# Antecedents to Dropout in Distance Education: Does One Model Fit All?

*Robert M. Bernard and Cheryl L. Amundsen*

## Abstract

In recent years, there has been an interest in adapting models of dropout-persistence, drawn from the literature of higher education, to explain the attrition phenomenon in distance education. The focus of these models has been redirected from explanations of program attrition (i.e., leaving university) to individual course attrition (i.e., leaving a course). Program models typically include little consideration of differing course characteristics (such as content, intended learning outcomes, and so on). At the program level, this is reasonable, since the nature of individual courses is likely to exert minor influence on decisions to leave university. However, such characteristics may contribute to decisions to drop out from courses. This study was conducted to determine if the Tinto Model of Student Persistence and Withdrawal in Higher Education holds across a variety of distance education course types, as Sweet has suggested. Results indicate that course factors may exert a potent influence on the relative importance of major elements in Tinto's model. It is argued that future models of course attrition recognize the contribution of differing course characteristics.

## Resumé

On essaie depuis quelques années d'adapter les modèles d'abandon et de persistance tirés de la littérature de l'éducation tertiaire pour expliquer le phénomène de l'attrition dans l'éducation à distance. Ce faisant, on a redirigé le point de ces modèles, partant des explications de l'attrition des programmes (c'est-à-dire, quitter l'université) vers des explications de l'attrition de cours individuels (c'est-à-dire, abandonner un cours). Les modèles se rapportant aux programmes considèrent en général très peu les caractéristiques variées des cours (telles que contenu, resultats recherchés, etc.). Ceci est raisonnable au niveau du programme, puisque la nature individuelle des cours n'exerce probablement qu'une influence minime sur la décision de quitter l'université. Cependant, de telles caractéristiques peuvent contribuer aux décisions d'abandonner un cours.

L'étude a été menée pour déterminer si le modèle de Tinto sur la persistance et le retrait des étudiants en éducation tertiaire est valable pour toute la variété des cours, comme le suggère Sweet. Les résultats indiquent que certains aspects des cours peuvent exercer une influence puissante sur l'importance relative des éléments primordiaux du modèle de Tinto. L'article suggère que des modèles futurs de l'attrition des cours devront reconnaître la contribution des caractéristiques particulières de ces cours.

## Introduction

Student success in university and college-level courses has been measured in a variety of ways for the purposes of research. Among the most common are those related to student achievement, self-perception of learning perform-ance, student satisfaction, and student attrition from courses and programs. Of these, the one measure used most often in distance education research is student attrition (also referred to in the literature as persistence toward completion, dropout, and withdrawal). In particular, emphasis has been placed on identifying variables that are causally related to students' decisions to leave distance courses before they are completed.

The focus on attrition in distance education stems from several factors. One is the fact that comparatively high attrition rates have always been asso-ciated with correspondence/distance efforts, creating a concern that high attrition may be one of the inherent difficulties of offering courses at a distance. Another is the political pressures that have placed administrators in the position of having to justify the educational and financial feasibility of distance education.

Research on attrition in distance education has been criticized primarily from three perspectives. It has been argued that

- inadequate attention has been given to defining attrition (Orton, 1977; Shale, 1982);
- theoretical models of attrition have tended towards description rather than explanation (Coldeway & Spencer, 1980); and
- the multiplicity of factors in the attrition process has been ignored (Holmberg, 1986).

In addition, investigations have concentrated more on students and their per-sonal characteristics (such as family and job responsibilities) and institutional factors (such as turn-around time on assignments, organization of tutors) than on issues of course content and the nature of desired learning outcomes.

Sweet (1986) attempted to refine the definition of student attrition and apply an explanatory model adapted from Tinto's (1975) Model of Persis-tence and Withdrawal in Higher Education. Based on the findings of a validation study, Sweet concluded that Tinto's model is an appropriate frame-work for further research on student dropout from distance education courses.

The current study was conducted to explore further the adequacies of Tinto's model applied to distance education. In contrast to Sweet, however, the premise of this study is that widely differing results may be obtained when the model is used to investigate the antecedents to dropout in courses that differ widely in content and instructional goals.

## Tinto's Model and Adaptations

Tinto's (1975) model of student persistence and withdrawal was originally proposed for four-year, residential university settings. Tinto extended the work of Spady (1970) and Rootman (1972), both of whom based their work in the theory of suicide originally proposed in 1897 by Durkheim (1961).

According to Tinto's model, the student brings to college such characteristics as family background and personal attributes and experiences, each of which is presumed to influence not only college performance, but also initial commitment levels to both the institution and the goal of completion. These characteristics and commitments, in turn, interact with various features of the particular college or university and lead to varying levels of integration into the academic and social systems of the university.

Tinto views persistence toward completion largely as a function of the student's academic and social integration into the college or university environment. According to Tinto, the extent of academic integration is determined primarily by the student's academic performance. Social integration is a function, first of the quality of peer-group interactions and second of the quality of student interactions with faculty. He argues that, given individual characteristics, prior experiences, and level of commitment, it is the individual student's integration into the academic and social systems of the institution that relates most directly to continuance at that institution. He further argues that given prior goal and institutional commitment, it is the integration into the academic and social systems that promote new levels of commitment. The model recognizes that external factors and varying personal perceptions of reality may affect the decision to withdraw voluntarily, but this is viewed as having an effect on goal and institutional commitment and, therefore, accounted for by the model.

Tinto (1975) supported his model with a synthesis of existing literature which was composed of investigations of individual variables thought to be correlated with academic dismissal and voluntary withdrawal. He concluded that:

> Although academic dismissal is most clearly associated with grade performance, dropout in the form of voluntary withdrawal is not. Such withdrawal, instead, appears to relate to the lack of congruency between the individual and both the intellectual climate of the institution and the social system composed of his peers. (pp. 116–117)

Most validation studies of Tinto's model have, quite naturally, focused on the four-year residential university setting, the setting for which the model

was originally intended. In this context, support has been provided for Tinto's model (Terenzini & Pascarella, 1978, 1980; Pascarella & Terenzini, 1979a, 1979b, 1980). In general, their results indicated that prior-enrollment characteristics of sex, academic aptitude, and personality were statistically non-significant in respect to decisions to dropout or persist. Designated measures of academic and social integration were significantly important to persistence. In all of the studies cited above, the variable designated as frequency of contact with faculty made the largest, unique contribution to the prediction of persistence status. However, in all but one of the studies, peer contact was not investigated; this was cited by the researchers themselves as a limitation of the study. When peer contact was included as a variable, it was found to contribute less than scales concerned with student-faculty contact. This finding was not in agreement with Tinto himself who found that of the various forms of social interaction (including faculty-student inter-action), peer-group associations appeared to be most directly related to individual social integration, and therefore to institutional commitment. The variance explained in the various studies ranged from 25.6% to 30%.

By contrast, one published study could not confirm Tinto's model, in general. In a multi-institutional, longitudinal study, Munro (1981) found that students' educational aspirations and those of their parents had a greater effect on goal commitment leading to persistence than did academic integration, and that academic integration had a stronger effect on institutional commitment than did social integration. No significant effects for social integration variables were found and the model accounted for only 14% of the variation in withdrawal behaviour.

Pascarella and Chapman (1983) assessed the generalizability of the model to several less traditional institutional settings in the form of both two- and four-year commuter colleges. The total variance in persistence/withdrawal decisions explained by the model ranged from 13% to 17%. This minimal finding is a function of inadequate operational definitions of the variables in the model, according to the authors. Distinct differences were found to distinguish resident students from both two- and four-year commuter students. In four-year, primarily residential colleges, institutional commitment had a stronger influence on persistence than did goal commitment; social integration had stronger direct and indirect effects than academic integration; and the influence of student background traits were mediated through the college experience variables. In four-year, primarily commuter colleges, institutional commitment had a stronger direct effect than did goal commitment. The reverse was true at two-year commuter colleges. In both two- and four-year commuter institutions, academic integration had stronger indirect effects on persistence than did social integration. Similarly, in both

commuter samples, student background traits were not totally mediated by the college experience, but had direct effects on persistence. Sweet acknowledged this as a limitation of his study.

Taylor (1986) employed Tinto's model to structure a discussion of results obtained from a cross-cultural, multi-institutional distance education survey. He concluded that, while some of the results obtained were consistent with Tinto's model, there was no compelling evidence to suggest guidelines for practice in distance education. One might consider this a hasty suggestion given that the structure of the survey did not follow the major dimensions of Tinto's model and therefore did not capture the multiplicity of an integrative model nor the relative importance of variables.

To date, only Sweet (1986) has attempted to validate Tinto's model in a distance education context. Sweet suggested that a possible explanation for Pascarella and Chapman's (1983) finding, that social integration had neither a direct nor an indirect effect on persistence in commuter colleges, is the relative lack of social opportunities in such settings. Even if such social contacts with faculty, for example, were important, the commuter situation offers little opportunity. He continues by drawing a parallel between the commuter situation and distance education in regard to opportunities for social integration. He introduced the variable of telephone tutoring, present in some distance education situations, and hypothesized that to the extent telephone tutoring represents an effective form of social integration between students and faculty, patterns of influence among the variables in Tinto's model will match that originally proposed by Tinto.

Sweet structured the analysis of data according to Tinto's model with adaptations he considered appropriate in applying the model to a distance education system. Demographic data were collected from 356 students enrolled in courses at the Open Learning Agency in British Columbia. Of this number, 153 students (43% of the original sample) were interviewed by telephone. All but the demographic data were collected after the semester had ended and final marks were issued. Sweet himself cites this as a limitation of the study.

Discriminant Function Analysis was used to estimate the relative importance of predictor variables in explaining the difference between completers and non-completers. Total variance explained by the model was 32%, somewhat higher than that obtained in the previous validation studies described above. Sweet found that 11% of the explained variation was related to background characteristics, 18% to the combination of academic and social integration and 3% to the combination of goal satisfaction and institutional commitment. Results suggested that a generally accurate definition of the model was achieved in the distance education context. In a

follow-up Path Analysis, Sweet found that social integration in the form of telephone tutoring was significantly related to institutional commitment and, therefore, indirectly to persistence.

## Course Completion Versus Degree Completion

Models developed for residential universities and colleges (Tinto, 1975; Bean, 1980, 1985) have focused on the antecedents to dropout from academic programs. Adaptations of these models to the distance education setting, on the other hand (Sweet, 1986; Billings, 1988), have redirected this focus to issues of completion and non-completion in individual courses, rather than programs. At the program level, individual course characteristics are likely to exert a minor influence on the decision to drop out. Within a particular course, issues like the structure and delivery of the content, and intended learning outcomes, may influence decisions to drop out as much as student characteristics and attitudes.

Bååth (1982) has proposed the underpinnings of a theory which may help explain the contribution of different course characteristics to the issue of completion and non-completion in distance education. Based on an analysis of several theoretical approaches—Skinner's behaviour control model, Rothkopf's model for written instruction, Egan's structural communication model, Bruner's discovery learning model, and Roger's model for facilitation of learning—he provides the following two general conclusions:

a) models with stricter control of learning towards fixed goals tend to imply, in distance education, a greater emphasis on the teaching materials than on the two-way communication between student and tutor/institution;

b) models with less control of learning toward fixed goals tend to make simultaneous communication between student and tutor/institution more desirable, this communication taking the form of either face-to-face or telephone contacts. (p. 15)

Bååth relates models with stricter control (closer to Skinner and Rothkopf) with verbal information and intellectual skills development. By contrast, the need for personal interaction is desirable for developing cognitive strategies and attitudes, and therefore related more closely to teaching models with less control of learning toward fixed goals (closer to Bruner and Rogers).

Based on this perspective, courses with stricter control toward fixed goals (i.e., objectives focused on the convergence of learning outcomes) would more naturally involve academic integration as an explanation for student satisfaction and ultimately, course completion. Courses with less control towards fixed goals (i.e., objectives focused on divergence of learning out-

comes) would most likely draw from the elements of personal history and social interaction in the Tinto model.

The purpose of this study was to examine the relevance of variables indicated by Tinto's model across two courses chosen to reflect the distinctions made above with regard to the nature of the learning outcomes (i.e., more or less control toward fixed goals). A third course had some of the characteristics of each of the above perspectives and therefore was considered as lying somewhere between more control and less control.

## Methods

### Context of the Study

The Institute of Canadian Bankers works in cooperation with 49 Canadian universities to offer academic programs to banking personnel throughout Canada. In addition, the Institute offers a general business correspondence program, the Personal Education Program (PEP), to banking employees who are remote from university campuses or prefer studying at home. The present study was conducted using students enrolled in the Personal Education Program.

The Program most closely resembles the first type of distance teaching institution described by Keegan (1986)—Public and Private Correspondence Schools and Colleges. It is the Type I institution to which the results of the present study are generalized.

### Sample

The sample for this study was 553 students enrolled in the Module I courses (Accounting, Business Administration, and Communication) in the Personal Education Program (henceforth referred to as Program) of the Institute of Canadian Bankers. Of this number, 483 returned a self-report learning behaviours and attitudes questionnaire, which was administered during the course term and from which many of the predictor variables were derived. Missing questionnaire items further reduced the number of usable subjects (see Table 1).

## Table 1

### Variables Derived from Questionnaire and Course Records and their Tinto Category

| Categories (Code) | Questionnaire item or data source |
|---|---|
| Background Characteristics (BK) | •Age<br>•Previous educational level<br>•Reasons for taking the course (six items)<br>•Previous "program" experience<br>•Previous "program" courses taken at universities<br>•Previous experience with correspondence education |
| Social Integration (SO) | •Level of contact with "program" tutors or staff<br>•Contact with peers or former students<br>•Attitudes toward effectiveness of staff-related course components (seven items, e.g., comments on assignments, questions, etc.) |
| Academic Integration (AC) | •Mean of course assignments completed and graded<br>•Attitudes toward effectiveness of materials (seven items, e.g., textbooks, instructions, module notes, etc.) |
| Goal Commitment (GO) | •Self perception of learning achievement |
| Institutional Commitment (IN) | •Willingness to take another "program" course<br>•Willingness to recommend the course to others |

As part of the requirement for enrollment, subjects were employees of banks across Canada. Subjects in the general sample had a median age of 30.5 and a median educational level of 12 years. Eighty-three percent (83%) were first-time students of distance education and 63% were first-time students in the Program.

## Design

*Predictor Variables.* Predictor variables were derived or adapted from the learning behaviours and attitudes questionnaire and the student database maintained by the Program. Thirty-one variables, representing various aspects of student response to the courses and falling roughly into one of the five different categories of the Tinto model, were analyzed. Included among them was a measure of achievement during the term, calculated as the mean of total assignments completed (final exam score was an inappropriate measure of achievement, since in most cases non-completers had not taken it). In the case of students who completed the course, the mean was based on all of the course assignments (i.e., communication–4 assignments; business administration–7 assignments; accounting–8 assignments). Non-completers,

on the other hand, had not completed all assignments, but had completed at least one. The predictor variables and their Tinto categories are described in Table 2.

## Table 2

Number of Subjects by Course in the Original Sample and in Each Group

| Courses | Total Sample | Missing Data | Usable Sample | Completers | Non-Completers |
|---|---|---|---|---|---|
| Communication | 224 | 47 | 177 | 156 (56%) | 21 (12%) |
| Business Administration | 145 | 39 | 106 | 91 (86%) | 15 (14%) |
| Accounting | 114 | 36 | 78 | 58 (74%) | 20 (26%) |

*Grouping variable.*    Since the purpose of this study was to determine variables associated with course completion and non-completion in distance education, a distinction between these was required.    Completers were defined as subjects who completed all assignments and exams and received a grade of A, B, or C in the course.  Non-completers were those students who withdrew from the course and received an Incomplete or who received a failing grade.  Students who registered for the course but failed to complete a single course assignment (i.e., non-starters) were not included in the study. Only 11 subjects out of the 483 questionnaire returnees, or 2.3% of the sample, failed one of the targeted courses, an inadequate number to permit the formation of a third grouping variable.  While it was recognized that students who failed may have differed in some ways from students who voluntarily discontinued, they were pooled so as not to lose information provided by these cases.

## Materials

A questionnaire was designed to collect information from the sample about demographic characteristics, previous experience with distance education and Program courses, use of the toll-free line, contact with students and/or former students during the session and frequency of contact, attitudes toward the various course components experienced, and perception of individual learning achievement.  The questionnaire employed a variety of question formats including questions for which responses required a dichotomous response, semantic differential scales, and two open-ended questions.  The questionnaire was developed through a two-step process of formative evaluation

adapted from Dick and Carey (1985). The first step involved expert review and revision at three different points in time. The second step involved distributing the questionnaire to three Program students who were part of the sample. After they had completed the questionnaire, individual interviews were conducted and revisions were made.

## Nature of Courses

*Course development.* New courses are developed by teams composed of program staff and university professors who teach similar courses at their university of employment. The level of difficulty, content coverage, and objectives are closely monitored to ensure that courses meet the standards of Canadian schools of commerce. However, materials are slanted toward the banking industry. Materials for each course are a textbook and course notes, with limited use of audio cassettes in a few courses. All course materials are sent to students at the beginning of the course session and students work to preset deadlines. The courses end with a written final exam administered at centralized locations across Canada.

University professors, who may or may not have been involved in the development of the courses, are contracted to mark assignments and the final exam. Some of these individual professors subcontract to graduate students or junior faculty, who actually mark the assignments. Quality and amount of written feedback to students varies among markers. Students may contact the professors indirectly by leaving a message at a toll-free telephone number answered by Program staff.

*Communication course.* This course addresses topics related to inter-personal communication and self-development. The course employs a textbook and supplementary module notes, all in print form. Students are required to submit four written assignments in which they explore personal issues, apply principles and concepts from the textbook, and deal with problems of inter-personal communication. The purpose of the course is to sensitize students to their role in the communication process and to improve their interpersonal problem-solving.

*Business administration course.* This course is based primarily on informal case studies of business situations in the banking context. The purpose of the course is to develop the analytical skills necessary for students to make appropriate decisions in managerial situations. In the seven term assignments, students analyze and react to case studies by means of written responses.

*Accounting course.* This course follows the basic content and approaches employed in the traditional business curriculum. Assignments are problem sets drawn form banking contexts. The course requires considerable quantitative skill, as well as logical and analytical thought processes.

*Informal course characteristics.* Since the purpose of this study was to determine if a single model accounts for attrition rate similarly across a variety of types of courses, it is important to emphasize the differences among the courses chosen. Many of these characteristics are informally recognized by program staff and students.

The nature of the required assignments and skills is quite different across the three courses. Responses to the Communication course term assignments are in short essays that require reasoned arguments and the justification of personal opinion. Likewise, Business Administration course assignments require reactions within a structured format based on accepted principles of business practice. However, responses from students may vary. By contrast, Accounting course assignments are evaluated based on the student's ability to arrive at a single correct answer and use the correct procedure.

Based upon these characteristics, it appears that the need for external input (contact with other students and staff) into the learning process varied among the three courses. The accounting course lends itself best to self-instruction. Business Administration students could refine their reactions to case studies by considering the view of others. The objectives of the Communication course encouraged the consideration of multiple perspectives. In one sense, these courses represent points on a continuum.

## Procedure

The questionnaire was mailed to all 553 students enrolled in the three courses in time so that it could be returned before the final examination was administered. Two reminders were sent, and in all, 425 questionnaires or 77% of the total available sample were returned.

## Results

The purpose of this study was to determine if clusters of variables found to discriminate between completers and non-completers in distance education courses (Sweet, 1986), account for variation equally across courses that are qualitatively different in nature. To achieve this, Discriminant Function Analysis (DFA) was used to construct the best combination of predictor variables which discriminate between those subjects who completed a course they were enrolled in and those who did not. Course completers were defined as subjects who received a passing final grade, while non-completers

were those who withdrew from the courses they were taking or received a failing grade (the ratio of withdrawals to failures was approximately 4:1).

Thirty-one predictor variables, either items drawn from the questionnaire or obtained through course records, were included in stepwise DFA. After each step in the procedure variables are evaluated for entry into the equation based upon their tolerance and their $F$ to enter/remove values. The overall equation, examined after the last step produced the following results: communication, $R_c = .63$, $R_c^2 = .40$, $F$ (16,160) = 6.69, p < .01; business administration, $R_c = .71$, $R_c^2 = .50$, $F$ (13.92) = 7.23, $p < .01$; and accounting, $R_c = .76$, $R_c^2 = .58$, $F(12,65) = 7.31$, $p < .01$. Together, these statistics suggest that the set of variables entered in DFA represent a powerful means of distinguishing between course completers and non-completers.

The number of variables remaining in the model after the last step in DFA is usually larger than is desired, since the entry criteria are normally set rather low to avoid Type II errors. Therefore, the next step in DFA is to determine which of the remaining variables represents the best set of predictors and to judge their relative contribution to the prediction equation. The primary criterion used in determining this was the correlation between the canonical discriminant function for each variable and the discriminating variable (i.e., completers/non-completers) and the magnitude of the multivariate $F$-ratio associated with each variable after the last step of the procedure.

Table 3 shows the means and standard deviations and Table 4 shows the $R$ and the univariate and multivariate $F$-ratios associated with the top predictors in each course. Although little consensus exists on this issue, Tabachnick and Fidell (1983) argue that correlations around .30 or above are best eligible for interpretation, especially if their $F$-ratios are highly ranked. In the communication course results more variables are shown because the ranking of correlations and multivariate $Fs$ did not coincide. The break points in the other two courses were much cleaner. Notice that of the four items with correlations above .30 in the communication course, one variable—Would you recommend this course to others?—deviates from the pattern of high $R$ and high-ranking $F$. In spite of its value as a univariate predictor, this item is apparently highly correlated with the preceding item—Would you take another course? By contrast, among the lower ranking correlations in the communication results, a background item—Other correspondence courses taken—has a large multivariate $F$. In both the business administration and accounting courses, the rank of $R$ and $F$ is nearly the same for variables with a correlation of $\pm.30$.

## Table 3

### Means and Standard Deviations of the Best Predictors by Course

| Variable (Category) | Completers | | Non-completers | |
|---|---|---|---|---|
| | M | SD | M | SD |
| **Communication** | | | | |
| Would take another course? (IN)[1] | 1.14 | .35 | 1.71 | .46 |
| Recommend to others? (IN)[1] | 1.09 | .29 | 1.57 | .51 |
| Mean on course assignments (AC) | .81 | .07 | .71 | .18 |
| Importance of materials—assignments (AC)[2] | 3.93 | .96 | 3.24 | 1.1 |
| Contact with other students (SO)[3] | 2.43 | 1.14 | 1.71 | 1.19 |
| Other correspondence courses taken (BK)[1] | 1.87 | .34 | 1.67 | .48 |
| Evaluation of materials—module notes (AC)[2] | 2.18 | .99 | 2.76 | 1.30 |
| Reason for taking course—supervisor suggested (BK)[5] | .08 | .27 | .24 | .44 |
| **Business Administration** | | | | |
| Would take another course? (IN)[1] | 1.20 | .40 | 1.73 | .45 |
| Mean on course assignments (AC) | .82 | .08 | .74 | .11 |
| Importance of materials—assignments (AC)[2] | 4.69 | .86 | 3.13 | 1.06 |
| Reason for taking—out of interest (BK)[5] | .05 | .23 | .27 | .46 |
| **Accounting** | | | | |
| Mean on course assignments (AC) | .86 | .07 | .69 | .14 |
| Importance of materials—assignments (AC)[2] | .05 | .23 | .27 | .46 |
| How much did you learn? (GO)[6] | .65 | .48 | .20 | .51 |
| Importance of materials—assignments (AC)[2] | 4.12 | .86 | 3.35 | 1.23 |

BK = Background characteristics;
SO = Social commitment;
AC = Academic integration;
GO = Goal commitment;
IN = Institutional commitment.

Scales:   [1] 1 = yes, 2 = no;
          [2] 1 = not helpful to 5 = very helpful;
          [3] 1 = no contact to 4 = frequent contact;
          [4] 1 = do not improve to 5 = improve a great deal;
          [5] 0 = no response to 1 = response;
          [6] 1 = nothing to 5 = a lot.

## Table 4

*R*, Univariate *F*, and Multivariate *F* of the Best Predictors by Course

| | | Discriminant Statistics | |
|---|---|---|---|
| Variable (Category) | $R^1$ | Univariate $F^2$ (Rank) | Multivariate $F^3$ (Rank) |
| **Communication** | | | |
| Would take another course? (IN) | −.63 | 45.91 (1) | 4.01 (4) |
| Recommend to others? (IN) | −.59 | 42.02 (2) | 2.54 (8) |
| Mean on course assignments (AC) | .46 | 24.51 (3) | 8.18 (1) |
| Importance of materials—assignments (AC) | .38 | 16.87 (4) | 5.03 (3) |
| Contact with other students (SOC) | .25 | 7.25 (5) | 3.08 (7) |
| Other correspondence courses taken (BK) | .23 | 6.17 (6) | 7.08 (2) |
| Evaluation of materials—module notes (AC) | −.23 | 5.95 (7) | 3.81 (5) |
| Reason for taking course—supervisor suggested (BK) | −.22 | 5.65 (8) | 3.15 (6) |
| **Business Administration** | | | |
| Would take another course? (IN) | −.46 | 22.11 (1) | 20.22 (1) |
| Mean on course assignments (AC) | .37 | 14.75 (2) | 14.60 (2) |
| Importance of materials—assignments (AC) | .37 | 9.50 (3) | 3.27 (4) |
| Reason for taking—out of interest (BK) | −.27 | 7.84 (4) | 9.51 (3) |
| **Accounting** | | | |
| Mean on course assignments (AC) | .72 | 52.80 (1) | 27.93 (1) |
| Importance of materials—assignments (AC) | .41 | 16.87 (2) | 9.86 (2) |
| How much did you learn? (GO) | .38 | 14.68 (3) | 4.59 (3) |
| Importance of materials—assignments (AC) | .30 | 9.50 (4) | 3.27 (4) |

BK = Background characteristics;
SO = Social commitment;
AC = Academic integration;
GO = Goal commitment;
IN = Institutional commitment.

[1] R = correlation between canonical discriminant functions and discriminating variables.
[2] Calculated before the first step in DFA.
[3] Calculated on the last step of DFA.

It is interesting to note in Table 4 that two items—Mean of course assignments and Importance of course assignments—were significant predictors in all three courses. As one would expect, students' success with correspondence activities is an important aspect of courses like these. The communication and business administration courses shared one item—Would you take another Program course? Other significant items were unique to individual courses.

Although it is clear that some commonality exists among the important predictive items in the three courses, it was desirable to examine the relative contributions of items grouped according to the Tinto categories. Blocks of items were forced into the multiple regression equation in the following order: Background characteristics; Academic integration; Social integration; Goal commitment; and Institutional commitment. The order of entry in stepwise multiple regression is important because different orders can change the relative importance of blocks of items. It is clear that Background characteristics should be entered first and that Goal and Institutional commitment should be entered last. However, the ordering of Academic and Social integration is less clear. Tinto (1975) argues that Academic integration is more directly linked to decisions of persistence than is Social integration. Therefore, Academic integration was entered in the model before Social integration.

All of the variables listed in Table 4 were regressed against a dummy coded criterion variable (i.e., non-completers = 0 vs. completers = 1). Each course was run separately and the overall variance accounted for resulting from regression was similar to that found in DFA for each course. Figure 1 shows the variance accounted for by each block of items. Only blocks that were significant ($\alpha = .05$) are shown in the graph. It is clear that when the items are considered in this light the differential nature of the courses must be considered an important factor in building a model of course completion. Background characteristics and Institutional commitments contribute to the explanation of dropout in the communication and business administration courses, while Goal commitment appears only in the accounting course. Academic integration is important in all of 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 the item—peer contact.

**Distance Education Courses**
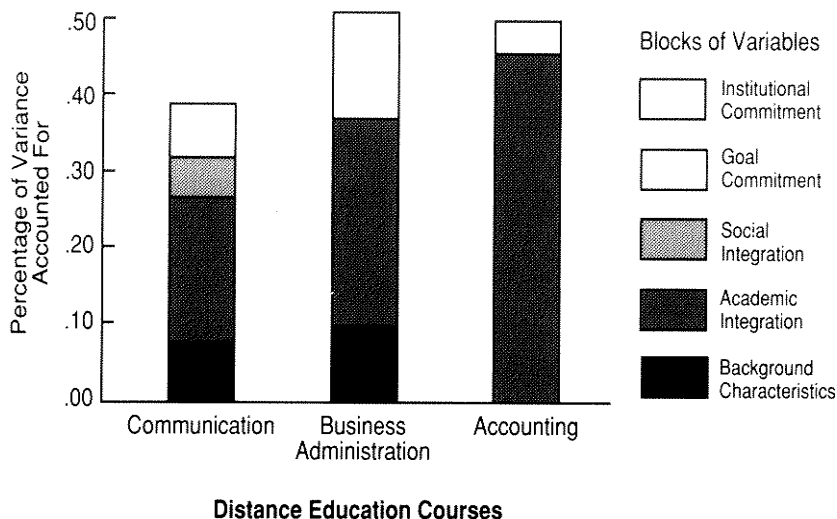
Note: Only significant blocks are included.
As a result, some percentages are approximate within 2%.

**Figure 1**    Distribution of variance accounted for in completion/non-completion across three courses.

## Discussion

### Limitation of the Study

The primary limitations of this study are twofold, the first relating to the design of the study and the second to its external validity.

Tinto's model is intended as a causal explanation of dropout behaviour. However, like its predecessors, the design of the present study of the model does not lend itself to strict causal interpretation. There are several reasons for this:

- the study is a correlational case study design (Campbell & Stanley, 1963);
- in some cases data were gathered after the decision to drop out was already made;

- instruments were administered at one time only during the semester; and
- with the exception of the achievement measure, data were obtained through self-reporting procedures.

Another design limitation was that direct inter-course comparisons of variance explained by the various Tinto categories were impossible.

The generalization of these results to other distance education settings is a matter of external validity. The program under study most closely resembles the first type of distance teaching institution described by Keegan (1986)—Public and Private Correspondence Schools and Colleges. Therefore, there may be difficulties in applying these findings to institutions with other characteristics.

### Application to Tinto's Model

One of the most dramatic aspects of the present study was the comparatively large percentage of total variance in completers and non-completers explained by the predictors in all three courses (i.e., 40% in Communication, 50% in Business Administration, and 58% in Accounting). The results obtained here eclipse all previous studies of Tinto's model. Several differences in the design of this study and Sweet's are notable and may partially explain the differential results obtained. Social interaction was defined by Sweet as the quality of student/tutor communications. The current study added the dimension of peer communication, which accounted for 5% of the variance explained in the Communication course. This is consistent with the importance given peer contact by Tinto. In contrast to Sweet, student achievement, a measure of academic integration, was taken directly from student records. This variable was implicated as a major predictor of dropout in all three courses. In addition, measures of prior experience with distance learning (Coldeway, Spencer, & Stringer, 1980 found experience to be the only predictor of dropout) and reasons for taking the course were included. Considered together, these measures accounted for 9% of the variance in the Communication course and 9% of the variance in the Business Administration course. Another factor that may have improved the predictive qualities in the current study as compared with Sweet's is the fact that all data were acquired during the course session and before the final exam. Sweet's telephone survey data were collected after students had completed the course.

Judging the courses collectively, all five aspects of the Tinto model are represented in variance explained between course completers and non-completers. This finding corresponds to Sweet's, that the Tinto Model is an appropriate framework for research on and explanation of student attrition in

distance education. However, when the courses are viewed separately, it is clear that some characteristics, not accounted for in previous work, produce a dramatically different distribution of explained variation. As Figure 1 indicates, variance explained in the Communication course is divided among background characteristics, academic integration, social integration and institutional commitment. The Business Administration course implicates background characteristics, academic integration, and institutional commitment. By contrast, variance in the Accounting course is accounted for by only academic integration and goal commitment. These results suggest 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.

## Differences Among Courses

Given the design of this study, it is difficult to assess exactly what considerations caused such dramatically different results among courses. Several aspects of the findings, however, are suggestive. First, courses were chosen on the basis of their qualitative differences in content and intended learning outcomes, from relatively process-oriented (i.e., communication) to relatively product-oriented (i.e., accounting). The differential importance of academic integration as an explanatory factor exactly mirrors this continuum. Second, social integration appears in exactly the position one might expect considering the learning requirements in the Communication course versus the others. Third, the appearance of background characteristics and institutional commitment in the Communication and Business Administration courses may suggest that non-academic factors influence dropout decisions in some instances. It is certainly possible that some of these findings are artifacts of local conditions and are therefore not generalizable. More research is needed to clarify the exact relationships that exist among courses with differing characteristics and to extend these results to other institutional types.

From these data, it seems reasonable to suggest that adaptations of any model of program attrition to explain course dropout must take into consideration factors related to the nature of the learning task in individual courses. This seems to contradict the assertion by Billings (1988) that "…attrition from correspondence courses is not unique to the medium of instruction, but rather it is more similar to dropout from any undergraduate program" (p. 32).

Bååth (1982) has suggested one way of conceptualizing the differences among courses that may be useful in discussing the attrition question and more broadly the issue of student satisfaction and achievement in distance

education. Weston and Cranton (1986) also provide a useful framework for describing the compatibility between learning outcomes and instructional patterns. At stake ultimately, in questions arising from student attrition, is the issue of instructional quality and the learning that results from it. In large measure, the long-term success of distance education, as a realistic educational alternative, depends on our ability to specify the conditions under which optimal learning will emerge.

## References

Bååth, J. A. (1982). Distance students' learning: Empirical findings and theoretical deliberations. *Distance Education, 3*(1), 6–27.

Bean, J. P. (1980). Dropouts and turnover: The synthesis and test of a causal model of student attrition. *Research in Higher Education, 12*(2), 155–187.

Bean, J. P. (1985). Interaction effects based on class level in an explanatory model of college student dropout syndrome. *American Educational Research Journal, 22*(1), 35–64.

Billings, D. M. (1988). A conceptual model of correspondence course completion. *American Journal of Distance Education, 2*(2), 23–35.

Campbell, D., & Stanley, J. (1963). *Experimental and quasi-experimental designs for research.* Chicago: Rand McNally.

Coldeway, D., & Spencer, R. (1980). The measurement of attrition and completion in distance learning courses. (REDEAL Research Rep. No. 8). Edmonton, Alta: Athabasca University. (ERIC Document Reproduction Service No. ED 256 770)

Coldeway, D., Spencer, R., & Stringer, M. (1980). Interaction: Learning attributes and learner course performance. (REDEAL Research Rep. No. 9). Edmonton, Alta: Athabasca University (ERIC Document Reproduction Service No. ED 249 346)

Dick, W., & Carey, L. (1985). *The systematic design of instruction* (2nd ed.). London: Scott-Foresman.

Durkheim, E. (1961). *Suicide* (J. Spaulding & G. Simpson, Trans.). Glencoe: The Free Press.

Holmberg, B. (1986). *Growth and structure of distance education.* London: Croom Helm.

Keegan, D. (1986). *The foundations of distance education.* London: Croom Helm.

Munro, B. H. (1981). Dropouts from higher education: Path analysis of a national sample. *American Educational Research Journal, 18*(2), 133–141.

Orton, L. J. (1977). Completion and non-start ratios in correspondence courses. *Canadian Journal of University Continuing Education, 4,* 21–26.

Pascarella, E., & Chapman, D. (1983). A multiinstitutional, path analytic validation of Tinto's model of college withdrawal. *American Educational Research Journal, 20*(1), 87–102.

Pascarella, E., & Terenzini, P. (1979a). Student-faculty informal contact and college persistence: A further investigation. *Journal of Educational Research, 72*(4), 214–218.

Pascarella, E., & Terenzini, P. (1979b). Interaction effects in Spady's and Tinto's conceptual models of college dropout. *Sociology of Education, 52*(4), 197–210.

Pacarella, E., & Terenzini, P. (1980). Predicting freshman persistence and voluntary drop-out decisions from a theoretical model. *Journal of Higher Education, 51*(1), 60–75.

Rootman, I. (1972). Voluntary withdrawal from a total adult socializing organization: A model. *Sociology of Education, 45,* 258–270.

Shale, D. (1982). Attrition: A case study. In J. Daniel, M. Stroud, & J. Thompson (Eds.), *Learning at a distance: A world perspective* (pp. 113–117). Edmonton, Alta: Athabasca University.

Spady, W. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange, 1,* 64–85.

Sweet, R. (1986). Student dropout in distance education: An application of Tinto's model. *Distance Education, 7*(2), 201–213.

Tabachnick, B., & Fidell, L. (1983). *Using multivariate statistics.* New York: Harper & Row.

Taylor, J. C. (1986). Student persistence in distance education: A cross-cultural multi-institutional perspective. *Distance Education, 7*(1), 69–91.

Terenzini, P., & Pascarella, E. (1978). The relation of students' precollege characteristics and freshman year experience to voluntary attrition. *Research in Higher Education, 9,* 347–366.

Terenzini, P., & Pascarella, E. (1980). Toward the validation of Tinto's model of college student attrition: A review of recent studies. *Research in Higher Education, 12*(3), 271–282.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research, 45*(1), 89–125.

Weston, C. B., & Cranton, P. (1986). Selecting instructional strategies. *Journal of Higher Education, 56*(3), 260–288.

**Robert M. Bernard** is an associate professor and Director of the Ph.D. Program in Educational Technology at Concordia University, 1455 de Maisonneuve Blvd. W., Montreal, PQ, H3G 1M8.

**Cheryl L. Amundsen** is an assistant professor in the Department of Educational Psychology and is associated with the Centre for University Teaching and Learning at McGill University, 3700 McTavish, Montreal, PQ, H3A 1Y2.