students experience. As stated earlier, having personal control means having all the tools they need in terms of appropriate resources and support easily available to them and, above all, being treated as adults. They want a solid body of
knowledge with links to prior understandings, practical experience and application, unambiguous learning expectations, guides for studying, easy access to resources to fill in prerequisite knowledge, opportunities for interactivity, good feedback and, if problems arise, empathetic counsel. Burge's (1989) assertion that what matters in a learner-centred approach is not learner self-directedness but learner self-responsibility seem valid. Being in personal control of their learning situation means the learners are in a position to assume responsibility, to be self-efficacious. These natural resource science students expressed that desire. Understanding the apparent contradiction between adults valuing independence and autonomy and their concurrent needs for support and interaction, and being able to respond with appropriate instructional and support provisions is what Daniel and Marquis (1983) call "getting the mixture right."

Answers to the Research Questions

"What, if any, are the student situational and dispositional variables, the institutional variables and epistemological variables, and relationships between and among these variables, which may impede students' ability to persist through to completion in distance education in the natural resource sciences? Do these variables act differentially, affecting equality of opportunity?"

In answer to these research questions, student understandings that were elucidated in the ethnographies identified numerous situational, institutional, dispositional and epistemological variables which posed problems for students and impacted their ability to persist through to course completion. However, withdrawal (non-starting, withdrawal and incompleting) and persisting (failure and completing) students shared these understandings. These variables, many of which are complex and have ill-defined permutations, acted additively and synergistically in such a multitude of combinations that decisions to withdraw or persist appear idiosyncratic in nature. None of the identified problems seemed to act singly in posing an insurmountable barrier to persistence. It is, however, possible that withdrawals, while sharing problems with persisters, have a cumulatively greater number of
obstacles to overcome.

The demographic data indicated that these distance education courses have failed to increase access; those from upper middle class and higher backgrounds are over-represented. The students had, on average, the advantaged socioeconomic backgrounds typical of university students in comparison to national norms. Withdrawals and persisters did not differ in this regard. Such barriers to entry as cost, socialization at home and work, and educational background -- the same barriers facing the regular student -- can be inferred. However, while the ethnography revealed that withdrawal is an idiosyncratic process, it also indicated that a number of the problems students encountered are mainly associated with disadvantaged social, economic and psychological backgrounds. These include not knowing how to "play the game", a lack of prerequisite knowledge, a tendency to learn by rote, a fragile ego, a lack of self-confidence, and a need for social reinforcement. Previous educational disadvantage and the closely-related student's dispositional discomfort in subsuming aspects of their roles as adults to their role of student are key overall aspects that impact ability to persist. In this regard, second chance learners, whether they were previously denied opportunities or whether they chose not to take advantage of them earlier, are particularly disadvantaged in comparison to those more experienced learners who are seeking a professional qualification or the more traditional student who is enrolled in distance education because of spatial, time or other constraints. Certainly the courses, in both content and process, serve the educationally skilled; the educationally disadvantaged are selected against. These differential problems reflect inequality of opportunity in distance education in the natural resource sciences.

Addressing the Issues

Reflecting the aims of this research, two particular foci emerge when issues are considered: the first is related to the lowering of barriers to participation in distance education; the second to improving the effectiveness of education and communication initiatives concerning natural resource management and the environment.
Enhancing Persistence in Distance Education

The starting point in addressing the first of these issues is finding ways to provide a learning environment for adult students that is responsive to their individual needs. This can be accomplished by creating a widespread sensitivity on the part of distance educators to the issues involved, specifically an understanding of the complex multivariables that interact to affect withdrawal/persistence. Fundamental is an heightened awareness of the problem of the conflicting roles of student and adult. These include: having a poor learning environment; the stress, constraints of time, and time management problems inherent in adult students having multiple roles; fragile motivation; individual learning style; course epistemology; life stage; and adult needs for achievement, personal relevance, respect and personal control. All of these, as well as problems with institutional procedures and policies, and the learning resources and tutor that the institution can directly affect, are areas of concern in that they pose problems for students that may lead to withdrawal.

Instructors or tutors should not give up their traditional powers of determining appropriate knowledge, ensuring academic rigor, giving normative advice, negotiating meaning and evaluating learning. Rather they must accomplish these tasks within a dialogic construct of empathetic response to the views, wishes, frames of reference and varying states of dependency of their individual adult learners. An understanding of the experiences of these students, specifically the experiences of adults with particular life circumstances and dispositions in the role of students, is required. This is congruent with the notion of the development of student autonomy or self-sufficiency or self-reliance espoused by others (e.g., Boud, 1988b; Burge, 1988; Daniel & Marquis, 1983; Paul, 1990; Pratt, 1988; Wright, 1987). Moreover, this dialogic construct needs to be shaped by the nature of the learning content itself, that is, the knowledge domain and its demands, what Verduin and Clark (1991) call the structure/specialized competence dimension, and what have been identified in this research as the epistemological variables. Indeed, this epistemological dimension may be considered an overarching construct for it is the interaction of the student with the content that is key in the learning process. All other variables, such as the tutor, the learning
environment and the learning materials themselves, are intervening, mediating ones.

This type of dialogic construct, molded by a specific epistemological environment, would allow adults to internalize their role of student and meet their needs for respect, personal control, and fulfilment. Boud (1988b), Brookfield (1986), Burge (1988), Daniel and Marquis (1983), Elton (1988), Gibbs (1981), Hayes (1990), Haughey (1991), Kember (1990), Knox (1986), Paul (1990) and others provide suggestions as to how this might be accomplished. These include a set of exercises, local tutorials, a learning skills program, integrating study notes in the content, and better facilitation on the part of educators. Fundamental is more, and better quality, dialogue; dialogue of the type defined by Evans and Nation (1989b): "dialogue involves the idea that humans in communication are engaged actively in the making and exchange of meanings, it is not merely about the transmission of messages" (p. 37).

The diversity of learners, the wide variation in learning contexts, and the problems of financial contraints and student accessibility preclude simple or universal solutions, although more facilitative instructional design of learning resources, with the assumption of immediate and individualized communication and sustained personal support, would seem intrinsic to any model which minimizes student problems in order to facilitate persistence. The focus must be on creating the uniquely optimal conditions for each and every learner to persevere while acknowledging that we may not understand all the factors at work. The climate of learning must be one of support and safety.

Some specific suggestions for natural resource sciences distance education at the University of British Columbia include decreasing bureaucracy and increasing sensitivity to the needs of adult students. This means increasing awareness on the part of all those involved in the development and delivery of these course of the problems that students encounter and the issues involved in withdrawal. For instance, perceiving many of the students' difficulties with the subject matter content as epistemological ones, particularly those that are gaps in epistemological stance, would allow tutors to better respond to the student who says, "I don't understand..." Using a humanist, critical approach, UBC distance
educators should improve instructional design by:

* preventing overwriting
* clarifying the relative importance of various concepts
* providing prerequisite knowledge transitions
* providing transitions or explanations or examples that help students span epistemological barriers
* including examples of application
* assuring readability
* increasing the number of interactive opportunities.

As well, more proactive, empathetic tutorial support must be encouraged. This support should not be forced upon the student who wants to be more independent, but should clearly be available. The key is being responsive to the individual learner.

**Improving Natural Resource Management Educational Initiatives**

The epistemological barriers to persistence revealed in this study are important in understanding and addressing the second overall issue, that is, improving the effectiveness of education and communication initiatives concerning resource management and the environment. Higher education in the natural resource sciences, whether delivered on-campus or by distance education, has a critical role to play in helping us achieve our espoused goal of sustainable development. It has the opportunity to not only educate and train professionals but also to help ensure an informed citizenry that can democratically effect change. However, the research reported herein has exposed some of the epistemological constraints in higher education in the natural resource sciences, explicitly in distance delivery and implicitly on-campus, that may be limiting its effectiveness in this regard.

By definition, these epistemological barriers are associated with the very nature of the knowledge itself in these natural resource science courses. This is so because these distance education courses mirror the subject matter content and presentation style of the on-campus face-to-face versions. The barriers have been exacerbated by the distance delivery mode,
which has constrained the interactivity helpful in enabling students to span epistemological
gaps, but the epistemological problems the students experienced reflect the subject matter
content per se as well as its presentation; these are what may impede the broader and more
effective dissemination of natural resource science knowledge. Both the particular
disciplinary content itself, the cognitive aspect, and the disciplinary culture, the social aspect,
would seem to present barriers to effective communication: the disciplinary knowledge
because of its highly structured, empirical and technical nature; the disciplinary culture
because of its tradition of dense formal communication, full of specialized jargon.

The cultural aspects of the epistemological barriers revealed in this study suggest
why, in the broad context of general communication about renewable natural resources and
the environment, natural resource scientists have difficulty effectively communicating their
expertise. Whether they are academics or have been molded by the natural resource sciences
academic culture during their education, they tend to present their knowledge in the manner
to which they are accustomed: as a number of highly structured, empirical and technical
concepts which they convey in dense, formal language full of jargon. People find natural
resource science information unintelligible because it is difficult to understand without both
foundation and complementary knowledge, and because it is communicated in tight code.
For instance, in spite of the claim that teaching environmental education is not contingent
upon a science background, teachers without this natural science background consider their
"deficiency" a very important barrier in their implementation of environmental education
programs (Ham & Sewing, 1987-88). This likely reflects the literary inaccessibility of this
material as much as its cognitive challenges.

To overcome these types of barriers scientists must assume a lack of foundation
understandings, simplify their information, link it to other knowledge that puts it in
perspective, contextualize and personalize it in an informal way, and help people understand
by making some of the transitions from scientific "facts" to the "multiple realities" of
application and implication. In other words, remove it from its absolutist pedestal and make
it accessible. Considering the centuries of established disciplinary culture that must be
overcome, this will be a tremendous challenge.

The problems go beyond even this, however. Crowfoot (1990) says,

The prevailing goals, structures and methods of higher education overwhelmingly support "business as usual" while our knowledge of the deepening environmental crisis calls for value and policy changes, new methods, new information and syntheses.

The challenge is to achieve major institutional changes that result in the redirection of resources in higher education towards efforts to reduce environmental problems and to achieve a new and sustainable relationship between human and natural systems. (p. 9)

Arguing that agriculture and related disciplines such as forestry and fisheries can no longer be conducted within conventional curricula, Schute (1989) says that a reorientation of disciplines and courses is required to accommodate a more holistic conception involving more integration, more interdisciplinarity, more practical work, more non-science subject matter, more problem solving, and less memorization.

As providers of knowledge which is applied by their professional graduates and others in solving society's problems, universities have an obligation to adapt to the needs of society. They must equip their graduates with the broadest possible and most current conceptual frameworks to employ in their professional roles as guides and decision-makers, and as citizens in a democratic society. A university's role is not to determine the relative merit of competing values but to focus attention on the issues; not to solve environmental problems per se or to make decisions determining courses of action but rather to best prepare its students and the community it serves to do these things. Assuming that there is an expressed demand for environment-related education, above and beyond an expressed concern about environment-related issues, UBC should be attempting to serve this demand. However, UBC and a number of other universities appear to be assuming that these needs can be served with existing curricula and structures. There seems to be a presumption that multiple goals, that is, one for holistic environment or sustainable development knowledge, and the second for specialized disciplinary knowledge, can be met within the established curriculum of, for example, specific, reductionist knowledge in the natural resource sciences.

The epistemological barriers revealed in this research show that this is not working and will not work. One of the marked difficulties a number of the students experienced was
spanning the cognitive gap between presented course content and course expectations. This problem provides, on a micro scale, a glimpse of the more profound problem with the epistemology of these courses. Recall that all are very discipline-specific; each follows its own narrow specialization and is somewhat reductionist in nature. The courses provide very few links to concepts from other natural resource science areas or from the relevant social sciences and humanities. Specifically, they fail to provide integrated content drawn from differing disciplinary sectors. This interdisciplinary content is necessary to provide students with the holistic perspective required for insightful understandings of environmental issues and of the problematic nature of the goal of sustainable development. Instead of a window on the world, specific disciplinary content is provided. There is an apparent expectation that students will acquire broader understandings about natural resource management and the environment subliminally or on their own. The courses seem successful in beginning to prepare natural resource sciences specialists but fail to start students on a path to holistic knowledge relevant in addressing our espoused goal of effecting sustainable development.

Earlier it was argued that students should develop a flexible epistemological stance, be able to undertake deep learning tasks, and come to appreciate the interrelatedness of knowledge and its essentially reflexive and relativistic nature. They should, indeed, be able to make inferential leaps across epistemological gaps. The concern here, however, is a chasm not a gap. There is an immense difference in scale. Early in their academic life students need to see the interrelatedness of knowledge, not just in the general sense of linking knowledge within a discipline but also in the sense of perceiving that study in some areas of concern, such as natural resource management or environmental education, must be interdisciplinary. Knowledge from widely differing areas must be related in order to gain relevant understandings and solve problems. Note that in this need for interdisciplinarity, these natural resource sciences differ from the traditional natural sciences. This is so because a "resource" is such only in terms of its value to people, that is, because of how it is perceived and used by humans. Two foci, nature and humanity, are fundamental; the former reflected in such natural resource science disciplinary specialisms as ecology, forestry,
oceanography, hydrology, soil science, plant science, etc., and the latter in the social, physiological, psychological and economic facets reflected in such areas as agricultural economics, town planning, philosophy and sociology. Similarly the phrase "sustainable development" captures the inextricable (but contradictory) relationship between the ecological/environmental aspect embodied in "sustainable" and socioeconomic aspect captured in "development". The ecocentric and anthropocentric perspectives, if you will.

However, when relevant subject matter is presented in isolation, it is entirely unreasonable to expect undergraduate students to derive singular understandings separately from both related and disparate subject matter content (difficult in itself as we have seen) and then, on their own, go beyond this to reconstruct these often abstract understandings into holistic knowledge about natural resource management or the environment in general. (Indeed, it is doubtful if students in a natural resource science disciplinary specialty would take many courses in the relevant social sciences and humanities.) Presenting sustainable development or environment-related content to students on a singular basis is similar to presenting them with a limited number of clues from a huge mystery story in which they must not only recognize and understand the clues but then must weave them together, discarding the "red herrings", to solve an intricate puzzle with several possible outcomes. As Labeyrie (1973) points out, students are unlikely to make the links when environment-related subject matter is taught in a juxtaposed but non-integrated disciplinary manner. A few can, of course, but the task is exceptionally challenging. It is an epistemological chasm not a gap. Why are we making it so hard? It almost goes without saying, of course, that if it is difficult for regular students to make these leaps in understanding, it is even more challenging for the interested, concerned adult enrolled in a single course, particularly if they are learning at a distance, or for a member of the general public exposed to some specific information, to be able to make these leaps in comprehension.

Some will argue that it is appropriate to present these courses in this way, that students should first acquire deep understandings in a single discipline before moving on to other disciplines or to interdisciplinary concerns. Indeed, this appears to be the position
taken at UBC where Resource Management Science is an Interdisciplinary specialization available at the graduate level. At the undergraduate level, except for the odd effort such as a couple of the Faculty of Forestry's Natural Resources Conservation courses which attempt to be broader than the remaining disciplinary offerings, students must focus in a disciplinary specialty. However, at a time when it is vital to provide as many people as possible with understandings useful in responsibly addressing sustainable development and environmental concerns, omitting interdisciplinary inputs in natural resource sciences and limiting a resource management or environmental focus to the graduate level greatly restricts access to this knowledge. Most students do not continue beyond the first degree and yet proceed in their subsequent careers to positions of influence. Graduates have specialized knowledge in a specific disciplinary area, and some general understandings, but hardly a holistic view of these essential matters.

In view of the disparity between current academic program offerings and society's needs for new expertise and leadership in the environmental area, the University of British Columbia and other tertiary institutions need to make changes, both in content and in delivery, in order to meet these needs and more effectively fill their societal role. However, just what changes need to be made and how to make them is unclear.

Given that we cannot perceive holistically without some discipline-specific concepts underpinning our understandings, what is the appropriate balance between disciplinary knowledge and interdisciplinary knowledge? How do we rationalize the goals of those with different perspectives; specifically, how do we balance a university's concern with academic rigor and in-depth disciplinary knowledge with the average person's interest in knowledge that provides them with broad understandings they can relate to their own experience? What is the appropriate balance, if there is one? Who decides? What is a suitable proportion of inputs from the natural resource sciences versus the social sciences and humanities in interdisciplinary courses and programs? Who decides? These are some of the important questions that need to be answered before a more holistic curriculum can be developed. Unfortunately, these questions are rarely being asked, let alone answered in any meaningful
Nonetheless, it seems that, within the guidelines established by answers to these questions, certain types of changes, some of them fairly substantial, would likely be required. New courses and programs must be developed in such a way as to cut across disciplinary jurisdictions, meld information from these traditional sectors into an interdisciplinary whole, and synthesize more comprehensive and profound knowledge about natural resources and the environment. Because of the complex interrelatedness and interdependence of resource management and environmental issues, it is not possible to just insert relevant understandings into monodisciplinary teaching. The subject matter material must be fully integrated, the courses recast. Instructors from different disciplinary areas would need to work as a team to reconceptualize completely the content, creating the courses and programs from scratch. The challenge would be maintaining sufficient in-depth focus to ensure rigor and specific expertise while including enough breadth to provide holistic understandings. This melding and integration will likely need to be preceded by other changes as well. For instance, the problem of discipline-specific jargon must be overcome so that there is a common, functional and easily accessible vocabulary. On an institutional basis, changes in a discipline-oriented infrastructure would be needed to provide a suitable and credible home for an interdisciplinary program.

Such a program could appropriately be underpinned by systems theory and by decision theory, with a strong problems and issues orientation. Common themes such as energy or systems analysis can link the biological, chemical, physical and social sciences. Strong input from the social sciences and humanities would reflect the fact that it is people's relationship with natural resources that is central to the problems we face. For instance, a Deakin University distance education course on environmental education emphasizes teaching using integrated content, an issues-based approach, a concern with processes, practical involvement, and goals that include attitudes, values, awareness and problem-solving and decision-making skills (Robottom, 1982).

The program would need to be innovative not only in its coherence and breadth but
also in its presentation. This would vary depending on the disciplinary focus, the differing issues being addressed, and other factors, including contextual ones, but, in general, there would likely need to be considerable emphasis on experiential and participatory teaching approaches. These are appropriate to the integrated, reflexive nature of the knowledge involved, and the fact that both cognitive and affective learning are required. Team teaching provides a means to provide specific expertise while facilitating interdisciplinarity. Having practicing professionals as guest speakers and increasing the number of field experiences are other means of linking theory with the practice of the real world. Less didacticism and more dialogue, discussion and interaction are essential; these not only enhance students' understandings of multiple viewpoints but also develop their communication skills, necessary for them to be effective in their future societal roles.

Effectively adapting these interdisciplinary courses to distance delivery would be a further creative challenge.
Chapter 7

Summary

This research was undertaken to clarify the nature of barriers to persistence in natural resource sciences distance education in order that participation through to completion may be improved. Its aim was to provide insights and theoretical concepts useful in clarifying distance education access as a whole, while also providing understandings that may help improve education and communication initiatives concerning resource management and the environment. These aims have been met.

Ethnography was used to illuminate the declarative and tacit understandings of students who were either withdrawals (nonstarters, withdrawals and incompleters) or persisters (failures and completers) in five academic natural resource sciences courses at the tertiary level. Ethnographic interpretations of student understandings were complemented by demographic and other data collected through questionnaires, student "learning style" data as determined by the Myers-Briggs Type Indicator psychological survey instrument, information provided by course tutors, and data concerning variables related to the course content and instructional design. An inductive, grounded theory approach was used for the ethnographies, with the methodologies of ethnoscience and hermeneutics used for data analysis and interpretation.

Almost all withdrawal students initially cited some sort of time constraint as the explanation for their dropout but ethnography revealed that there were higher order reasons; the circumstances that led to withdrawal were much more complex. These withdrawal students experienced a great number of problems that posed barriers to their persisting through to completion. The problems are situational, institutional, dispositional or epistemological in nature. The ethnography of persisting students showed that they shared these problems, many of which were interactive in nature. Some situational and institutional problems were dependent on the student's disposition.
Situational problems include factors associated with the student's environment, such as a lack of support from family and peers, and a poor study situation. As well, students experience time constraints resulting from changes in their circumstances, misjudgment of the time required, and their busy, multiple-role lives.

Institutional barriers comprise cost, problems with bureaucratic procedures, inappropriate course pacing, problems involving the tutor such as poor feedback and unsatisfactory interpersonal relations, and problems that involve the instructional design. The latter includes the need for additional learning resources, problems with language and style, overwriting, and unclear course expectations.

Dispositional problems reflect the student's psychological and sociological make-up. These types of problems include lack of a clear goal, difficulties with time management and procrastination, learning style problems such as the need for face-to-face oral and visual learning or not knowing how to "play the game", fear of poor achievement, and factors such as low self-confidence which may reflect previous experience.

The newly elucidated cluster of potential barriers termed epistemological problems result from a lack of congruency between the student's cognitive and affective perceptions of knowledge, and the nature of the knowledge presented in the content. The courses all present relatively hard, applied knowledge with a generally positivistic viewpoint and a quantitative nature. A great number of concepts are presented in a highly structured hierarchy, in a language that is specialized, technical and full of unique jargon, and in a style that is dense, formal and objective. To varying degrees, the courses also demand high levels of integration and inference, with complex conceptualization and abstraction of meaning. Some students found the courses' epistemologies problematic: a number found the courses too scientific and technical, a few found them too abstract and conceptual. In other cases, where the courses' content was presented in a very scientific, empirical manner but the assignments demanded considerable abstraction of meaning, some students were unable to make this transition in cognitive processes on their own, often because they didn't realize that a shift was required. Other epistemological problems the students encountered included
content that was not personally relevant or practical, and the courses' assumptions about prerequisite knowledge.

Analyses of the demographic and personality profile data yielded little explanatory information although predictive relationships involving the MBTI judging-perceiving personality dimension, student occupation and some other less significant variables did emerge to account for 24-39% of the variability in withdrawal/persistence. However, variables such as motivation, epistemological stance and self-confidence defy meaningful quantitative analysis. In view of the results found here and those reported by others, it is clear that student withdrawal/persistence is related to a set of complex multivariables, acting additively or interactively, which resist credible measurement and fully predictive quantitative analysis, and which vary in importance depending on the specific context. Indeed, there seem to be so many variables with tangled permutations and interactions, some context dependent, that, although important common barriers, such as procrastination, time constraints, epistemological problems with the content, fear of poor achievement, and learning style, can be identified, withdrawal/persistence itself seems to be an idiosyncratic phenomenon.

The demographic data indicated that those from socioeconomically advantaged backgrounds are overrepresented in the study group. In comparison to national norms, the students had, on average, the advantaged socioeconomic backgrounds typical of university students. Distance delivery of these courses has, therefore, not lowered socioeconomic barriers to access. Withdrawals and persisters did not differ in this regard. Nonetheless, the ethnographies suggest that a number of variables act differentially, affecting equality of opportunity. This is so because a number of the problems, although experienced by both withdrawals and persisters, exist mainly for those who have been previously disadvantaged. Those challenges that are relatively particular to second chance learners who are disadvantaged by their social, economic or psychological backgrounds, include not knowing how to "play the game", a lack of prerequisite knowledge, a tendency to learn by rote, fragile egos, a lack of academic self-confidence, and a need for social reinforcement in learning.
The courses, in content and process, serve the educationally skilled, others are disadvantaged. It may be that, although they experience the same types of problems as persisters, withdrawals have a greater cumulative burden of problems to overcome.

The situational, institutional, dispositional and epistemological problems identified by the withdrawal and persisting students share some underlying themes which help elucidate why and how these problems act as barriers. A central cultural theme, one with cogent explanatory power, is the social contradiction between the humble, dependent role of student and the honorable, autonomous role of mature adult. The conflict between these roles manifests itself in the emotional nature of the students' distance education experience. For most, it was fraught with anxiety. Many of the problems the students encountered reflect their unmet adult needs for respect, personal control and fulfilment. As used here, personal control does not mean total self-reliance, nor does it imply being in control of the entire educational transaction, which is inappropriate in this tertiary context. Rather personal control connotes students being in control of their own personal learning situation, that is, being able to assume responsibility for their learning in an efficacious manner. This means having all the resources and support they need readily available to them and being treated as adults.

More facilitative learning resources, with immediate and individualized communication and support, are required to meet these student needs. Tutors should not give up the traditional role of teacher in determining appropriate knowledge, negotiating meaning and giving normative advice, but they must accomplish these tasks within a dialogic construct of empathetic response to the views, wishes, sensitivities and dependency states of their individual adult learners. This type of dialogic construct, molded by the specific epistemological environment, that is, the nature of the content knowledge itself, would provide students with the help they require to increase their epistemological flexibility while meeting their needs for respect, personal control and fulfilment. It would enable them to internalize their roles as students and minimize some of the problems that prevent persistence.
The epistemological barriers to student persistence revealed in this study are relevant in the context of the effectiveness of natural resource sciences educational and communication initiatives. Understanding that the highly structured technical nature of the disciplinary content and the dense, formal jargon of the disciplinary discourse in themselves impede effective communication makes it clear that to be more effective in sharing their knowledge with society, natural resource scientists must simplify their information, assume no foundation understandings, contextualize the content in an informal subjective way, and help people understand the kinds of application and implication inferences one might make from the scientific information. Moreover, if tertiary institutions wish to provide environment or sustainable development-related programs then they cannot attempt to accomplish this within existing curricula of discipline-specific courses in the natural resource sciences. The epistemological gap revealed in this study, in which some students had difficulty making an inferential leap from scientific, empirical understandings to more holistic and abstract conceptualization within a specific disciplinary area, suggests that they would have even greater difficulty reconstructing discipline-specific knowledge in the natural resource sciences into holistic understandings about the environment or sustainable development in general. These broader understandings require interdisciplinary knowledge derived from integrated content melded from the natural resources sciences, the social sciences and the humanities. New curricula that are innovative in both content and presentation are needed if natural resource science students are to be as effective as possible in contributing to sustainable development and environmental solutions.
References


Studies in Education.


Evans, T. (1989). Taking place: The social reconstruction of place, time and space, and the (re)making of distances in distance education. Distance Education, 10(2), 170-183.


Granby, MA: Bergin & Garvey.


Inglis, P. (1988). Independent learning: What the students say. In D. Sewart & J.S. Daniel (Eds.), *Developing Distance Education* (pp. 249-254). Oslo: International Council for Distance Education.


Consulting Psychologists Press.


Kember, D. (1989). An illustration, with case studies, of a linear-process model of drop-out from distance education. Distance Education, 10(2), 197-211.


Organization for Economic Co-operation and Development.


Paul, R. (1988). If student services are so important why are we cutting them back? In D. Sewart & J.S. Daniel (Eds.), Developing distance education (pp. 50-56). Oslo: International Council for Distance Education.


Croom Helm.


Tait, A. (1990, May). *Individualisation and individualism: Contradictory currents in distance education*. Paper presented at the meeting of the Canadian Association for Distance Education, Quebec City, Quebec.


Taylor, J.C. et al. (1986). Student persistence in distance education: A cross-cultural multi-
in institutional perspective. _Distance Education_, 7(1), 68-91.


Appendix A

Course Descriptions
Course Description
Economic analysis for food production and marketing in Canada and around the world.

Prerequisite: Economics 100 or the equivalent, or permission of the instructor.

The Intended Student

Students should have one year of education in economic principles. It is expected that a student may be intending to major in agricultural economics and is taking this course as an introduction, or, because of interest, wishes to learn more about food marketing and production systems and Canadian agricultural policy.

Course Objectives
This course seeks to acquaint students with the role of agriculture in Canada and how it is affected by policy decisions in the public sector and world markets. Analytical methods will be developed to analyze different issues. Current issues such as agricultural policy reform, international trade negotiations, and consumer food safety concerns will be discussed.

Course Content
The course consists of 14 lessons in which the topics listed below are discussed:

Lesson 1 - Introduction to Economics in Agriculture
Lesson 2 - Agricultural Production and Costs
Lesson 3 - Agricultural Supply
Lesson 4 - Demand
Lesson 5 - Price Determination
Lesson 6 - Futures Markets
Lesson 7 - Market Intervention
Lesson 8 - Marketing Boards
Lesson 9 - Overview of Dairy and Wheat Sectors
Lesson 10 - International Trade, Part I (relative to small countries)
Lesson 11 - International Trade, Part II (relative to large countries)
Lesson 12 - US and EC Policies in Wheat
Lesson 13 - Export Subsidy War and Trade Negotiations
Lesson 14 - Environmental and Resource Issues in Agricultural Economics

Course Opening Date:
Agricultural Economics 258 is normally offered once per year. The dates below are approximate.

For the course Apply for Register for
opening date at admission the course
the beginning of: to UBC by: by:
May Apr. 1 Apr. 21

†Check a current UBC Access catalogue for specific dates and for admission and registration procedures.

Evaluation
Assignments (three) 25%
Term paper 25%
Final examination 50%

Textbook
There is no required text.

Supplementary Materials
Books and additional readings not included with the course manual are available from the Extension Library.
Course Description
The livestock and poultry industry; application of scientific principles to the production of various classes of livestock and poultry.
The course examines underlying biological principles and their application to the management of domestic animals in agricultural systems.

The Intended Student
The course is designed either as an introduction to Animal Science for students planning to major in Animal Science or as an overview of this subject material for students majoring in other fields of agricultural sciences.

Course Opening Date†
Animal Science 258 is normally offered once per year. The dates below are approximate.

<table>
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†Check a current UBC Access catalogue for specific dates and for admission and registration procedures.

Course Objectives
Upon completion of Animal Science 258 you will:
- have an understanding of the basic biology of domestic animals;
- appreciate how this knowledge can be used to enhance the level and efficiency of animal production;
- understand the application of animal science in the management of livestock production systems;
- be aware of some of the current issues related to animal agriculture such as animal welfare, the advantages and disadvantages of animal products in the human diet, and the question of the use of substances such as antibiotics in livestock production.

Course Content
Animal Science 258 is divided into 15 lessons which are grouped into five units.

Unit I: Introduction — This unit consists of two lessons that serve as a general introduction. Topics covered in Lesson 1 include the role of animals in agriculture and the domestication of animals. Lesson 2 examines the development and characteristics of breeds, the principles of genetics, and the improvement of livestock by means of genetic selection.

Unit II: Anatomy and Physiology — This unit provides basic knowledge pertaining to the biology of domestic animals. Lessons 3 and 4 focus on the anatomy and physiology of those body systems that are of greatest importance in the production of animal products. The subject material covered includes: the anatomy and physiology of growth and development; reproduction; egg-laying; lactation, and the digestive systems.

Unit III: Nutrition, Environment and Health — Lesson 5 introduces the fundamentals of nutrition and requirements of animals for specific nutrients. The application of this basic information to feeding practices is discussed on a comparative basis for both monogastric and ruminant species. Lesson 6 discusses the importance of physiological interactions between animals and their environment. This lesson also provides an overview of the basic aspects of animal health and specific causes of disease. Selected disease conditions are used as examples of different types of disease and methods of prevention and/or treatment.

Unit IV: Livestock Production and Management — This unit consists of seven lessons. Lessons 7 through 12 describe the current management and production practices employed by the main animal industries. These have been grouped into monogastric and ruminant species with one lesson devoted each to pigs, poultry, fish aquaculture, dairy cattle, beef cattle, and sheep. Lesson 13 introduces concepts of product quality, inspection, and grading.

Unit V - Issues and Concerns — Lessons 14 and 15 address the questions of animal welfare in animal agriculture and also issues of concern to the consuming public such as the possibility of antibiotic and hormone residues in meat, milk, and eggs.

Evaluation
Assignments: five @ 10% each = 50%
Final examination = 50%

Textbooks
Required text — approximate price $44

Supplementary Materials
A slide-tape is included in your course package. There is a supplementary material deposit required.

Television Broadcasts
Two television programs are broadcast on the Knowledge Network. The course schedule indicates initial and repeat broadcast dates and times.
Course Description

Dendrology offers a study of the development, anatomy, morphology, function, and autecology of trees.
Prerequisite: Biology 12 or Biology 101 or 102 (corequisite).

The Intended Student

Students who successfully complete this course, along with appropriate first-year college courses in science, mathematics, and English, may be eligible for admission to the second year of the UBC four-year degree program leading to the B.S.F. or B.Sc. in Forestry.

Course Objectives

On completion of this course, you should:
• be familiar with the details of the various stages of tree growth and development;
• have a good understanding of how trees become adapted to the environment in which they are growing and how environmental factors affect growth and development;
• be able to describe morphological and anatomical characteristics of trees;
• be able to identify the species studied in the course, describe the distribution of (major) B.C. species, and use identification keys to identify species you are not familiar with;
• be able to apply the knowledge gained in this course to different aspects of forestry practices and education.

Course Content

The course content is divided into four different parts, all of which are interrelated.

Introduction
• The origin of life, and the main events concerning plants since then, emphasizing the special problems of trees that are the result of evolution.
• Taxonomy and nomenclature: the classification of plants, with emphasis on those classes in which trees occur; the scientific naming of plants, the origin and use of common and scientific names.

The Life History of Trees
Emphasis is on one conifer, Douglas-fir (Pseudotsuga menziesii (Mirb. & Franco) and one angiosperm, red alder (Alnus rubra Bong.), and on the way in which environment affects growth (autecology). The topics are:
• seed structure and primary meristems (for growth in length)
• seed dormancy and dormance breakage
• seed germination and seedbed requirements
• primary growth, leaf initiation and arrangement
• tolerance
• first season's growth: growth cessation
• secondary meristems (for growth in thickness) and secondary growth
• plant dormancy and dormancy breakage
• second and subsequent seasons' growth: tree form
• wood formation and bark formation
• silviculture for wood properties
• physiology of growth of groups of trees (stand development) and succession
• sexual maturity and seed formation
• elementary genetics, speciation and plant geography
• forest regions of the world, Canada and British Columbia
• vegetative methods of reproduction
• introductory tree breeding
• aging, senility, and death

The Function of Trees
Physiological processes in trees and ways in which they are affected by different environmental factors, including:
• water relations
• photosynthesis and respiration
• introductory mineral nutrition

Tree Identification
This part of the course covers:
• the use of different morphological characteristics in the identification of the tree species;
• the construction and use of identification keys;
• the examination of the characteristics and ranges of approximately one hundred species.

Course Opening Dates
Forestry 111 is normally offered once per year. The dates below are approximate.

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<td>Aug. 1</td>
<td>Aug. 21</td>
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Check a current UBC Access catalogue for specific dates and for admission and registration procedures.

Laboratory Session

Attendance is required at an intensive five-day lab session held on the UBC campus in June. The current course schedule shows specific dates of the lab and when the lab application form and the $100 lab fee must be submitted.

Evaluation

There are seven assignments, four of which you submit to your tutor during the first nine months of the course, and three which you will complete after the on-campus laboratory session and submit by the last week in July. The initial four assignments consist of short-answer or brief essay-type questions; the final three are reports on morphological and/or anatomical characteristics of a conifer at three different stages...
Course Description
Introduction to the growth, development and utilization of cultivated plants. Influences of climate, soil, weeds, diseases and pests; cultural practices and systems; plant improvement.

The Intended Student
The course is introductory and is intended to serve those wishing to proceed to a program leading to the B.Sc. (Agr.) degree in plant science, and as a general interest course for those who wish to learn the underlying principles of successful plant and crop production. Since it is nominally a second-year course, it is expected that students wishing to take the course for credit would have a background equivalent to first-year university-level biology, mathematics, and physics or chemistry.

Course Opening Date‡
Plant Science 259 is normally offered once per year. The dates below are approximate.

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<th>Register for the course by:</th>
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‡Check a current UBC Access catalogue for specific dates and for admission and registration procedures.

Course Objectives
Although the ultimate goal of this course is to provide an understanding of present crop production practices, the course is intended to provide sufficient grounding in fundamentals, terminology and concepts to provide explanations and rationales for these practices, and to indicate future trends. On completion of the course, the student will have an appreciation of:
• the diversity of crop plants and their important characteristics;
• their origins and the methods used to improve these characteristics;
• the fundamental metabolic and physiological processes which are essential for successful plant growth;
• the ways in which environmental factors influence plant growth and how these factors may be modified;
• the ecological interactions between crops and weeds, diseases and pests, leading to integrated pest management;
• systems of crop production in use in British Columbia and elsewhere, resulting from the integration of the biology of the crops with their environments and the use of appropriate cultural practices.

Course Content
The course content is divided into eight units:
• Plant Structure, Classification and Identification
• Plant Metabolism: The Capture, Storage and Use of Energy
• Water and Solute Movement within the Plant
• Growth and Development
• Crop Ecology and Crop Protection
• Plant Propagation and Manipulation
• Crop Improvement
• Cropping Systems

Evaluation
Your course grade will be based on the following breakdown of marks:

- Assignments: 40%
- Term paper: 20%
- Final examination: 40%

In order to pass this course, you must:
• complete and submit all assignments;
• obtain a passing mark (≥ 50%) on the final examination;
• obtain an overall passing mark (≥ 50%) for the course.
The final examination is normally held in April.

Textbook
Required text—approximate price S57.50

Supplementary Materials
A set of three videotapes accompanies this course. A deposit of $75 is required for the tapes; $70 will be refunded when you return them.
Course Description
Soil Science 200 (1.5) 'An Introduction to the Study of Soils' - Physical, chemical and biological properties of soils; soil formation, classification, use and conservation.

The Intended Student
This directed study course in Soil Science is designed for:
1. students desiring credit for UBC Soil Science 200 with a view to entering a program leading to a B.Sc.(Agr) or B.S.F. or B.Sc.(Forestry);
2. students requiring UBC Soil Science 200 as a component of the requirements for professional registration in the Association of B.C. Professional Foresters;
3. students with an interest in agriculture, land use and forestry who are seeking to deepen their knowledge of soil as a resource.

Course Objectives
Upon completion of this course, you will have an understanding of:
• soil as a product of physical, chemical and biological processes acting over time on various rock and organic parent materials;
• the wide variety of soils resulting from soil-forming processes;
• the major criteria used for classifying these soils into the Canadian System of Soil Classification;
• the importance of appropriate management and land use practices to ensure conservation of this vital resource for forestry and agriculture.

Course Content
The course content is divided into the following eight topics:
1. The Soil in Perspective
2. Soil Physics
3. Soil Chemistry and Biology
4. Soil Nutrients, Fertility and Fertilizers
5. Factors of Soil Formation
6. Weathering
7. Soil Classification
8. Soil Mapping and Soil Quality

Course Opening Date‡
Plant Science 259 is normally offered once per year. The dates below are approximate.

<table>
<thead>
<tr>
<th>Course opening date at the beginning of</th>
<th>Apply for admission to UBC by:</th>
<th>Register for the course by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan.: Dec. 1</td>
<td>Dec. 21</td>
<td></td>
</tr>
</tbody>
</table>

‡Check a current UBC Access catalogue for specific dates and for admission and registration procedures.

Laboratory Session
Attendance is required at an intensive two-day lab session held on the UBC campus in May. You must have completed two assignments to be eligible to attend the lab. Lab applications, along with the $65.00 lab fee, must be submitted prior to the lab session as indicated on the course schedule sheet.

Evaluation
The grade for the course work will be broken down into the following percentages:

• Assignments: 40%
• Laboratory reports: 20%
• Final examination: 40%

In order to pass the course, students must:
• complete and submit all assignments before writing the final examination;
• obtain a passing mark (≥50%) on the exam;
• obtain an overall passing mark in the course.

The final exam will be held in the period around the end of the second week of June.

Textbook
*Required text—approximate cost is $78.50

Supplementary Materials
In addition to the course manual, you will be supplied with a videotape, an audiotape, and a set of 35mm slides. An invoice for the $50 refundable supplementary materials deposit fee will be included in your course package.

Feb. 1990

Phone UBC Access Guided Independent Study at (604) 228-6565 (collect in B.C., Yukon and N.W.T.) if you require further information.
Appendix B

Letters Sent to Students and Tutors
Dear (student name):

I am a doctoral candidate in Interdisciplinary Studies in Resource Management Science. I am writing to ask you to participate in my research, which is concerned with the factors that influence participation in distance education in the natural resource sciences. Your participation in my research does not require any particular knowledge of distance education; I am interested in your experiences as a distance education student.

Your participation will involve about 15 minutes to complete the attached questionnaire. As well, I will contact you by telephone to arrange to meet with you, at your convenience, in order that I may collect the questionnaire, talk with you about your experiences, and have you respond to a self-scorable survey instrument that provides a "personality profile". This meeting will take about 60-90 minutes. Your participation is entirely voluntary and in no way will affect your class standing. You may refuse to participate or withdraw your participation at any time.

All responses will be kept strictly confidential. The code number on the questionnaire signifies your name. The identification key for names is available only to me; it will be destroyed once the research is complete.

You may reach me at 822-5072, or my research advisor, Dr. LeRoi Daniels, at 822-4476 if you have any questions about this study.

As you are one of a relatively small number of people enrolled in natural resource science courses through distance education, your participation is important to my study. I thank you in advance for considering my request and look forward to your response when I speak with you soon by telephone.

Yours sincerely,

Maureen R. Garland
Dear (tutor name):

I am a doctoral candidate in Interdisciplinary Studies in Resource Management Science. I am writing to ask you to participate in my research, which is concerned with the factors that influence participation in distance education in the natural resource sciences. My main concern is students' experiences; I would like to speak with you about your impressions of their experiences.

Your participation will involve only 15-30 minutes and is entirely voluntary. You may refuse to participate or withdraw your participation at any time. Your identity and your responses will be kept strictly confidential. I will contact you by telephone to arrange a time to meet, at your convenience. You may reach me at 228-5072, or my research advisor, Dr. LeRoi Daniels, at 228-4476 if you have any questions about this study.

As you are one of a very small number of people involved in tutoring natural resource sciences courses offered through distance education, your participation is important to my study. I thank you in advance for considering my request and look forward to your response when I speak with you soon by telephone.

Yours sincerely,

Maureen R. Garland
Appendix C

The Questionnaire
This questionnaire is designed to gather information about you and your reactions to the course. This information will assist us in making changes and improvements. Please note that the questionnaire is anonymous.

Instructions: Please read the following questions and, where applicable, fill in the blanks. Below several questions you will find a series of responses with boxes [ ] preceding them. Mark the box like this [ ] next to the response you feel is most appropriate.

GENERAL INFORMATION

1. Course: _____________________________

2. Tutor: _____________________________

3. Date course started: _____________________________

4. What was your purpose in taking this course?
   [ ] For credit towards a degree/diploma
   [ ] For credit towards a qualifying or 5th year
   [ ] For professional development
   [ ] For general interest
   [ ] Other:

5. Have you taken a U.B.C. ACCESS course before?
   [ ] Yes [ ] No

6. Where did you first hear about UBC ACCESS
   [ ] From a friend or colleague
   [ ] Television advertisement
   [ ] Advertising flyer
   [ ] Brochure
   [ ] Journal advertisement
   [ ] Newspaper advertisement
   [ ] Other:

7. [ ] Male [ ] Female

8. Age
   [ ] 15-19
   [ ] 20-24
   [ ] 25-29
   [ ] 30-34
   [ ] 35-39
   [ ] 40-44
   [ ] 45-49
   [ ] 50+

9. Current address
   [ ] Greater Vancouver/Lower mainland
   [ ] Fraser Valley
   [ ] Vancouver Island
   [ ] Southern B.C.
   [ ] Central B.C.
   [ ] Northern B.C.
   [ ] Outside B.C. (specify):

10. Occupation
    [ ] Student
    [ ] Homemaker
    [ ] Nurse
    [ ] Teacher
    [ ] Forester
    [ ] Managerial
    [ ] Other (specify):

11. Marital Status
    [ ] Married
    [ ] Single
    [ ] Widowed, Divorced, Separated

12. Do you have children?
    [ ] Yes, living with me
    [ ] Yes, not living with me
    [ ] No

13. Did you have paid employment at the same time that you were taking this course?
    [ ] Yes, employed less than 10 hours per week
    [ ] Yes, employed 10-20 hours per week
    [ ] Yes, employed 20-35 hours per week
    [ ] Yes, employed fulltime (over 35 hours per week)
    [ ] No

14. What is your highest level of education? Check one box only.
    [ ] less than Grade 9
    [ ] high school (no diploma)
    [ ] high school (diploma)
    [ ] college (no diploma)
    [ ] college (diploma)
    [ ] trade certificate
    [ ] University (no degree)
    [ ] University (degree)
    [ ] University (graduate degree)
15. Please indicate, by checking the appropriate boxes, the highest level of courses you have completed in the following subject areas:

<table>
<thead>
<tr>
<th></th>
<th>Math</th>
<th>Biology</th>
<th>Chemistry</th>
<th>Physics</th>
<th>Botany</th>
<th>Zoology</th>
<th>Geology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 11</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
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<td>[ ]</td>
</tr>
<tr>
<td>Grade 12</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
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<td>[ ]</td>
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<td>[ ]</td>
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<tr>
<td>Diploma</td>
<td>[ ]</td>
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<td>[ ]</td>
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<tr>
<td>University (Introductory level or transfer credit equivalent)</td>
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<td>[ ]</td>
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<td>[ ]</td>
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</tr>
<tr>
<td>University (Advanced level or transfer credit equivalent)</td>
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<td>[ ]</td>
</tr>
</tbody>
</table>

16. What is/was your father's highest level of education? Check one box only.

- [ ] N/A (not applicable, unknown)
- [ ] less than Grade 9
- [ ] high school (no diploma)
- [ ] high school (diploma)
- [ ] college (no diploma)
- [ ] college (diploma)
- [ ] trade certificate
- [ ] University (no degree)
- [ ] University (degree)
- [ ] University (graduate degree)

17. What is/was your mother's highest level of education? Check one box only.

- [ ] N/A (not applicable, unknown)
- [ ] less than Grade 9
- [ ] high school (no diploma)
- [ ] high school (diploma)
- [ ] college (no diploma)
- [ ] college (diploma)
- [ ] trade certificate
- [ ] University (no degree)
- [ ] University (degree)
- [ ] University (graduate degree)

18. What was your motive for taking this course? You may check more than one box but, if you do, please number your responses in order of priority by placing a 1. in the box of your most important reason for taking the course, 2. in the box for your next most important reason, and so on.

- [ ] to get a job (check only if you are currently unemployed)
- [ ] to get a better job
- [ ] to be promoted
- [ ] to get a salary increase
- [ ] to increase job security
- [ ] needed for current job
- [ ] to increase current job satisfaction
- [ ] to maintain currency in my field
- [ ] personal development through study
- [ ] interest in the subject area
- [ ] other (please specify) __________________________

19. Every person comes from a different kind of background in terms of family origin, culture, nationality and beliefs. In addition, each person may have their own sense of who they are. Please answer the following question to indicate what you feel is your own cultural background in terms of the cultural group to which you belong.

Some examples of cultural groups are: English Canadian, Native Indian, Japanese Canadian, Argentinian, Sikh, Filipino, German Canadian, etc.

I belong to the ____________________________ cultural group.

20. Please provide some information about your parents' usual jobs or occupations. Don't try to recall all of the work they may have done, simply indicate their typical work. Here are some examples:

- Owner/manager, electrical appliance sales, employing 7 people
- Restaurant worker, waiting on tables
- Heavy equipment operator, self-employed
- Homemaker
- Salesperson, real estate, residential homes

a) What was your father's usual work during the time you were growing up?

_____________________________________________________

b) What was your mother's usual work during the time you were growing up?

_____________________________________________________

Page 2
**21. STUDENT SERVICES**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Admission procedures were efficient.</td>
<td></td>
<td></td>
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<tr>
<td>2. Registration procedures were efficient.</td>
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</tr>
<tr>
<td>3. I received my course materials on time.</td>
<td></td>
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<tr>
<td>4. I received my books from the bookstore on time.</td>
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<tr>
<td>5. I received my materials from the Extension library on time.</td>
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<tr>
<td>6. The UBC Access office kept me well-informed.</td>
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<tr>
<td>7. The procedures for the final examination were efficient.</td>
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</tbody>
</table>

**22. COURSE DELIVERY**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I clearly understood what was expected of me in the course.</td>
<td></td>
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<tr>
<td>2. The student manual helped me to complete the course.</td>
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<tr>
<td>3. The information in the student manual is explained clearly</td>
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<tr>
<td>4. The Book of Readings helped me to complete the course</td>
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<tr>
<td>5. The textbooks helped me to complete the course</td>
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<tr>
<td>6. The Extension library materials helped me to complete the course</td>
<td></td>
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<tr>
<td>7. The television/video programs helped me to complete the course</td>
<td></td>
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<tr>
<td>8. The information in the TV/video programs was explained clearly</td>
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<tr>
<td>9. The television/video programs were interesting</td>
<td></td>
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<tr>
<td>10. The scheduled times for the TV/video programs were convenient</td>
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<tr>
<td>11. The TV/video programs helped keep me on my study schedule</td>
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<tr>
<td>12. The audio tapes helped me to complete the course</td>
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<tr>
<td>13. The information in the audio tapes was explained clearly</td>
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<td></td>
</tr>
<tr>
<td>14. The audio tapes were interesting</td>
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<tr>
<td>15. The teleconferences helped me to complete the course</td>
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<tr>
<td>16. The scheduled times for the teleconferences were convenient</td>
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<tr>
<td>17. The teleconference locations were convenient</td>
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<tr>
<td>18. The lab or clinical components helped me to complete the course</td>
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</table>

**23. COURSE TUTOR**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The tutor was available when needed.</td>
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<tr>
<td>2. The tutor’s written comments were helpful.</td>
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<tr>
<td>3. The tutor handled the teleconferences well.</td>
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<tr>
<td>4. Overall, the assistance from the tutor was helpful</td>
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</tbody>
</table>

**24. COURSE WORK**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The assignments were useful learning experiences.</td>
<td></td>
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<tr>
<td>2. The amount of work required was appropriate for this type of course</td>
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<td>3. The course objectives were all met</td>
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<tr>
<td>4. The examination(s) were fair</td>
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<tr>
<td>5. The course schedule helped me complete the course</td>
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<tr>
<td>6. I will be able to apply what I learned in the course to my job or some other aspect of my life.</td>
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</tbody>
</table>

**25. COMPARISON TO CLASSROOM (ON-CAMPUS) COURSES**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The interaction between the instructor and students is better in on-campus courses.</td>
<td></td>
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<tr>
<td>2. The interaction between students is better in on-campus courses</td>
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<tr>
<td>3. My ability to concentrate is better in on-campus courses</td>
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<td>4. The rate of presentation of material is better in on-campus courses</td>
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<td>5. The use of audio-visual aids is better in on-campus courses</td>
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<tr>
<td>6. I am more motivated to work in on-campus courses</td>
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<tr>
<td>7. The material is structured more clearly in on-campus courses</td>
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<td>8. The workload is heavier in on-campus courses</td>
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<tr>
<td>9. Grading standards are higher in on-campus courses</td>
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</tbody>
</table>

Page 3
26. PREFERRED MODE OF INSTRUCTION

Rank the following modes of instruction according to your preference. For example, fill in the box under "1" for your most preferred mode and the box under "5" for your least preferred etc. Be sure to give each mode a separate ranking, (i.e. no ties)

1. Face to face instruction in an off-campus location (i.e. not at U.B.C.)
2. Face to face instruction at U.B.C.
3. Independent study without television/video programs.
4. Independent study with television/video programs.
5. Independent study with audio tapes

Most preferred Least preferred
1 2 3 4 5

27. PREFERRED TELEVISION VIEWING MODE
(only for courses with broadcast television programs)

1. How do you usually watch the television programs in your course.
   [ ] At scheduled broadcast times
   [ ] On a videocassette recorder
2. Do you have access to a videocassette recorder?
   [ ] Yes
   [ ] No

28. PREFERRED TELEVISION VIEWING TIMES
(only for courses with television programs)

Please indicate at which times during the week and on weekends that you could, if necessary, watch television. Choose as many times as appropriate.

Weekend
6:00 a.m. - 8:00 a.m. [ ] [ ]
8:00 a.m. - 10:00 a.m. [ ] [ ]
10:00 a.m. - 12:00 p.m. [ ] [ ]
12:00 p.m. - 2:00 p.m. [ ] [ ]
2:00 p.m. - 4:00 p.m. [ ] [ ]
4:00 p.m. - 6:00 p.m. [ ] [ ]
6:00 p.m. - 8:00 p.m. [ ] [ ]
8:00 p.m. - 10:00 p.m. [ ] [ ]
10:00 p.m. - 12:00 a.m. [ ] [ ]

29. IMPROVEMENTS

In your opinion, what aspect of the course needs the most improvement and what needs the least improvement? (Check one only for each category)

1. Student manual
2. Textbooks
3. Television/video programs
4. Audio tapes
5. Tutorial assistance
6. Book of Readings
7. Teleconferences
8. Lab or clinical component
9. Other (specify)

Most Least
improvement needed improvement needed

30. OVERALL RATING

Considering all aspects, how would you rate this course?
[ ] Excellent
[ ] Good
[ ] Average
[ ] Poor

31. SUGGESTIONS & COMMENTS

1. What other courses would you be interested in taking which we do not already offer?

2. Other comments.
Appendix D

Statistical Analysis of Quantitative Data
Table D-1
Chi Square Analysis of Student Gender by Course

<table>
<thead>
<tr>
<th>GENDER</th>
<th>Count</th>
<th>COURSE</th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th>DF</th>
<th>Significance</th>
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<td>.00386</td>
</tr>
<tr>
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Minimum Expected Frequency - 1.803
Cells with Expected Frequency < 5 - 4 OF 10 (40.0%)
### Table D-2
Chi Square Analysis of Student Ethnic Group by Course

<table>
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<tr>
<th>ETHNIC</th>
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<th>Row Total</th>
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<th>COURSE</th>
<th>Row Total</th>
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<tbody>
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<td></td>
<td>Total</td>
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|        |                       |       | Total  | 60        |
|        |                       |       |         |           |
|        |                       |       |         | 100.0     |

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<th>DF</th>
<th>Significance</th>
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</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>21.03765</td>
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<td>.04983</td>
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<tr>
<td>Likelihood Ratio</td>
<td>23.33570</td>
<td>12</td>
<td>.02501</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>4.79475</td>
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<td>.02855</td>
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Minimum Expected Frequency < .167
Cells with Expected Frequency < 5 - 16 OF 20 (80.0%)

Number of Missing Observations: 1

Ethnicity:
1 = English-Canadian
2 = non-English but Caucasian Canadian
3 = visible minority Canadian
4 = non-Canadian
Table D-3
Chi Square Analysis of Student Previous Education Level by Course

<table>
<thead>
<tr>
<th>EDUCATE</th>
<th>COURSE</th>
<th>Count</th>
<th>FRST</th>
<th>SOIL</th>
<th>ANSC</th>
<th>PLNT</th>
<th>AGEC</th>
<th>Total</th>
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<td></td>
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<td>2</td>
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<td>3</td>
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Column Total: 22 15 5 10 8 60

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<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
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<tbody>
<tr>
<td>Pearson</td>
<td>40.79957</td>
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</tr>
<tr>
<td>Likelihood Ratio</td>
<td>46.97381</td>
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<td>Mantel-Haenszel test for linear association</td>
<td>.26892</td>
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Minimum Expected Frequency - .083
Cells with Expected Frequency < 5 - 31 OF 35 (88.6%)

Number of Missing Observations: 1

Educational Level Completed:
1 = less than Grade 9
2 = high school (no diploma)
3 = high school (diploma)
4 = college (no diploma)
5 = college (diploma)
6 = trade certificate
7 = University (no degree)
8 = University (degree)
9 = University (graduate degree)
Table D-4

Chi Square Analysis of Student Previous Distance Education Experience by Course

| PREVDE | Count | COURSE | | | | Row Total |
|--------|-------|--------|---|---|---|---|---|
|        | 1     | 2      | 3  | 4  | 5  |    |    |
| yes    |       |        |    |    |    |    |    |
| yes    | 7     | 6      | 1  | 4  | 1  | 19 | 31.7|
| no     | 15    | 9      | 4  | 6  | 7  | 41 | 68.3|

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<tr>
<th>Column Total</th>
<th>22</th>
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<th>5</th>
<th>10</th>
<th>8</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
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<td>25.0</td>
<td>8.3</td>
<td>16.7</td>
<td>13.3</td>
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</tr>
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Chi-Square Value DF Significance

- Pearson: 2.47520 4 .64908
- Likelihood Ratio: 2.71520 4 .60656
- Mantel-Haenszel test for linear association: .45147 1 .50164

Minimum Expected Frequency - 1.583
Cells with Expected Frequency < 5 - 5 OF 10 (50.0%)

Number of Missing Observations: 1
# Table D-5

Chi Square Analysis of Student Age Distribution by Course

<table>
<thead>
<tr>
<th>AGE</th>
<th>COURSE</th>
<th>Count</th>
<th>FRST</th>
<th>SOIL</th>
<th>ANSC</th>
<th>PLNT</th>
<th>AGEC</th>
<th>Row Total</th>
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<td>20-24</td>
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Column Total: 22  15  5  10  8  60

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<th>Significance</th>
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<tr>
<td>Pearson</td>
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<td>Likelihood Ratio</td>
<td>37.23641</td>
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<td>.11374</td>
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<td>Mantel-Haenszel test for linear association</td>
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Minimum Expected Frequency - .083
Cells with Expected Frequency < 5 - 38 OF 40 (95.0%)

Number of Missing Observations: 1
Table D-6

Chi Square Analysis of Student Purposes for Taking the Course by Course

<table>
<thead>
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<th>PURPOSE</th>
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<th>Count</th>
<th>Row Total</th>
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<tbody>
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</table>

Column Total: 22 15 5 10 8 60

Chi-Square Value

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<th>Value</th>
<th>DF</th>
<th>Significance</th>
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<td>4.41159</td>
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Minimum Expected Frequency = .083
Cells with Expected Frequency < 5 - 27 OF 30 (90.0%)

Number of Missing Observations: 1

Purpose for Taking the Course:
1 = credit toward a degree
2 = credit toward a fifth or qualifying year
3 = for professional development
4 = for general interest
5 = for a professional credential
6 = for practical application
Table D-7

Chi Square Analysis of Student Occupation by Course

<table>
<thead>
<tr>
<th>OCCUP occupation by COURSE</th>
<th>COURSE</th>
<th>FRST</th>
<th>SOIL</th>
<th>ANSC</th>
<th>PLNT</th>
<th>AGEC</th>
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<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>profess</td>
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<td>2</td>
<td>37</td>
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<tr>
<td>nonprof</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td></td>
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<td>15</td>
<td>5</td>
<td>10</td>
<td>8</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>36.7</td>
<td>25.0</td>
<td>8.3</td>
<td>16.7</td>
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<td>100.0</td>
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</tbody>
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Chi-Square

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<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
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<td>.07947</td>
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<tr>
<td>Likelihood Ratio</td>
<td>19.19888</td>
<td>12</td>
<td>.08384</td>
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<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>2.93597</td>
<td>1</td>
<td>.08663</td>
</tr>
</tbody>
</table>

Minimum Expected Frequency - .083
Cells with Expected Frequency < 5 - 16 OF 20 (80.0%) 

Number of Missing Observations: 1

Occupation:
1 = student
2 = homemaker
3 = professional or semiprofessional
4 = non-professional
### Table D-8

**Chi Square Analysis of Student Marital Status by Course**

<table>
<thead>
<tr>
<th>MARITAL marital status by COURSE</th>
<th>FRST</th>
<th>SOIL</th>
<th>ANSC</th>
<th>PLNT</th>
<th>AGEC</th>
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<td>4</td>
<td>2</td>
<td>34</td>
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<td>4</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>26</td>
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<th>5</th>
<th>10</th>
<th>8</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>36.7</td>
<td>25.0</td>
<td>8.3</td>
<td>16.7</td>
<td>13.3</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>7.84862</td>
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<td>.09728</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>8.00102</td>
<td>4</td>
<td>.09154</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>6.45554</td>
<td>1</td>
<td>.01106</td>
</tr>
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</table>

Minimum Expected Frequency = 2.167
Cells with Expected Frequency < 5 = 5 OF 10 (50.0%)

Number of Missing Observations: 1
Table D-9
Chi Square Analysis of Student Parental Status by Course

<table>
<thead>
<tr>
<th>CHILDREN by COURSE</th>
<th>COURSE</th>
<th>CHILDREN</th>
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<th>1</th>
<th>2</th>
<th>3</th>
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<th>Total</th>
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<tbody>
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<td>FRST</td>
<td>SOIL</td>
<td>ANSC</td>
<td>PLNT</td>
<td>AGEC</td>
<td></td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td></td>
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<td></td>
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<td>8</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>36</td>
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<td></td>
<td></td>
<td>60.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total               | 22     | 15       | 5   | 10  | 8   | 60 |
|                     | 36.7   | 25.0     | 8.3 | 16.7| 13.3| 100.0|

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>4.98439</td>
<td>8</td>
<td>.75924</td>
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<tr>
<td>Likelihood Ratio</td>
<td>5.53261</td>
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<td>.32395</td>
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<td></td>
</tr>
<tr>
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<td>10 OF</td>
<td>15 (66.7%)</td>
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</tr>
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</table>

Number of Missing Observations: 1
Table D-10

Chi Square Analysis of Student Weekly Hours of Paid Employment by Course

<table>
<thead>
<tr>
<th>EMPLOY employment status</th>
<th>COURSE</th>
<th>FRST</th>
<th>SOIL</th>
<th>ANSC</th>
<th>PLNT</th>
<th>AGEC</th>
<th>Row Total</th>
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<td>1</td>
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<td>12</td>
</tr>
<tr>
<td>&lt;10</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>20-35</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>&gt;35</td>
<td>5</td>
<td>16</td>
<td>12</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>41</td>
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</table>

<table>
<thead>
<tr>
<th>Column Total</th>
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<th>15</th>
<th>5</th>
<th>10</th>
<th>8</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>36.7</td>
<td>25.0</td>
<td>8.3</td>
<td>16.7</td>
<td>13.3</td>
<td>60.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chi-Square Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>14.31532</td>
<td>16</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>14.32519</td>
<td>16</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>2.47571</td>
<td>1</td>
</tr>
</tbody>
</table>

Minimum Expected Frequency - .083
Cells with Expected Frequency < 5 - 21 OF 25 (84.0%)
MOTIVE motive for taking the course by COURSE

<table>
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<th>MOTIVE</th>
<th>COURSE</th>
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<th>SOIL</th>
<th>ANSC</th>
<th>PLNT</th>
<th>AGEC</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
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<td>3</td>
<td>1</td>
<td>1</td>
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<td></td>
<td>12</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>23</td>
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<td></td>
<td></td>
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<td>3</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>18</td>
</tr>
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<td>15</td>
<td>5</td>
<td>10</td>
<td>8</td>
<td>60</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Chi-Square Value
-----------------
| Pearson                   | 20.09500 |
| Likelihood Ratio          | 19.50654 |
| Mantel-Haenszel test for linear association | .55490 |
| Minimum Expected Frequency | .083 |
| Cells with Expected Frequency < 5 | 22 OF 25 (88.0%) |

Number of Missing Observations: 1

Motives for Taking the Course:
1 = to get a job
2 = for job security or to get a better job
3 = to increase job satisfaction/competence
4 = for personal development and interest
5 = for practical application
### Table D-12

Chi Square Analysis of Educational Level of Students' Fathers by Course

<table>
<thead>
<tr>
<th>DADED fathers educational level by COURSE</th>
<th>Count</th>
<th>COURSE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Row Total</th>
</tr>
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<td>4</td>
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<td>23.2</td>
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<td>1</td>
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<td>5.4</td>
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<td>3</td>
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<td></td>
<td>4</td>
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<table>
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<td>33.9</td>
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<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
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<tbody>
<tr>
<td>Pearson</td>
<td>27.47167</td>
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<td>.28295</td>
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<tr>
<td>Likelihood Ratio</td>
<td>33.45364</td>
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<td>.09486</td>
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<td>Mantel-Haenszel test for linear association</td>
<td>1.78335</td>
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<td>.18174</td>
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</table>

Minimum Expected Frequency - .268

Cells with Expected Frequency < 5 - 35 OF 35 (100.0%)

Number of Missing Observations: 5

Educational Level Completed:
1 = less than Grade 9
2 = high school (no diploma)
3 = high school (diploma)
4 = college (no diploma)
5 = college (diploma)
6 = trade certificate
7 = University (no degree)
8 = University (degree)
9 = University (graduate degree)
Table D-13
Chi Square Analysis of Educational Level of Students' Mothers by Course

<table>
<thead>
<tr>
<th>COURSE</th>
<th>FRST</th>
<th>SOIL</th>
<th>ANSC</th>
<th>PLNT</th>
<th>AGEC</th>
<th>Row Total</th>
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<td>6</td>
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</tr>
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<td>1</td>
<td>1</td>
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<td>4</td>
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<td>2</td>
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<td>1</td>
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<td>1</td>
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</tbody>
</table>

| Column Total | 14 | 25.5 | 9.1 | 14.5 | 14.5 | 100.0 |

Chi-Square Value

<table>
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<tr>
<th></th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>29.12818</td>
<td>32</td>
<td>.61265</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>27.84398</td>
<td>32</td>
<td>.67705</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>1.44154</td>
<td>1</td>
<td>.22989</td>
</tr>
<tr>
<td>Minimum Expected Frequency</td>
<td>.091</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cells with Expected Frequency &lt; 5</td>
<td>43 of 45 (95.6%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of Missing Observations: 6

Educational Level Completed:
1 = less than Grade 9
2 = high school (no diploma)
3 = high school (diploma)
4 = college (no diploma)
5 = college (diploma)
6 = trade certificate
7 = University (no degree)
8 = University (degree)
9 = University (graduate degree)
Table D-14

Chi Square Analysis of Student Prerequisite Knowledge Level by Course

<table>
<thead>
<tr>
<th>PREREQ prerequisite knowledge by COURSE</th>
<th>Count</th>
<th>FRST</th>
<th>SOIL</th>
<th>ANSC</th>
<th>PLNT</th>
<th>AGEC</th>
<th>Row Total</th>
</tr>
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<td>1</td>
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<td></td>
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<td>3</td>
<td>16</td>
<td>9</td>
<td>3</td>
<td>9</td>
<td>6</td>
<td>43</td>
</tr>
<tr>
<td>Column</td>
<td>22</td>
<td>15</td>
<td>5</td>
<td>10</td>
<td>8</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36.7</td>
<td>25.0</td>
<td>8.3</td>
<td>16.7</td>
<td>13.3</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Chi-Square Value | DF | Significance
-----------------|----|----------------
Pearson          | 5.33322 | 8 | .72144
Likelihood Ratio | 6.06020 | 8 | .64049
Mantel-Haenszel test for linear association | .89376 | 1 | .34446

Minimum Expected Frequency < 5 - 11 OF 15 (73.3%)

Number of Missing Observations: 1
Table D-15

Chi Square Analysis of Student Myers-Briggs Type Indicator Extrovert-Introvert Status by Course

<table>
<thead>
<tr>
<th>EVSI extrovert or introvert by COURSE</th>
<th>Count</th>
<th>COURSE</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVSI</td>
<td>1</td>
<td>1 9 4 1 6 3</td>
<td>23 37.7</td>
</tr>
<tr>
<td>extro</td>
<td>2</td>
<td>14 11 4 4 5</td>
<td>38 62.3</td>
</tr>
<tr>
<td>intro</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Column Total</th>
<th>23 37.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>37.7 24.6 8.2 16.4 13.1 100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>3.58167</td>
<td>4</td>
<td>.46557</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>3.66152</td>
<td>4</td>
<td>.46261</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>.33194</td>
<td>1</td>
<td>.56452</td>
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</table>

Minimum Expected Frequency = 1.885
Cells with Expected Frequency < 5 = 5 OF 10 (50.0%)

Number of Missing Observations: 0
Table D-16
Chi Square Analysis of Student Myers-Briggs Type Indicator Sensing-Intuitive Status by Course

<table>
<thead>
<tr>
<th>SVSN sensing or intuitive</th>
<th>COURSE</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>sensing</td>
<td></td>
<td>12</td>
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<td>intuitive</td>
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<td></td>
<td></td>
<td>23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>37.7</td>
</tr>
</tbody>
</table>

**Chi-Square Value**

- Pearson: 2.01384
- Likelihood Ratio: 2.03889
- Mantel-Haenszel test for linear association: .11497

**Minimum Expected Frequency**

- 2.295

**Cells with Expected Frequency < 5**

- 5 OF 10 (50.0%)

**Number of Missing Observations:** 0
### Table D-17

Chi Square Analysis of Student Myers-Briggs Type Indicator Thinking-Feeling Status by Course

<table>
<thead>
<tr>
<th>TVSF thinking or feeling by COURSE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVSF thinking</td>
<td>20</td>
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<td>5</td>
<td>8</td>
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<td>49</td>
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<td>3</td>
<td></td>
<td>12</td>
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<th>Chi-Square Value</th>
<th>DF</th>
<th>Significance</th>
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</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>3.93815</td>
<td>4</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>4.68817</td>
<td>4</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>1.15229</td>
<td>1</td>
</tr>
<tr>
<td>Minimum Expected Frequency</td>
<td>-.984</td>
<td></td>
</tr>
<tr>
<td>Cells with Expected Frequency &lt; 5</td>
<td>6</td>
<td>60.0%</td>
</tr>
</tbody>
</table>

Number of Missing Observations: 0
Table D-18
Chi Square Analysis of Student Myers-Briggs Type Indicator Judging-Perceiving Status by Course

<table>
<thead>
<tr>
<th>Course</th>
<th>Count</th>
<th>FRST</th>
<th>SOIL</th>
<th>ANSC</th>
<th>PLNT</th>
<th>AGEC</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>JVSP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>38</td>
</tr>
<tr>
<td>judging</td>
<td>1</td>
<td>16</td>
<td>9</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>62.3</td>
</tr>
<tr>
<td>perceive</td>
<td>2</td>
<td>7</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>23</td>
</tr>
</tbody>
</table>

Column Total: 23 15 5 10 8 61
Total: 37.7 24.6 8.2 16.4 13.1 100.0

Chi-Square

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>2.90912</td>
<td>4</td>
<td>.57315</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>2.84741</td>
<td>4</td>
<td>.58368</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>1.24733</td>
<td>1</td>
<td>.26406</td>
</tr>
<tr>
<td>Minimum Expected Frequency</td>
<td>1.885</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cells with Expected Frequency < 5: 5 of 10 (50.0%)

Number of Missing Observations: 0
### Table D-19

Chi Square Analysis of the Number of Withdrawal or Persisting Students by Course

<table>
<thead>
<tr>
<th>STATUS</th>
<th>COURSE</th>
<th>Count</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FRST</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>withdraw</td>
<td>0</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>persist</td>
<td>1</td>
<td>16</td>
<td>11</td>
</tr>
</tbody>
</table>

Column Total: 23  15  5  10  8  61
Total: 37.7  24.6  8.2  16.4  13.1  100.0

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>.89240</td>
<td>4</td>
<td>.92565</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>.88379</td>
<td>4</td>
<td>.92686</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>.00394</td>
<td>1</td>
<td>.94993</td>
</tr>
</tbody>
</table>

Minimum Expected Frequency - 1.475
Cells with Expected Frequency < 5 - 5 OF 10 (50.0%)

Number of Missing Observations: 0
Table D-20
Analysis of Variance of Student Age in Relation to Withdrawal/Persister Status and Course

** * * * C E L L  M E A N S * * * **

AGE
BY STATUS
COURSE

TOTAL POPULATION

3.90
(60)

STATUS

0 1
3.89 3.90
(18) (42)

COURSE

1 2 3 4 5

4.00 4.53 3.40 3.80 2.88
(22) (15) (5) (10) (8)

STATUS

0 1
3.57 4.20
(7) (15)

COURSE

1 2 3 4 5

4.75 4.45 3.75 3.17 3.00
(4) (11) (4) (6) (6)

* * * A N A L Y S I S O F V A R I A N C E * * *

AGE
BY STATUS
COURSE

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS</td>
<td>16.010</td>
<td>5</td>
<td>3.202</td>
<td>1.399</td>
<td>.241</td>
</tr>
<tr>
<td>COURSE</td>
<td>.019</td>
<td>1</td>
<td>.019</td>
<td>.008</td>
<td>.928</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td>16.007</td>
<td>4</td>
<td>4.002</td>
<td>1.749</td>
<td>.154</td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>10.965</td>
<td>4</td>
<td>2.741</td>
<td>1.198</td>
<td>.323</td>
</tr>
<tr>
<td></td>
<td>10.965</td>
<td>4</td>
<td>2.741</td>
<td>1.198</td>
<td>.323</td>
</tr>
<tr>
<td>Explained</td>
<td>26.975</td>
<td>9</td>
<td>2.997</td>
<td>1.310</td>
<td>.256</td>
</tr>
<tr>
<td>Residual</td>
<td>114.425</td>
<td>50</td>
<td>2.288</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>141.400</td>
<td>59</td>
<td>2.397</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 Cases were processed.
1 Cases (1.6 FCT) were missing.
Table D-21

Analysis of Variance of Student Previous Educational Level in Relation to Withdrawal/Persister Status and Course

* * * C E L L M E A N S * * *

<table>
<thead>
<tr>
<th>EDUCATE</th>
<th>COURSE</th>
<th>education level</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS</td>
<td></td>
<td>Education Level Completed:</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1 = less than Grade 9</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2 = high school (no diploma)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3 = high school (diploma)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4 = college (no diploma)</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5 = college (diploma)</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6 = trade certificate</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>7 = University (no degree)</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>8 = University (degree)</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>9 = University (graduate degree)</td>
</tr>
</tbody>
</table>

TOTAL POPULATION

| 6.57   | (60) |

STATUS

| 0 6.17 | (18) |
| 1 6.74 | (42) |

COURSE

| 1 6.32 | (22) |
| 2 6.73 | (15) |
| 3 7.40 | ( 5) |
| 4 6.20 | ( 5) |
| 5 6.88 | ( 8) |

| 1 6.60 | (15) |
| 2 5.71 | ( 7) |
| 3 6.50 | ( 4) |
| 4 7.00 | ( 1) |
| 5 5.75 | ( 4) |

* * * A N A L Y S I S O F V A R I A N C E * * *

<table>
<thead>
<tr>
<th>EDUCATE</th>
<th>COURSE</th>
<th>education level</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>10.362</td>
<td>5</td>
<td>2.072</td>
<td>.697</td>
<td>.628</td>
</tr>
<tr>
<td>STATUS</td>
<td>3.010</td>
<td>1</td>
<td>3.010</td>
<td>1.012</td>
<td>.319</td>
</tr>
<tr>
<td>COURSE</td>
<td>6.248</td>
<td>4</td>
<td>1.562</td>
<td>.525</td>
<td>.718</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td>3.623</td>
<td>4</td>
<td>.906</td>
<td>.304</td>
<td>.874</td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>3.623</td>
<td>4</td>
<td>.906</td>
<td>.304</td>
<td>.874</td>
</tr>
<tr>
<td>Explained</td>
<td>13.985</td>
<td>9</td>
<td>1.554</td>
<td>.522</td>
<td>.851</td>
</tr>
<tr>
<td>Residual</td>
<td>148.748</td>
<td>50</td>
<td>2.975</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>162.733</td>
<td>59</td>
<td>2.758</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 Cases were processed.
1 Cases (1.6 PCT) were missing.
Table D-22

Analysis of Variance of Educational Level of Students’ Fathers in Relation to Withdrawal/Persister Status and Course

**CELL MEANS**

**DADEd fathers educational level**

<table>
<thead>
<tr>
<th>COURSE</th>
<th>STATUS</th>
<th>Educational Level Completed:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1 = less than Grade 9</td>
</tr>
<tr>
<td></td>
<td>(</td>
<td>2 = high school (no diploma)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3 = high school (diploma)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 = college (no diploma)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 = college (diploma)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 = trade certificate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 = University (no degrees)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 = University (degree)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 = University (graduate degree)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COURSE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL POPULATION</td>
<td>4.50</td>
<td>3.57</td>
<td>4.20</td>
<td>4.78</td>
<td>6.38</td>
</tr>
<tr>
<td>STATUS 0</td>
<td>(17)</td>
<td>(19)</td>
<td>(15)</td>
<td>(5)</td>
<td>(9)</td>
</tr>
<tr>
<td>STATUS 1</td>
<td>5.42</td>
<td>3.64</td>
<td>4.50</td>
<td>4.33</td>
<td>6.17</td>
</tr>
<tr>
<td>COURSE</td>
<td>(12)</td>
<td>(11)</td>
<td>(4)</td>
<td>(6)</td>
<td>(6)</td>
</tr>
</tbody>
</table>

**ANALYSIS OF VARIANCE**

**DADEd fathers educational level**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>68.686</td>
<td>5</td>
<td>13.737</td>
<td>1.520</td>
<td>.202</td>
</tr>
<tr>
<td>STATUS</td>
<td>10.334</td>
<td>1</td>
<td>10.334</td>
<td>1.143</td>
<td>.291</td>
</tr>
<tr>
<td>COURSE</td>
<td>59.374</td>
<td>4</td>
<td>14.844</td>
<td>1.642</td>
<td>.180</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td>21.554</td>
<td>4</td>
<td>5.388</td>
<td>.596</td>
<td>.667</td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>21.554</td>
<td>4</td>
<td>5.388</td>
<td>.596</td>
<td>.667</td>
</tr>
<tr>
<td>Explained</td>
<td>90.240</td>
<td>9</td>
<td>10.027</td>
<td>1.109</td>
<td>.375</td>
</tr>
<tr>
<td>Residual</td>
<td>415.760</td>
<td>46</td>
<td>9.038</td>
<td>9.200</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>506.000</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 Cases were processed.
5 Cases (8.2 PCT) were missing.
### Table D-23

#### Analysis of Variance of Educational Level of Students' Mothers in Relation to Withdrawal/Persister Status and Course

*** * * C E L L M E A N S * * * *

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>20.375</td>
<td>5</td>
<td>4.075</td>
<td>.972</td>
<td>.445</td>
</tr>
<tr>
<td>STATUS</td>
<td>2.714</td>
<td>1</td>
<td>.714</td>
<td>.170</td>
<td>.682</td>
</tr>
<tr>
<td>COURSE</td>
<td>19.227</td>
<td>4</td>
<td>4.807</td>
<td>1.147</td>
<td>.347</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td>29.444</td>
<td>4</td>
<td>7.361</td>
<td>1.756</td>
<td>.154</td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>29.444</td>
<td>4</td>
<td>7.361</td>
<td>1.756</td>
<td>.154</td>
</tr>
<tr>
<td>Explained</td>
<td>49.820</td>
<td>9</td>
<td>5.536</td>
<td>1.321</td>
<td>.253</td>
</tr>
<tr>
<td>Residual</td>
<td>188.617</td>
<td>45</td>
<td>4.191</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>238.436</td>
<td>54</td>
<td>4.415</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 Cases were processed.
6 Cases (9.8 PCT) were missing.

Educational Level Completed:
1 = less than Grade 9
2 = high school (no diploma)
3 = high school (diploma)
4 = college (no diploma)
5 = college (diploma)
6 = trade certificate
7 = University (no degree)
8 = University (degree)
9 = University (graduate degree)
Table D-24
Analysis of Variance of Socioeconomic Index Score of Students' Fathers in Relation to Withdrawal/Persister Status and Course

* * * CELL MEANS * * *
DADSOCIO fathers socioeconomic index
BY STATUS
COUSE

TOTAL POPULATION
488.47
Socioeconomic Scores:
Blishen and McRoberts (1976) scores X 10

STATUS
0 1
447.50 506.02
( 18) ( 42)

COUSE
1 2 3 4 5
523.18 431.47 507.20 409.90 586.38
( 22) ( 15) ( 5) ( 10) ( 8)

COUSE
1 2 3 4 5
STATUS
0 511.43 316.00 438.00 394.25 598.00
( 7) ( 4) ( 1) ( 4) ( 2)
1 528.67 473.45 524.50 420.33 582.50
( 15) ( 11) ( 4) ( 6) ( 6)

* * * ANALYSIS OF VARIANCE * * *
DADSOCIO fathers socioeconomic index
BY STATUS
COUSE

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>249756.686</td>
<td>5</td>
<td>49951.337</td>
<td>1.421</td>
<td>.233</td>
</tr>
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<td>STATUS</td>
<td>34338.333</td>
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<td>34338.333</td>
<td>.977</td>
<td>.328</td>
</tr>
<tr>
<td>COURSE</td>
<td>206601.229</td>
<td>4</td>
<td>51650.307</td>
<td>1.469</td>
<td>.226</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td>47781.889</td>
<td>4</td>
<td>11945.472</td>
<td>.340</td>
<td>.850</td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>47781.889</td>
<td>4</td>
<td>11945.472</td>
<td>.340</td>
<td>.850</td>
</tr>
<tr>
<td>Explained</td>
<td>297538.575</td>
<td>9</td>
<td>33059.842</td>
<td>.940</td>
<td>.499</td>
</tr>
<tr>
<td>Residual</td>
<td>1757622.358</td>
<td>50</td>
<td>35152.447</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2055160.933</td>
<td>59</td>
<td>34833.236</td>
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</table>

61 Cases were processed.
1 Cases (1.6 PCT) were missing.
Table D-25
Analysis of Variance of Socioeconomic Index Score of Students' Mothers in Relation to Withdrawal/Persister Status and Course

* * * CELL MEANS * * *

MOMSOCIO mothers socioeconomic index
BY STATUS
COURSE

TOTAL POPULATION

<table>
<thead>
<tr>
<th>Status</th>
<th>Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>404.69</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Socioeconomic Scores:
Blishen and McRoberts (1976) scores X 10

<table>
<thead>
<tr>
<th>Status</th>
<th>Course</th>
<th>Socioeconomic Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>433.41</td>
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<tr>
<td></td>
<td>2</td>
<td>393.07</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>367.00</td>
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<td>455.88</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>414.90</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status</th>
<th>Course</th>
<th>Socioeconomic Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>405.87</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>384.09</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>468.00</td>
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<td></td>
<td>4</td>
<td>309.33</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>411.33</td>
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</tbody>
</table>

* * * ANALYSIS OF VARIANCE * * *

MOMSOCIO mothers socioeconomic index
BY STATUS
COURSE

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS</td>
<td>84251.859</td>
<td>5</td>
<td>16850.372</td>
<td>1.606</td>
<td>.175</td>
</tr>
<tr>
<td>COURSE</td>
<td>25789.235</td>
<td>1</td>
<td>25789.235</td>
<td>2.462</td>
<td>.123</td>
</tr>
<tr>
<td>COURSE</td>
<td>64558.254</td>
<td>4</td>
<td>16139.563</td>
<td>1.541</td>
<td>.205</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>90544.340</td>
<td>4</td>
<td>22636.085</td>
<td>2.161</td>
<td>.087</td>
</tr>
<tr>
<td>COURSE</td>
<td>90544.340</td>
<td>4</td>
<td>22636.085</td>
<td>2.161</td>
<td>.087</td>
</tr>
<tr>
<td>Explained</td>
<td>174796.199</td>
<td>9</td>
<td>19421.800</td>
<td>1.854</td>
<td>.082</td>
</tr>
<tr>
<td>Residual</td>
<td>513322.309</td>
<td>49</td>
<td>10475.965</td>
<td>11864.112</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>688118.508</td>
<td>58</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 Cases were processed.
2 Cases (3.3 PCT) were missing.
Table D-26

Chi Square Analysis of Gender of Withdrawal and Persisting Students

<table>
<thead>
<tr>
<th>GENDER</th>
<th>STATUS</th>
<th>Count</th>
<th>Row Total</th>
<th>Column Total</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>withdraw</td>
<td>0</td>
<td>10</td>
<td>26</td>
<td>36</td>
</tr>
<tr>
<td>men</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>persist</td>
<td>1</td>
<td>13</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>women</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>7</td>
<td>13</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>.31721</td>
<td>1</td>
<td>.57329</td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>.06757</td>
<td>1</td>
<td>.79491</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>.31382</td>
<td>1</td>
<td>.57535</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>.31155</td>
<td>1</td>
<td>.57673</td>
</tr>
</tbody>
</table>

Minimum Expected Frequency = 6.071

Number of Missing Observations: 0
Table D-27
Chi Square Analysis of Withdrawal and Persisting Students' Purposes for Taking the Course

<table>
<thead>
<tr>
<th>PURPOSE</th>
<th>STATUS</th>
<th>Count</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>withdraw</td>
<td>0</td>
<td>17</td>
<td>24</td>
<td>43.6</td>
</tr>
<tr>
<td>degree</td>
<td>persist</td>
<td>7</td>
<td>1</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>credit</td>
<td></td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>7.3</td>
</tr>
<tr>
<td>pro-D</td>
<td></td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>interest</td>
<td></td>
<td>5</td>
<td>5</td>
<td>13</td>
<td>18</td>
</tr>
<tr>
<td>credentl</td>
<td></td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td>applied</td>
<td></td>
<td>17</td>
<td>38</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>38</td>
<td>55</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Chi-Square: 30.9, 69.1, 100.0

Pearson: 4.67067, 4.90149
Likelihood Ratio: 4.90149, 5
Mantel-Haenszel test for linear association: .02139, 1
Minimum Expected Frequency: 4.67067, 4.90149
Cells with Expected Frequency < 5: 8 OF 12 (66.7%)

Number of Missing Observations: 1

Purpose for Taking the Course:
1 = credit toward a degree
2 = credit toward a fifth or qualifying year
3 = for professional development
4 = for general interest
5 = for a professional credential
6 = for practical application
Table D-28

Chi Square Analysis of the Occupation of Withdrawal and Persisting Students

<table>
<thead>
<tr>
<th>OCCUP occupation by STATUS</th>
<th>STATUS</th>
<th>Count</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------</td>
<td>-------</td>
<td>-----------</td>
</tr>
<tr>
<td>OCCUP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>student</td>
<td></td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25.5</td>
</tr>
<tr>
<td>homemaker</td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.8</td>
</tr>
<tr>
<td>profess</td>
<td></td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>60.0</td>
</tr>
<tr>
<td>nonprof</td>
<td></td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Column</td>
<td></td>
<td>17</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30.9</td>
<td>69.1</td>
</tr>
</tbody>
</table>

Chi-Square

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>3.29813</td>
<td>3</td>
<td>.34790</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>3.42504</td>
<td>3</td>
<td>.33038</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>1.91897</td>
<td>1</td>
<td>.16597</td>
</tr>
</tbody>
</table>

Minimum Expected Frequency = .309
Cells with Expected Frequency < 5 - 5 OF 8 (62.5%)

Number of Missing Observations: 1

Occupation:
1 = student
2 = homemaker
3 = professional or semiprofessional
4 = non-professional
Table D-29

Chi Square Analysis of the Marital Status of Withdrawal and Persisting Students

| MARITAL marital status | STATUS | Count | | | Total |
|------------------------|--------|-------|---|---|
|                        | withdraw | persist | Row |
| married                | 1       | 9     | 21 | 30 | 54.5 |
|                        | 2       | 8     | 17 | 25 | 45.5 |
| single                 |         |       |    |    |
| Column                 | 17      | 38    | 55 |
| Total                  | 30.9    | 69.1  | 100.0 |

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>.02554</td>
<td>1</td>
<td>.87302</td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>.00000</td>
<td>1</td>
<td>1.00000</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>.02552</td>
<td>1</td>
<td>.87308</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>.02508</td>
<td>1</td>
<td>.87417</td>
</tr>
<tr>
<td>Minimum Expected Frequency</td>
<td>7.727</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of Missing Observations: 1
### Table D-30

Chi Square Analysis of the Parental Status of Withdrawal and Persisting Students

<table>
<thead>
<tr>
<th>CHILDREN by STATUS</th>
<th>STATUS</th>
<th>Count</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>withdraw</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>persist</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>yes</td>
<td>1</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>absent</td>
<td>3</td>
<td>12</td>
<td>33</td>
</tr>
<tr>
<td>no</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>18</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>36</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30.9</td>
<td>69.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>1.91563</td>
<td>2</td>
<td>.38373</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>1.97037</td>
<td>2</td>
<td>.37337</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>1.45999</td>
<td>1</td>
<td>.22693</td>
</tr>
<tr>
<td>Minimum Expected Frequency</td>
<td>.618</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cells with Expected Frequency &lt; 5</td>
<td>2 OF</td>
<td>6</td>
<td>(33.3%)</td>
</tr>
</tbody>
</table>

Number of Missing Observations: 1
### Table D-31

Chi Square Analysis of the Weekly Hours of Paid Employment of Withdrawal and Persisting Students

<table>
<thead>
<tr>
<th>EMPLOY employment status by STATUS</th>
<th>STATUS</th>
<th>Count</th>
<th>Row Total</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>withdraw</td>
<td>1</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>18.2</td>
</tr>
<tr>
<td></td>
<td>persist</td>
<td>1</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;10</td>
<td>withdraw</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>persist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-20</td>
<td>withdraw</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>persist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-35</td>
<td>withdraw</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>persist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;35</td>
<td>withdraw</td>
<td>5</td>
<td>12</td>
<td>27</td>
<td>39</td>
<td>70.9</td>
</tr>
<tr>
<td></td>
<td>persist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Column</strong></td>
<td></td>
<td>17</td>
<td>38</td>
<td>55</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>30.9</td>
<td>69.1</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Chi-Square

<table>
<thead>
<tr>
<th>Chi-Square Type</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>3.14251</td>
<td>4</td>
<td>.53427</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>3.83962</td>
<td>4</td>
<td>.42815</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>.10384</td>
<td>1</td>
<td>.74726</td>
</tr>
</tbody>
</table>

Minimum Expected Frequency - .309
Cells with Expected Frequency < 5 - 7 OF 10 (70.0%)
Chi Square Analysis of Withdrawal and Persisting Students' Motives for Taking the Courses

<table>
<thead>
<tr>
<th>MOTIVE</th>
<th>motive for taking the course</th>
<th>by STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>withdraw</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Column Total: 17 38 55
Total 30.9 69.1 100.0

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>5.59259</td>
<td>4</td>
<td>.23171</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>6.81284</td>
<td>4</td>
<td>.14612</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>1.94072</td>
<td>1</td>
<td>.16359</td>
</tr>
<tr>
<td>Minimum Expected Frequency - .309</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cells with Expected Frequency &lt; 5 - 6 OF 10 (60.0%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of Missing Observations: 1

Motives for Taking the Course:
1 = to get a job
2 = for job security or to get a better job
3 = to increase job satisfaction/competence
4 = for personal development and interest
5 = for practical application
Table D-33

Chi Square Analysis of the Ethnic Status of Withdrawal and Persisting Students

<table>
<thead>
<tr>
<th>ETHNIC</th>
<th>ETHNIC group by STATUS</th>
<th>Count</th>
<th>withdraw</th>
<th>persist</th>
<th>Total</th>
<th>Row</th>
<th>Column</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>English-Canadian</td>
<td>13</td>
<td>25</td>
<td></td>
<td>38</td>
<td>69.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>non-English but Caucasian Canadian</td>
<td>1</td>
<td>7</td>
<td></td>
<td>8</td>
<td>14.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>visible minority Canadian</td>
<td>3</td>
<td>5</td>
<td></td>
<td>8</td>
<td>14.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>non-Canadian</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>1.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>17</td>
<td>38</td>
<td>55</td>
<td>30.9</td>
<td>69.1</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>Value</th>
<th>DF</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>2.07359</td>
<td>3</td>
<td>.55727</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>2.58344</td>
<td>3</td>
<td>.46040</td>
</tr>
<tr>
<td>Mantel-Haenszel test for linear association</td>
<td>.23283</td>
<td>1</td>
<td>.62943</td>
</tr>
<tr>
<td>Minimum Expected Frequency &lt; 5</td>
<td>.309</td>
<td>4 OF</td>
<td>8 (50.0%)</td>
</tr>
</tbody>
</table>

Number of Missing Observations: 1

Ethnicity:
1 = English-Canadian
2 = non-English but Caucasian Canadian
3 = visible minority Canadian
4 = non-Canadian
### Table D-34

**T-test of the Age of Withdrawal and Persisting Students**

Independent samples of STATUS

**Group 1:** STATUS EQ 0  **Group 2:** STATUS EQ 1

**t-test for: AGE**

<table>
<thead>
<tr>
<th></th>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>17</td>
<td>3.8824</td>
<td>1.691</td>
<td>.410</td>
</tr>
<tr>
<td>Group 2</td>
<td>38</td>
<td>3.9211</td>
<td>1.496</td>
<td>.243</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F 2-Tail Value</th>
<th>t Degrees of 2-Tail Value</th>
<th>Degrees of 2-Tail Freedom</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.28</td>
<td>-.09</td>
<td>53</td>
<td>.932</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F 2-Tail Value</th>
<th>t Degrees of 2-Tail Value</th>
<th>Degrees of 2-Tail Freedom</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.28</td>
<td>-.08</td>
<td>27.69</td>
<td>.936</td>
</tr>
</tbody>
</table>

Student Ages:
1 = 15-19
2 = 20-24
3 = 25-29
4 = 30-34
5 = 35-39
6 = 40-44
7 = 45-49
8 = 50+
### Table D-35

T-test of the Previous Educational Levels of Withdrawal and Persisting Students

Independent samples of STATUS

Group 1: STATUS EQ 0  
Group 2: STATUS EQ 1

t-test for: EDUCATE education level

<table>
<thead>
<tr>
<th></th>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>17</td>
<td>6.2353</td>
<td>2.047</td>
<td>.497</td>
</tr>
<tr>
<td>Group 2</td>
<td>38</td>
<td>6.6316</td>
<td>1.496</td>
<td>.243</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Pooled Variance Estimate</th>
<th>Separate Variance Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>F 2-Tail Value</td>
<td>t Degrees of 2-Tail Value</td>
<td>t Degrees of 2-Tail Value</td>
</tr>
<tr>
<td>Prob.</td>
<td>Freedom</td>
<td>Freedom</td>
</tr>
<tr>
<td>1.87</td>
<td>-.81</td>
<td>-.72</td>
</tr>
<tr>
<td>.115</td>
<td>53</td>
<td>23.97</td>
</tr>
<tr>
<td></td>
<td>.423</td>
<td>.480</td>
</tr>
</tbody>
</table>

Educational Level Completed:

1 = less than Grade 9  
2 = high school (no diploma)  
3 = high school (diploma)  
4 = college (no diploma)  
5 = college (diploma)  
6 = trade certificate  
7 = University (no degree)  
8 = University (degree)  
9 = University (graduate degree)
Table D-36

T-test of the Educational Levels of Fathers of Withdrawal and Persisting Students

Independent samples of STATUS
Group 1: STATUS EQ 0  Group 2: STATUS EQ 1

t-test for: DADED fathers educational level

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cases</td>
<td>16</td>
<td>35</td>
</tr>
<tr>
<td>Mean</td>
<td>3.9375</td>
<td>4.5714</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>3.087</td>
<td>3.061</td>
</tr>
<tr>
<td>Standard Error</td>
<td>.772</td>
<td>.517</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F 2-Tail Value</th>
<th>Pooled Variance Estimate</th>
<th>Separate Variance Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t  Degrees of 2-Tail</td>
<td>t  Degrees of 2-Tail</td>
</tr>
<tr>
<td>Value</td>
<td>Value</td>
<td>Freedom</td>
</tr>
<tr>
<td>Prob.</td>
<td></td>
<td>Prob.</td>
</tr>
<tr>
<td>1.02</td>
<td>-.68</td>
<td>49</td>
</tr>
<tr>
<td>.924</td>
<td>.497</td>
<td>.500</td>
</tr>
<tr>
<td>-.68</td>
<td>28.94</td>
<td>.500</td>
</tr>
</tbody>
</table>

Educational Level Completed:
1 = less than Grade 9
2 = high school (no diploma)
3 = high school (diploma)
4 = college (no diploma)
5 = college (diploma)
6 = trade certificate
7 = University (no degrees)
8 = University (degree)
9 = University (graduate degree)
Table D-37

T-test of the Educational Levels of Mothers of Withdrawal and Persisting Students

Independent samples of STATUS

Group 1: STATUS EQ 0  
Group 2: STATUS EQ 1

t-test for: MOMET mothers educational level

<table>
<thead>
<tr>
<th></th>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>16</td>
<td>3.5625</td>
<td>2.250</td>
<td>.563</td>
</tr>
<tr>
<td>Group 2</td>
<td>35</td>
<td>3.7429</td>
<td>2.091</td>
<td>.353</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Pooled Variance Estimate</th>
<th>Separate Variance Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>F 2-Tail Value</td>
<td>t Degrees of 2-Tail Value</td>
<td>t Degrees of 2-Tail Value</td>
</tr>
<tr>
<td>1.16 .696</td>
<td>-.28 49 .781</td>
<td>-.27 27.31 .788</td>
</tr>
</tbody>
</table>

Educational Level Completed:
1 = less than Grade 9
2 = high school (no diploma)
3 = high school (diploma)
4 = college (no diploma)
5 = college (diploma)
6 = trade certificate
7 = University (no degree)
8 = University (degree)
9 = University (graduate degree)
Table D-38
T-test of the Socioeconomic Indices of Fathers of Withdrawal and Persisting Students

Independent samples of STATUS
Group 1: STATUS EQ 0    Group 2: STATUS EQ 1

t-test for: DADSOCIO fathers socioeconomic index

<table>
<thead>
<tr>
<th></th>
<th>Number of Cases</th>
<th>Standard Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>17</td>
<td>445.1176</td>
<td>182.919</td>
<td>44.364</td>
</tr>
<tr>
<td>Group 2</td>
<td>38</td>
<td>498.9474</td>
<td>193.327</td>
<td>31.362</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Pooled Variance Estimate</th>
<th>Separate Variance Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>F 2-Tail Value</td>
<td>t Degrees of 2-Tail</td>
<td>t Degrees of 2-Tail</td>
</tr>
<tr>
<td>1.12</td>
<td>-.97</td>
<td>53</td>
</tr>
</tbody>
</table>

Socioeconomic Scores:
Blishen and McRoberts (1976) scores X 10
Table D-39
T-test of the Socioeconomic Indices of Mothers of Withdrawal and Persisting Students

Independent samples of STATUS
Group 1: STATUS EQ 0  Group 2: STATUS EQ 1

t-test for: MOMSOCIO mothers socioeconomic index

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>16</td>
<td>438.6250</td>
<td>136.616</td>
</tr>
<tr>
<td>Group 2</td>
<td>38</td>
<td>390.9474</td>
<td>98.722</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F 2-Tail Value</th>
<th>Prob.</th>
<th>t Degrees of 2-Tail</th>
<th>Degrees of 2-Tail</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.92</td>
<td>.108</td>
<td>1.44</td>
<td>52</td>
<td>.155</td>
</tr>
<tr>
<td>1.26</td>
<td>21.89</td>
<td>.220</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Socioeconomic Scores:
Blishen and McRoberts (1976) scores X 10
Table D-40

Analysis of Variance of the Myers-Briggs Type Indicator Extrovert Scores of Withdrawal and Persisting Students for Different Courses

* * * ANALYSIS OF VARIANCE * * *

EXTRO MBTI extroversion score
BY STATUS COURSE

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS</td>
<td>214.090</td>
<td>5</td>
<td>42.818</td>
<td>1.039</td>
<td>.405</td>
</tr>
<tr>
<td>COURSE</td>
<td>26.558</td>
<td>1</td>
<td>26.558</td>
<td>.644</td>
<td>.426</td>
</tr>
<tr>
<td></td>
<td>201.434</td>
<td>4</td>
<td>50.359</td>
<td>1.221</td>
<td>.313</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>84.092</td>
<td>4</td>
<td>21.023</td>
<td>.510</td>
<td>.729</td>
</tr>
<tr>
<td></td>
<td>84.092</td>
<td>4</td>
<td>21.023</td>
<td>.510</td>
<td>.729</td>
</tr>
<tr>
<td>Explained</td>
<td>298.182</td>
<td>9</td>
<td>33.131</td>
<td>.804</td>
<td>.615</td>
</tr>
<tr>
<td>Residual</td>
<td>2102.736</td>
<td>51</td>
<td>41.230</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2400.918</td>
<td>60</td>
<td>40.015</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 Cases were processed.
0 Cases (.0 PCT) were missing.
### Table D-41
Analysis of Variance of the Myers-Briggs Type Indicator Introvert Scores of Withdrawal and Persisting Students for Different Courses

**A N A L Y S I S O F V A R I A N C E**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F of F</th>
<th>Signif</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS</td>
<td>235.669</td>
<td>5</td>
<td>47.134</td>
<td>1.031</td>
<td>.410</td>
</tr>
<tr>
<td>COURSE</td>
<td>49.385</td>
<td>1</td>
<td>49.385</td>
<td>1.080</td>
<td>.304</td>
</tr>
<tr>
<td></td>
<td>206.526</td>
<td>4</td>
<td>51.632</td>
<td>1.129</td>
<td>.353</td>
</tr>
<tr>
<td><strong>2-way Interactions</strong></td>
<td>89.693</td>
<td>4</td>
<td>22.423</td>
<td>.490</td>
<td>.743</td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>89.693</td>
<td>4</td>
<td>22.423</td>
<td>.490</td>
<td>.743</td>
</tr>
<tr>
<td><strong>Explained</strong></td>
<td>325.362</td>
<td>9</td>
<td>36.151</td>
<td>.791</td>
<td>.626</td>
</tr>
<tr>
<td>Residual</td>
<td>2332.048</td>
<td>51</td>
<td>45.726</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2657.410</td>
<td>60</td>
<td>44.290</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 Cases were processed.
0 Cases (0.0 PCT) were missing.
Table D-42

Analysis of Variance of the Myers-Briggs Type Indicator Sensing Scores of Withdrawal and Persisting Students for Different Courses

* * * ANALYSIS OF VARIANCE * * *

SENSING MbTI sensing score
BY STATUS COURSE

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS</td>
<td>314.738</td>
<td>5</td>
<td>62.948</td>
<td>1.322</td>
<td>.270</td>
</tr>
<tr>
<td>COURSE</td>
<td>301.318</td>
<td>4</td>
<td>75.330</td>
<td>62.948</td>
<td>.193</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>127.855</td>
<td>4</td>
<td>31.964</td>
<td>.671</td>
<td>.615</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td>127.855</td>
<td>4</td>
<td>31.964</td>
<td>.671</td>
<td>.615</td>
</tr>
<tr>
<td>Explained</td>
<td>442.593</td>
<td>9</td>
<td>49.177</td>
<td>1.033</td>
<td>.427</td>
</tr>
<tr>
<td>Residual</td>
<td>2427.767</td>
<td>51</td>
<td>47.603</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2870.361</td>
<td>60</td>
<td>47.839</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 Cases were processed.
0 Cases (0 PCT) were missing.
Table D-43

Analysis of Variance of the Myers-Briggs Type Indicator Intuition Scores of Withdrawal and Persisting Students for Different Courses

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS</td>
<td>240.151</td>
<td>5</td>
<td>48.030</td>
<td>1.690</td>
<td>.154</td>
</tr>
<tr>
<td>COURSE</td>
<td>9.869</td>
<td>1</td>
<td>9.869</td>
<td>.347</td>
<td>.558</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>227.331</td>
<td>4</td>
<td>56.833</td>
<td>1.999</td>
<td>.109</td>
</tr>
<tr>
<td>Explained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>97.142</td>
<td>4</td>
<td>24.285</td>
<td>.854</td>
<td>.498</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>1449.724</td>
<td>51</td>
<td>28.426</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1787.016</td>
<td>60</td>
<td>29.784</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 Cases were processed.
0 Cases (.0 PCT) were missing.
**Table D-44**

Analysis of Variance of the Myers-Briggs Type Indicator Thinking Scores of Withdrawal and Persisting Students for Different Courses

*** * * ANALYSIS OF VARIANCE * * ***

THINKING MBTI thinking score
BY STATUS
COURSE

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>127.863</td>
<td>5</td>
<td>25.573</td>
<td>.492</td>
<td>.781</td>
</tr>
<tr>
<td>STATUS</td>
<td>12.999</td>
<td>1</td>
<td>12.999</td>
<td>.250</td>
<td>.619</td>
</tr>
<tr>
<td>COURSE</td>
<td>106.347</td>
<td>4</td>
<td>26.586</td>
<td>.511</td>
<td>.728</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td>127.137</td>
<td>4</td>
<td>31.784</td>
<td>.611</td>
<td>.656</td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>127.137</td>
<td>4</td>
<td>31.784</td>
<td>.611</td>
<td>.656</td>
</tr>
<tr>
<td>Explained</td>
<td>255.000</td>
<td>9</td>
<td>28.333</td>
<td>.545</td>
<td>.835</td>
</tr>
<tr>
<td>Residual</td>
<td>2651.590</td>
<td>51</td>
<td>51.992</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2906.590</td>
<td>60</td>
<td>48.443</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 Cases were processed.
0 Cases (.0 PCT) were missing.
Table D-45

Analysis of Variance of the Myers-Briggs Type Indicator Feeling Scores of Withdrawal and Persisting Students for Different Courses

* * * ANALYSIS OF VARIANCE * * *

FEELING MBTI feeling score
BY STATUS COURSE

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>41.698</td>
<td>5</td>
<td>8.340</td>
<td>.427</td>
<td>.827</td>
</tr>
<tr>
<td>STATUS</td>
<td>2.273</td>
<td>1</td>
<td>2.273</td>
<td>.117</td>
<td>.734</td>
</tr>
<tr>
<td>COURSE</td>
<td>38.526</td>
<td>4</td>
<td>9.631</td>
<td>.494</td>
<td>.740</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td>71.053</td>
<td>4</td>
<td>17.763</td>
<td>.911</td>
<td>.465</td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>71.053</td>
<td>4</td>
<td>17.763</td>
<td>.911</td>
<td>.465</td>
</tr>
<tr>
<td>Explained</td>
<td>112.751</td>
<td>9</td>
<td>12.528</td>
<td>.642</td>
<td>.756</td>
</tr>
<tr>
<td>Residual</td>
<td>994.921</td>
<td>51</td>
<td>19.508</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1107.672</td>
<td>60</td>
<td>18.461</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 Cases were processed.
0 Cases (.0 FCT) were missing.
Table D-46

Analysis of Variance of the Myers-Briggs Type Indicator Judging Scores of Withdrawal and Persisting Students for Different Courses

* * * ANALYSIS OF VARIANCE * * *

JUDGING MBTI judging score BY STATUS COURSE

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS</td>
<td>114.336</td>
<td>5</td>
<td>22.867</td>
<td>.549</td>
<td>.738</td>
</tr>
<tr>
<td>COURSE</td>
<td>42.711</td>
<td>1</td>
<td>42.711</td>
<td>1.026</td>
<td>.316</td>
</tr>
<tr>
<td></td>
<td>62.527</td>
<td>4</td>
<td>15.632</td>
<td>.376</td>
<td>.825</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>159.537</td>
<td>4</td>
<td>39.884</td>
<td>.958</td>
<td>.439</td>
</tr>
<tr>
<td></td>
<td>159.537</td>
<td>4</td>
<td>39.884</td>
<td>.958</td>
<td>.439</td>
</tr>
<tr>
<td>Explained</td>
<td>273.873</td>
<td>9</td>
<td>30.430</td>
<td>.731</td>
<td>.679</td>
</tr>
<tr>
<td>Residual</td>
<td>2123.078</td>
<td>51</td>
<td>41.629</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2396.951</td>
<td>60</td>
<td>39.949</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

61 Cases were processed.
0 Cases ( .0 PCT) were missing.
### Table D-47

Analysis of Variance of the Myers-Briggs Type Indicator Perceiving Scores of Withdrawal and Persisting Students for Different Courses

```
* * * A N A L Y S I S O F V A R I A N C E * * *

PERCEIVE MBTI perceiving score
BY STATUS
COURSE

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Signif of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS</td>
<td>1.998</td>
<td>1</td>
<td>1.998</td>
<td>.044</td>
<td>.834</td>
</tr>
<tr>
<td>COURSE</td>
<td>40.992</td>
<td>4</td>
<td>10.248</td>
<td>.227</td>
<td>.922</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATUS COURSE</td>
<td>152.329</td>
<td>4</td>
<td>38.082</td>
<td>.844</td>
<td>.504</td>
</tr>
<tr>
<td>Explained</td>
<td>196.347</td>
<td>9</td>
<td>21.816</td>
<td>.483</td>
<td>.879</td>
</tr>
<tr>
<td>Residual</td>
<td>2301.423</td>
<td>51</td>
<td>45.126</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2497.770</td>
<td>60</td>
<td>41.630</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

61 Cases were processed.
0 Cases (.0 PCT) were missing.
<table>
<thead>
<tr>
<th></th>
<th>Group 1: STATUS EQ 0</th>
<th>Group 2: STATUS EQ 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>t-test for: EXTRO MBTI extroversion score</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of Cases</strong></td>
<td>17</td>
<td>39</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>10.6471</td>
<td>12.2821</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>5.873</td>
<td>6.545</td>
</tr>
<tr>
<td><strong>Standard Error</strong></td>
<td>1.424</td>
<td>1.048</td>
</tr>
</tbody>
</table>

|                      |                      |                      |
| **F 2-Tail Value**   | 1.24                 | -.92                 |
| **Prob.**            | .657                 | .362                 |

|                      |                      |                      |
| **t Degrees of 2-Tail Value** | -.89                 | -.92                 |
| **Degrees of Freedom** | 54                   | 33.84                |
| **Prob.**            | .380                 | .362                 |
**Table D-49**

**T-test of the Myers-Briggs Type Indicator Introvert Scores for Withdrawal and Persisting Students Overall**

Independent samples of STATUS

Group 1: STATUS EQ 0  
Group 2: STATUS EQ 1

**t-test for: INTRO MBTI introversion score**

<table>
<thead>
<tr>
<th></th>
<th>Number of Cases</th>
<th>Standard Mean Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1</strong></td>
<td>17</td>
<td>16.2941</td>
<td>1.524</td>
</tr>
<tr>
<td><strong>Group 2</strong></td>
<td>39</td>
<td>13.9744</td>
<td>1.084</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Pooled Variance Estimate</th>
<th>Separate Variance Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F 2-Tail Value</strong></td>
<td>1.16</td>
<td>1.24</td>
</tr>
<tr>
<td><strong>Prob.</strong></td>
<td>.771</td>
<td>.224</td>
</tr>
<tr>
<td><strong>t Degrees of 2-Tail Value</strong></td>
<td>1.20</td>
<td>1.24</td>
</tr>
<tr>
<td><strong>Freedom</strong></td>
<td>54</td>
<td>32.77</td>
</tr>
<tr>
<td><strong>Prob.</strong></td>
<td>.234</td>
<td>.224</td>
</tr>
</tbody>
</table>
Table D-50

T-test of the Myers-Briggs Type Indicator Sensing Scores for Withdrawal and Persisting Students Overall

Independent samples of STATUS

Group 1: STATUS EQ 0  Group 2: STATUS EQ 1

t-test for: SENSING MBTI sensing score

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>17</td>
<td>13.4706</td>
<td>7.658</td>
</tr>
<tr>
<td>Group 2</td>
<td>39</td>
<td>12.0256</td>
<td>6.690</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F 2-Tail Value</th>
<th>Pro.</th>
<th>t Degrees of 2-Tail Value</th>
<th>t Degrees of 2-Tail Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pooled Variance Estimate</td>
<td>.131</td>
<td>.482</td>
<td>54</td>
</tr>
<tr>
<td>Separate Variance Estimate</td>
<td>.67</td>
<td>27.15</td>
<td>.506</td>
</tr>
</tbody>
</table>
Table D-51
T-test of the Myers-Briggs Type Indicator Intuition Scores for Withdrawal and Persisting Students Overall

Independent samples of STATUS
Group 1: STATUS EQ 0       Group 2: STATUS EQ 1

t-test for: TUITIVE MBTI intuitive score

<table>
<thead>
<tr>
<th></th>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>17</td>
<td>11.7647</td>
<td>6.629</td>
<td>1.608</td>
</tr>
<tr>
<td>Group 2</td>
<td>39</td>
<td>12.8462</td>
<td>5.029</td>
<td>.805</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Pooled Variance Estimate</th>
<th>Separate Variance Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>F 2-Tail Value</td>
<td>t Degrees of 2-Tail Value</td>
<td>t Degrees of 2-Tail Value</td>
</tr>
<tr>
<td>1.74 .162</td>
<td>-.67 54 .506</td>
<td>-.60 24.39 .553</td>
</tr>
</tbody>
</table>
Table D-52

T-test of the Myers-Briggs Type Indicator Thinking Scores of Withdrawal and Persisting Students Overall

Independent samples of STATUS

Group 1: STATUS EQ 0  Group 2: STATUS EQ 1

t-test for: THINKING MBTI thinking score

<table>
<thead>
<tr>
<th></th>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>17</td>
<td>16.1176</td>
<td>7.541</td>
<td>1.829</td>
</tr>
<tr>
<td>Group 2</td>
<td>39</td>
<td>17.6923</td>
<td>6.685</td>
<td>1.070</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pooled Variance Estimate</td>
<td>Separate Variance Estimate</td>
<td></td>
</tr>
<tr>
<td>-.78</td>
<td>54</td>
<td>.439</td>
<td>-.74</td>
</tr>
<tr>
<td>.464</td>
<td>27.48</td>
<td>.464</td>
<td>.464</td>
</tr>
<tr>
<td>1.27</td>
<td>.527</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table D-53
T-test of the Myers-Briggs Type Indicator Feeling Scores of Withdrawal and Persisting Students Overall

Independent samples of STATUS
Group 1: STATUS EQ 0 Group 2: STATUS EQ 1

t-test for: FEELING MBTI feeling score

<table>
<thead>
<tr>
<th></th>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>17</td>
<td>5.4706</td>
<td>4.611</td>
<td>1.118</td>
</tr>
<tr>
<td>Group 2</td>
<td>39</td>
<td>4.8205</td>
<td>4.097</td>
<td>.656</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Pooled Variance Estimate</th>
<th>Separate Variance Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.27</td>
<td>.53</td>
<td>.601</td>
</tr>
</tbody>
</table>
### Table D-54

T-test of the Myers-Briggs Type Indicator Judging Scores of Withdrawal and Persisting Students Overall

Independent samples of STATUS

<table>
<thead>
<tr>
<th>Group 1: STATUS EQ 0</th>
<th>Group 2: STATUS EQ 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>t-test for:</strong> JUDGING MBTI judging score</td>
<td><strong>t-test for:</strong> JUDGING MBTI judging score</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1</strong></td>
<td>17</td>
<td>14.5294</td>
<td>5.625</td>
</tr>
<tr>
<td><strong>Group 2</strong></td>
<td>39</td>
<td>16.4359</td>
<td>6.723</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F 2-Tail Value</th>
<th>t Degrees of 2-Tail Value</th>
<th>Degrees of 2-Tail Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prob.</strong></td>
<td><strong>Freedom</strong></td>
<td><strong>Prob.</strong></td>
</tr>
<tr>
<td>1.43</td>
<td>-1.02</td>
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</tr>
<tr>
<td></td>
<td>.448</td>
<td>.311</td>
</tr>
<tr>
<td></td>
<td>-1.10</td>
<td>36.22</td>
</tr>
<tr>
<td></td>
<td>.280</td>
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</tr>
</tbody>
</table>
Table D-55

T-test of the Myers-Briggs Type Indicator Perceiving Scores of Withdrawal and Persisting Students Overall

Independent samples of STATUS

Group 1: STATUS EQ 0    Group 2: STATUS EQ 1

t-test for: PERCEIVE MBTI perceiving score

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cases</td>
<td>17</td>
<td>39</td>
</tr>
<tr>
<td>Mean</td>
<td>11.8824</td>
<td>11.5128</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>5.988</td>
<td>6.988</td>
</tr>
<tr>
<td>Standard Error</td>
<td>1.452</td>
<td>1.119</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Pooled Variance Estimate</th>
<th>Separate Variance Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>F 2-Tail Value</td>
<td>t Degrees of 2-Tail Value</td>
<td>t Degrees of 2-Tail Value</td>
</tr>
<tr>
<td>1.36 .514</td>
<td>.19 54 .850</td>
<td>.20 35.38 .841</td>
</tr>
</tbody>
</table>
### Table D-56
Correlation of Myers-Briggs Type Indicator Scores and Withdrawal/Persister Status

<table>
<thead>
<tr>
<th>Correlations:</th>
<th>STATUS</th>
<th>EXTRO</th>
<th>INTRO</th>
<th>SENSING</th>
<th>TUITIVE</th>
<th>THINKING</th>
<th>FEELING</th>
<th>JUDGING</th>
<th>PERCEIVE</th>
<th>JPADD</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS</td>
<td>1.0000</td>
<td>.1196</td>
<td>-.1616</td>
<td>-.0963</td>
<td>.0908</td>
<td>.1055</td>
<td>-.0713</td>
<td>-.1378</td>
<td>-.0258</td>
<td>.3740*</td>
</tr>
<tr>
<td>EXTRO</td>
<td>-.1196</td>
<td>1.0000</td>
<td>-.9498**</td>
<td>.1065</td>
<td>-.0778</td>
<td>-.0822</td>
<td>.1399</td>
<td>-.1289</td>
<td>.0904</td>
<td>-.1191</td>
</tr>
<tr>
<td>INTRO</td>
<td>-.1616</td>
<td>-.9498**</td>
<td>1.0000</td>
<td>-.1172</td>
<td>.0911</td>
<td>.0697</td>
<td>-.1080</td>
<td>-.1329</td>
<td>-.0840</td>
<td>-.1398</td>
</tr>
<tr>
<td>SENSING</td>
<td>-.0963</td>
<td>.1065</td>
<td>-.1172</td>
<td>1.0000</td>
<td>-.8984**</td>
<td>.0933</td>
<td>-.1270</td>
<td>-.2050</td>
<td>-.2740</td>
<td>-.2652</td>
</tr>
<tr>
<td>TUITIVE</td>
<td>.0908</td>
<td>-.0778</td>
<td>.0911</td>
<td>-.8984**</td>
<td>1.0000</td>
<td>-.1817</td>
<td>.2347</td>
<td>-.3060</td>
<td>-.3846*</td>
<td>.2417</td>
</tr>
<tr>
<td>THINKING</td>
<td>.1055</td>
<td>-.0822</td>
<td>.0697</td>
<td>-.1817</td>
<td>1.0000</td>
<td>-.8988**</td>
<td>.4510**</td>
<td>-.4445**</td>
<td>-.0314</td>
<td>.0314</td>
</tr>
<tr>
<td>FEELING</td>
<td>-.0713</td>
<td>.1399</td>
<td>-.1080</td>
<td>-.1270</td>
<td>.2347</td>
<td>-.8988**</td>
<td>1.0000</td>
<td>-.4575**</td>
<td>-.4673**</td>
<td>.0891</td>
</tr>
<tr>
<td>JUDGING</td>
<td>.1374</td>
<td>-.1299</td>
<td>.1329</td>
<td>.2050</td>
<td>-.3060</td>
<td>-.4510**</td>
<td>-.4575**</td>
<td>1.0000</td>
<td>-.9580**</td>
<td>.0265</td>
</tr>
<tr>
<td>PERCEIVE</td>
<td>-.0258</td>
<td>.0904</td>
<td>-.0940</td>
<td>-.2740</td>
<td>.3648**</td>
<td>-.4445**</td>
<td>.4673**</td>
<td>-.9580**</td>
<td>1.0000</td>
<td>.2612</td>
</tr>
<tr>
<td>JPADD</td>
<td>.3740*</td>
<td>-.1191</td>
<td>.1198</td>
<td>-.2452</td>
<td>.2417</td>
<td>-.0314</td>
<td>.0891</td>
<td>.0265</td>
<td>.2612</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

N of cases: 56  
1-tailed Signif: * = .01  ** = .001
### Table D-57
Correlation Matrix for All Variables

<table>
<thead>
<tr>
<th>Correlations:</th>
<th>STATUS</th>
<th>ETHRO</th>
<th>INTRO</th>
<th>REMING</th>
<th>TUTIVE</th>
<th>THIMING</th>
<th>FEELING</th>
<th>JUDGING</th>
<th>PERCEIVE</th>
<th>GENDER</th>
<th>AGE</th>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS</td>
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<td>-0.114</td>
<td>-0.019</td>
<td>-0.094</td>
<td>-0.048</td>
<td>-0.105</td>
<td>-0.071</td>
<td>-0.025</td>
<td>-0.073</td>
<td>-0.017</td>
<td>-0.192</td>
<td>-0.019</td>
</tr>
<tr>
<td>ETHRO</td>
<td>1.0000</td>
<td>0.066**</td>
<td>0.0000</td>
<td>0.1172</td>
<td>0.0931</td>
<td>0.0957</td>
<td>0.0590</td>
<td>0.0390</td>
<td>0.0411</td>
<td>0.004</td>
<td>0.043</td>
<td>0.018</td>
</tr>
<tr>
<td>INTRO</td>
<td>1.0000</td>
<td>0.0000</td>
<td>-0.009</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>REMING</td>
<td>0.1172</td>
<td>0.0957</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
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<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>TUTIVE</td>
<td>0.0931</td>
<td>0.0957</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
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<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>THIMING</td>
<td>0.0957</td>
<td>0.0957</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
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<td>0.0000</td>
</tr>
<tr>
<td>FEELING</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>JUDGING</td>
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1-tailed signif: * p < .01; ** p < .001