

Factors Affecting Attrition at a Canadian College

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EXECUTIVE SUMMARY

High attrition rates embody one of the most studied, most persistent, and most intractable problems facing postsecondary education. Despite well-intentioned institutional efforts to address this complex issue, North American postsecondary attrition rates have persisted at approximately 30% - 40% over the past thirty years, with a wide range of attrition-related human and financial costs continuing to negatively affect students, institutions, and taxpayers. Historically, the factors affecting attrition rates have been characterized in terms of either student variables, institutional variables, or student-institution interactional variables, resulting in a wide spectrum of findings and interpretations, with different studies offering differing portraits of the attributes and factors associated with postsecondary attrition. For example, while approximately half the studies of attrition and gender have found attrition to be strongly related to male gender, an approximately equal number of studies found contrary results with attrition strongly related to female gender.

Despite the wide disparity of studies, findings, and interpretations in this field, some consensus has formed around at least four factors that consistently appear to be strongly related to postsecondary attrition, namely: *date of admission*, *program choice*, *academic preparedness*, and *student engagement*. In the context of the current study, however, it should be noted that the research literature derives primarily from studies of *university-level* institutions, and that a significant gap exists with respect to attrition studies within the context of *community colleges*. Furthermore, there has been much less attention to attrition in a purely *Canadian* context compared to the plethora of *American* studies in this field. This study, therefore, proposed to address these research gaps by attempting to identify the key factors affecting attrition specifically in the context of a *Canadian community college*.

This study followed a longitudinal, correlational design in which the enrollment status of all new students who began full-time programs at Fanshawe College in the fall of 2007 ($n = 6,447$) was monitored over a one-year period from fall of 2007 to the fall of 2008. Changes in the dependent/criterion variable (*enrollment status*) - operationalized as either “Active” (currently enrolled) or “Non-active” (no longer enrolled) after one year - were subsequently correlated with five attrition-related independent/predictor variables: *gender*, *date of admission*, *program choice*, *academic preparedness*, and *student engagement*.

Data regarding gender, date of admission, program choice, and enrollment status were gathered from student records through the Office of the Registrar. Similarly, data regarding academic preparedness were gathered for a subset of students ($n = 1,195$) who had participated in an academic upgrading course in the fall term of 2007. In addition, data on student engagement were collected after 10 weeks of classes in the first term of 2007 by means of a questionnaire administered to a non-probability sample of students ($n = 142$), supplemented by qualitative data subsequently gathered through two randomly selected student focus groups ($n = 14$). Ethics approval was obtained from the Fanshawe College Research Ethics Board.

Results indicated that, of the initial beginning cohort ($n = 6,447$), 51% were males, 82% had enrolled early (at least three months prior to start of the first term), and 83% had received their first or second preferred choice of program. With respect to attrition, 2,408 students who began as full-time students in the fall of 2007 were no longer enrolled at the college after one year, representing a year-over-year attrition rate (37.3%) which was comparable to the historical average reported in the majority of attrition studies.

Of the 2,408 Non-active students who were no longer enrolled after one year, quantitative analyses indicated statistically significant relationships with all five independent variables. However, subsequent tests of *practical significance* indicated that less than 1% of the variance in enrollment status between Active and Non-Active students could be explained by gender, date of admission, or program choice. Particularly with respect to admission dates and program choice, while the relative *rates* of attrition were higher among those Non-active students who had enrolled later than the first available month of admission (May) or who had received less than their first or second preferred choice of program, in practical terms, these groups represented small segments (22% and 19% respectively) of the overall number of Non-active students. Therefore, while gender, date of admission, and program choice were found to be statistically significant factors with respect to *individual student* decisions to withdraw, from the *institutional* perspective these variables were not strong determinants of attrition, since the vast majority of students who were Non-active after one year had, in fact, enrolled early (78%) or had received their first or second preferred choice of program (81%).

On the other hand, *academic unpreparedness* was found to explain 15% of the variance in enrollment status, while lack of *student engagement* explained 37% of the variance in enrollment status, reflecting the strong affect of these two variables on the majority of students

who were Non-active after one year. For example, students who successfully completed academic upgrading programs had significantly lower attrition rates (31%) than the fall 2007 student cohort as a whole (37.3%), and dramatically lower rates than students who had attempted but failed to complete an academic upgrading program (73% attrition), suggesting both a strong statistical and a strong practical relationship between academic unpreparedness and withdrawal from college. Similarly, a strong correlation ($r = .611, p < .001$) was found between the scores on a Student Engagement Survey (conducted during the fall 2007 term) and subsequent enrollment status after one year, again suggesting both a strong statistical and a strong practical relationship between low student engagement and withdrawal from college.

Based on the findings in this study, therefore, stakeholders who seek to address the obstinate problem of attrition at Canadian colleges might consider focusing their retention strategies and targeted interventions on the factors that were found to affect most directly the majority of students who were Non-active after one year, namely, *academic unpreparedness* and *low levels of student engagement* with the institution.

INTRODUCTION

High attrition¹ rates embody one of the most studied, most persistent, and most intractable, problems facing postsecondary education (Grayson & Grayson, 2003; Parkin & Baldwin, 2009; Pascarella, 1982; Spady, 1970; Tinto, 1993). A North American postsecondary attrition rate between 30% and 40% has persisted for over thirty years (Calder & Gordon, 1996; Dance, 1990; Dietsche, 1990; Drea, 2004; Grayson & Grayson, 2003; Ontario Ministry of Education, 2004; Summers, 2003; Tinto, 1993). Consequently, despite well-intentioned institutional efforts to address this complex issue, a wide range of attrition-related human and financial costs continue to negatively affect students, institutions, and taxpayers (Calder & Gordon, 1996; Drea, 2004; Gomme & Gilbert, 1984; Lambert & Bussière, 2004; McClenney & Marti, 2006; Pascarella, 1982; Seymour & Hewitt, 1997; Summers, 2003).

College² dropouts suffer financial loss of tuition and residence costs, loss of future earnings due to inadequate certification, as well as less tangible losses related to unrealized personal potential and negative impacts associated with failure to achieve (Association of Canadian Community Colleges, 2008; Dietsche, 1990; Gomme & Gilbert, 1984; Noel & Levitz, 1985; Wignall, 2005). Postsecondary institutions experience financial losses through unremunerated recruitment, administrative, and operational costs expended for students who subsequently withdraw; additionally, lost revenues from unrealized future tuition and provincial grants create unsustainable financial burdens on operating budgets, leading inevitably to cutbacks in staffing, services, and programs. Canadian estimates of annual institutional loss for each first year postsecondary student who did not proceed to second year range from \$4,230 (Okanagan University College, 1996) to \$6,282 (Dietsche, 1990). Furthermore, since “empty seats represent a poor return on the public’s investment” (Canadian Council on Learning, Oct.

¹*Attrition*, for the purpose of this paper, refers to the withdrawal of students from college prior to program completion or graduation.

²*College*, for the purpose of this paper, is used in the Canadian context as an omnibus term representing the wide range and diversity of publicly funded non-university postsecondary institutions that are variously referred to as: community colleges, colleges of applied arts and technology, technical institutes, polytechnic institutes, and (in Quebec) collèges d’enseignement général et professionnel (CEGEPs).

2005), this disturbing phenomenon “undermines public confidence in the college system” (Drea, 2004, p. 1). Therefore, in order to enhance the effectiveness of programs designed to address this obstinate problem, postsecondary administrators and educators require a clear understanding of the multidimensional and interrelated factors influencing this troubling trend of postsecondary attrition.

Historically, the factors affecting attrition rates have been characterized in terms of student variables, institutional variables, or student-institution interactional variables, resulting in a wide spectrum of findings and interpretations, with different studies offering varying profiles of the attributes and factors associated with attrition (Andres & Carpenter, 1997; Drea, 2004; Grayson & Grayson, 2003; Parkin & Baldwin, 2009; Summers, 2003; Tinto, 1993). With respect to *student variables*, demographic characteristics (such as age, gender, parental education, socioeconomic status, ethnicity, finances, health, etc.) and psychological variables (such as attitudes, values, norms, expectations, goals, etc.) were found to explain differing proportions of the variance in attrition across three decades of research (Attinasi, 1986; Baxter, 2004; Bean & Metzner, 1985; Brussi re, 2006; Dietsche, 1990; Eccles, 1983; Etherington, 1990; Fishbein & Ajzen, 1975; Gomme & Gilbert, 1984; Lambert & Bussi re, 2004; Ma & Frempong, 2008; Marinaccio, 1985; Thiessen, 2001; Tinto, 1993). For example, *gender* has long been studied as a factor affecting attrition, with varying results. Some studies have reported higher attrition rates for males (Baxter, 2004; Bussi re, 2006; Ma & Frempong, 2008; Parkin & Baldwin, 2009), females (Lenning, 1982; Looker & Lowe, 2001; Thiessen, 2001; Tinto, 1993), or no correlations with gender (Aquino, 1990; Fischbach, 1990; Mohammadi, 1994; Summers, 2000).

However, some consensus has formed around at least four factors affecting attrition rates in postsecondary education, namely: *date of admission*, *program choice*, *academic preparedness*, and *student engagement*. With respect to *date of admission*, since most Canadian community colleges tend to be “open access” institutions with fairly liberal registration policies, late registration is not uncommon. However, numerous studies have found strong relationships between late registration and attrition (Canales, 2008; Peterson, 1986; Sova, 1986; Stein, 1984; Street, Smith, & Olivarez, 2001; Summers, 2000; Tincher-Ladner, 2006). For example, Stein (1984) found a 76.6% attrition rate among late registrants compared to 37.4% for the whole student body, while Street, Smith, and Olivarez (2001) found a comparable attrition rate (75%) among late registrants.

Similarly, with respect to *program choice*, attrition rates have been consistently higher among students who reported a poor “fit” with their program (Baxter, 2004; Berger, Motte & Parkin, 2007; Bussiere, 2006; Grayson & Grayson, 2003; Lambert, 2004; Lenning, 1982; Parkin & Baldwin, 2009; Tinto, 1993). For example, 52% of dropouts in one study cited “lack of interest or satisfaction with their program” (Parkin & Baldwin, 2009, p. 10) as a significant reason for discontinuing their postsecondary studies, while in another study the majority of dropouts “didn’t like their program, or their program wasn’t ‘for them’” (Lambert, 2004, p. 19).

Similar consensus has formed around the relationship between *academic preparedness* and attrition. Whether operationalized in terms of previous (high school) academic performance, standardized diagnostic scores on entrance tests, or first term GPA results, a wealth of studies have reported consistently that low measures of academic preparedness were strongly related to higher attrition rates (Bean & Metzner, 1985; Boughan, 1998; Bussiere, 2006; Hagedorn, Maxwell, & Hampton, 2002; Lanni, 1997; Lenning, 1982; Looker & Lowe, 2001; Ma & Frempong, 2008; Parkin & Baldwin, 2009; Spady, 1970; Thiessen, 2001; Zhao, 1999). Ma and Frempong (2008), for example, found that Canadian students with first-year postsecondary GPA at 60% or lower were 2.13 times more likely than students with first-year GPA at 70% or higher to drop out. Similarly, Dietsch’s (1990) study of college attrition reported that academic under-preparedness contributed to almost twice the number of dropouts than other factors.

However, of all the factors studied in this field, the strongest consensus has formed around the significance of *student engagement* as a key determinant of student retention/attrition decisions (Andres & Carpenter, 1997; CCI, 2008; Grayson & Grayson, 2003; Kuh, 2003; Pascarella, 1985; Spady, 1970, 1971; Tinto, 1975, 1993). Tinto (1975), building on Spady’s (1970, 1971) work, developed a *student integration model* in which student retention/attrition in postsecondary education is primarily a function of student interactions with the institution’s academic and social systems, rather than a function of student or institutional variables *per se*. “Given individual characteristics, prior experiences, and commitments, it is the individual’s *integration* into the academic and social systems of the college that most directly relates to his [sic] continuance in that college” (Tinto, 1993, p. 96). Tinto’s (1975) student integration model has provided the primary theoretical framework guiding research in this field for over three decades (Andres & Carpenter, 1997; Braxton, 1997; Calder & Gordon, 1996; Dietsche, 1990; Drea, 2004; Gomme & Gilbert, 1984; Grayson & Grayson, 2003; McClenney & Marti, 2006;

Noel & Levitz, 1985; Pascarella & Terenzini, 1977; Seymour & Hewitt, 1997). Employing Tinto's model, Pascarella and Terenzini (1977), for example, noted that student-faculty interaction "was found to discriminate significantly between those students who withdrew voluntarily from the institution at the end of their freshman year and those who persisted" (p. 550). Numerous researchers have validated Tinto's initial thesis that the greater the student involvement and integration into the life of a postsecondary institution, the greater the likelihood the student will remain enrolled at that institution (Astin, 1984, 1997; Dietsche, 1990; Drea, 2004; Grayson & Grayson, 2003; Noel & Levitz, 2007; Stover, 2007).

However, in the context of the present study, it should also be noted that the research literature derives primarily from studies focused on *university-level* postsecondary institutions, and that a significant gap exists with respect to retention/attrition studies within the context of *community colleges*. Indeed, "there has been minimal investigation of the impact of student engagement in samples of community college students" (McClenney & Marti, 2006, p. 9). Pascarella & Terenzini (1997) estimated that only 5% of approximately 2,600 studies in this field focused on community college students, while only 8% of articles examined in a recent meta-analysis of postsecondary attrition studies had even a single reference to community colleges (Townsend, Donaldson, & Wilson, 2004). "The literature on student engagement has focused overwhelmingly on students at baccalaureate-granting institutions, leaving a gap in the literature . . . reflect[ing] the lack of empirical work done using community college samples" (McClenney & Marti, 2006, p. 9, 10).

A further gap in empirical research on postsecondary attrition arises from the preponderance of American-based research in this field (Drea, 2004; Grayson & Grayson, 2003; Wignall, 2005). As Grayson and Grayson (2003) have cautioned, "we cannot assume that conclusions based on [American] research are equally applicable to Canada" (p. 23). For example, based on the criteria used in the Carnegie (2009) classification system for higher education in the United States, Canadian colleges are systemically different in terms of their role, structure, student demographics, and curricular outcomes. While some efforts have been made to study attrition in the Canadian context, there has been little focus, as in the American experience, on community colleges as *distinct settings* for studies in retention/attrition. These Canadian studies either focused solely on the university experience or conflated university and college data into *postsecondary* findings (Andres & Carpenter, 1997; Baxter, 2004; Brussi re, 2006; Coutts &

Goyder, 1998; Grayson & Grayson, 2003; Lambert & Bussière, 2004; Looker & Lowe, 2001; Ma & Frempong, 2008; Thiessen, 2001; Usher & Potter, 2006). While some studies have attempted to focus on attrition factors *specifically in the context of Canadian colleges* (Dennison, 1972; Dietsche, 1990; Prokopick, Hoth, & Feltham, 2007; Henning, 2006; Marshall, 2008; Sarkar, 1993; Schollen, et al., 2008), there continues to be “a paucity of Canadian research into community colleges” (Lowry & Froese, 2001, p. 3).

This study, therefore, proposes to address the research gaps in this field by studying factors affecting attrition specifically in the context of a Canadian community college. Building on previous pilot studies at the Principal Investigator’s home college (Prokopick, Hoth, & Feltham, 2008; Henning, 2005; Marshall, 2008), and based on the recurrence of these factors in the literature, as well as on the availability of participants and access to student registration data, the following five factors were selected for study regarding their affect on attrition rates at a Canadian community college: *gender, date of admission, program choice, academic preparedness, and student engagement*. The potential benefit of this study arises, therefore, from the opportunity to provide empirical data on the relative influence of these factors in order to permit more informed, evidence-based decision-making in the development and implementation of effective predictive models, retention strategies, and targeted interventions to address the ongoing and costly problem of student attrition at Canadian colleges.

METHODOLOGY

Participants

The subjects of this longitudinal, correlational study comprised the 6,447 full-time students beginning their first semester in the fall of 2007 at Fanshawe College of Applied Arts and Technology, a large, comprehensive community college (located in London, Ontario) with an annual full time enrollment exceeding 15,000 students. A longitudinal design was employed over a one year period since this permitted an investigation of factors that were affecting student attrition at the very time they were exerting their influence (Dietsche, 1990; Tinto, 1993). At the beginning of the first term (as of Sept. 30, 2007) data were gathered from the college Registrar regarding three independent/predictor variables (*gender, date of admission, and program choice*) for all beginning full-time students.

In addition, data on two additional attrition factors were collected from two other sources during the first term of 2007. First, in order to study the effect of *academic preparedness*, final grades were gathered at the end of the first term from a subset of students ($n = 1,195$) who had participated in an academic upgrading course throughout the fall of 2007. Second, in order to obtain an in-depth analysis of the effect of *student engagement* on attrition, a Student Engagement Survey was administered, after 10 weeks of classes in the fall term of 2007, to a non-probability subset of students ($n = 142$) who attended a satellite campus that had implemented a purposeful student engagement strategy. Additional qualitative data were gathered from a further subset of students ($n = 14$) at the satellite campus who agreed to participate in two focus group sessions. A copy of the survey is given in Appendix A.

Subsequently, enrollment data from all beginning full-time students ($n = 6,447$), including the subsets, were collected from the college student records system in order to determine each student's *enrollment status* (Active, Non-Active) at two significant points in time: (1) at the beginning of the second term (as of Jan. 30, 2008) to indicate *term-over-term* attrition; and (2) at the beginning of the second year (as of Sept. 30, 2008) to indicate *year-over-year* attrition. Students who were categorized as "Active" included those who continued to be enrolled in full time programs (or, in some cases, students who had successfully completed their programs); "Non-Active" students were those who were no longer enrolled in full time programs (and who had not successfully completed their programs). Changes in this dependent/criterion variable (*enrollment status*) were subsequently correlated with the five attrition-related independent/predictor variables (*gender, admission date, program choice, academic preparedness, and student engagement*).

Instruments

Data related to student *gender, admission date, program choice, academic upgrading, and enrollment status* were extracted from the college student records system. In-depth data related to *student engagement* were gathered by means of a Student Engagement Survey utilizing a 50-item, largely multiple choice questionnaire using a 5-point Likert scale. Content validity of this survey instrument was addressed in three ways: (1) the instrument was grounded in items used on other surveys of student engagement; (2) the questionnaire was reviewed by a panel with expertise in student engagement and survey administration; and (3), the instrument was field

tested on a convenience sample of students ($n = 10$). To facilitate correlation analyses, a *Student Engagement Index* was subsequently constructed using a cluster of 10 survey response items with strong internal consistency reliability (Cronbach's $\alpha = .810$). This index measured student responses to statements concerning “inviting environment”, “easy to make friends”, “socially connected”, and “good fit” versus “socially isolated”, or “felt just like a number” (see Appendix A).

Ethics approval was obtained from the Research Ethics Board of Fanshawe College. All statistical analyses were accomplished using computer software programs, including SPSS 16.0 and NVivo 7.0.

RESULTS

Table 1 shows that 27.9% of the beginning students who enrolled in full-time programs at Fanshawe College in the fall of 2007 were no longer actively enrolled in the second term (as of Jan. 30, 2008), and that the attrition rate had risen to 37.3% by the beginning of the second year (as of Sept. 30, 2008).

Table 1

Enrollment Status after One Term, and after One Year.

Enrollment Status	After 1 Term		After 1 Year	
	<i>n</i>	% of Total	<i>n</i>	% of Total
Active Students: (currently enrolled full-time, or graduated)	4,813	72.1%	4,039	62.7%
Non- Active Students: (not currently enrolled, and not graduated)	1,861	27.9%	2,408	37.3%
Total Students	6,447	100%	6,447	100%

Results from tests of statistical significance, correlation coefficients, and tests of practical significance with respect to the dependent/criterion variable (*enrollment status*) and the five attrition-related independent/predictor variables (*gender, admission date, program choice, academic preparedness, and student engagement*) are discussed below.

Gender. With respect to the relationship between *gender* and attrition, Table 2 shows that while males represented 51% of the beginning freshman cohort compared to females (49%), after one year this ratio had reversed, with females representing 52% of full-time enrolled students compared to males (48%). This represented a higher year-over-year attrition rate for males (57%) than for females (43%). Subsequently, a Chi-squared test for independence (with Yates Continuity Correction), using a 2 X 2 cross-tabulation, indicated a statistically significant association between gender and enrollment status after one year, $\chi^2(1, n = 6,447) = 48.375, p < 0.001$ (2 tailed). However, a test for effect size (phi coefficient) revealed no practical significance, $\theta = .087$, indicating that, in the context of the large sample size, less than 1% of the variance between Active and Non-active enrollment status could be explained by gender (Cohen, 1988).

Table 2

Relationship between Gender and Enrollment Status after One Year.

	Gender as % Initial Enrollment (as of Sept. 30, 2007)		Gender as % Enrollment after 1 year (as of Sept. 30, 2008)	
	<i>n</i>	% of Total	% of Active	% of Non-Active
Male Students	3307	51%	48%	57%
Female Students	3140	49%	52%	43%
Total Students	6447	100%	100%	100%

Date of admission. For the purpose of this study, the independent/predictor variable *admission date* was operationalized in terms of five monthly categories (May to September) in which

students accepted offers of admission from the college. A Chi-squared test for independence, using a 2 X 5 cross-tabulation, indicated a significant association between date of admission and enrollment status after one year, $\chi^2(1, n = 6,447) = 48.83, p < 0.001$ (2 tailed). Table 3 summarizes the data with respect to enrollment status and the five categories of admission dates.

Table 3

Date of Admission and Enrollment Status after One Year.

Date of Admission (categorized by month)	Initial Enrollment (Fall, 2007)		Enrollment after 1 year (Fall, 2008)			
			Active		Non-Active	
	<i>n</i>	% of Total	<i>n</i>	% of Active	<i>n</i>	% of Non-Active
May 2007	5,281	82%	3,399	84%	1,882	78%
June 2007	323	5%	191	5%	132	5%
July 2007	408	6%	236	6%	172	7%
August 2007	307	5%	160	4%	147	6%
September 2007	129	2%	65	1%	64	4%
Total	6447	100%	4,039	100%	2,408	100%

However, a test for effect size revealed no practical significance, Cramer's $V = .087$, indicating that less than 1% of the variance between Active and Non-Active enrollment status could be explained by admission dates. Therefore, while statistically significant differences were found in attrition rates when correlated with dates of admission, this finding had no practical significance since the vast majority (78%) of students who were Non-active after one year had, in fact, enrolled in the earliest admission category (May 2007). Figure 1 illustrates the contrast between statistical significance and practical significance by comparing the rising rates of attrition across the five categories of admission dates (top) against the *actual* numbers of Active and Non-active students across the same five categories of admission dates (bottom). While the *rate* of Non-active students was lowest in the first category (May), in actual counts this category

comprised the majority (78%) of students who were subsequently identified as Non-active after one year.

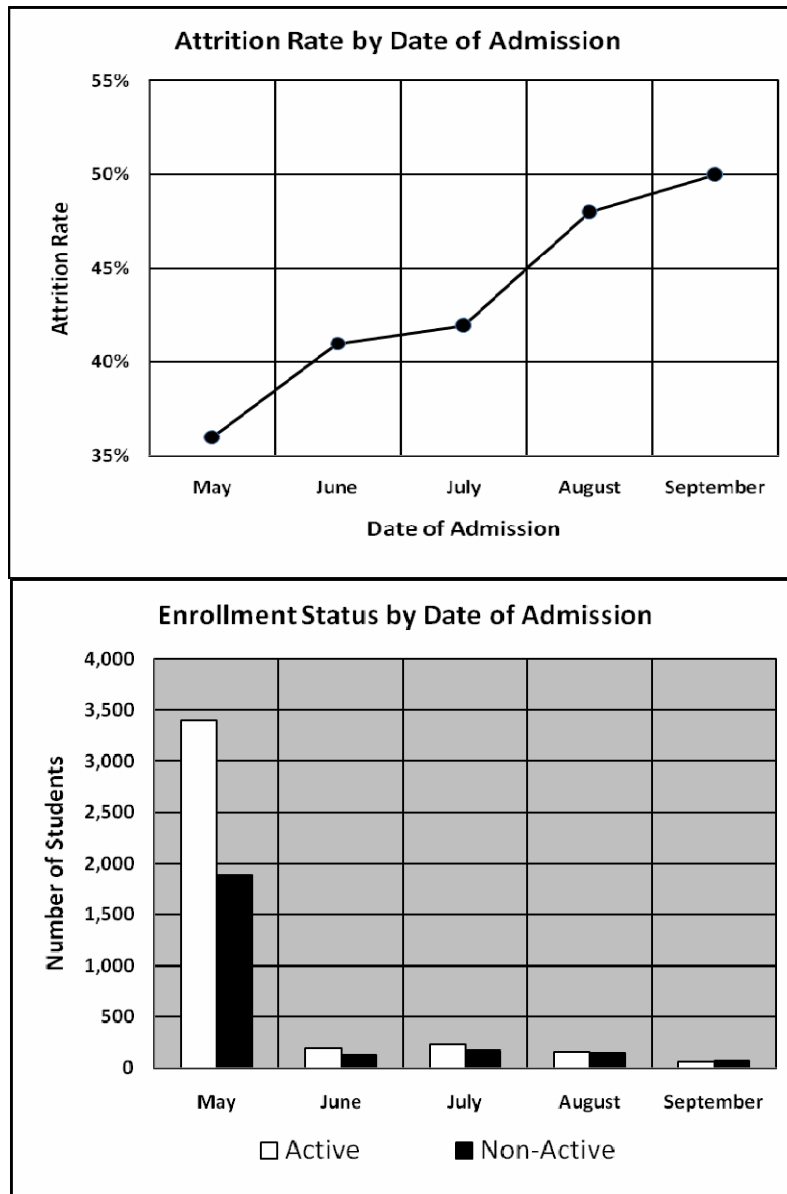


Figure 1. Statistical significance (top) versus practical significance (bottom). Attrition rate by admission date (top); actual number of Active/Non-active students by admission date (bottom).

Program choice. For the purpose of this study, *program choice* was operationalized in terms of each students' attainment of their preferred choice of program, represented by six categories (from 1st Choice to 5th Choice, plus an additional category representing "Other" choice). A Chi-

squared test for independence, using a 2 X 6 cross-tabulation, indicated a statistically significant association between program choice and enrollment status after one year, $\chi^2(1, n = 6,447) = 24.81, p < 0.001$ (2 tailed). Table 4 summarizes the data with respect to enrollment status and the six categories of program choice.

Table 4

Program Choice and Enrollment Status after One Year.

Categories of Program Choice	Enrollment Status after 1 Year					
	Total		Active		Non-Active	
	<i>n</i>	% of Total	<i>n</i>	% of Active	<i>n</i>	% of Non-Active
1 st Choice	4,139	65%	2,645	65%	1,494	62%
2 nd Choice	1,219	19%	761	19%	458	19%
3 rd Choice	604	9%	372	9%	232	10%
4 th Choice	233	4%	134	3%	99	4%
5 th Choice	160	2%	87	2%	73	3%
Other Choice	92	1%	40	2%	52	2%
Total	6,447	100%	4,039	100%	2,408	100%

However, a test for effect size revealed no practical significance, Cramer's $V = .062$, indicating that less than 1% of the variance between Active and Non-active enrollment status could be explained by program choice. Therefore, while the *rate* of attrition rose inversely to students' preferred program choices, the majority (81%) of students who were Non-active after one year had, in fact, received their first or second preferred choice of program upon admission to the college, suggesting that lack of preferred program was not a significant factor affecting the majority of students who were Non-active after one year.

As in the discussion of admission dates, the contrast between statistical significance and practical significance can be graphically illustrated by comparing the rising *rate* of attrition per category of program choice against the *actual* numbers of Active and Non-active students per category of program choice. While the *rate* of Non-active students rose inversely from “First Choice” to “Other Choice” (Figure 2, top), the majority (81%) of Non-active students had, in fact, received their first or second preferred choice of program (Figure 2, bottom).

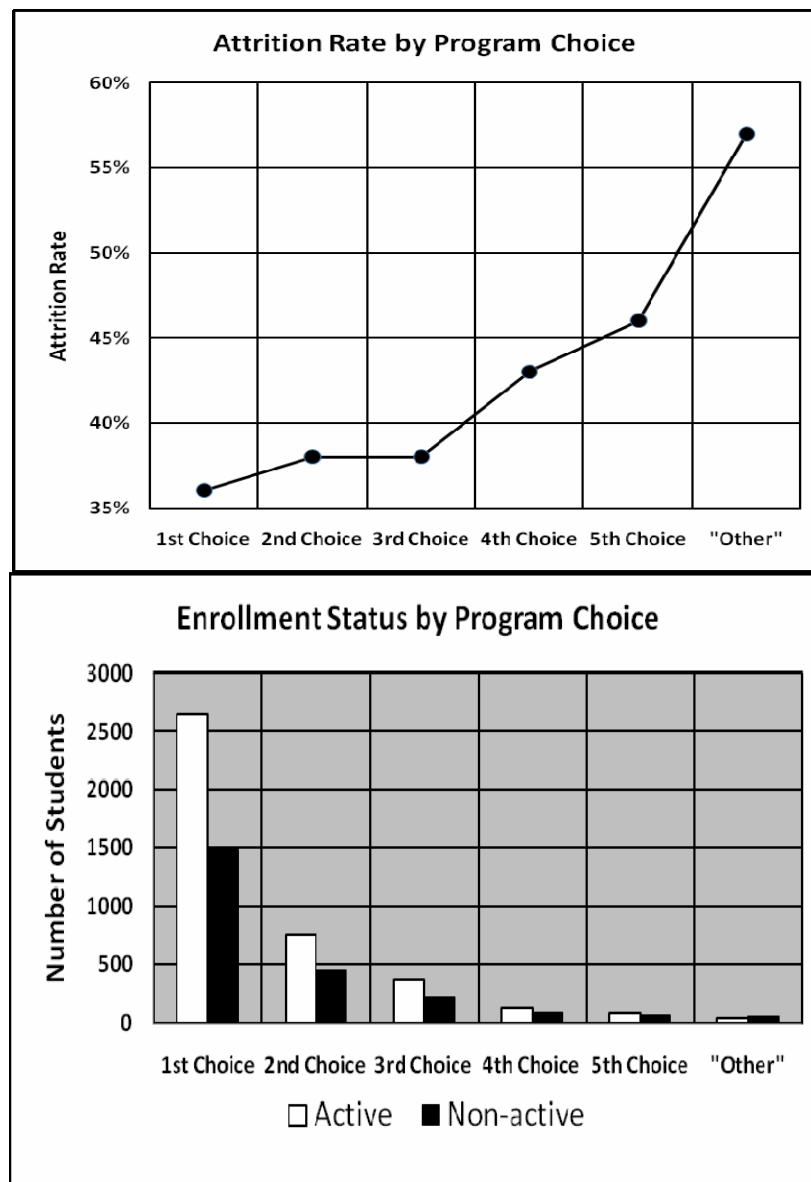


Figure 2. Statistical significance (top) versus practical significance (bottom). Attrition rate by program choice (top); actual number of Active/Non-active students by program choice (bottom).

Academic preparedness. For the purposes of this study, *academic preparedness* was operationalized as the successful completion of an academic upgrading course during the fall term of 2007. Based on mandatory diagnostic testing in two college departments, 1,195 incoming students were placed in level-appropriate academic upgrading courses. Of that group, 941 (79%) successfully completed their academic upgrading courses, while 254 (21%) did not. A Chi-squared test for independence (with Yates Continuity Correction), using a 2 X 2 cross-tabulation, indicated a statistically significant association between academic preparedness (as measured by successful completion of an academic upgrading course) and enrollment status after 1 year, $\chi^2(1, n = 1,195) = 162.6, p. < 0.001$ (2 tailed). Pearson Chi-square correlation also indicated a significant association, $r = .387, p < .01$ (2 tailed). A subsequent test for effect size, $\theta = .387$, indicated that 14.9% of the variance between Active and Non-active enrollment status could be explained by academic preparedness, suggesting a correlation of moderately strong practical significance. Table 5 shows that students who successfully completed an academic upgrading course were far less likely to withdraw by their second year of studies (31% attrition) than students who did not successfully complete an academic upgrading course (73% attrition), and were 6.3% less likely to withdraw than the overall student population (37.3% attrition).

Table 5

Academic Preparedness and Enrollment Status:

	Fall 2007		Enrollment Status (after 1 Year)		
			Active	Non-Active	
	<i>n</i>	<i>n</i>	% of Category	<i>n</i>	% of Category
Students who did <i>not</i> successfully complete their academic upgrading course	254	69	27%	185	73%
Students who successfully completed their academic upgrading course	941	649	69%	292	31%
Total student population	6,447	4,039	62.7%	2,408	37.3%

Student Engagement. For the purposes of this study, *student engagement* was operationalized as the mean score obtained on a *Student Engagement Index* arising from a student survey questionnaire administered, after 10 weeks of classes in the fall term of 2007, to a subset of beginning full-time students ($n = 142$) enrolled at a satellite campus that had implemented a purposeful student engagement strategy. The findings indicated that only 14% of beginning students at this satellite campus were no longer enrolled after one year, compared to the overall college attrition rate of 37.3%. Furthermore, students from this subset who were not actively enrolled after one year had significantly lower mean scores ($M = 2.44$) on the Student Engagement Index than those students who were still actively enrolled after one year ($M = 4.29$). Table 6 summarizes the data with respect to enrollment status and results from the student engagement survey.

Table 6

Student Engagement Index and Enrollment Status.

Student Engagement Index (after 10 weeks of classes)	Enrollment Status (after 1 year)		
	Total	Active	Non-Active
Number of Respondents (n)	142	120	22
Percentage of Respondents (%)	100%	86%	14%
Mean Score on Engagement Index (M)	4.02	4.288	2.44
Standard Deviation (SD)	.787	.649	.838

A subsequent t - test for independence indicated a significant association between scores on the Student Engagement Index and enrollment status after 1 year, $t = 6.99$, df 141, $p < .001$. Similarly, Pearson correlation also indicated a significant association, $r = .611$, $p < .01$ (2 tailed) between the students who were no longer enrolled in the fall 2008 term and their mean scores on the Student Engagement Index. A subsequent test for effect size, $R^2 = .373$, indicated that more than 37% of the variance between Active and Non-Active enrollment status could be explained by student engagement, suggesting a correlation of strong *practical* significance between student engagement scores and attrition rates. Figure 3 graphically illustrates the differences between Active and Non-active students with respect to their mean scores on the global Student

Engagement Index, compared to their mean scores on two items (“Feel socially isolated” and “Feel like a number”) that were strongly related to higher attrition rates.

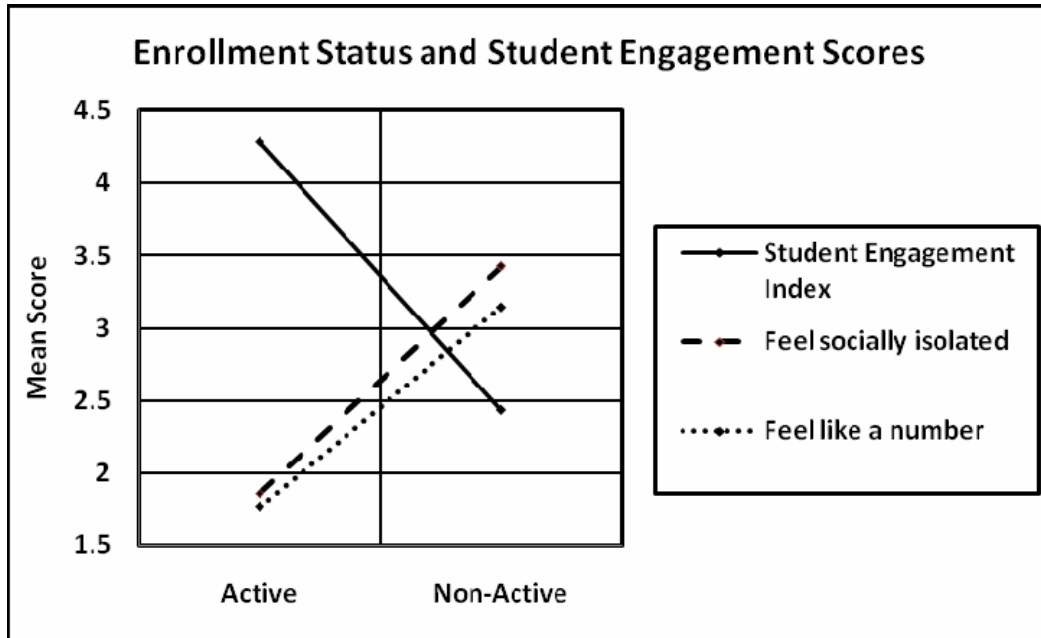


Figure 3. Enrollment status and student engagement scores.

Table 7 summarizes the overall results of the previously described analytical tests of statistical significance, correlation coefficients, and tests of practical significance for the dependent/criterion variable (*enrollment status*) and the five independent/predictor variables (*gender, date of admission, program choice, academic preparedness, and student engagement*).

Table 7

Summary of Results: Analyses of Relationships between Dependent and Independent Variables Related to College Attrition.

Independent/ Predictor Variables	Dependent/Criterion Variable: Enrollment Status After 1 Year		
	Test of Statistical Significance	Correlation Coefficient	Test of Practical Significance (Effect Size)
Gender	$\chi^2 (1, n = 6,447) = 48.375^{**}$	$r = .087^*$	$\theta = .087$ < 1% of variance
Date of Admission	$\chi^2 (1, n = 6,447) = 48.83^{**}$	$r = .084^*$	Cramer's $V = .087$ < 1% of variance
Program Choice	$\chi^2 (1, n = 6,447) = 24.81^{**}$	$r = .059^*$	Cramer's $V = .062$ < 1% of variance
Academic Preparedness	$\chi^2 (1, n = 1,195) = 162.6^{**}$	$r = .387^{**}$	$\theta = .387$ > 15% of variance
Student Engagement	$t (df, 138) = 6.99^{**}$	$r = .611^{**}$	$R^2 = .373$ > 37% of variance

* $p < .01$ (2 tailed). ** $p < .001$ (2 tailed).

DISCUSSION

The current study revealed that, of the 6,447 beginning full-time students who began their college programs in the fall of 2007, 2,408 (37.3%) were no longer enrolled after one year (as of Sept. 30, 2008). This figure was higher than the average freshman year attrition rate of 32% across the Ontario college system reported by Stoll and Scarff (1983), lower than the average attrition rate of 43.5% reported for Ontario colleges from 1998-2003 (Ontario Ministry of Education and Training, 2004), and generally consistent with the historical mean for postsecondary attrition reported by Tinto (1993). The study also revealed that 77% of the students who withdrew from their college programs did so at the end of the first *term*, suggesting that the factors affecting attrition were exerting their strongest influences during the early stages of beginning students' college experiences, and that strategies designed to address attrition

would be most effective during this shorter timeframe, when students are still on the threshold between the comfort zone of previous experiences and the new, relatively unfamiliar college environment.

Overall, the study revealed that three of the attrition-related factors under examination (*gender*, *date of admission*, and *program choice*) showed statistically significant relationships with attrition, but no *practical significance*, since none of these factors could explain more than 1% of the variance in enrollment status at the end of the 1-year study. On the other hand, two of the factors under investigation, *academic unpreparedness* and *low student engagement*, were found to be strongly related to attrition rates, and explained 15% and 37% respectively of the variance in enrollment status. The specific effects on attrition of each of the five factors examined in this study are discussed individually below.

Gender. With respect to the relationship between *gender* and attrition, while males represented 51% of the beginning freshman cohort compared to females (49%), after one year this ratio had reversed, with females representing 52% of actively enrolled students compared to males (48%) at the end of the study. This higher attrition rate for males is comparable to findings in some previous studies (Baxter, 2004; Bussière, 2006; Ma & Frempong, 2008; Parkin, 2009). Ma and Frempong (2008), for example, found males to have 1.64 times the risk of attrition as females in postsecondary education. However, other studies reported higher attrition for females (Lenning, 1982; Looker & Lowe, 2001; Thiessen, 2001; Tinto, 1993), or found no correlations with gender at all (Aquino, 1990; Fischbach, 1990; Mohammadi, 1994; Summers, 2000).

The implication of these diverse findings suggests that attrition factors differ among males and females in “ways which extend beyond the boundaries of the college” (Tinto, 1993, p. 77), with, for example, child-raising responsibilities impacting more heavily upon females, or pressure for occupational attainment weighing more heavily upon males. This current study clearly reflected the complexity of the broader gender/attrition dynamic, since, although males withdrew at higher rates than females, subsequent tests of practical significance found that less than 1% of the variance between Active and Non-active enrollment status over the course of this study could be explained by gender. Therefore, institutional efforts to design effective retention strategies and targeted interventions based on gender will probably prove ineffective without a clearer understanding of the multi-dimensional interrelationships associated with gender and

postsecondary education attrition. Further study is required to more clearly delineate the landscape of postsecondary attrition with respect to the changing demographics and interrelated exogenous forces related to gender, age, societal expectations, economic conditions, job market opportunities, and so forth.

Date of admission. The current study revealed that attrition rates increased progressively across the five categories of monthly admission dates (from May to September), with the highest attrition associated with students who enrolled in the last two admission categories (August and September). These findings were comparable to other studies that reported similarly strong relationships between late admission and attrition (Canales, 2008; Peterson, 1986; Sova, 1986; Stein, 1984; Street, Smith, & Olivarez, 2001; Summers, 2000; Tincher-Ladner, 2006). However, while late enrollers presented higher *rates* of attrition, the *actual numbers* of Non-Active students who enrolled late (i.e., in August or September) represented a very small segment (7%) of the total Non-active group. In the context of the effect size of the large sample (6,447), subsequent tests of practical significance revealed that less than 1% of the variance between Active and Non-active enrollment status could be explained by admission dates. The implication of this finding is that institutional changes to policies concerning late admissions would have little effect on reducing overall attrition rates. While late admission was found to be a significant factor with respect to *individual student* decisions to withdraw, from the *institutional* perspective this finding had no practical significance; the vast majority (78%) of Non-active students had, in fact, enrolled in the earliest admission category (May).

Program choice. This study revealed that, with respect to *program choice*, attrition rates rose inversely to enrollment in a student's preferred choice of program. Attrition rates were highest for students who received their lowest (fifth) preferred choice of program (46% attrition) or "Other" program choice (57% attrition). This result was comparable to those found in the literature that reported consistently higher attrition rates among students who reported a poor "fit" with their program (Baxter, 2004; Berger, Motte & Parkin, 2007; Bussiere, 2006; Grayson & Grayson, 2003; Lambert, 2004; Lenning, 1982; Parkin, 2009; Tinto, 1993). In one study, 52% of students who withdrew cited "lack of interest or satisfaction with their program" (Parkin & Baldwin, 2009, p. 10) as a significant factor in their decision to withdraw from postsecondary

studies, while in another study the majority of students who withdrew “didn’t like their program, or their program wasn’t ‘for them’” (Lambert, 2004, p. 19).

However, as in the discussion of late admission, while the relative *rates* of attrition were higher among those Non-active students who had failed to obtain their first or second choice of preferred program, in practical terms, these combined groups represented a relatively small segment (19%) of the overall number of Non-active students, suggesting that lack of preferred choice of program was not a key determinant affecting the overall attrition rate. The implication of this finding is that institutional changes to policies concerning program choice would have little effect on reducing overall attrition rates. While the failure to obtain one’s preferred program choice was found to be a statistically significant factor with respect to *individual student* decisions to withdraw, from the *institutional* perspective this finding had no practical significance; the vast majority of Non-active students (81%) had, in fact, obtained their first or second preferred choice of program.

Academic preparedness. For the purposes of this study, and building on previous pilot studies conducted at Fanshawe College, *academic preparedness* was operationalized as the successful completion of an academic upgrading course during the fall term of 2007. Based on diagnostic testing of incoming students in two college departments, 1,195 students were placed in level-appropriate academic upgrading courses. Of that group, 941 (79%) successfully completed their academic upgrading courses, while 254 (21%) did not. This study revealed that, with respect to *academic preparedness*, those students who successfully completed an academic upgrading course were significantly less likely to withdraw (31% attrition) than students who did not successfully complete their academic upgrading course (73% attrition), and significantly less likely to withdraw than the overall cohort who began in the fall 2007 (37.3% attrition). Subsequent tests of practical significance indicated that, among those students who had participated in an academic upgrading course, 14.9% of the variance between Active and Non-active enrollment status after one year could be explained by successful completion of the academic upgrading course, a correlation of moderately strong significance.

This finding was comparable to a wealth of studies which have reported consistently that, whether operationalized in terms of previous (high school) academic performance, standardized diagnostic scores on entrance tests, or first term GPA results, low measures of academic

preparedness were found to be strongly related to higher attrition rates (Bean & Metzner, 1985; Boughan, 1998; Bussiere, 2006; Dietsche, 1990; Hagedorn, Maxwell, & Hampton, 2002; Lanni, 1997; Lenning, 1982; Looker & Lowe, 2001; Ma & Frempong, 2008; Parkin & Baldwin, 2009; Schollen, et al., 2008; Thiessen, 2001; Weissman, 1997; Zhao, 1999).

Furthermore, a wide range of experimental findings have described the positive effect on postsecondary attrition of providing academic upgrading or remediation courses, especially with respect to essential literacy and numeracy skills (Attewell, 2006; Bettinger & Long, 2005; Boylan, 1999; Colton, 1999; Glenn, 2005; Herzog, 2005; Hoyt, 1999; Raub & Adam, 2005). Raab and Adam (2005), for example, found that students who had successfully completed pre-enrollment summer remedial programs had attrition rates of 20.8% compared to the overall institutional rate of 32.3%, a finding comparable to those revealed in the current study. Similarly, Bettinger and Long (2005) found that beginning postsecondary students receiving remediation in literacy skills were 9.7% less likely to withdraw than the overall student population.

The findings of the current study also validated a previous series of pilot studies conducted at Fanshawe College that found strong relationships between academic upgrading and retention (Prokopick, Hoth, & Feltham, 2007; Henning, 2005; Marshall, 2007). Prokopick, Hoth, and Feltham (2007), for example, found a 5.2% increase in retention for students who successfully completed a newly-implemented literacy upgrading course, compared to the previous three-year average retention rate in the general communications courses that had preceded the literacy upgrading course. Henning (2005) similarly found a very strong relationship between low completion rates in manufacturing sciences programs and low scores on initial mathematics diagnostic tests. The implication of these findings is that institutional investment in programs dedicated to early identification and appropriate upgrading of essential academic skills could have a significant impact on reducing overall attrition rates, since successful completion of academic upgrading courses was strongly related to lower attrition over the course of this study.

Student engagement. Participants in the student engagement survey were drawn from one of Fanshawe College's satellite campuses (at Woodstock, Ontario) that had purposefully implemented a range of social and academic engagement programs. Evidence of the effect of this student engagement strategy was indicated in the dramatically lower attrition rate (14%) of the

2007 beginning cohort compared to the overall college attrition rate (37.3%). Of the students who were still actively enrolled after one year ($n = 120$), the majority agreed or strongly agreed that the satellite campus was an “inviting environment” (93%), found it “easy to make friends” (88%), felt “socially connected” (71%), and felt a “good fit” (84%) with the Woodstock program. On the other hand, of the students who were Non-active after one year ($n = 22$), 45% felt “socially isolated” (compared to 8% of Active respondents), and 39% felt “just like a number” (compared to 7% of Active respondents). Overall, the Non-active students scored significantly lower ($M = 2.44$) than Active students ($M = 4.29$) on the global Student Engagement Index.

Anecdotal comments obtained through two student focus group sessions ($n = 14$), conducted in the fall of 2007 at the Woodstock campus, reinforced these findings with respect to the association of student engagement and enrollment status. Focus group participants (all of whom were subsequently Active after one year) expressed feelings of “belonging here” and used words like “family” and “community” to describe their own sense of engagement. Students repeatedly agreed that they were “not just a number”. “I feel comfortable, almost like a home away from home”; “the friendly atmosphere gives me the confidence to complete the program and also gives me the attitude to keep going and want to come to class”; “I am not a number here, I am a person”. Students spoke of their sense of “personal connection” with the college, praising faculty and staff as being “really personable” and “treating you like an individual, not just another student paying tuition”.

With respect to responses to statements on the *student engagement questionnaire* specifically related to their teachers, the majority of students who were subsequently Active after one year agreed or strongly agreed that their teachers were “enthusiastic” (88%), “use a variety of teaching strategies (80%), “are approachable” (94%), “care about my success” (87%), and “provide individual assistance” (81%). These impressions were reflected in similar comments from participants in the student focus groups, who valued the “personal, one on one connection” with many of their teachers, and appreciated classes that were “meaningful” and “relate back to our real lives”. Teachers were “more involved with the student because there are smaller classes”, “teachers connect on a personal level”, and there were many opportunities for “one on one teaching”. Students reported that their teachers “have a lot of initiative to help” and “share their stories, their successes, their feelings to help us with ours”. Many teachers “know us by

name” which “makes you want to come to class”. Further comments included: “teachers here are really approachable and understanding”, “they want to help each one of their students to succeed”, and “I can always talk to my teachers; they really care”.

These qualitative and quantitative findings were comparable those found in a wide range of studies which have reported consistently the significance of *student engagement* as a key factor in student decisions related to persistence/withdrawal (Andres & Carpenter, 1997; CCI, 2008; Grayson & Grayson, 2003; Kuh, 2003; Pascarella, 1985; Spady, 1970, 1971; Tinto, 1975, 1993). Tinto (1993), for example, found that “it is the individual’s *integration* into the academic and social systems of the college that most directly relates to his [sic] continuance in that college” (p. 96). Notably, many of these studies drew attention to “the particularly strong contributions of student-faculty relationships” (Pacarella & Terezini, 1977, p. 72) affecting student decisions to persist in postsecondary education. Astin (1997), for example, concluded that “student-faculty interaction has a stronger relationship to student satisfaction with the college experience than any other variable [and] any student characteristic or institutional characteristic” (p. 223). Drea (2004) similarly noted that “students will be successful when there is a genuine interest in student life by faculty and staff, [and recommended] the building of learning communities to help students integrate” (p. 4).

While the smaller size and more intimate environment of the satellite campus appear to have played a critical role in creating opportunities to enhance student social and academic engagement, the dramatic reduction in attrition rates achieved at this site nevertheless warrants further study of the affect of purposeful strategies aimed at enhancing student social and academic engagement. In the same context, the reduced attrition rates associated with successful completion of academic upgrading courses at the main campus similarly involved smaller class sizes, more individualized instruction, and greater student-faculty interaction. Further studies of the interrelationships between *academic upgrading courses* and *enhanced student-faculty interaction* could prove particularly instructive in identifying and enhancing strategies and interventions aimed at reducing postsecondary attrition rates.

Furthermore, since the study also revealed that 77% of the students who withdrew from the college did so at the end of the first *term*, it appears that the factors affecting attrition were exerting their strongest influences during the early stages of beginning students’ college experiences. Therefore, strategies and programs designed to address academic preparedness and

student engagement would be most effectively deployed during this shorter timeframe, when these *threshold students* are still on the college doorstep, so to speak, vacillating between the comfort zone of their previous known experiences and the relatively unfamiliar environment of the new institution.

Overall, with respect to this study, a few methodological limitations should be noted. First, the current study was based on only one institution. While this large, comprehensive college may be considered representative of Canadian community colleges in terms of program offerings and student demographics (Dietsche, 2008), additional research at other Canadian colleges should be explored to validate the results of this study. Second, while the population under investigation was large ($n = 6,447$), results of analyses for two of the five factors (*academic preparedness* and *student engagement*) were based on smaller subsets ($n = 1195$, and $n = 142$ respectively), thus increasing the risk of Type I error, especially with respect to student engagement findings. However, the alphas for all analyses were small, consistently below the .01 level, and the results for the current study appear analogous to other studies mentioned in the Introduction and Discussion sections. Finally, this was a 1-year study; longitudinal studies that follow enrollment status and attrition-related factors over longer periods should be explored in future research. This is especially relevant in the context of institutional challenges in differentiating between students who discontinue their studies permanently and students who re-enroll at a later date, or who re-enroll at other colleges (Parkin & Baldwin, 2009).

In conclusion, the results of this current study indicated that both *academic unpreparedness* and *low levels of student engagement* were strongly related to year-over-year attrition at this representative Canadian college. However, further studies could benefit from the exploration of attrition factors at other Canadian colleges, from the use of larger sample sizes (especially with respect to measures of student engagement), and from the use of longer timeframes that address the challenging phenomenon of tracking Non-active students who subsequently re-enroll either at a later date or at other colleges or postsecondary institutions. Additionally, further study of the interrelationships between academic upgrading and enhanced student-faculty interaction could provide valuable additional information to further our understanding of the affect of these critical factors in reducing college attrition. Finally, appropriate databases and information management systems should be developed to better utilize, on an on-going longitudinal basis, the wealth of available attrition-related data. With a

clearer understanding of the factors affecting attrition, and with the concerted development and implementation of effective predictive models, retention strategies, and targeted interventions, Canadian colleges in the 21st century are well positioned to make further progress in reducing the human and financial costs associated with postsecondary student attrition.

References

- Andres, L. & Carpenter, S. (1997). *Today's higher education students: Issues of admission, retention, transfer, and attrition in relation to changing student demographics*. Vancouver, BC: Centre for Policy Studies in Education, University of British Columbia.
- Aquino, F. (1990). *A typology of community college students' behaviors: Defining student success and student failure*. Paper presented at the Annual Forum of the Association for Institution Research, Louisville, KY.
- Association of Canadian Community Colleges (2008). *Economic contribution of Canada's colleges and institutes*. Ottawa, ON: Association of Canadian Community Colleges.
- Astin, A. (1997). How good is your institution's retention rate? *Research in Higher Education*, 38(6), 647-658.
- Astin, A. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel*, 25(4), 297-308.
- Attewell, P., Lavin, D., Domina, T., & Levey, T. (2006). New evidence on college remediation. *Journal of Higher education*, 77(5), 886-924.
- Attinasi, L. (1986). *Getting in: Mexican American students' perceptions of their college-going behavior*. Paper presented at the Association for the Study of Higher Education, San Antonio TX.
- Baxter, R. (2004). *Early leaver survey report*. Edmonton, AB: Grant MacEwan College.
- Beal, P. & Noel, L. (1980). *What works in student retention?* Iowa City, IA: American College Testing Program.
- Bean, J., & Metzner, B. (1985). A conceptual model of non-traditional undergraduate student attrition. *Review of Educational Research*, 55(4), 485-508, 520-530.
- Boughan, K. (1998). *New approaches to the analysis of academic outcomes*. Paper presented at the Annual Forum of the Association for Institutional Research, Minneapolis, MN.

- Braxton, J., Sullivan, A., & Johnson, R. (1997). Appraising Tinto's theory of college student departure. In J. Smart (Ed.) *Higher education: A handbook of theory and research, 12*, pp. 107-164. New York, NY: Agathon Press.
- Bussière, P. (2006). *Result from the third cycle of the Youth in Transition Survey*. Ottawa, ON: Learning Policy Directorate, Human Resources Development Canada.
- Cabrera, A., Castaneda, M., Nora, A., & Hengstler, D. (1992). The convergence between two theories of college persistence. *Journal of Higher Education, 63*(2), 143-164.
- Calder, W. & Gordon, B. (1996). Developing institutional leadership for student success. *College Canada, 1*(3).
- Canadian Council on Learning (2005). *Lessons in learning, October 28, 2005*. Vancouver, BC: Canadian Council on Learning.
- Canales, L. (2008). *Achieving the dream: Driving student success through a culture of evidence*. Paper presented at the Western Association of Schools and Colleges, San Diego, CA.
- Carnegie classification of institutions of higher education*. (2009). Stanford, CA: The Carnegie Foundation for the Advancement of Teaching. Retrieved July 10, 2009, from <http://www.carnegiefoundation.org/classifications>
- Colton, G., Connor, U., Shults, E., & Easter, L. (1999). Fighting attrition: One freshman year program that targets academic progress and retention. *Journal of College Student Retention, 1*(2), 147-162.
- Coutts, S. & Goyder, J. (1998). *Has the mathematical preparedness of first year students at the University of Waterloo declined?* Waterloo, ON: University of Waterloo.
- Cuseo, J. (2003). *Academic advisement and student retention: Empirical connections and systemic interventions*. Brevard College, NC: Policy Centre on the First Year of College. Retrieved March 17, 2007 from <http://www.brevard.edu/fyc/listserv/remarks/cuseorientation.htm>
- Dietsche, P. (1990). Freshman attrition in a college of applied arts and technology of Ontario. *The Canadian Journal of Higher Education, 20*(3), 65-84.
- Drea, C. (2004). Student attrition and retention in Ontario's colleges. *College Quarterly 7*(2), 1-7.
- Ethington, C. (1990). A psychological model of student persistence. *Research in Higher Education. 31*(3), 279-293.

- Fischbach, R. (1990). *Persistence among full-time students at Illinois Central College*. (ERIC Document Reproduction Service No. ED 325190)
- Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention and behaviour: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Gomme, I. & Gilbert, S. (1984). Paying the cost: Some observations on the problem of post-secondary student attrition. *The Canadian Journal of Higher Education*, 14(3), 95-100.
- Grayson, J. & Grayson, K. (2003). *Research on retention and attrition*. Montreal, QC: Canada Millennium Scholarship Foundation.
- Hageforn, L., Maxwell, W., & Hampton, P. (2002). Correlates of retention for African-American males in community colleges. *Journal of College Student Retention*, 3(3), 243-263.
- Henning, M. (2005). *A study of the level of math preparedness of manufacturing sciences students in the fall semester of 2005*. Unpublished manuscript, London, ON: Fanshawe College.
- Herzog, S. (2005). Measuring determinants of student return versus dropout/stopout versus transfer. *Research in Higher Education*, 46(8), 883-928.
- Hoyt, J. (1999). Remedial education and student attrition. *Community College Review*, 27(2), 51.
- Lambert, M., Zeman, K., Allen, M., & Bussière, P. (2004). *Who pursues postsecondary education, who leaves, and why? Results from the Youth in Transition Survey*. Ottawa, Canada: Statistics Canada.
- Lanni, J. (1997). *Modeling student outcomes: A longitudinal study*. Paper presented at the Annual Forum of the Association for Institutional Research, Orland, FL.
- Looker, E., & Lowe, G. (2001). *Postsecondary access and student financial aid in Canada: current knowledge and research gaps*. Ottawa, ON: Canadian Policy Research Network.
- Lowry, C., & Froese, W. (2001). *Transitions: Becoming a college teacher*. Paper presented at the 2001 Pan-Canadian Education Research Agenda Symposium, May 22-23, 2001, Laval University, Quebec City, PQ.
- Ma, X., & Frempong, G. (2008). *Reasons for non-completion of postsecondary education and profile of postsecondary dropouts*. Ottawa, ON: Learning Policy Directorate, Human Resources and Social Development Canada.
- Marshall, C. (2007). *Literacy and retention literature review*. Unpublished manuscript, London, ON: Fanshawe College.

- McClenney, K., & Marti, C. (2006). *Exploring relationships between student engagement and student outcomes in community colleges*. Austin, TX: University of Texas at Austin.
- McGregor, D., & Coen, S. (2006). *Student retention for the school's perspective*. Paper presented at the 2006 National Council of Higher Education Loan Programs, April 4-7, 2006, Nashville TN.
- McGrew, J., Nededog, A., & Cox, J. (2006). *College of natural science freshman retention survey*. Denver, CO: University of Colorado.
- Mohammadi, J. (1994). *Exploring retention and attrition in a two-year public community college*. Martinsville, VA: Patrick Henry Community College.
- Noel, L., & Levitz, R. (2007). *National Freshman Attitudes Report*. Iowa City, IA: American College Testing Program. Retrieved March 18, 2007 from www.noellevitz.com/freshman.
- Noel, L., Levitz, R., & Saluri, D. (1985). *Increasing student retention: Effective programs and practices for reducing the dropout rate*. San Francisco, CA: Jossey-Bass.
- Okanagan University College. (1996). *Student retention and attrition in academic and career technology programs at Okanagan university college, 1990-91 through 1995-96*. Vancouver, BC: Okanagan University College.
- Ontario Ministry of Education and Training. (2004). *Graduation rates in Ontario colleges 1998-2003*. Toronto, ON: Ontario Ministry of Education and Training.
- Parkin, A., & Baldwin, N. (2009). *Persistence in post-secondary education in Canada: The latest research*. Millennium Research Note #8. Montreal, PQ: Canada Millennium Scholarship Foundation.
- Pascarella, E., Ed. (1982). Studying student attrition. *New Directions for Institutional Research*, 9(4). San Francisco, CA: Jossey-Bass.
- Pascarella, E. & Terenzini, P. (1980). Predicting freshman persistence and voluntary dropout decisions from a theoretical model. *The Journal of Higher Education*, 51(1), 60-75.
- Pascarella, E. & Terenzini, P. (1977). Patterns of student-faculty informal interaction beyond the classroom and voluntary freshman attrition. *The Journal of Higher Education*, 48(5), 540-552.
- Peterson, B. (1986). *Institutional research: A follow-up study on the late applicant and late registrant at Honolulu Community College*. Honolulu, HI: Honolulu Community College.

- Prokopick, K., Hoth, W., & Feltham, M. (2007). *Literacy, general education, & communications: Retention analysis*. Unpublished manuscript, London, ON: Fanshawe College.
- Raab, L., & Adam, A. (2005). A learning-centred approach to retention and remediation. *New Directions for Institutional Research*, 125, 87-106.
- Sarkar, G. (1993). *Factors affecting retention of first-year students in a Canadian technical institute of applied science and technology*. Paper delivered at Canadian Institutional Researchers and Planners Conference, March 3-6, 1993, Simon Fraser University, Vancouver, BC.
- Schollen, L., Orpwood, G., Byers, P., Sinclair, M., & Assiri, H. (2008). *College mathematics project, 2007*. Toronto, ON: Seneca College of Applied Arts & Technology.
- Seymour, E., & Hewitt, N. (1997). *Talking about leaving: Why undergraduates leave the sciences*. Boulder, CO: Westview Press.
- Sova, A. (1986). *A study of the success rate of late admits in freshman English at a two-year college*. Working paper 2-86. Birmingham, NY: Institute for Community College Research, Broome Community College.
- Spady, W. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange*, 1, 109-121.
- Spady, W. (1971). Dropouts from higher education: Toward an empirical model. *Interchange*, 2, 38-62.
- Stein, J. (1984). *Should late enrolling new students be registered for classes?* Minneapolis, MN: Minneapolis Community College.
- Stover, C. (2007). College freshmen arrive with determination and motivation: Why do only half graduate? *Recruitment and Retention in Higher Education*, 21(3), 1-3.
- Street, M, Smith, A., & Olivarez, A. (2001). *The effects of early, regular, and late registration on community college student success*. Paper presented at the Annual Meeting of the Council for the Study of Community Colleges, Chicago, IL.
- Summers, M. (2000). *Enrollment and registration behaviors as predictors of academic outcomes for full-time students in a rural community college*. Paper presented at the Annual Meeting of the Council for the Study of Community Colleges, Chicago, IL.

- Summers, M. (2003). Attrition Research at Community Colleges. *Community College Review*, 30(4), 64-85.
- Thiessen, V. (2001). *Policy research issues for Canadian youth: non-completion of postsecondary educational programs*. Ottawa, ON: Human Resources Development Canada.
- Tincher-Ladner, L. (2006). *A review of late registration participants*. Mississippi Gulf Coast Community College.
- Tinto, V. (1997). Classrooms as communities: exploring the educational character of student persistence. *The Journal of Higher Education*, 68(6), 599-623.
- Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago, ILL: University of Chicago Press.
- Tinto, V. (1988). Stages of student departure: Reflection on the longitudinal character of student leaving. *The Journal of Higher Education*, 59(4), 438-455.
- Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45, 89-125.
- Townsend, B., Donaldson, J., & Wilson, T. (2004). Marginal or monumental? Visibility of community colleges in selective higher education journals. *Community College Journal of Research & Practice*, 29, 123-135.
- Usher, A., & Potter, A. (2006). *A state of the field review of post-secondary education*. Toronto, ON: Educational Policy Institute.
- Weissman, J., silk, E., & Bulakowski, C. (1997). Assessing developmental education policies. *Research in Higher Education*, 38(2), 187-200.
- Wignall, R. (2005). *School-to-college transition in Ontario: A review of the relevant research*. Toronto, ON: Colleges Ontario.
- Zhao, J. (1999). *Factors affecting academic outcomes of underprepared community college students*. Paper present at the Annual Forum for the Association for Institutional Research, Seattle, WA.

APPENDIX A

Student Engagement Index

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
This institution provides an inviting environment.					
I usually find it easy to make friends here.					
I usually feel socially connected here.					
I often think about dropping out.					
I feel just like a number most (or all) of the time at this institution.					
I enjoy participating in extra-curricular activities when I have time.					
I often feel socially isolated at this institution.					
I generally enjoy attending school here.					
I generally feel I have a good fit with this institution.					
Overall, I feel well engaged with this institution.					