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A Cohort-based Learning Community Enhances Academic Success and Satisfaction with University Experience for First-Year Students

Abstract

Assessment of a successful cohort-based learning communities program for first-year undergraduate students shows that students in the program perform better academically and also report a higher level of satisfaction with their university experience than students who are not in the program. Students enrolled in arts and science at the University of Toronto, who take several large-enrolment courses in their first year, may optionally participate in the First-Year Learning Communities (FLC) program, designed to assist with the academic and social transition from high school to university. In this Freshman Interest Group model of learning community, the curriculum across the clustered courses is not linked. The FLC program was assessed over a five-year period, using student academic records and self-reported survey data. This paper also provides details on program design and implementation.

L'évaluation d'un programme de communautés d'apprentissage fondées sur les cohortes pour les étudiants de première année du premier cycle qui a obtenu du succès montre que ceux qui sont inscrits à ce programme ont de meilleurs résultats scolaires et sont plus satisfaits de leur expérience universitaire que les autres. Les étudiants inscrits en arts et sciences à l'Université de Toronto, qui suivent plusieurs cours de première année où il y a de nombreux inscrits, peuvent participer au programme de communautés d'apprentissage la première année (CAPA) qui vise à les aider à effectuer la transition entre l'école secondaire et l'université sur le plan scolaire et social. Dans ce modèle de communautés d'apprentissage destiné au groupe d'intérêts particuliers des étudiants de première année, il n'y a pas de lien entre les programmes d'études des participants. Les chercheurs ont évalué le programme pendant cinq ans à partir des dossiers scolaires des étudiants et des données d'un sondage réalisé auprès d'eux. Le présent article fournit aussi des détails sur l'élaboration et la mise en œuvre du programme.

Keywords

learning communities, Freshmen Interest Group model, academic transition, social transition, student success, student experience

Cover Page Footnote

The author, who was director of the program reported here from 2005 to 2011, wishes to thank Heidi Pepper Coles (FLC Program Coordinator, 2006-07 to 2008-09 and 2010-11) for her assistance with many aspects of this paper; the Office of the Dean, Faculty of Arts and Science, University of Toronto, for funding this research study; Sinisa Markovic (Office of the Faculty Registrar) for providing data from student records; Barbara Thomson (Thomson Data Analysis) and David Andrews (Department of Statistics, University of Toronto) for data analysis; Deanne Fisher (formerly of Student Life Programs, University of Toronto, now Associate Vice President, Students, Ontario College of Art and Design University) for co-chairing (with Goldman) the committee that created the FLC program; Fisher, Glenn Loney, and Nona Robinson for commenting on an earlier version of the manuscript; and Richard Chow, Nelson De Melo, Jennifer Guyatt, Emanuel Melo, Morteza Memari, and Sally Walker for their continuing support of the FLC program.

This paper reports on the assessment of a learning community program for first-year students over a five-year period, using student academic records and self-reported survey data. Students in the University of Toronto's First-Year Learning Communities (FLC) program perform better academically and report a higher level of satisfaction with their university experience than students who are not in the program. Since the program's creation in 2005, other post-secondary institutions across Canada have expressed interest in learning about the Toronto program and its effectiveness. Thus, I also describe the FLC program in detail so that others can assess whether to implement a similar learning communities program.

Learning Communities

Learning community programs in North American post-secondary institutions originated in the 1920s with the Experiential College at the University of Wisconsin, and became widespread in the 1980s and 1990s (Pike, 2008). The common goal of learning communities is to improve the overall undergraduate education experience, including increasing a student's sense of intellectual and social integration with the institution. In general, a learning community is a cohort of students who take at least two courses together and are block scheduled (co-enrolled) into the same course sections. Regular mandatory meetings of 20 to 30 students are facilitated by an adviser; student interactions are both academic and social.

There are several models of learning communities. They differ largely in the degree of curriculum integration across the courses, from low or no integration (e.g., the Freshman Interest Groups model) to high integration (e.g., the coordinated/integrated studies model that links at least two courses across a common theme and is team-taught by faculty who designed the learning community curriculum). Some learning communities have a residential component where students enrolled in the same classes also live together. The University of Toronto's FLC program is modelled after the Freshman Interest Groups of the University of Texas at Austin. Other well-established Freshman Interest Group models include programs at the Universities of Oregon (first to establish the model in 1983), Washington (established 1987), and Missouri (established 1992).

Participation in a learning community results in many positive educational outcomes for students, including better grades, higher rates of course completion, improved retention of students into second and third years and higher rates of graduation (Lenning & Ebbers, 1999; Levine Laufgraben, 2005; Tinto, 2003). Students also acquire a better understanding of self and others, learn about the expectations of university and "how to learn" within the discipline, and establish academic and social support networks (Tinto, 2003). Students who have participated in such communities have reported to feel more connected with the university, as well as a greater satisfaction with university life (Tinto, 2003).

Upcraft, Gardner, and Barefoot (2005) have noted that learning communities can also directly support the dimensions which define a successful first-year student: the development of intellectual and academic competence, establishment and maintenance of interpersonal relationships, identity development, program considerations and career goals, maintenance of health and wellness, internalization of beliefs and values, development of an awareness of and appreciation for diversity, and the creation of community and civic responsibility. Sanford believed that "in order for students to succeed, they must be both challenged (provided with educational experiences that foster learning and personal development) and supported (provided

with a campus climate that helps students learn and develop)” (as cited in Upcraft, Gardner, & Barefoot, 2005, p. xii).

Research suggests that the effects of participation in a learning community are indirect; participation enhances student engagement which, in turn, leads to a variety of positive educational outcomes, such as achievement, learning, and success (Kuh, 2009; Pike, Kuh, & McCormick, 2011). Kuh (2009) defines student engagement as the time and effort students devote to activities that are empirically linked to desired outcomes of undergraduate education. Data from the National Survey of Student Engagement indicate that participation in a learning community is positively and significantly related to student engagement for both first-year and senior students (Pike, Kuh, & McCormick, 2011; Zhao & Kuh, 2004).

There is considerable literature on learning communities and how they function. Levine Laufgraben (2005) summarizes the implementation and assessment of learning communities. Details about creating and assessing learning communities, as well as sustaining and improving such programs, can be found in Leigh Smith, MacGregor, Matthews and Gabelnick (2004), Levine Laufgraben and Shapiro (2004), Shapiro and Levine (1999), and Taylor, Moore, MacGregor, and Linblad (2003) as well as from Washington Center’s Learning Communities National Resource Center website (<http://www.evergreen.edu/washcenter/lcfaq.htm>).

About the Toronto FLC Program

The FLC Program in the Faculty of Arts and Science, University of Toronto, was created in 2005 to improve the transition experience of entering students who are often enrolled in several large first-year classes and who are commuting to campus. The University of Toronto is a large, research-intensive university with approximately 76,000 undergraduate and graduate students on three campuses. The Faculty of Arts and Science, with approximately 26,000 full- and part-time undergraduate students, is located on the St. George campus in downtown Toronto, Canada. Approximately 6,000 students enter the Faculty each year directly from high school. Approximately 75% of these students commute to campus.

The FLC (pronounced “flick”) program provides students with several opportunities: to meet classmates and develop friendships; to develop the academic and personal skills needed to be a successful university student; to be introduced to the resources, opportunities, and culture of the campus and surrounding community; and to interact with faculty in a co-curricular context.

High school students entering their first year in the Faculty self-select (in June and July) to participate in the FLC program. Each student identifies, based on academic interests, with one of the program’s thematically-linked clusters (cohorts), such as Life Science, Commerce, Computer Science, Economics, Philosophy, Actuarial Science or International Relations. Life Science FLC groups are restricted to students who commute to campus; other FLC groups are also open to students who live in a university residence. Students are block scheduled into the same sections of two or more large-enrolment core courses as well as into the learning community sessions.

Each FLC group of 24 students meets bi-weekly for eight months (13 sessions total) between September and April. Sessions deliver academic, developmental, and social programming (such as study strategies, time management, and field trips) and are facilitated by upper-year student peer mentors, who receive guidance and support from a staff advisor, a faculty member (when possible), and the central FLC program office. Students who actively participate in the program receive a notation on their academic transcript but they receive no

academic credit. There is no fee for students to participate. Approximately 10% of entering students enrolled in the FLC program in September 2011.

Program goals. The goals of the FLC program (see Table 1) guide development and session programming. FLC is promoted as a small group of students who come together to create a community of learners. Promotional materials state: “First-Year Learning Communities (FLCs, “flicks”) make it easier to find your way around, make friends, form study groups, develop skills, and succeed academically. FLCs enhance the way you learn and help you connect to your university community.” FLC sessions are not tutorials, peer mentors are not tutors offering academic help with course material, and programming is *not* directly linked to course content. One faculty member aptly described FLC as “a social space to discuss academics.”

Table 1

Goals of the First-Year Learning Communities (FLC) Program, University of Toronto

1. Help students connect with each other, with faculty and staff, and the many opportunities available on campus.
 2. Help students navigate their transition from high school to university.
 3. Help students understand and develop the strategies and skills needed to be a successful university student.
 4. Help students adjust to the teaching style at university including becoming familiar with the culture and expectations of the institution and the expectations of instructors, and how to be successful in an environment where students are responsible for their own learning.
 5. Help students make new friends and develop a supportive peer network, including forming and sustaining a successful study group.
 6. Introduce students to the university resources, facilities, and services that will assist them to achieve their personal and academic goals.
 7. Promote the idea that a university education is more than attending classes, thus encourage students to participate in out-of-class campus activities.
 8. Create an atmosphere within the FLC that minimizes anxiety, promotes positive attitudes, and stimulates an excitement for learning.
 9. Enhance each student’s sense of belonging and identity with the University.
-

Registration/enrolment. Participation in FLC is voluntary and there is no financial cost to the student. Students are admitted only once a year, for courses beginning in September. All Arts and Science students are affiliated with one of the Faculty’s seven colleges, and the FLC cohorts are grouped by college. Incoming students learn about FLC from college or program materials, the *U of T Viewbook*, the Faculty of Arts and Science’s *First-Year Handbook*, and the

FLC website (<http://flc.utoronto.ca>). Each college reserves a block of spaces for its FLC students in the core courses (e.g., Life Science FLC students are block scheduled in biology, calculus, and chemistry with the other students from their college's FLC in a set schedule). Students view the pre-determined schedules posted on the FLC website. If they wish to join, they do so via the FLC website prior to the first day of online course enrolment. When students later log in to the university's course enrolment website to enrol in their other courses in late July, they have already been registered in their FLC course sections by the Office of the Faculty Registrar.

In addition to their core FLC courses, students are enrolled in their 90-minute FLC sessions. These sessions are held weekly for the first two weeks of the fall term and then in alternate weeks through to the end of March/early April. If students actively participate in FLC for the academic year (participate in at least 9 of 13 sessions) this is noted as a non-credit activity on their academic transcript.

Cohorts. Since its inception, FLC has grouped first-year students into "cohorts": Life Science, Commerce, Computer Science, Economics, Philosophy, Psychology, Social Science, and, most recently, Actuarial Science, and International Relations. While students in the Faculty of Arts and Science do not choose a program of study until the end of their first year, many do have an idea what programs are of interest to them, so they choose a FLC cohort that most closely aligns with their interests. The Life Science FLCs are restricted to commuting students because this cohort is large, and the students deemed most in need of a program such as FLC are commuters. The other FLC cohorts are also open to students living in a university residence, either because low participation numbers could hinder the building of community in a small department/unit, or for pedagogical reasons.

Peer mentors. Upper-year students from the same area of study as the cohort serve as the primary facilitator for each FLC group. They are responsible for programming, scheduling bi-weekly meetings with their advisors and mentoring the students in their FLC. The peer mentors each receive an honorarium of \$1,000 (for eight months, payable half in November and half in February). An assistant peer mentor position was added to the program in 2007-08. The assistant is typically a second-year student from the same area of study (and is often a former FLC student), who supports the peer mentor in programming and facilitation and receives an honorarium of \$400.

Peer mentors and assistant peer mentors are hired at the beginning of April through an application and interview process, coordinated by the FLC office and involving staff and faculty advisers and program liaisons. They are selected for their aptitude in facilitation, communication, leadership, and mentoring. After a two-hour orientation in April all peer mentors attend a mandatory, on-campus three-day training at the end of August prior to orientation week. Peer mentor training is provided collaboratively by the FLC central office and Student Life Programs and Services and with various guest speakers from across campus. In addition to FLC program-specific training and information, the peer mentors receive general training in facilitation, individual and group communication, diversity and equity issues, leadership principles, conflict resolution, mentorship, identifying and referring students in difficulty, program planning and implementation, and maintaining a budget.

Following each FLC session, the peer mentors provide written feedback to the FLC Program Coordinator on the effectiveness of the programming, documenting areas of success and/or concern and capturing the personal experience of the peer mentor. The Program Coordinator responds, offering feedback and support to the peer mentor.

Peer mentors meet with their staff and/or faculty adviser bi-weekly to plan FLC sessions. All peer mentors meet with the Program Coordinator as a group twice each term for in-service training. The Program Coordinator also meets individually with each cohort's peer mentor team twice during the year. Results of surveys completed by peer mentors show their overwhelmingly positive experiences in personal development, leadership skills, and connection to a community.

Advisers. Each FLC group has at least one adviser; all groups have an adviser who is a staff member and most also have a faculty adviser. The staff adviser is a registrarial staff member, student life professional, or undergraduate counsellor. Staff advisers participate in selection of peer mentors, guide peer mentors in their programming planning, participate in FLC sessions, manage the group's FLC expenses and perform other administrative functions. Staff advisers are given release time of approximately 1.5 hours per week to participate in FLC and receive no financial compensation for their participation. Some staff advisers oversee more than one group. Many staff advisers remark that their involvement with their FLC students and peer mentors is the highlight of their job and an excellent professional development activity. Faculty advisers are teaching-only or research-stream faculty members who provide guidance with respect to programming and participate in FLC sessions when their expertise is required. Faculty advisers volunteer approximately 1.5 hours per week to participate in the FLC program, and receive no financial compensation. Most FLC cohorts also have a program liaison (a staff member who works to ensure that the needs of their cohort are being met), often also holding the position of an FLC adviser.

Central office. The FLC program is administered within the Faculty of Arts and Science, with direct funding from the Office of the Dean. The Program Director (a part-time position) provides overall direction, supports the Program Coordinator, provides budget oversight, recruits faculty advisers, liaises with senior administration, participates in peer mentor training and acts a champion of the program within and outside the university. The founding Program Director (Goldman) is a faculty member in biology and the current director is an Associate Dean in the Faculty of Arts and Science.

The FLC Program Coordinator (a full-time position) is the first point of contact and administrative support for peer mentors, advisers, and program liaisons. The coordinator assists in the hiring of peer mentors and assistant peer mentors, provides training to peer mentors and assistant peer mentors, creates the peer mentor handbook for training and supervises senior peer mentors who assist with program development and delivery. The coordinator also develops FLC programming and supports existing programming initiatives. This work includes liaising with colleges, departments, academic programs, student life programs and student services to provide a wide breadth of quality programming. The coordinator also oversees the FLC website, promotes the FLC program at student recruitment events, coordinates student online registration and coordinates FLC-wide events such as the end-of-year banquet. In addition, the Coordinator is responsible for the administration of program evaluations. Part-time student staff employed by the central office also assist with program planning, development, and delivery.

Session programming. The content of each FLC session, addressing academic, developmental, and social transition areas, is designed by the student peer mentors within established program guidelines. FLC meetings cover a range of topics, including time management, academic integrity, getting involved at university, finding an academic/social life balance, choosing a program of study, research opportunities, peer networking, career networking, résumé writing, community outreach, a day in the life of a professor, getting a summer job, how to write a multiple-choice exam, how to prepare for a university exam,

studying abroad, and essay writing. Social activities are popular and include special interest tours, dodgeball, pumpkin-carving, bowling, cooking classes, museum tours, tai chi, yoga, ballroom and salsa dancing, skating, attending the Toronto International Film Festival, laser tag, and the FLC Amazing Race. All FLC students are invited to a free ice cream social in early September, free skating at city hall in February, and the FLC end-of-year banquet in April (subsidized tickets are sold to students). Several university departments, programs, and services also provide programming opportunities for FLC, inviting groups to attend health promotions or special sessions organized by the student academic integrity office, student life programs and services, the career centre, the international student centre, the anatomy museum, and the writing centres.

Program assessment. Each FLC student completes a mid-session evaluation in late November/early December and an end of year evaluation in late March/early April. The April survey is administered by the FLC office and contains about 30 items, assessing student satisfaction with the FLC program, level of development towards achieving the strategies and skills to be a successful university student, connection to a community on campus, level of knowledge of available resources on campus, and overall satisfaction with the university experience. Survey results inform program development in the subsequent year.

Program growth. Units that approach the FLC office with an interest and staff willing to volunteer their time are welcomed into the program if the central FLC office is able to provide the financial and staff support. The full-time Program Coordinator can successfully oversee a program of about 25 FLC groups (24 students per group, plus 50 peer mentors and assistants).

Budget. The budget for each FLC group is provided by the Office of the Dean and is transferred to and managed by each college, department, or program that hosts FLC groups. The budget includes fixed amounts for peer mentor honoraria and expenses for individual group activities, food, and FLC social activities. There are exceptions; for selected FLC groups, peer mentor honoraria and money for expenses are provided directly from the hosting unit's own budget.

Method

To assess the effectiveness of the FLC program, this paper analyzes (a) academic performance variables from student records, and (b) self-reported student satisfaction data and extra-curricular involvement data from surveys, over a five-year period (2005-06 to 2009-10). Retention within the program is also reported. Statistical analyses were produced using SAS software (SAS Institute Inc., Cary, NC).

This paper presents data representing the Life Science cohort, as this is the largest cohort in the FLC program (with a minimum of 11 FLC groups each year since 2005-06). A large data set enables robust statistical comparisons. The Life Science cohort is also the only FLC cohort with complete self-reported survey data (with controls) since 2005-06. To establish if results can be generalized to other FLC cohorts, academic performance variables from student records were also analyzed for the second largest FLC cohort, first-year Commerce students (8 to 10 FLC groups each year between 2006-07 and 2009-10). Because the results of the analyses of Commerce FLC vs. non-FLC (Control) students support the findings observed for Life Science FLC students, the specific findings of the Commerce FLCs are not presented in this paper; general remarks are included in the discussion.

Students in Life Science FLCs were block enrolled into three first-year core courses: biology (BIO150Y) and calculus (MAT135Y) (each are full-year courses) and chemistry

(CHM138H and CHM139H; each are half-year courses). Priority registration was given to students living off-campus (Fewer than 5% of students in Life Science FLCs lived in a university residence. These students were offered a place in residence *after* being accepted into FLC.)

Academic Performance

Two groups of Life Science students were compared (see Table 2):

1. FLC: Students who completed the FLC program and received a grade (greater than zero) in each of the core courses (biology, calculus, and chemistry). More than 95% of FLC Life Science students lived off-campus.
2. Control: Students who did not enrol in the FLC program, received a grade (greater than zero) in each of the core courses (biology, calculus, and chemistry), and were 20 years of age or younger (as the FLC program is for students who have recently graduated from high school). Reliable data indicating if a student lived in a university residence was not available, so the control group included students who lived on- and off-campus.

Four academic performance variables were obtained from student records (provided by the Office of the Faculty Registrar) for both FLC and Control groups for a five-year period, from 2005-06 to 2009-10 (GPA data were also included for 2010-11). The records also listed gender and the high school each student attended in Grade 12. Only complete records (including high school identification) were used for statistical analyses, yielding the sample sizes in Table 2.

Table 2

Number of students per group per year for academic performance variables and student satisfaction

| | Group | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 | Total |
|--------------|---------|---------|---------|---------|---------|---------|-------|
| Academic | FLC | 166 | 198 | 163 | 156 | 167 | 850 |
| Performance | Control | 813 | 611 | 606 | 482 | 563 | 3075 |
| Student | FLC | 235 | 225 | 219 | 202 | 220 | 1101 |
| Satisfaction | Control | 497 | 398 | 384 | 364 | 488 | 2131 |

The four academic performance variables are:

1. Grade12Final: Average of the highest six final grades obtained in Ontario Grade 12 courses including English (ENG4U) and Calculus and Vectors (MCV4U).
2. CoreGrade: Average of final grades in first-year biology (BIO150Y), calculus (MAT135Y), and chemistry (the scores for the two chemistry half courses CHM138H and CHM139H were first averaged); i.e., $\text{CoreGrade} = (\text{BIO150Y} + \text{MAT135Y} + ((\text{CHM138H} + \text{CHM139H})/2)) / 3$.

3. Grade Point Average (GPA) obtained at the end of each year of four years of study: GPA1 (i.e., GPA at end of first year), GPA2, GPA3, GPA4. For the 2005-06, 2006-07, and 2007-08 entering classes, GPA data are reported for years 1 to 4. For the 2008-09 entering class, GPA1, GPA2 and GPA3 are reported. For the 2009-10 entering class, only GPA1 and GPA2 are reported.
4. FCE2: Number of full-course equivalents (FCEs) completed in second year. This variable was used to determine retention from first year to second year. If FCE2 = 0 then a student in first year did not complete second year in the subsequent fall-winter academic session.

Adjustment of scores. The data showed that better high school students do better in university: GPA1 was plotted against Grade12Final for 14,683 full-time students (FCE > 3.0) in the Faculty of Arts and Science (over a five-year period, 2005-06 to 2009-10), and a highly significant regression was observed ($p < 0.0001$), with a correlation coefficient (r) of 0.6. Because students self-select to participate in the FLC program, it is possible that FLC and Control groups may have differed in academic ability before entering university, and that any differences in university marks could be explained by differences in ability as reflected in high school marks. Therefore, university academic performance variables (CoreGrade, GPA, FCE2) were adjusted to remove effects of high school marks and high school attended.

For each of the academic performance variables, analysis of covariance (ANCOVA) was used in SAS (PROC GLM) with the student's high school as a fixed effect and the Grade12Final score as a covariate. Residuals were saved and added to the overall mean for the academic performance variable to create the adjusted data. These new data have thus essentially removed the effects of attending different high schools and the students' high school grades. An analysis of variance (ANOVA) was then used in SAS (PROC GLM) with FLC participation as a fixed effect. Analyses with non-adjusted data were also performed to see the effect of adjusting scores; the results using adjusted data were slightly *less* significant than the non-adjusted results, so by adjusting for high school grades and high school attended, the conclusions in this report are statistically conservative.

Student Satisfaction and Extra-curricular Involvement

All students in Life Science FLCs (2005-06 to 2009-10) were enrolled in the first-year biology course BIO150Y. Each student who attended the final BIO150Y laboratory period in March was given a paper course evaluation survey administered by course teaching assistants. The average response rate over the five years was 86% (range 84% to 90%). The survey contained a maximum of 53 multiple-choice questions (most to do with BIO150Y, but also nine general questions on the student experience); most survey questions presented five options. Students entered their responses on an optical scan form. Student identification was not reported (i.e., responses were anonymous); the BIO150Y office staff scanned the student responses and tabulated the results.

The self-reported survey responses of two groups of students were compared (Table 2):

1. FLC: Students reported that they were enrolled in the FLC program (thus enrolled in BIO150Y, CHM138H, CHM139H, and MAT135Y), attended high school in the previous year and did not live in a university residence.

2. Control: Students reported that they were not in FLC, were enrolled in BIO150Y, CHM138H, CHM139H, and MAT135Y, attended high school in the previous year and did not live in a university residence.

Reported here are four survey questions that relate to student satisfaction and success:

1. Transition: “If you attended high school last year, your transition from high school to university was: (a) smooth from the start, (b) was rough at first but is okay now, (c) is still challenging, (d) is overwhelming, but I am seeking/getting help, (e) is overwhelming, and I don’t know where to get help.”
2. Connection to a community: “I feel connected to a community at U of T (i.e., I feel part of a group that shares common interests, goals, values, experiences; such as college, club, team, course union, student government, online community, etc.): (a) strongly agree, (b) agree, (c) neutral, (d) disagree, (e) strongly disagree.”
3. Supportive university: “The university provides the support I need to help me succeed academically: (a) strongly agree, (b) agree, (c) neutral, (d) disagree, (e) strongly disagree.”
4. University experience: “Overall, my university experience has been positive: (a) strongly agree, (b) agree, (c) neutral, (d) disagree, (e) strongly disagree.”

Two additional BIO150Y survey questions were used to explore differences in extra-curricular involvement between students in FLC and students not participating in FLC:

1. “Are you involved *this* year in extra-curricular campus activities outside of your classes?”
2. “Do you have an interest in being involved in activities on campus (outside of class) *next* year?”

Statistical analyses. For question 1 (Transition) a chi-square test was used to test for differences between the two groups, and was considered statistically significant if $p \leq 0.05$. For questions 2 to 4, the two positive responses (“strongly agree” and “agree”) were converted to 1 and the other three responses to 0 as a method for calculating the percentage of positive responses, and for questions 5 and 6, “yes” was converted to 1 and “no” to 0. *T*-tests were performed to compare the percentages of positive responses, using a pooled variance. All *t*-tests were two-sided and considered statistically significant if $p \leq 0.05$.

Ethical Considerations

This research was exempt from institutional research ethics review. According to Article 2.4 of the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (December 2010; <http://www.pre.ethics.gc.ca>), ethics approval is “not required for research that relies exclusively on secondary use of anonymous information, so long as the process of data linkage or recording or dissemination of results does not generate identifiable information” (p. 19). The identification of students (such as by name or student number) for the academic performance records obtained from the Office of the Faculty Registrar was not required for the analyses included in this report. BIO150Y and FLC surveys were completed anonymously. In

this report student academic performance records and self-reported survey data were not matched, nor was identifiable information generated.

Results

Academic Performance

With respect to high school grades (Grade12Final), there was no statistically significant difference ($p = 0.19$) between Life Science students in FLC ($N = 850$, mean = 88.63, standard deviation = 4.454) and those not participating in FLC ($N = 3075$, mean = 88.49, standard deviation = 4.576).

The results of analyses of covariance for effect of high school grades and high school attended against each academic performance variable are shown in Table 3. In every case, both showed a highly significant regression ($p < 0.0001$), indicating that it was appropriate to adjust for these two pre-university factors.

Table 3

Tests of effects of high school grades and high school attended from analyses of covariance

| Variable | Effect | Numerator df | Denominator df | <i>F</i> | <i>p</i> |
|------------|--------------|-----------------|-------------------|----------|----------|
| CoreGrades | Grade12Final | 1 | 3459 | 3080.95 | < 0.0001 |
| | High School | 464 | 3459 | 3.30 | < 0.0001 |
| GPA1 | Grade12Final | 1 | 3459 | 2944.70 | < 0.0001 |
| | High School | 464 | 3459 | 3.05 | < 0.0001 |
| GPA2 | Grade12Final | 1 | 3201 | 2264.74 | < 0.0001 |
| | High School | 453 | 3201 | 2.48 | < 0.0001 |
| GPA3 | Grade12Final | 1 | 2343 | 1290.37 | < 0.0001 |
| | High School | 397 | 2343 | 1.94 | < 0.0001 |
| GPA4 | Grade12Final | 1 | 1757 | 570.56 | < 0.0001 |
| | High School | 362 | 1757 | 1.50 | < 0.0001 |

Note. Each case shows a highly significant regression.

Table 4 shows that for each academic performance variable (CoreGrades, GPA1 to GPA4), students participating in FLC had significantly higher scores than students not participating in FLC. Each case shows a highly significant difference ($p < 0.001$).

Table 4

Tests of effect of participation in FLC (Yes/No) from Analyses of Variance

| Variable | FLC- Yes ¹ | FLC- No ¹ | Numerator df | Denominator df | <i>F</i> | <i>p</i> |
|------------|--------------------------|-------------------------|-----------------|-------------------|----------|----------|
| CoreGrades | 72.64 | 71.06 | 1 | 3919 | 31.91 | < 0.0001 |
| GPA1 | 2.87 | 2.75 | 1 | 3919 | 32.24 | < 0.0001 |
| GPA2 | 2.91 | 2.80 | 1 | 3650 | 26.46 | < 0.0001 |
| GPA3 | 2.98 | 2.89 | 1 | 2737 | 13.58 | 0.0002 |
| GPA4 | 2.98 | 2.87 | 1 | 2117 | 11.48 | 0.0007 |

Note. ¹ Least squares means from Analyses of Variance.

Retention to second year. If the number of full-course equivalents (FCEs) in second year was zero, then a student did not complete second year. There was no difference in the number of students in FLC and not in FLC who completed second year; 92.4% of FLC students had FCE2 > 0, compared with 93.1% of Control students which is not a significant difference, $t(4453) = 0.63$, $p = 0.527$. At the University of Toronto, a minimum of 3.0 full-course equivalents (FCEs) is required for full-time status. A greater number of FLC students (89.0%) were full-time in second year (p (FCE > 3.0) than students not in FLC (86.7%), but this difference is not statistically significant, $t(1522) = 1.92$, $p = 0.054$.

Gender. The FLC group had a significantly higher proportion of female students than the Control group: 66.4% of FLC students were female compared to 61.5% of non-FLC students, $t(4453) = 2.72$, $p = 0.0065$.

Student Satisfaction

Table 5 shows student responses to the survey question about transition from high school to university; $\chi^2 = 9.675$, thus the null hypothesis that the responses to this question are independent of group was rejected ($p = 0.022$). There are more “a” responses (transition to university was smooth from the start of the year) in the FLC group than expected and fewer “a” responses in the Control group than expected. Students in FLC reported a smoother transition from the start of university than students not participating in FLC.

Table 5

Student responses to survey question about transition from high school to university

| Group | Transition from high school to university was... | | | |
|------------------|--|------------------------------|--------------------------|--------------------------|
| | (a) Smooth from start | (b) Rough first, okay now | (c) Still challenging | (d+e) Is overwhelming |
| FLC (N=1053) | 20.72% (218) | 38.28% (382) | 32.95% (347) | 10.07% (106) |
| Control (N=2034) | 16.22% (330) | 38.94% (792) | 34.17% (695) | 10.67% (217) |

Table 6 shows student responses to the survey questions about connection to a community, supportive university, and university experience, where positive responses are “strongly agree” and “agree”; positive responses are graphically displayed in Figure 1. Table 6 also shows t -values, degrees of freedom, and probabilities for comparisons of the two groups for these three survey questions. The FLC group had statistically significant higher scores than the

Control group for all three questions ($p < 0.001$), reporting a greater connection to a community at the university, having received a greater amount of support to succeed academically, and a more positive overall university experience. While the overall percentages of positive responses as reported in Figure 1 appear to be relatively low for FLC students (42% for “connected to a community”, 40% for “supportive university”, and 57% for “university experience”), it is noteworthy that “neutral” responses were numerous (35%, 39%, and 30%, respectively), and thus negative responses (“disagree” and “strongly disagree”) were low (22%, 21%, 13%, respectively).

Table 6
Means, variability, and t-test results for student responses to three survey questions

| Variable | Group | N | Mean | Standard Deviation | Standard Error | df | t | p |
|-------------------------|---------|------|--------|--------------------|----------------|------|------|---------|
| Connection to community | FLC | 1100 | 0.4245 | 0.4945 | 0.0149 | 3228 | 9.47 | <0.0001 |
| | Control | 2130 | 0.2629 | 0.4403 | 0.0095 | | | |
| Support is provided | FLC | 1100 | 0.4009 | 0.4903 | 0.0148 | 3228 | 3.59 | 0.0003 |
| | Control | 2130 | 0.3371 | 0.4728 | 0.0102 | | | |
| University experience | FLC | 1096 | 0.5721 | 0.4950 | 0.0150 | 3224 | 3.00 | 0.0025 |
| | Control | 2130 | 0.5164 | 0.4998 | 0.0108 | | | |

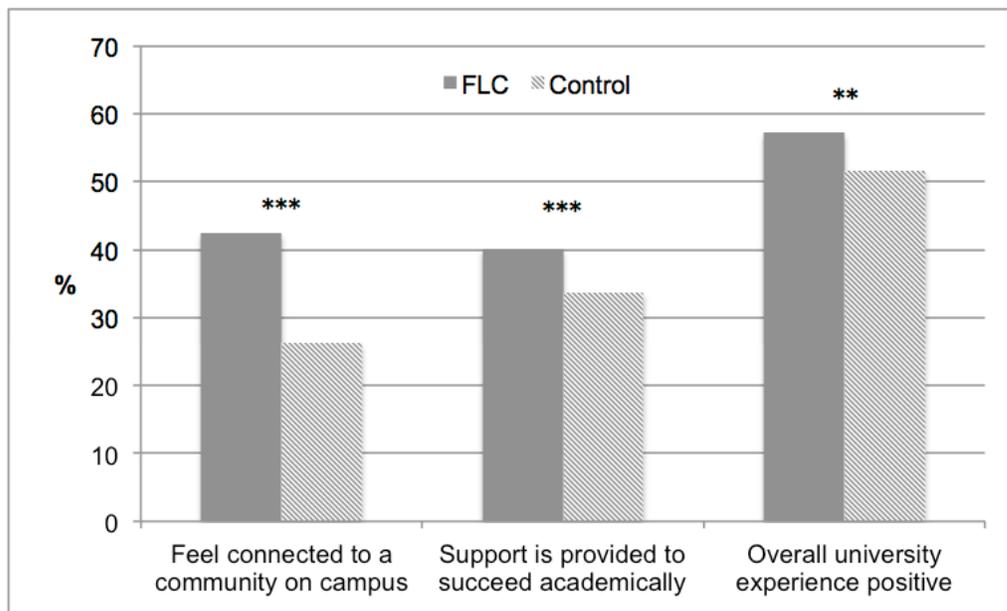


Figure 1. Positive (“strongly agree” and “agree”) responses to three survey question for FLC and Control groups; the between group difference for each of the three variables is significant (** = $p \leq 0.01$; *** = $p \leq 0.001$).

Extra-Curricular Involvement

Significantly more students in Life Science FLCs (44.96%) reported being involved in extra-curricular activities in their first year than students not in FLC (32.90%) (Table 7). Significantly more students in the FLC group (84.15%) reported at the end of their first year that they have an interest in being involved in activities on campus (outside of class) in their second year than students in the Control group (78.64%; Table 7).

Survey results for students *not* participating in FLC *and* who indicated on the survey that they lived in a university residence in their first year were also compared (Table 7): 52.49% reported being involved in extra-curricular activities (which is statistically *more* than the 44.96% of students in the FLC group), and 79.84% reported an interest in being involved in activities on campus (outside of class) in their second year (which is significantly *fewer* than the 84.15% of students in the FLC group). Students in FLC were less involved in extra-curricular activities in their first year than non-FLC students living in a university residence. However, students who participated in the FLC program were *more* interested in being involved in extra-curricular activities in their second year than non-FLC students living in a university residence.

Table 7

Means, variability, and t-test results for student responses to two survey questions about extra-curricular involvement

| | Variable | Group | N | Mean | Standard Deviation | Standard Error | df | <i>t</i> | <i>p</i> |
|-------------------|---|---------|------|--------|--------------------|----------------|------|----------|----------|
| FLC vs. Control | Involved <i>this year</i> | FLC | 863 | 0.4496 | 0.4977 | 0.0169 | 2490 | 5.97 | <0.0001 |
| | | Control | 1629 | 0.3290 | 0.4700 | 0.0116 | | | |
| | Interested in being involved <i>next year</i> | FLC | 858 | 0.8415 | 0.3654 | 0.0125 | 2471 | 3.30 | 0.001 |
| | | Control | 1615 | 0.7864 | 0.4100 | 0.0167 | | | |
| FLC vs. Residence | Involved <i>this year</i> | FLC | 863 | 0.4496 | 0.4977 | 0.0169 | 1743 | 3.15 | 0.0016 |
| | | Resid. | 882 | 0.5249 | 0.4997 | 0.0168 | | | |
| | Interested in being involved <i>next year</i> | FLC | 858 | 0.8415 | 0.3654 | 0.0125 | 1734 | 2.34 | 0.0195 |
| | | Resid. | 878 | 0.7984 | 0.4014 | 0.0135 | | | |

Note. Both FLC and Control students commute to campus. “Residence” group consists of non-FLC students living in a university residence.

Retention within FLC Program

Between 2005-06 and 2009-10, and across all cohorts, 1,850 students completed the FLC program and 568 students started the program but completed fewer than the 9 of 13 sessions required to receive an annotation on their transcript. The overall within-program retention rate was 77%. Within-program retention varied among the cohorts. For example, Life Science FLCs had 88% retention (1,136 students completed, 152 did not); the rate was 63% and 61% for

Commerce and Computer Science FLCs, respectively. Within-program retention also increased from the first year that a cohort joined the program. For example, the Philosophy FLC's 48% retention in the first year (2007-08) increased to 82% in the third year (2009-10).

Discussion

When students progress from high school to university, they are challenged by academic, social, and developmental transitions. Academic transition involves understanding and developing the strategies and skills needed to be a successful university student in an environment where students are responsible for their own learning. Social transition involves making new friends and developing a supportive peer network. Developmental transition involves managing health and developing an identity, a sense of purpose, values and ethics, and independence from parents. Many post-secondary institutions create initiatives to address transition issues. Evidence of whether a transition initiative is successful is obtained by measuring whether students who participate in the initiative obtain better grades and re-enrol in subsequent terms at a higher rate, establish academic and social support networks, and report a greater connection with their institution and a greater satisfaction with their university experience.

The First-Year Learning Communities (FLC) program at the University of Toronto was designed to help students with their academic and social transition from high school to university (specific program goals are articulated in Table 1). With respect to the academic transition, Life Science students who participated in the FLC program performed better academically than students not in the program; students obtained higher grades in their first-year core courses and higher grade point averages in each of four years of study. Analyses for Commerce FLC students demonstrated parallel findings: Commerce FLC students ($N = 520$, 2006-07 to 2009-10) obtained significantly higher grades ($p < 0.001$) in their first-year core course (RSM100Y) and significantly higher grade point averages (in first year and second year, $p < 0.01$) than Commerce students who were not in the FLC program ($N = 1,868$).

There was no difference in the grades obtained in high school by Life Science FLC students and non-FLC students; yet FLC students obtained higher grades in university. A recent study commissioned by the Higher Education Quality Council of Ontario found that the most powerful indicator of persistence (a student's success and completion once enrolled) and academic success in university is the strength of a student's high school grades (Dooley, Payne, & Robb, 2011). It is assumed then that the better academic performance in university of FLC students is a result of participation in the FLC program. However, I cannot rule out that students who self-selected to participate in FLC were more highly motivated to be successful university students and might have done as well academically if they had not participated in FLC.

This study could have controlled for motivation to enter the FLC program had the program advertised broadly and created a larger demand from students than the program could meet. The students who were not admitted would have been an effective control group because they would presumably have been as highly motivated as those students admitted to the program. The Faculty of Arts and Science did not want to create a situation whereby many students were disappointed at not being admitted to the FLC program, so the program's advertising efforts were tempered to just meet the capacity for spaces within the program.

The analyses reported here showed that there was *no* difference in the high school grades of Life Science FLC and non-FLC students. This is important because if FLC students had

performed much better in high school than non-FLC students, then the greater academic performance achieved by FLC students in university might not be attributable to participation in the FLC program. However, this study did attempt to control for pre-university factors; university marks in our analyses were adjusted to remove a priori differences in academic ability before entering university. By adjusting university grades (for high school attended and high school grades) the precision of the resulting comparisons increased.

I characterize the university “student experience” as having four primary elements (presented in descending order of importance):

1. Student satisfaction with their courses (both content and quality of instruction, as well as interaction with their instructors).
2. Student satisfaction with their grades (i.e., grades are reflective of effort and understanding).
3. Connection to a community on campus.
4. A supportive campus environment.

The FLC program was created to directly address the latter two elements (3 and 4), while providing the necessary conditions that indirectly address the first two elements (1 and 2). Life Science students who participated in the FLC program reported a higher level of satisfaction with their university experience in four ways. Compared to non-FLC students, FLC students reported having a greater connection to a community on campus, receiving a greater amount of support to succeed academically, and a more positive overall university experience. In addition, more FLC students reported having a “smoother transition from the start” than non-FLC students.

One of the goals of the FLC program (see Table 1) was to promote among students the idea that a university education involves more than attending classes. Thus, students were encouraged to participate in out-of-class campus activities. Life Science students who participated in FLC reported a higher level of extra-curricular involvement than students not in FLC, and more FLC students reported being interested in participating in activities outside of class in their second year. This is a welcome result, but perhaps not surprising, as one could assume that students in FLC have a higher motivation to participate in extra-curricular activities as FLC itself is an extra-curricular activity, despite its emphasis on promoting academic success.

Life Science students in the FLC program were as likely to return to and complete second year as non-FLC students. This is not surprising; retention rates from first year to second year within the Faculty of Arts and Science are high, at over 90%. However, at institutions where retention rates from first to second year are low, learning community programs have been shown to increase retention. A retention study at the University of Missouri-Columbia showed a 12% higher retention rate after three years for students who participated in a Freshman Interest Group (Student Life Studies Abstracts, 1996).

Overall retention within the FLC program is also high: 77% of students who started the FLC program completed at least 9 of 13 program sessions and received an annotation on their academic transcript. However, there is variation among cohorts. Retention within the program is highest in cohorts where students are taking many high-enrolment classes and have few opportunities to meet classmates and interact with staff and faculty. The FLC program was created specifically to target Life Science students (88% retention) who are commuting to campus, as this group of students, many of whom are enrolled in five very high-enrolment classes each term, was perceived as being the most in need of assistance and support with their

transition to university. Other cohorts joined the program at the request of the cohort's primary academic unit, and not because the institution recognized a specific need. Often in these other cohorts, such as in Commerce and Computer Science, students already identify with a community within their academic program; these FLC cohorts also admit both commuting students and students living in a university residence.

Retention rates within the FLC program also improve each year that a cohort is in the program. The FLC program strives to clearly identify the needs of each cohort and to adapt programming to meet those needs. For example, Philosophy students can benefit from detailed sessions on writing an essay, but this is not a primary need for many Life Science students in their first year. Data on why students do not complete the FLC program have not been systematically collected; however, students report that reasons include work and family responsibilities conflicting with the times that the FLC group meets, and signing up for the program believing it will specifically address academic content (such in a course tutorial), which the FLC program does not do.

In addition to the survey results presented in this paper, all students in the FLC program (all cohorts) complete within their FLC sessions a mid-program evaluation in late November/early December and a year-end evaluation in late March/early April. The March/April survey contains about 30 multiple-choice questions. Students also provide qualitative responses to questions asking what they liked best about FLC and what they would change to improve the program. Student satisfaction is very high, with 95.9% of students (all cohorts, N=690, 2005 to 2008) reporting ("strongly agree" and "agree") that they are glad they participated in FLC. An important outcome of participating in FLC is having made new friends and established an academic and social support network: 95.8% of students (all cohorts, N=690, 2005 to 2008) reported ("strongly agree" and "agree") that through FLC they made new friends. Qualitative comments such as the following support the numerical data:

- "Making new friends is the best thing I got from the FLC program. University is really big and if there were not such a program it would be really hard to make friends."
- "[In FLC] I made best friends, who were there to share happy times and sad times, before and after labs and tests, and who were willing to help online and walk to the subway after class. Overall, FLC gave me the best peer mentor, friends, and staff and faculty advisers, who made life easier than if I had not joined FLC. Joining FLC was one of the best things I ever did."
- "The best thing about FLC is that it motivates me to get more involved. It's also another window to get more information about university, make friends, and hear my peer mentor's experiences."
- "I liked how everyone in my FLC had the same lecture, tutorial, and lab sections. It makes studying a lot easier."
- "What I like best about FLC is the fact that it allowed me to feel part of a community."
- "I loved everything about FLC, especially the peer mentor and staff. I'm glad I joined and wished everyone could have been part of it. I wish there was FLC next year. I'm going to greatly miss it."
- "I liked that I learned really important information that university students should know, such as academic integrity, but would be hard to find out if we weren't discussed in FLC."
- "The best part of FLC is meeting people who have now become really good friends of mine. The network of friends I have now will really be a benefit in the future."

Challenges

Within-program retention. Overall, 77% of Life Science FLC students complete the program. There is no financial cost to students to withdraw, since they paid no fee to participate. It is possible that a participation fee that could be returned to the student upon successful completion could increase retention rates within the program.

Space. FLC sessions run optimally when the groups are able to meet in a multi-purpose space (and not in a traditional classroom). Locating appropriate meeting spaces on campus can be challenging, as lecture rooms with fixed seating are not suitable for most FLC sessions. A FLC room should have tables and chairs that can be moved to allow floor space for group activities such as ice-breakers. A capacity for about 30 people is needed; access to a sink and fridge is an asset. Departmental lounges can be suitable meeting spaces for FLC sessions.

Faculty and staff involvement. The FLC program has faced challenges in recruiting faculty as FLC advisers and sustaining their participation. At a research-intensive university faculty struggle to maintain a balance between their research and teaching commitments. Faculty are reluctant to give their time to be involved on a regular basis with undergraduate students in co-curricular activities; there are exceptions, but the current FLC model has struggled to place one faculty adviser per FLC group. The FLC model works because many staff advisers volunteer their time to participate in the program. In order to sustain the involvement of these staff advisers the FLC office must provide most of the program's administrative functions.

Future Research

Future research could investigate student motivations for entering the FLC program, gender differences, and variation in retention rates among cohorts. To ensure that the Control group is as motivated to participate in FLC as are students enrolled in the program, one could advertise heavily to create a large demand for limited spaces; the students who are not admitted into the program become the Control group. Because students self-select to enter the FLC program, if future research controls for entry motivation then questions such as "Are FLC students, based on their desire to get involved in first year, more likely to participate in other extra-curricular activities?" can be addressed. As noted earlier, a higher proportion of women participated in FLCs (66.4%) than were represented in non-FLC students (61.5%). Additional research could control for gender and investigate whether men or women benefit more from the FLC program. Further study is required to isolate specifically why there are differences in retention among FLC cohorts; contributing factors could include frequency and quality of faculty participation in FLC sessions, and whether or not enrolment is limited to students commuting to campus or also includes students living in a university residence.

Conclusions

Based on the results presented here, the Freshman Interest Group model of learning community, where students are block scheduled in two or more of the same courses and the course curriculum is not linked, is effective in improving the transition of students from high school to university. Students in the University of Toronto's First-Year Learning Communities program perform better academically and also report a higher level of satisfaction with their

university experience than students who are not in the program. Participation in the FLC program is voluntary. A strong motivation for students to participate is the opportunity to make new friends and establish a peer support network.

Peer mentors, under the guidance of faculty and/or staff advisers, facilitate the learning community sessions, serving as role models and introducing students to the opportunities and resources available on campus. Session programming includes academic, developmental, and social activities. Program assessment includes academic performance data and self-reported survey data. Retention within the program is highest among cohorts of students who are most in need of support with their transition to university, such as students who are commuting to campus, enrolled in several very large classes, and have few opportunities to meet classmates and interact with staff and faculty.

A unique aspect of the program reported here is the regular involvement of research-stream and teaching-stream faculty; however recruiting faculty and sustaining their involvement is a challenge, as is securing suitable multi-purpose space on campus to support the learning community sessions. Another unique aspect of the Toronto program is its home within the Faculty of Arts and Science and direct financial support of the Office of the Dean; the central university office of student life programs assisted in the creation of the program and continues to assist annually with the delivery of programming.

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