CSAP/PREC

COLLEGE STUDENT ACHIEVEMENT PROJECT

Final Report 2015

For the

Ontario Ministry of Education

and the

Ontario Ministry of Training, Colleges and Universities

The College Student Achievement Project Team

Acknowledgement

The CSAP team is pleased to present the second College Student Achievement Project (CSAP) research report. We would like to acknowledge the work of many individuals and groups whose contributions have enabled the project to operate. These include:

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CSAP was built on the exceptional experience of the College Mathematics Project (CMP). Over the past two years, the research has been conducted and supported by a core team of individuals who are passionate about education, mathematics and language and student success. The CSAP team is: Dr. Graham Orpwood, Associate Director of CSAP and Project Manager of CMP, Maureen Dey, CSAP Language Lead and Pina Marinelli-Henriques, CSAP Project Manager.

It is difficult to imagine CSAP without Graham; however after a decade of work on CMP and CSAP, Graham has decided to "pass the torch". Graham's passion for CMP and CSAP is unparalleled, possibly only exceeded by his drive to ensure the work results in tangible change at the college, school, board, and provincial levels. His contribution to the project cannot be understated. Without his vision, it would not have developed to the level, nor received the international recognition it enjoys. We shall miss his wisdom, humour, and most of all, the spirited discussions. Thank you, Graham, it has been a privilege to work with you.

Laurel Schollen

CSAP Project Director

Table of Contents

Acknowledgement 2
Executive Summary 5
Chapter 1: CSAP and its Research Program 9
The CSAP Research Program 11
CSAP Research Questions 11
CSAP College Program Clusters 12
The CSAP Grading System 13
CSAP Student Types 13
CSAP Course Types 15
The CSAP Fall 2012 Student Cohort 16
Winter 2013 Enrolments 18
Chapter 2: Mathematics 20
Participation in First Semester Mathematics 20
Achievement in First Semester Mathematics 22
Secondary School Backgrounds 27
Grade 12 course pathways 27
Grade 11 and 12 course pathways 30
Grade 9 and 10 course pathways 32
Participation in Second Semester Mathematics 34
Achievement in Second Semester Mathematics 36
Chapter 3: Language 37
Participation in First Semester Language 38
Achievement in First Semester Language Courses 39
Secondary School Backgrounds 42
Second Semester Participation 49
Achievement in Second Semester Language Courses 52
Chapter 4: CSAP Provincial Forum 54
Role of the Forum in Relation to the CSAP Research Methodology 54
Organisation of the Forum 54
Forum Introduction – Context Setting 54
Perspectives on CSAP Research 56
Chapter 5: Recommendations and Supporting Suggestions 64
Recommendations 64

Student Success 64
Mathematics and Numeracy 65
Language and Literacy 66
Supporting Suggestions 67
Student Success 67
Further Research 70
Numeracy and Literacy 72
Appendix A: Secondary School Mathematics Courses 75
Appendix B: Secondary School English Language Courses 76
Appendix C: Secondary School French Language Courses 78

Executive Summary

The CSAP Final Report 2015 presents the findings on the mathematics and language (English and French) participation, achievement and secondary school background of the first semester 2012/13 college student cohort and on their participation and achievement in second semester.

In addition to reporting on the analysis of the data listed above, the project's second goal is to engage members of the college and school communities in discussion centred on ways to increase student success in college mathematics and communication courses, to improve their overall retention, and to make the transition from secondary school to college as seamless as possible.

CSAP includes all 24 colleges and 72 district school boards in the province. It is funded by the Ministry of Education and the Ministry of Training, Colleges and Universities, and led by a team of researchers based at Seneca College.

The first chapter of this report introduces the project, its research questions and the criteria under study. It also contains explanations of how CSAP has grouped college programs into Program Clusters and how a common CSAP grading system for college grades was created. Definitions of the various types of first and second semester mathematics and language courses are included. Data is available on overall student enrolment by program clusters and sub-clusters and includes a comparison between the fall 2011 and 2012 student enrolment by program cluster. Overall enrolment increased by 2.92% in 2012. Approximately 2% fewer students continued into the winter semester in 2013.

Highlights from Chapter 2, Mathematics, include the following:

- Approximately 40,000 students were enrolled in mathematics courses in the fall 2012 semester; of those, a little over 10,000 were enrolled in either remedial mathematics courses or mathematics courses in foundations programs. In 2008, 17.3% of students were enrolled in preparatory mathematics courses; in 2012, 25.8% of students were enrolled in these courses
- Achievement shows little difference among program clusters, but at the sub-cluster level the differences among groups is more marked
- There is little difference among students types: the achievement of Recent Ontario Graduates (ROGs) and Direct Entry students (DEs) is similar in both college-level and preparatory courses
- When achievement is broken down by age and gender, females consistently outperform males and older students (30-39 and 40-49 age groups) outperform younger students, specifically those in the 23 and younger group
- Approximately 1/3 of students are "at risk" of not completing their program due to their grades in first semester mathematics courses; there has been little change in overall mathematics achievement in the past five years
- As discussed in previous reports, the level of achievement in secondary school courses has a significant impact on success in college mathematics courses –those with over 80% in MAP4C were more successful (76.6% achieved Good Grades [GG]) than those with grades in the 60-69% range, where 46.7% achieved GG and in the 70-79% range 62.5% did so; of those

who had taken MCT4C, marks in the range of 70-79% produced success rates of 75.5% and of those with marks of 80% and above, 85.9& achieved GG

- Of students graduating with credits in college-destination mathematics courses, 60.1% of those who had taken MAP4C achieved GG, while 71.4% of those who had taken MCT4C achieved GG
- An examination of three of the Grade 11 and 12 course combinations shows results similar to previous years: MBF3C and MAP4C is the most frequently followed pathway, but only 55.4% of the students achieved GG in college; of those who had taken MCF3M and MCT4C, 70.3% achieved GG; and students with credits in MCR3U and MDM4U achieved the highest rate of success, 77.5% GG
- Grade 9 and 10 course selection is related to college achievement; students who take the academic courses in both grades, the most popular route, have the highest level of achievement in college mathematics (76.2% GG); of students who take the applied courses, 67.1% achieve GG while of those who take Grade 9 academic and Grade 10 applied, only 60.2% achieve GG
- Of students with a Grade 11 mathematics course as their terminal secondary school course, overall only 55.8% achieved GG in any first semester mathematics course; however, of those students who had taken MCR3U, 72.8% achieving GG
- 91.6% of students who achieve good grades in Semester 1 (68.2% of students) continue to second semester while only 60.2% of those with at risk grades in the fall (31.8% of students) proceed to the next semester
- Six different types of courses are available in second semester; most second semester students (11,758) are enrolled in a second semester mathematics course, which can be one of three types, and achieve the highest level of GG at 70.7%
- Second semester students repeating a first semester course have the lowest level of achievement with only 35.6% receiving GG

Chapter 3, Language, analyzes the data on student participation and achievement for both French and English-speaking students together and that on secondary school background separately. English-language students take regular communication courses taught using an expository or vocational writing approach. First level regular French-language courses combine the two approaches. Remedial language courses are offered at four English-language colleges and one French-language college. Developmental courses, for English as a second language students, are offered at four of the GTA English-language colleges.

Highlights from the data include the following, most of which support the findings of the previous year:

- 70,913 students were enrolled in a first semester communications course; from 2011 to 2012 the enrolment increased by approximately 1,000 students, most of whom were enrolled in expository writing courses; the enrolment in remedial courses dropped as only five colleges offered these courses in 2012 while seven colleges did so in 2011
- ROGs account for 60.7% of the enrolment in remedial courses of which 54.9% are DEs

- Looking at achievement by grade and gender, females outperform males at the higher grades (As and Bs); the grading pattern is, as it was the previous year, bimodal with peaks at the A/B and F grades; overall 46.8% of students achieved either an A or B grade and 73.2% received Good Grades (GG – A, B, C, P)
- An examination by gender and age shows females outperforming males in all age groups and those in the 30-39, 40-49 and 50+ groups all achieving more than 80% success rates while of those in the under 23 group 66.9% of males and 75.7% of females achieved GG
- When comparing achievement by course type between the 2011 and 2012 cohorts, there is a slight decrease in the success rate in expository writing courses, no change in vocational writing courses, and a substantial increase in good grades in the remedial and developmental courses
- Looking at achievement based on secondary school courses, for English-language students there is again a substantial difference in success rates between students with a credit in ENG4C (65.4% of ROGs and 66.0% of DEs achieve GG) and those with a credit in ENG4U (76.8% of ROGs and 77.0% of DEs achieve GG)
- An even larger difference is seen between French-language students with a credit in FRA4C (66.8% of ROGs and 65.9% of DEs achieve GG) and those with a credit in FRA4U (79.8% of ROGs and 81.4% of DEs achieve GG)
- Of English-language students who follow the applied/college-destination route from Grades 9 – 12, 63.1% achieve GG in college communications courses; of those who follow the academic/university-destination route, 77.1% achieve GG
- 57.3% of French-language students with credits in the applied/college-destination courses achieve GG while 82.1% of those who take the academic/university destination courses achieve GG
- Similar to the results for mathematics, the level of achievement in secondary school English/French courses impacts later achievement in college; for example, of students with marks in the 60-69% grade range in ENG4C, only 54.3% achieve GG, while of those with marks at 80% and above, 79.5% receive GG; 72.1% of the students with marks in the 60-69% range in ENG4U achieve GG, while 80.6% of those in the 70-79% range and 86.7% of those in the 80+ range do so
- Results are similar although with even more disparity for French-language students; of those with marks in the 60-69% range in FRA4C, 54.7% receive GG while 95.3% of those with grades at 80 and above do so; of those with marks in the 60-69% range in FRA4U, 72.7% achieve GG, and 90.9% of those in the 70-79% range and 100% of those in the 80+ range do so
- 73.2% of students achieve GG in first semester; of those 89.5% continue to second semester
- 26.8% received ‘at risk’ grades in first semester of which only 59.4% continued to second semester
- There are seven types of second semester English courses and three types of second semester French courses; in both languages, fewer than 50% of students who repeated first semester courses achieved GG

CSAP sponsored a Provincial Forum in fall 2014 and brought together 125 representatives from schools, colleges, universities, government, associations and agencies. After listening to short presentations on the data, participants at each table were asked to answer a series of questions related to specific topics, to record their comments on the laptops that were provided and to submit them to CSAP. The forum was introduced by Assistant Deputy Minister Gallagher, Ministry of Education, who spoke of the importance of using research to find ways to assist students in making the transition from secondary to postsecondary education, among other topics. Dr. Charles Pascal was the keynote speaker and "Critical Friend" and spoke of the many opportunities for improvement in both secondary and postsecondary pedagogy, policies and practices. Details of these speeches, a summary of the deliberations from the table discussions and information on two additional CSAP Projects, the Assessment Development Project and the Learning Outcomes Development Project, can be found in Chapter 4.

The final chapter of the Report is entitled *Recommendations and Supporting Suggestions*. No new recommendations emerged from this year's data. Rather patterns observed over the past five years for mathematics and two years for language were reinforced in the analysis of the data. As a result, the CSAP Research Team decided to repeat a number of recommendations from past Reports and offer supporting suggestions that have emerged from discussions at forums and other CSAP presentations to assist in the full realization of the recommendations. The recommendations are presented under three main themes: Student Success, Mathematics and Numeracy, and Language and Literacy. The supporting suggestions are presented under the same themes with Student Success being divided into the following sub-themes: Making the Transition to College, Valuing Colleges as Postsecondary Destinations, the School/College/Work Initiative, College Practices, Further Research, and Accountability for Learning Skills. Numeracy and Literacy are combined and broken into two sub-themes: Teacher Preparation and Pedagogy and Curriculum Design.

The CSAP Research Team believes that with the will and cooperation that has led to the many successes enjoyed by the CMP and CSAP, a new vision of the K – Career continuum can emerge that will ensure the seamless transition of students from one educational level to the next and increased success at each stop along the way.

Chapter 1: CSAP and its Research Program

The College Student Achievement Project (CSAP) is aimed at increasing student success and retention in the Ontario college system. To this end the CSAP collects and analyses students' achievement data from each of the 24 colleges (22 English language and 2 French language) and shares this with both college and secondary school communities. It also organizes annual provincial forums where these analyses can be discussed and ways of increasing student success can be deliberated.

The CSAP is built on a decade of research, deliberation and action in the College Mathematics Project (CMP) initiated in 2004 at Seneca College and extended to the full college system in 2008. The CMP was designed to analyse the mathematics achievement of first semester college students, particularly in the light of their secondary school mathematics backgrounds, and to support deliberations about ways in which this achievement could be enhanced. One of the underlying principles of the CMP was that this analysis and deliberation should be conducted in partnership with colleagues in the secondary school system. That spirit of partnership has underpinned the work of CMP throughout the decade and has led to a growing understanding of each other's' realities, challenges and opportunities[1].

Each year, the CMP published a report of its work, documenting its research findings and reporting on the regional deliberative forums it has supported. In 2011, the CMP organized a provincial forum, based on the same principles but looking at the central issues from the perspective of provincial policies and practice. The presence of Assistant Deputy Ministers from the Ministry of Education (EDU) and the Ministry of Training, Colleges and Universities (MTCU) at this first provincial forum was significant in two ways. First, it indicated the level of significance that the research and deliberations of CMP was accorded by the two Ministries. But second, it led directly to the formation of an enhanced project (CSAP) whose mandate includes student achievement in language (English/French) and the scope of whose research extends from first semester in college to include second semester as well.

All of these forums led to suggestions for changes in policy and practice at college, school board or government levels. These suggestions, along with the analyses of the research findings were further developed by the CMP/CSAP team and incorporated into a final report for each cycle of the study. Some of these recommendations were solely within the purview of the colleges, some within the boards and some were provincial in scope and directed towards Ministries or provincial organisations.

In addition, the CSAP team was tasked with two additional projects, designed to impact student success in an even more direct way. The Assessment Development Project (ADP) developed and tested an assessment for use in measuring the numeracy skills of post-admission college students across the college system. The assessment is also available for students prior to their application to college as a diagnostic tool with which to identify their own strengths and weaknesses. In this mode, the assessment is linked to a set of remedial instructional modules, which students can use to upgrade their knowledge and skills where necessary. The intention underlying this assessment is

[1] Many of these forums were organised by regional planning teams of the School/College/Work Initiative (SCWI). The early years of CMP were also supported financially by Connecting Greater Toronto Area Teachers (CGTAT), the SCWI regional planning team of the Greater Toronto Area.

that colleges are making a clear statement to students and schools about the mathematical skills that are expected of them as they enter college. At the same time, the colleges are also providing the means for students to ensure that they have those skills prior to entering college programs.

The second project undertaken by the CSAP team during the past year is the Learning Outcomes Development Project (LODP). This project has generated a set of common learning outcomes for colleges' first year mathematics courses in three program areas: business foundations certificate; technology foundations certificate; and business diploma programs[2]. Having common learning outcomes for these introductory mathematics courses in colleges across Ontario can have several benefits for students: it can facilitate transfers between programs within a college; it can facilitate transfers between colleges; and it can clarify colleges' expectations for students planning to apply to college and thus enhance the ongoing conversation among mathematics educators at both school and college levels. More details about the origins of both the ADP and the LODP can be found in the reports of the projects, which are posted in both English and French on the CSAP web site[3].

The CSAP is, in many respects, similar to its predecessor, the College Mathematics Project (CMP) and has very similar goals:

- **to analyse student achievement in first-year college mathematics and language courses and to relate these to students' educational backgrounds in secondary school;**
- **to deliberate with members of both college and school communities about ways to increase student success in college.**

These goals are achieved through cycles of work lasting about 18 months, each of which consists of two phases. The first is the research phase, in which program information and student data is collected and validated from all 24 Ontario colleges. This data is then analysed and compiled into an interim research report, whose conclusions take the form of *questions for deliberation* by members of the school and college communities at the local, regional and provincial levels. The second phase of the cycle then involves forums at these various levels in which the data is interpreted and ideas generated for moving forward. Deliberations in one cycle also raise new research questions for subsequent cycles. This integration of research with deliberation is the essence of the *Deliberative Inquiry* methodology, a proven strategic approach for ensuring (a) that research is relevant to the problems of practice and (b) that practical deliberations are well grounded in evidence. This methodology – which was designed for use at the Science Council of Canada over 30 years ago – has underpinned the CMP in the past and the CSAP now.

Each 18-month cycle begins in the summer, when data relating to the student cohort that entered college the previous fall becomes available for collection, continues through the deliberations in the following calendar year, and concludes with a final report. The report of the first cycle of CSAP (concerning students entering college in fall 2011) was released in Fall 2014 and is available on the CSAP web site. The present report marks the end of the second CSAP cycle, whose data relates to students who entered college in fall 2012.

[2] The nomenclature of the foundations programs may vary according to institutions; such programs may be termed "pre" or "fundamentals" or "skills" programs.
[3] http://csap.senecacollege.ca

The CSAP is conducted by members of a small team of researchers based at Seneca College on behalf of the college system as a whole and with the support of the (Ontario) Ministry of Education and the Ministry of Training, Colleges and Universities. The project is overseen by a steering committee and operates with the cooperation of the Vice-Presidents, Academic, and 'CSAP leads' in each college, who enable the collection and validation of data and the communication of information within their institutions.

All CSAP data is stored securely and confidentially in a database at Seneca College. Members of the CSAP team can access it in order to generate reports such as this one. In addition, authorized users from both colleges and school boards can access data relating to their own institutions (and regional and provincial aggregate data as well) to conduct investigations of particular interest to themselves[4].

The CSAP Research Program

CSAP Research Questions

The CSAP research program is based on research questions similar to those used in the College Mathematics Project but, since the mandate of the CSAP includes language (English and/or French) as well as mathematics and to student achievement in second semester as well as in first, it was decided to simplify the research questions rather than make them more complex. The CSAP research questions comprise generic questions (or groups of questions) together with a list of optional parameters that enable the development of specific customised reports.

The generic questions are as follows:

A: STUDENTS' COLLEGE PARTICIPATION

- A1: What are the program enrolments in our sample?
- A2: What are the numbers of students enrolled in mathematics and language courses?

B: STUDENTS' COLLEGE ACHIEVEMENT

- B1: What is the level of achievement of students in college mathematics and language courses?

C: STUDENTS' COLLEGE ACHIEVEMENT BY SECONDARY SCHOOL COURSE SELECTION

- C1: How does students' achievement in college mathematics and language courses relate to their course selection and achievement in secondary school mathematics and/or language?

D: STUDENTS' COLLEGE PARTICIPATION AND ACHIEVEMENT BY SCHOOL BOARD

- D1: How are secondary school graduates distributed across colleges and programs?
- D2: What are secondary school graduates' levels of achievement in college mathematics and/or language?

For each question, the database provides optional parameters that enable the question to be focused more specifically to areas of interest. In addition, there are a large number of additional

[4] Further information about the database and how it may be accessed is provided on the CSAP web site (http://csap.senecacollege.ca).

research questions that investigate combinations of these basic questions or track these data from year to year.

CSAP College Program Clusters

As in past years, the CSAP has collected information about college programs as part of its data collection process. The project includes all full time Ontario College Certificate, Ontario College Diploma and Ontario College Advanced Diploma programs. College bachelor degree, apprenticeship and graduate certificate programs are excluded from the study because, for the most part, their curricula and admission criteria make them not directly comparable to the diploma and certificate programs that form the majority of college programs.

Once the list of programs from each college is collected, they are classified according to a program cluster system, based on broad discipline categories redeveloped for the CSAP[5]. Clustering ensures comparability of the aggregate analysis across colleges and also affords researchers opportunities to "drill down" further into the data to investigate achievement at the sub-cluster and program level. The CSAP uses Ministry of Training, Colleges and Universities (MTCU) program codes to organize college programs into six major clusters, each of which is subdivided into sub-clusters, as shown in Table 1.1. The results of classifying programs according to these clusters and sub-clusters are shown on the CSAP web site.[6]

Table 1.1
CSAP Program Clusters and Sub-clusters

Major Cluster	Sub-clusters	Sample Program
Applied Arts (AA)	Arts	Broadcasting-Radio
Business (B)	Accounting & Finance	Business –Accounting
	Business Administration	Business – Human Resources
	Office Administration	Office Administration - Legal
Foundations (F)	Pre-Arts	Art & Design Foundations
	Pre-Business	Business Foundations
	Pre-Health	Pre-Health Science
	Pre-Human Services	Pre-Community Services
	Pre-Technology	Technology Foundations
General (G)	General Arts & Science (1 year)	General Arts & Science – certificate
	General Arts & Science (2 year)	General Arts & Science – diploma
Human Services (HS)	Health Services	Early Childhood Education
	Hospitality & Tourism	Culinary Management
	Human Services	Hotel and Restaurant Management
Technology (T)	Applied Science	Chemical Laboratory Technology
	Computer	Computer Engineering Technician
	Construction	Civil Engineering Technology
	Electrical	Electronics Engineering Technician
	Mechanical	Mechanical Engineering Technology

[5] The addition of language to the project rendered the former (CMP) system of four clusters inappropriate for use in CSAP. The changes however have left the Business and Technology clusters essentially the same, enabling comparisons of student data *in those program areas* from past years to be made.
[6] http://csap.senecacollege.ca/ .

The CSAP Grading System

Since all colleges have their own grading systems, the College Mathematics Project developed – and the CSAP has adopted – its own simplified system of grades. For the purposes of aggregating achievement data across multiple colleges, grades from all college data sets are transformed into CSAP grades.

The CSAP grading system is shown in Table 1.2 and the detailed comparison of this system with that of each participating college is also available on the CSAP web site. In addition, the CSAP has found from earlier studies that a D grade in first semester mathematics is often followed by a student dropping out or changing programs. We therefore classify D grades along with F and W, as evidence that students are "at risk" of not completing their chosen program. The CSAP research also identifies an additional 'grade' in its grading system to signify a credit transferred from another institution. This grade, which includes exemptions and advanced standings, is denoted as "T" for transfer credit. Since this grade does not reflect achievement at the college from which the data has been collected, it is not included in subsequent analyses except where specifically noted.

Table 1.2
CSAP Grading System

Good Grades		
	A (includes A+ and A-)	80% - 100%
	B (includes B+ and B-)	70% - 79%
	C (includes C+ and C-)	60% - 69%
	P (used for courses with Pass/Fail grades)	
At Risk		
	D (includes D+ and D-)	50% - 59%
	F	under 50%
	W	Withdrawal
Additional		
	T	Transfer Credit

CSAP Student Types

1st and 2nd Semester Students

The cohort of students whose achievement is reported here comprises those who entered the Ontario college system in September 2012. Their first semester was the fall semester 2012. Those continuing to the winter semester 2013 are regarded as "2nd semester students" *for CSAP purposes*, regardless of how their college might classify them for administrative purposes. Only students who are part of the CSAP fall 2012 cohort are included in the winter semester enrolments. Students who enrol in a college program for the first time in the winter semester are not included in the CSAP study.

As the data presented later in this chapter show, not all students who enrol in the fall semester continue to the winter semester and, of those who do, not all continue in the same program. Even those who continue to 2nd semester in the same program may be taking one or more courses from the 1st semester curriculum. For example, a student who took a remedial mathematics course in the

fall may take the regular 1st semester mathematics course in the winter[7]. In this report, we reserve the terms 1st and 2nd for *students* (to designate their status within a program) and for *courses* (based on their location within the curriculum). The terms 'fall' and 'winter' are used to denote the *semesters* of the academic year.

Recent Ontario Graduates and Direct Entry students

The CSAP also has two special classifications of students. *Recent Ontario Graduates* (ROGs) are those who graduated from an Ontario Secondary School *and* who were under the age of 23 on December 31, 2012. This sub-group of the overall cohort of students are those for whom we analyse secondary school academic records. By implication, the remaining 'non-ROGs' comprise those 23 years of age or over (regardless of the location of their secondary schooling) or those whose secondary schooling was outside Ontario.

The CSAP also classifies as *Direct Entry* students (DEs) those who graduated from an Ontario secondary school after January 1, 2012 *and* who are under the age of 23 on December 31, 2012. These students are considered as having entered college directly from secondary school. Note that this is a new definition since it was introduced and used in the College Mathematics Project, so care must be taken when interpreting trends relating to DEs.

These two groups are therefore nested within each other as shown in Figure 1.1

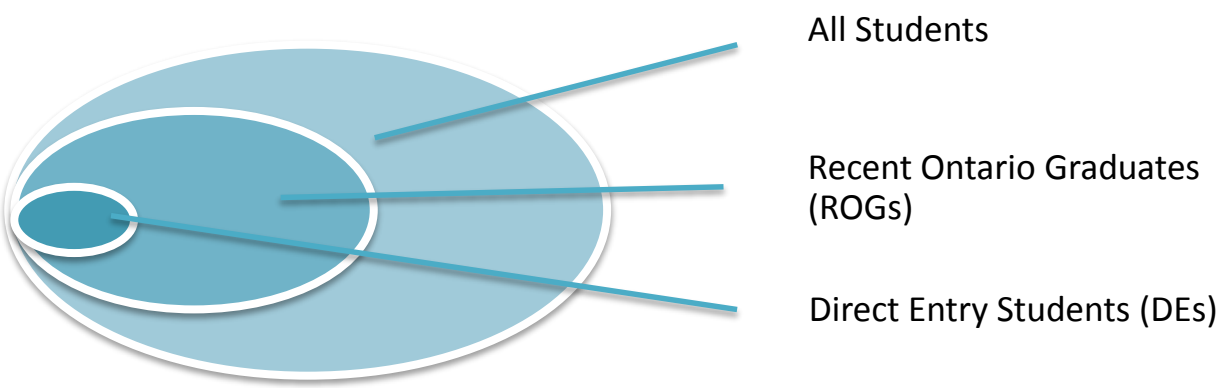


Figure 1.1: Relationships among All Students, Recent Ontario Graduates, and Direct Entry students

French-language students

Within the Franco-Ontarian community, there is also interest in the mathematics and language achievement of French-language students. The CSAP therefore identifies as *French-language students* those who have graduated from an Ontario French-language school board, regardless of the college destination of these students. As the data show, about half of these students attend the two French-language colleges in the province and the other half enrol in the remaining 22 English-language colleges.

[7] The term 'regular' as used in this report is defined on page 15.

CSAP Course Types

The CSAP involves the study of student achievement in both mathematics and language in first and second semester of college programs. While this appears to be quite simple, it is operationally quite complex due to the variety of course types and their emphases. For the purposes of the CSAP we have developed the classification of course types shown in Table 1.3. Note that a "first semester course" refers to a course intended to be taken in the first semester *of a program*, regardless of the students enrolled in it.

Table 1.3

CSAP Course Types

Subject	Semester	Regular Courses		Preparatory (Remedial) Courses	
Mathematics	1	Regular		Remedial	
Mathematics	2	Regular	Embedded		
English	1	Expository	Vocational	Remedial (L1)	Developmental (L2- ESL)
English	2	Regular			
French	1	Expository	Vocational	Remedial (L1)	
French	2	Regular			

Programs containing mathematics usually (but not always) include a mathematics course in first semester. This is referred to as a "regular" 1st semester mathematics course. Some colleges also offer a remedial or preparatory mathematics course in first semester for students who need such a course. These programs then either have a second, stand-alone, "regular" mathematics course or a course in another subject (such as accounting or statistics) in which mathematics is "embedded." In some colleges, certain programs, most often in the business cluster, have their first mathematics course in second semester. Finally, if students take a remedial mathematics course or fail a regular mathematics course in first semester, then they may go on to take a first semester mathematics course (either regular or remedial) in second semester. All of these possibilities are included in the analysis of student participation and achievement in second semester in Chapter Two[8].

The types of English courses are no less complex. In first semester, the CSAP has identified four general types, though not all colleges offer all these types of courses:

- **A regular course in expository writing**
- **A regular course in vocational writing**
- **A first language remedial course for English and French-speaking students**
- **A developmental course for English as a Second Language (ESL) students**

In second semester, the data is broken down into seven different types of courses. The first three deal with second semester students taking regular second semester courses:

- **A course that is a continuation of a first semester courses**
- **A course delivered in Semester 2 (using either an expository or vocational writing approach) where no course had been part of the program in Semester 1**

[8] These are not the only course-type possibilities. However, these are the ones that the CSAP has decided to investigate.

- **A course that differs in focus from a first semester course**

The next category contains data on students who had been in developmental or remedial courses in first semester and have now moved on to the next sequential course:

- **Students taking a regular expository or vocational writing course or a remedial course following a remedial or developmental course in the fall semester**

The last three categories deal with students who are repeating first semester courses that they either failed or withdrew from:

- **Students repeating an expository or vocational writing course**
- **Students repeating a remedial course**
- **Students repeating a developmental course**

The two French-language colleges offer both English and French courses to their students but for consistency, only the French language courses have been analysed for this report. Readers should also be aware of the relatively small number of colleges and size of the student sample and should therefore take particular care in drawing conclusions. In particular, our purpose is not to make comparisons between English and French colleges but rather to present a complete and consistent picture of college language achievement in the province.

In Semester 1, the French courses are of two types:

- **A regular course using a combination of expository and vocational writing**
- **A remedial course for French-speaking students**

In Semester 2, students may be in one of the following courses:

- **A course that is continuation of a first semester course**
- **A course delivered in Semester 2 (using either an expository or vocational writing approach) where no course had been part of the program in Semester 1**
- **A first semester course that a student is repeating**

In addition, students who had been placed in a remedial French course in Semester 1 may be taking a regular course in Semester 2. These students are included in the second type of course.

The CSAP Fall 2012 Student Cohort

The CSAP fall 2012 student cohort comprises almost 100,000 students enrolled in 1,935 programs, as shown in Table 1.4. For the purpose of year over year comparison, Table 1.5 shows the CSAP cluster enrolments for the past two years. Prior to Fall 2011, the College Mathematics Project defined the clusters somewhat differently and a detailed cluster comparison could be misleading. However, the overall enrolments have increased from 83,996 (in Fall 2008), an increase of 18% over the past four years.

Table 1.4

CSAP Programs and Enrolments by Cluster and Sub-cluster, Fall 2012

Cluster	*Programs*	*Enrolment*	*Sub-cluster*	*Programs*	*Enrolment*
Applied Arts	227	10,440	Arts	227	10,440
Business	270	13,588	Administration	145	7,185
			Finance	64	4,135
			Office	61	2,268
Foundations	140	9,976	Pre-Arts	36	2,626
			Pre-Business	18	701
			Pre-Health	38	4,967
			Pre-Human Services	12	735
			Pre-Technology	36	947
General	76	4,035	General Arts & Science – 1 year	50	2,830
			General Arts & Science – 2 year	26	1,205
Human Services	604	37,041	Health	173	9,924
			Hospitality & Tourism	101	5,513
			Human Services	330	21,604
Technology	618	24,011	Applied Sciences	124	4,652
			Computer	97	4,099
			Construction	120	5,656
			Electrical	76	3,338
			Mechanical	201	6,266
TOTAL	**1,935**	**99,091**		**1,935**	**99,091**

Table 1.5

CSAP Enrolments by Program Cluster, Fall 2011 & 2012

Program Cluster	Fall 2011	Fall 2012	Change, 2011-2012
Applied Arts	10,230	10,440	+2.05%
Business	13,360	13,588	+1.71%
Foundations	9,367	9,976	+6.50%
General	4,379	4,035	-7.86%
Human Services	36,313	37,041	+2.00%
Technology	22,631	24,011	+6.10%
TOTAL	**96,280**	**99,091**	**+2.92%**

Table 1.5 also shows that while enrolments have increased overall, decreases in General Arts and Science program enrolments have been more than counter-balanced by sharp increases in Foundation programs and Technology programs. Increased enrolments in Applied Arts, Business and Human Services programs are in line with overall growth.

Table 1.6 shows the breakdown of fall 2012 enrolments in clusters by gender, with the fall 2011 % of females in each cluster shown for comparison purposes. It can be seen that the proportions of

males and females enrolled in each program cluster have changed little, though more females were enrolled in Technology programs in 2012 than in 2011.

Table 1.6
Program Cluster Enrolments by Gender, Fall 2012 & Fall 2011

Program Clusters	Fall 2012				Fall 2011
	TOTAL	M	F	%F	%F
Applied Arts	10,440	5,019	5,401	51.7%	53.6%
Business	13,588	6,751	6,819	50.2%	49.9%
Foundations	9,976	3,878	6,079	60.9%	61.2%
General	4,035	1,938	2,094	51.9%	51.4%
Human Services	37,041	11,972	25,005	67.5%	67.2%
Technology	24,011	19,577	4,388	18.3%	17.5%
TOTAL	**99,091**	**49,155**	**49,780**	**50.2%**	**50.4%**

Winter 2013 Enrolments

Because we have defined 2nd semester students as a subset of 1st semester students, program enrolments in the winter semester are inevitably lower than those of the fall semester, as shown in Table 1.7. In this table, the column 'S1' shows the student enrolments in the fall (as in Table 1.4 above), 'All S2' shows the enrolments of all of those students continuing in the winter, and 'S2 - same program' shows the enrolments of those students who have continued *in the same program* in the winter. The table shows that, overall, 81.9% of the fall cohort is still enrolled in college in their 2nd semester and 77.4% in the same program.

Table 1.7
Program Cluster Enrolments, all Students, Fall 2012 (S1) and Winter 2013 (S2)

Program Cluster	S1	All S2	% S2/S1	S2 - same program	% S2 - same program/S1
Applied Arts	10,440	8,697	83.3%	8,579	82.2%
Business	13,588	11,241	82.7%	10,064	74.1%
Foundations	9,976	7,489	75.1%	7,088	71.1%
General	4,035	3,796	94.1%	2,728	67.6%
Human Services	37,041	30,870	83.3%	29,962	80.1%
Technology	24,011	19,079	79.5%	18,250	76.0%
TOTAL	**99,091**	**81,172**	**81.9%**	**76,671**	**77.4%**

Table 1.8 compares the data from 2012/2013 with that of a year earlier. It shows somewhat smaller proportions of students continuing from Fall to Winter except in General Arts & Science (GAS) programs where the proportion has increased significantly. But further inspection shows that many of these continuing students are continuing in other programs (while 94.08% of all GAS students are continuing from Fall to Winter, only 67.61% are continuing in the same program).

Table 1.8
Continuing from Fall (S1) to Winter (S2): A comparison of 2011/2012 and 2012/2013

	Fall 2011/Winter 2012		Fall 2012/Winter 2013	
Program Cluster	**% S2/S1**	**% S2 same program/S1**	**% S2/S1**	**% S2 same program /S1**
Applied Arts	86.3%	83.9%	83.3%	82.2%
Business	84.3%	76.1%	82.7%	74.1%
Foundations	78.0%	73.2%	75.1%	71.1%
General	75.7%	68.7%	94.1%	67.6%
Human Services	85.0%	82.6%	83.3%	80.9%
Technology	83.6%	79.0%	79.5%	76.0%
TOTAL	**83.6%**	**79.5%**	**81.9%**	**77.4%**

Otherwise, these proportions of continuing students are about 2 percentage points less than were found the previous year, but it is too early to infer any particular trends. In addition, these data must be interpreted with care; there are many reasons why students might not continue from first semester to second other than "dropping out". Moving out of province, moving to another Ontario college, moving into a college degree program, or moving to a university, could all result in the same data, and further research is required before any specific interpretation can be confirmed.

The proportions of ROGs and DEs continuing to second semester are shown in Table 1.9. Taken together, these tables show that the profile of the students in 2nd semester – at least as far as gender and student type are concerned – are very similar to that in 1st semester.

Table 1.9
Enrolments by Student Type, Fall 2012 (S1) and Winter 2013 (S2)

Student Types	**S1**	**All S2**	**% S2/S1**	**S2 - same program**	**% S2 - same program/S1**
All students	99,091	81,172	81.9%	76,671	77.4%
ROGs	62,043	50,628	81.6%	47,669	76.8%
DEs	25,188	20,776	82.5%	19,466	77.3%

More detailed analysis of the CSAP cohort is provided in the following chapters which cover participation and achievement in both 1st and 2nd semesters, as well as secondary school backgrounds: Mathematics (Chapter Two) and Language (Chapter Three).

Chapter 2: Mathematics

The study of the achievement in college mathematics of first and second semester students in the CSAP Fall 2012 cohort follows and extends the pattern established both in the College Mathematics Project over the past several years and in the CSAP Fall 2011. This chapter is divided into five sections:

- ***First Semester Participation***, in which the mathematics enrolments of the overall cohort are documented;
- ***First Semester Achievement***, in which the mathematics achievement of first semester students is described;
- ***Secondary School Backgrounds,*** in which various pathways through secondary school mathematics are related to students' achievement in college mathematics;
- **Second Semester Participation,** in which the mathematics enrolments of those students who continue to second semester are documented;
- **Second Semester Achievement,** in which the mathematics achievement of these second semester students is described;

Participation in First Semester Mathematics

Overall, over 40,000 first-semester students were enrolled in a mathematics course in fall 2012, representing about 40% of all first-semester students. Table 2.1 shows the distribution of these mathematics courses and students across program clusters and sub-clusters, paralleling Table 1.4 for programs and overall student enrolments. In this table, columns 2 and 5 show the number of college programs containing first semester mathematics courses by cluster and sub-cluster respectively.

However, as we have noted in the past, math enrolments are not distributed evenly across all program clusters. While the majority of Technology students are enrolled in mathematics in their first semester, fewer than 10% of Human Services students take mathematics and most of these are enrolled in Hospitality & Tourism programs. Similarly, while over 60% of Foundations program students take mathematics in first semester; more than three-quarters of these are in pre-Health programs.

The distribution of students by gender in mathematics courses is correspondingly uneven, both because of the distribution of mathematics across programs and also because of uneven distributions of males and females across programs. Table 2.2 shows the mathematics enrolments by gender and program cluster. As is the case with other displays involving gender, the numbers are less than the total numbers because not all students identify their gender.

Table 2.1

Mathematics Enrolments by Program Cluster and Sub-cluster, Fall 2012

Program Cluster	*All Programs*	*Programs with Math*	*Mathematics Enrolment*	*Program Sub-cluster*	*Programs with Math*	*Mathematics Enrolment*
Applied Arts	227	12	510	Arts	12	510
Business	270	208	9,843	Administration	125	5,564
				Finance	58	3,206
				Office	25	1073
Foundations	140	89	6,119	Pre-Arts	1	0
				Pre-Business	17	532
				Pre-Health	37	4,639
				Pre-Human Services	3	164
				Pre-Technology	31	784
General	76	40	1,818	GAS – 1 year	26	1,175
				GAS – 2 year	14	643
Human Services	604	57	3,520	Health	13	941
				Hospitality & Tourism	33	2,124
				Human Services	11	455
Technology	618	515	18,276	Applied Sciences	88	3,194
				Computer	76	2,696
				Construction	110	4,825
				Electrical	71	2,768
				Mechanical	170	4,793
TOTAL	**1,935**	**921**	**40,086**		**921**	**40,086**

Table 2.2

Mathematics Enrolment, Fall 2012, by gender and program cluster

Major Cluster	Females	Males	Total	% Female	% Male
Applied Arts	104	404	510	20.4%	79.2%
Business	4,642	5,185	9,843	47.2%	52.7%
Foundations	4,041	2,067	6,119	66.0%	33.8%
General	971	845	1,818	53.4%	46.5%
Human Services	2,104	1,407	3,520	59.8%	40.0%
Technology	2,972	15,264	18,276	16.3%	83.5%
TOTAL	**14,834**	**25,172**	**40,086**	**37.0%**	**62.8%**

As noted in Chapter One, the CSAP also follows the achievement of two sub-groups of students, Recent Ontario Graduates (ROGs) and Direct-Entry students (DEs). The numbers of these enrolled in a mathematics course in fall 2012 are shown in Table 2.3. The proportions of these types of students vary little from those shown in Table 2.1 for all students.

Table 2.3
Mathematics Enrolments of Recent Ontario Graduates (ROGs) and Direct Entry Students (DEs), Fall 2012

Major Cluster	*All Students*	*ROGs*	*DEs*
Applied Arts	510	351	141
Business	9,843	5,730	2,247
Foundations	6,119	4,112	1,773
General	1,818	1,236	546
Human Services	3,520	1,966	767
Technology	18,276	11,549	4,978
TOTAL	**40,086**	**24,944**	**10,452**

As explained in Chapter One, college mathematics courses in first semester are of two main types: regular (i.e. diploma level) or preparatory (remedial). Students whose skills are deemed to be insufficient for success in diploma-level mathematics are often counselled into taking a preparatory level course or a foundations program[9]. In last year's CMP report, we grouped these together to provide an indication of the overall numbers of college students who were taking lower than regular diploma-level mathematics courses. A corresponding table for the CSAP 2012 cohort, with comparison data from previous years, is presented in Table 2.4.

Table 2.4
***Enrolment Increase in Foundational[10] and Remedial Mathematics** Courses, Fall 2008 - Fall 2012*

	Fall 2008	**Fall 2009**	**Fall 2010**	**Fall 2011**	**Fall 2012**	**Ave Increase**
All Mathematics	31,806	35,290	35,489	39,359	40,086	**6.5%**
Foundations Math	2,992	3,565	3,765	5,839	6,119	**26.1%**
Remedial Math	2,506	2,712	2,552	3,998	4,233	**17.2%**
% Foundations + Remedial	**17.3%**	**17.8%**	**17.8%**	**25.0%**	**25.8%**	**12.3%**

This table shows a significant increase in both the numbers of students enrolled in Foundation programs and those of students enrolled in diploma programs but taking a preparatory (remedial) mathematics course. This is on top of a 20% increase in these numbers from 2008 through 2010 as shown here and discussed in the CMP 2011 and CSAP2013 final reports.

Achievement in First Semester Mathematics

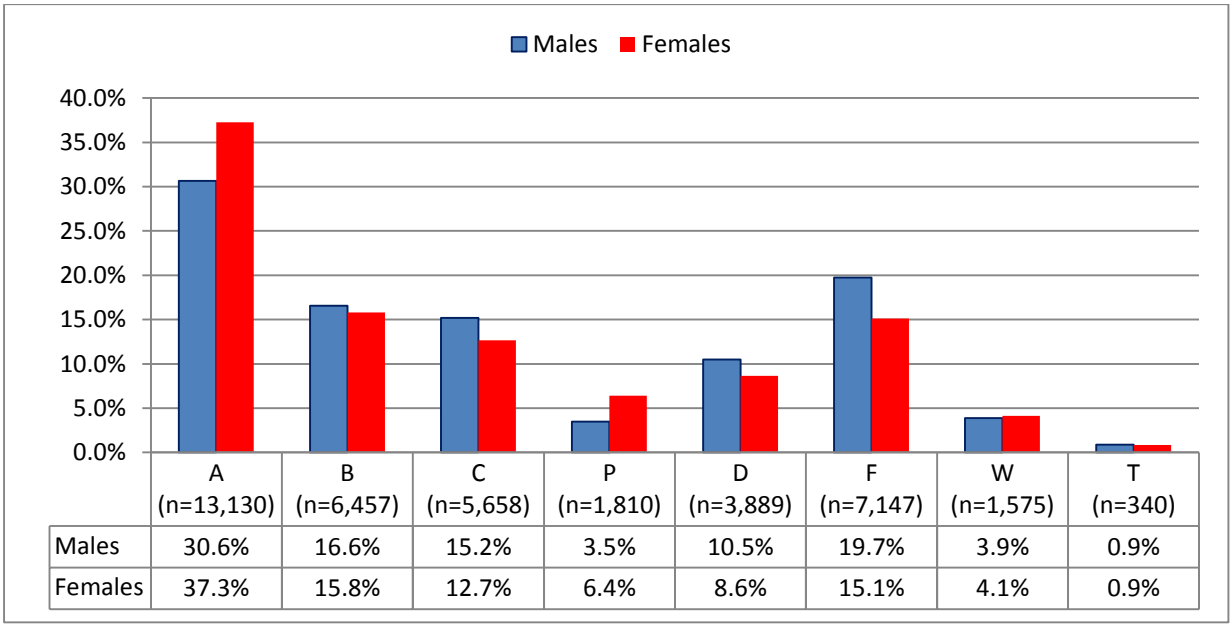
Analysis of the college mathematics achievement of the fall 2012 cohort of students follows a similar pattern to analyses conducted in the CSAP report last year. In this section of Chapter Two, we look at achievement in first semester college mathematics courses, analysed in the following ways:

- Grade distribution by gender (Figure 2.1);

[9] There are a variety of strategies used by colleges to support students of which these are two. Not all colleges offer preparatory mathematics courses.
[10] Mathematics Courses offered as part of a one-year General Arts & Science certificate program are not included here, although their content may be similar to other foundational mathematics courses. If these courses were included, the enrolments would be correspondingly higher.

- Comparative achievement over the past four years (Figure 2.2);
- Achievement analysed by program cluster and sub-cluster (Figure 2.3 and Table 2.5);
- Achievement analysed by gender and student type (Figure 2.4);
- Achievement analysed by course type and student type (Figure 2.5);
- Achievement analysed by age and gender (Figure 2.6).

Figure 2.1 shows the grade distribution of mathematics achievement of all students in the fall 2012 cohort. The general pattern is very similar to those of previous years, with females outperforming males at the higher grades (where the percentage of females is greater than that of males) and the reverse being true in the 'at risk' grades (D, F and W) where males have a higher percentage. The distribution is also bimodal, as observed in the past, with peaks at A and F grades. 340 students with transfer credits (T grades) are also shown here though these are not included as either Good Grades (GG) or At Risk (AR) in subsequent analyses.

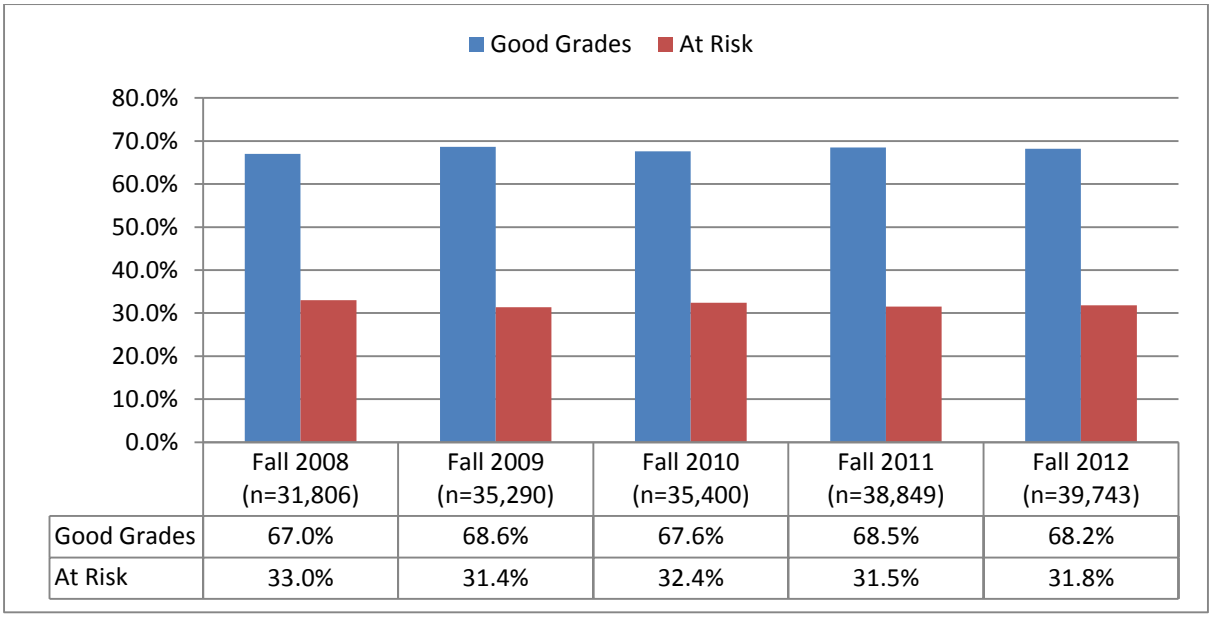


	A (n=13,130)	B (n=6,457)	C (n=5,658)	P (n=1,810)	D (n=3,889)	F (n=7,147)	W (n=1,575)	T (n=340)
Males	30.6%	16.6%	15.2%	3.5%	10.5%	19.7%	3.9%	0.9%
Females	37.3%	15.8%	12.7%	6.4%	8.6%	15.1%	4.1%	0.9%

Figure 2.1: Mathematics Achievement (Grade Distribution), All Students, All Programs, All Mathematics Courses, Fall 2012 (n = 39,666[11])

Figure 2.2 compares the mathematics achievement of students over the past five years. There has been remarkably little change in overall mathematics achievement over this time, with a consistently high percentage of students showing low achievement in mathematics, thereby putting themselves at risk of not completing their chosen programs.

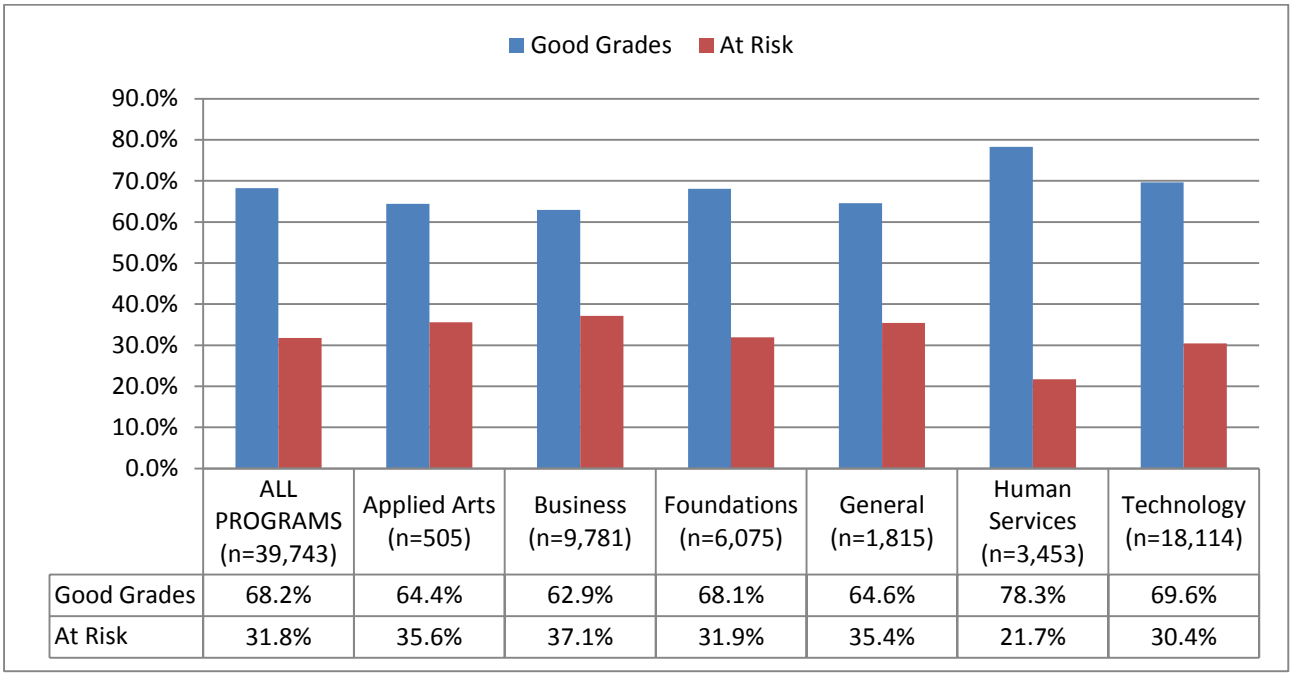
[11] While Table 2.1 shows 39,539 students enrolled in first semester mathematics, Figure 2.1 omits those not declaring a gender (376).



	Fall 2008 (n=31,806)	Fall 2009 (n=35,290)	Fall 2010 (n=35,400)	Fall 2011 (n=38,849)	Fall 2012 (n=39,743)
Good Grades	67.0%	68.6%	67.6%	68.5%	68.2%
At Risk	33.0%	31.4%	32.4%	31.5%	31.8%

Figure 2.2: Mathematics Achievement, All Students, All Programs, All Courses, Fall 2008 through Fall 2012

Figure 2.3 shows mathematics achievement analysed by program cluster. Table 2.5 expands this to include clusters, sub-clusters and a breakdown by gender. Technology students show a small increase in the achievement of good grades over past years but generally there is little difference at the cluster level. At the sub-cluster level, differences between groups are more marked, with the Health sub-cluster of Human Services showing 83.7% with good grades, though the numbers in that sub-cluster are relatively small. Within the Technology cluster, Applied Science students show the highest level of achievement with 74.3% achieving good grades.



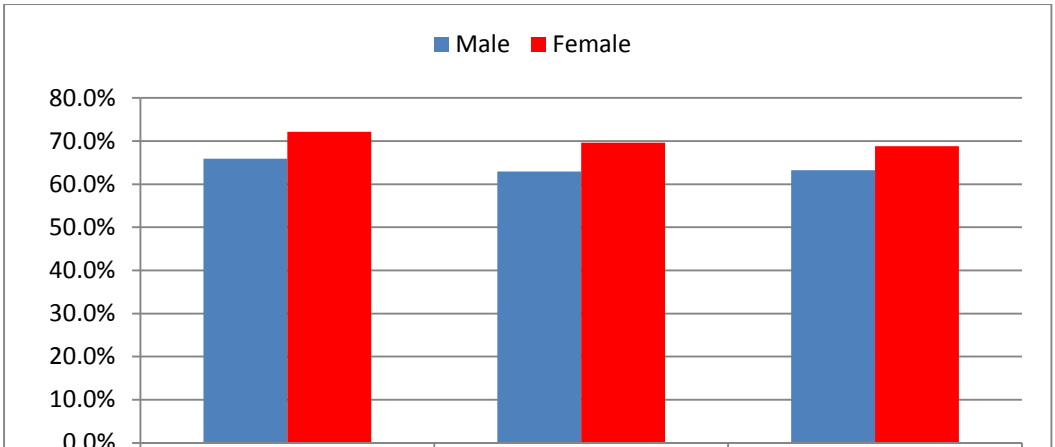
	ALL PROGRAMS (n=39,743)	Applied Arts (n=505)	Business (n=9,781)	Foundations (n=6,075)	General (n=1,815)	Human Services (n=3,453)	Technology (n=18,114)
Good Grades	68.2%	64.4%	62.9%	68.1%	64.6%	78.3%	69.6%
At Risk	31.8%	35.6%	37.1%	31.9%	35.4%	21.7%	30.4%

Figure 2.3: Mathematics Achievement by Program Cluster, Fall 2012

Table 2.5
Mathematics Achievement by Cluster and Sub-cluster, Fall 2012

Major Cluster	Total	GG	% GG	AR	% AR
Applied Arts					
Arts	406	260	64.0%	146	36.0%
TOTAL	**406**	**260**	**64.0%**	**146**	**36.0%**
Business					
Administration	5,530	3,176	57.4%	2,354	42.6%
Finance	3,190	2,240	70.2%	950	29.8%
Office	1,061	740	69.7%	321	30.3%
TOTAL	**9,781**	**6,156**	62.9%	**3,625**	37.1%
Foundations					
Pre-Arts	0	0	0.0%	0	0.0%
Pre-Business	527	296	56.2%	231	43.8%
Pre-Health	4,601	3,229	70.2%	1,372	29.8%
Pre-HS	164	113	68.9%	51	31.1%
Pre-Technology	783	500	63.9%	283	36.1%
TOTAL	**6,075**	**4,138**	**68.1%**	**1,937**	**31.9%**
General					
GAS - 1	1,174	787	67.0%	387	33.0%
GAS - 2	641	385	60.1%	256	39.9%
TOTAL	**1,815**	**1,172**	**64.6%**	**643**	**35.4%**
Human Services					
Health	932	780	83.7%	152	16.3%
Hospitality and Tourism	2,067	1,632	79.0%	435	21.0%
Human	454	290	63.9%	164	36.1%
TOTAL	**3,453**	**2,702**	**78.3%**	**751**	**21.7%**
Technology					
Applied Science	3,163	2,349	74.3%	814	25.7%
Computer	2,664	1,752	65.8%	912	34.2%
Construction	4,792	3,383	70.6%	1,409	29.4%
Electrical	2,746	1,778	64.7%	968	35.3%
Mechanical	4,749	3,337	70.3%	1,412	29.7%
TOTAL	**18,114**	**12,599**	**69.6%**	**5,515**	**30.4%**

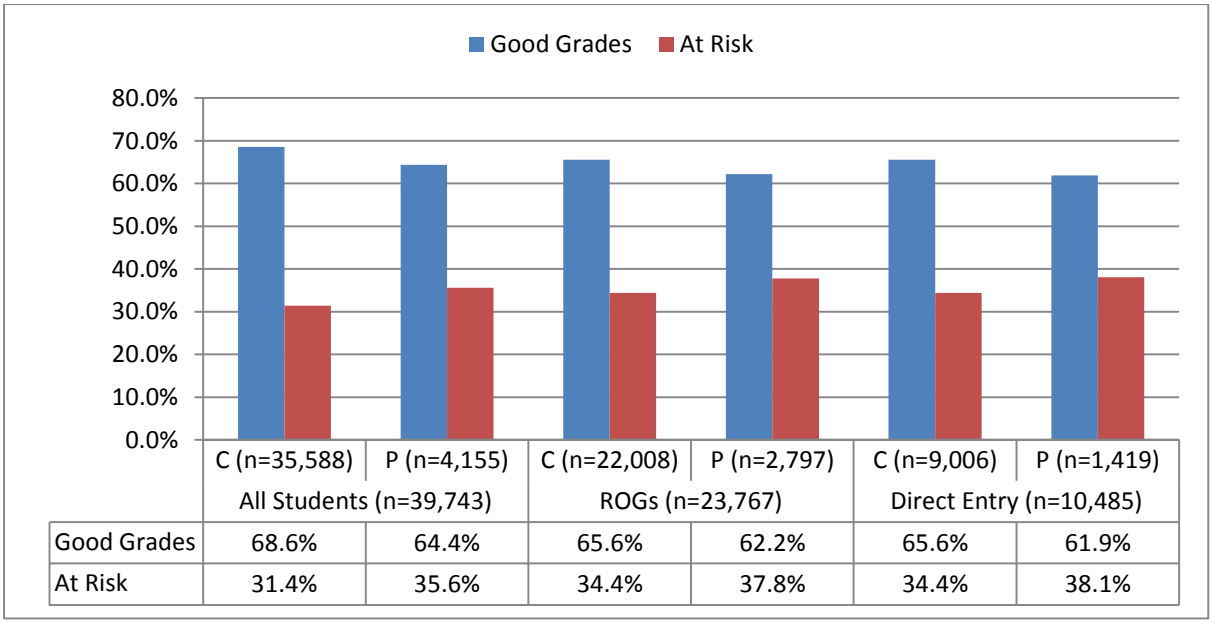
Figure 2.4 shows first semester mathematics achievement analysed by gender and student type, comparing the achievement of all students with that of Recent Ontario Graduates (ROGs) and of Direct Entry students (DEs). Differences among the three student types are relatively small, partly because ROGs are a subset of all students, and DEs are in turn a subset of ROGs. These achievement differences can also be explained by differences in age (see Figure 2.6 later) since a large proportion of non-ROGs are older students. The higher achievement of females than that of males is also evident in Figure 2.4.



	All Ss (n=39,743)	ROGs (n=24,805)	DEs (n=10,425)
Male	65.9%	62.9%	63.2%
Female	72.1%	69.6%	68.8%

Figure 2.4: Mathematics Achievement by Student Type and Gender, Fall 2012

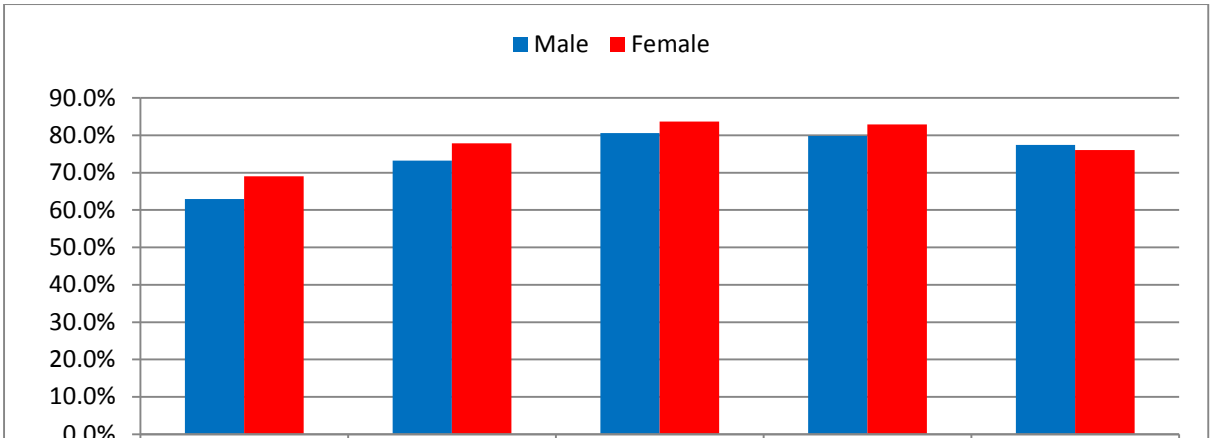
Figure 2.5 shows first semester mathematics achievement analysed by the type of mathematics course (C = college level and P = preparatory level[12]) and student type. Once again, only small differences are apparent among the groups.



	C (n=35,588)	P (n=4,155)	C (n=22,008)	P (n=2,797)	C (n=9,006)	P (n=1,419)
	All Students (n=39,743)		ROGs (n=23,767)		Direct Entry (n=10,485)	
Good Grades	68.6%	64.4%	65.6%	62.2%	65.6%	61.9%
At Risk	31.4%	35.6%	34.4%	37.8%	34.4%	38.1%

Figure 2.5: Mathematics Achievement by Course Type and Student Type, Fall 2012

[12] In this case, only mathematics courses designated as preparatory or remedial are included. Mathematics courses within Foundations programs are included with College-level courses even though their content may be more comparable to that of remedial courses.



	Under 23 (n=29,475)	23-29 (n=7,025)	30-39 (n=2,089)	40-49 (n=899)	50 & over (n=255)
Male	63.0%	73.2%	80.6%	79.8%	77.4%
Female	69.0%	77.9%	83.6%	82.9%	76.0%

Figure 2.6: Mathematics Achievement by Age and Gender, Fall 2012

Figure 2.6 shows the relationship between achievement, age and gender. Once again – we have observed the same pattern in the CMP and CSAP during the past few years – we see that females outperform males at all ages and that students aged between 23 and 50 (approximately one-quarter of all the students in the cohort) outperform their younger colleagues.

Secondary School Backgrounds

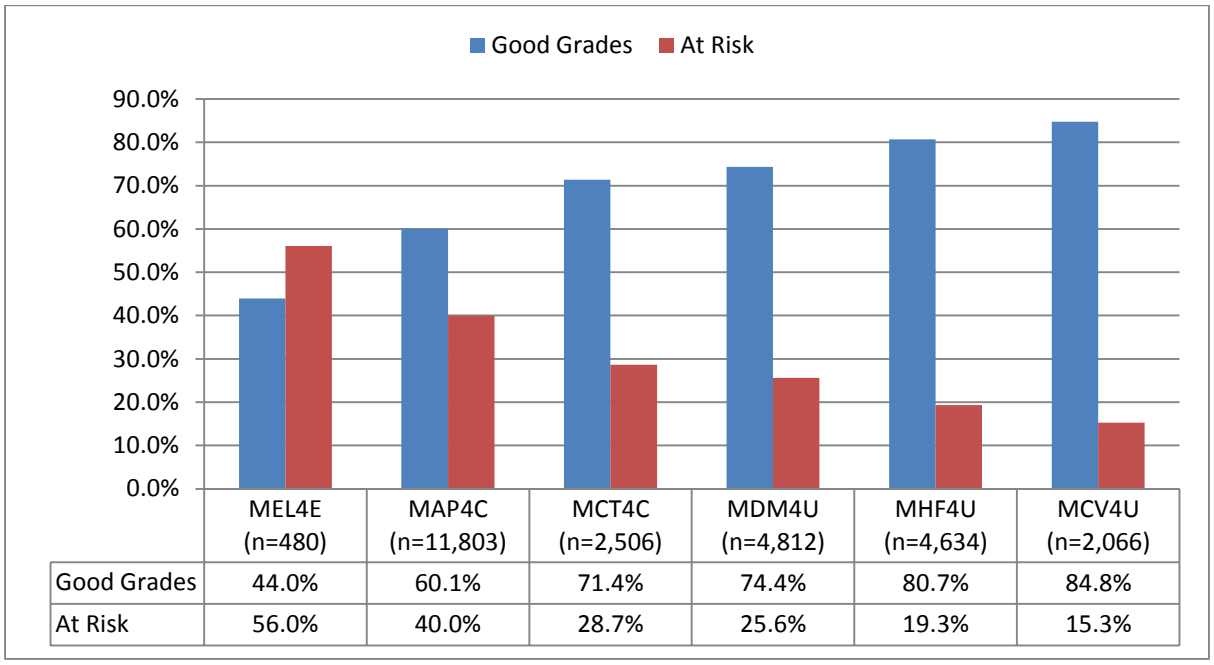
This section of the Mathematics Chapter examines students' college mathematics achievement in relation to their mathematics backgrounds (course selection and achievement) in secondary school. Since we can only interpret secondary school backgrounds in terms of Ontario mathematics credits, these analyses are restricted to graduates of Ontario secondary schools. We further restrict the analyses to those students who have graduated relatively recently since those whose secondary school education was many years ago have had other more recent experiences that make their secondary school background less relevant. Hence this section is based only on the mathematics achievement of Recent Ontario Graduates (ROGs).

Another feature of the CSAP pathways analyses should also be noted. The CSAP database is not an extension of the CMP database but an entirely new design. For the most part, the new design enables analyses of different pathways to be conducted more easily than in the past. However, the change also means that some direct comparison of analyses from the CMP reports cannot be made, at least at this time. In addition, some colleges were unable to provide full secondary school transcript data for their students, resulting in reduced overall numbers of records for these analyses.

Grade 12 course pathways

The most logical place to start thinking about college students' secondary school backgrounds is their choice of Grade 12 mathematics courses. Because college admissions policies are also most frequently framed in terms of Grade 12 credits, this selection is an important one. Figure 2.7 shows the different achievement levels in college mathematics of students having different Grade 12

mathematics backgrounds. The pattern observed here is very similar to that shown in the past[13]. Each of the Grade 12U (university preparation) courses has been shown for comparison purposes.



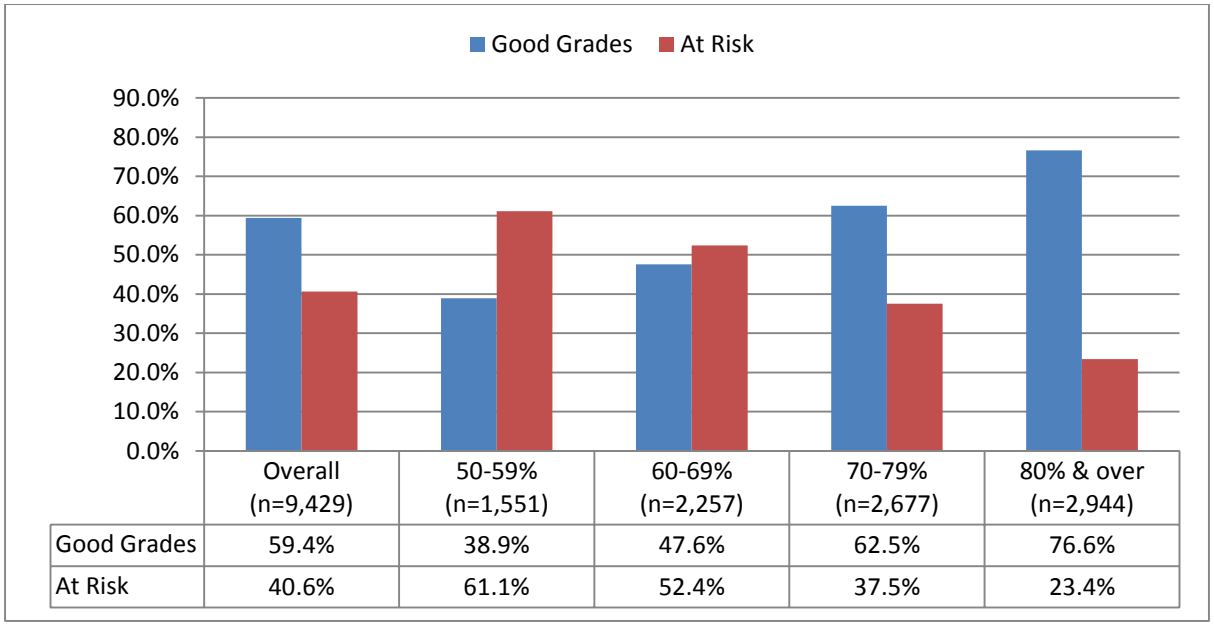
	MEL4E (n=480)	MAP4C (n=11,803)	MCT4C (n=2,506)	MDM4U (n=4,812)	MHF4U (n=4,634)	MCV4U (n=2,066)
Good Grades	44.0%	60.1%	71.4%	74.4%	80.7%	84.8%
At Risk	56.0%	40.0%	28.7%	25.6%	19.3%	15.3%

Figure 2.7: College Mathematics Achievement of ROGs with Selected Grade 12 Mathematics Courses, Fall 2012[14]

We have noted in the CMP reports in recent years that the mere possession of a required credit is often insufficient to be assured of college success. The level of achievement in secondary school mathematics courses has a significant impact on subsequent success in college mathematics. Figures 2.8, 2.9 and 2.10 show this impact for three Grade 12 mathematics courses commonly taken by college-bound students: Foundations for College Mathematics (MAP4C), Mathematics for College Technology (MCT4C), and Mathematics of Data Management (MDM4U). Each Figure shows the college mathematics (good grades or at risk) achievement of students with various ranges of marks in the specific Grade 12 mathematics course.

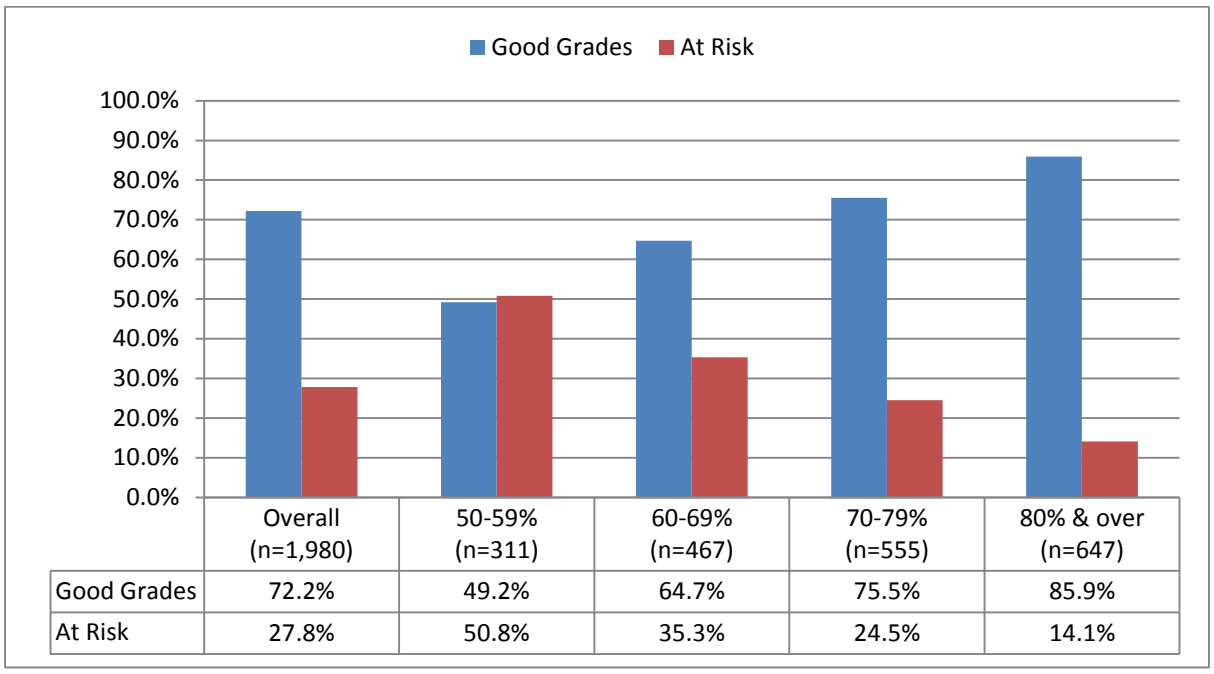
[13] Many students take more than one Grade 12 mathematics course. Figures in this section show the total number of students who took a given course, regardless of other courses they may have taken as well. In this respect, the figures are not strictly comparable to those in the corresponding section of CMP reports, in which the figures show the numbers of students for whom a given course was the highest mathematics course taken. In addition, the sum of the numbers of those shown in a series of courses, such as are shown in Figure 2.7, may not correspond to the overall number of ROGs with mathematics as shown in Figure 2.5.

[14] An explanation of Ontario secondary school course codes and curriculum structure for mathematics is provided in Appendix A.



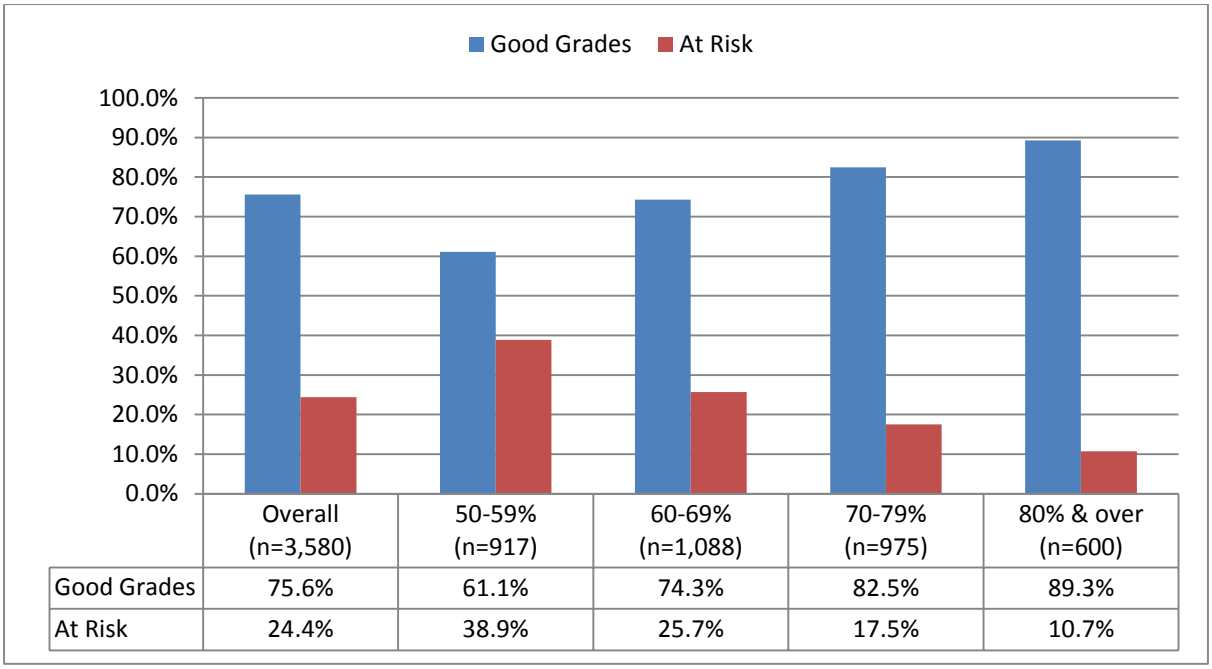
	Overall (n=9,429)	50-59% (n=1,551)	60-69% (n=2,257)	70-79% (n=2,677)	80% & over (n=2,944)
Good Grades	59.4%	38.9%	47.6%	62.5%	76.6%
At Risk	40.6%	61.1%	52.4%	37.5%	23.4%

Figure 2.8: College Mathematics Achievement by Level of Achievement in MAP4C, Fall 2012



	Overall (n=1,980)	50-59% (n=311)	60-69% (n=467)	70-79% (n=555)	80% & over (n=647)
Good Grades	72.2%	49.2%	64.7%	75.5%	85.9%
At Risk	27.8%	50.8%	35.3%	24.5%	14.1%

Figure 2.9: College Mathematics Achievement by Level of Achievement in MCT4C, Fall 2012

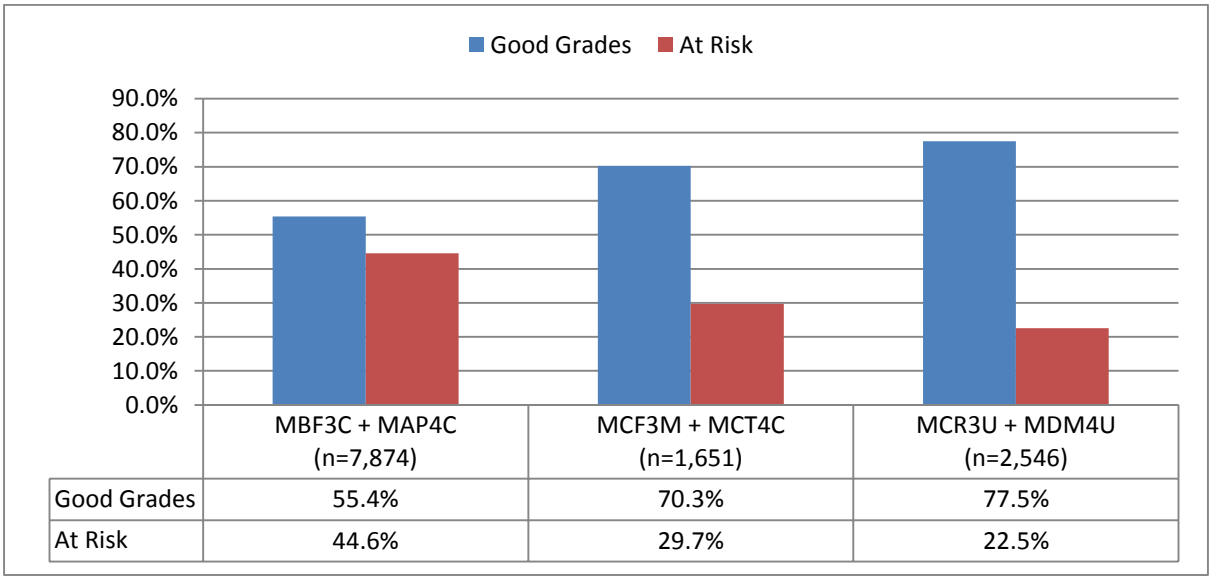


	Overall (n=3,580)	50-59% (n=917)	60-69% (n=1,088)	70-79% (n=975)	80% & over (n=600)
Good Grades	75.6%	61.1%	74.3%	82.5%	89.3%
At Risk	24.4%	38.9%	25.7%	17.5%	10.7%

Figure 2.10: College Mathematics Achievement by Level of Achievement in MDM4U, Fall 2012

Grade 11 and 12 course pathways

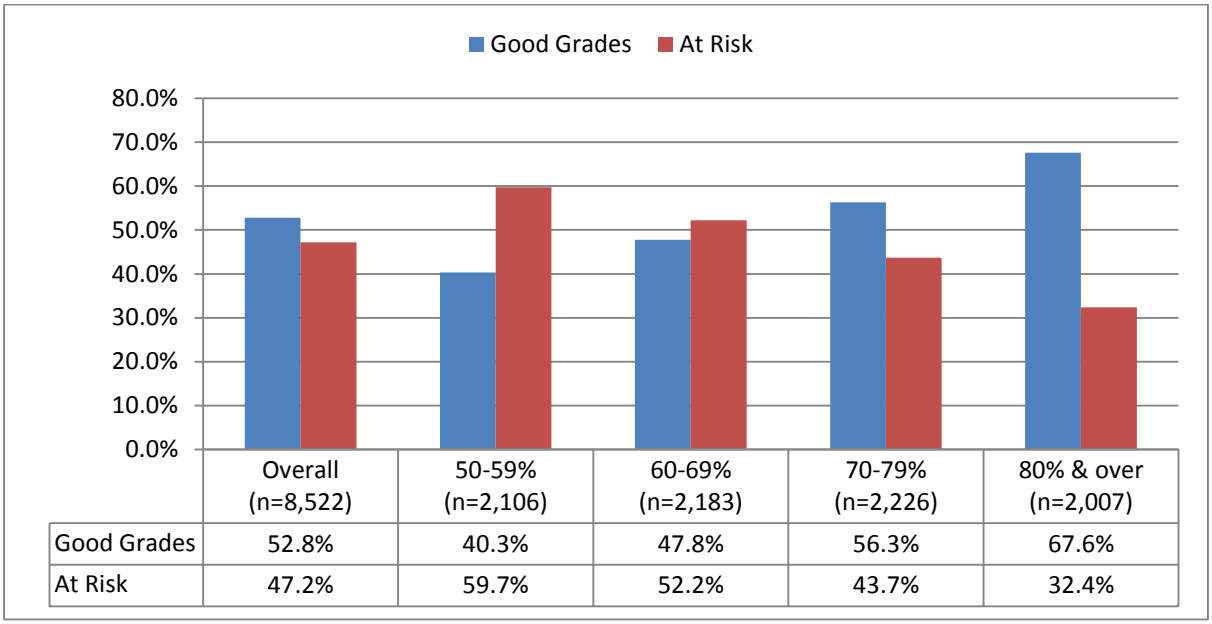
Figure 2.11 shows the mathematics achievement of college students who have followed the three most common mathematics pathways through both grades 11 and 12. Once again, the pattern is similar to that observed in the CMP over the past three years. The Foundations for College Mathematics (MBF3C) + MAP4C combination is the most frequently followed pathway; however, only 55.4% of students following this pathway achieve good grades in college mathematics. The Functions and Applications (MCF3M) + MCT4C combination is a pathway followed by fewer students and 70.3% of these students achieve good grades in college mathematics. The Functions (MCR3U) + MDM4U pathway, followed by a moderate number of students, leads to the highest level of achievement (77.5% with good grades) of the three.



	MBF3C + MAP4C (n=7,874)	MCF3M + MCT4C (n=1,651)	MCR3U + MDM4U (n=2,546)
Good Grades	55.4%	70.3%	77.5%
At Risk	44.6%	29.7%	22.5%

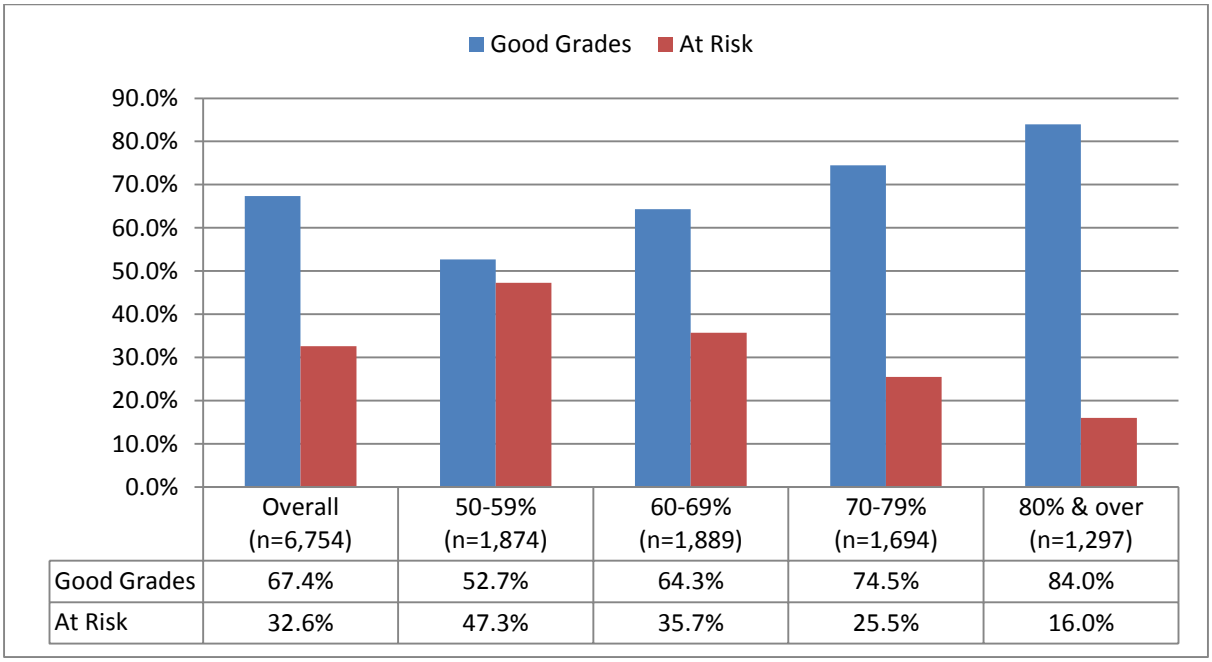
Figure 2.11: College Mathematics Achievement of ROGs with Alternative Grade 11 & 12 Mathematics Pathways, Fall 2012

Once again, there appears to be an increase in the number of students following the MCF3M + MCT4C pathway. We find this a positive sign, since the CMP (along with colleges and many school boards) has been encouraging more students to follow this pathway.



	Overall (n=8,522)	50-59% (n=2,106)	60-69% (n=2,183)	70-79% (n=2,226)	80% & over (n=2,007)
Good Grades	52.8%	40.3%	47.8%	56.3%	67.6%
At Risk	47.2%	59.7%	52.2%	43.7%	32.4%

Figure 2.12*:* College Mathematics Achievement by Level of Achievement in MBF3C, Fall 2012

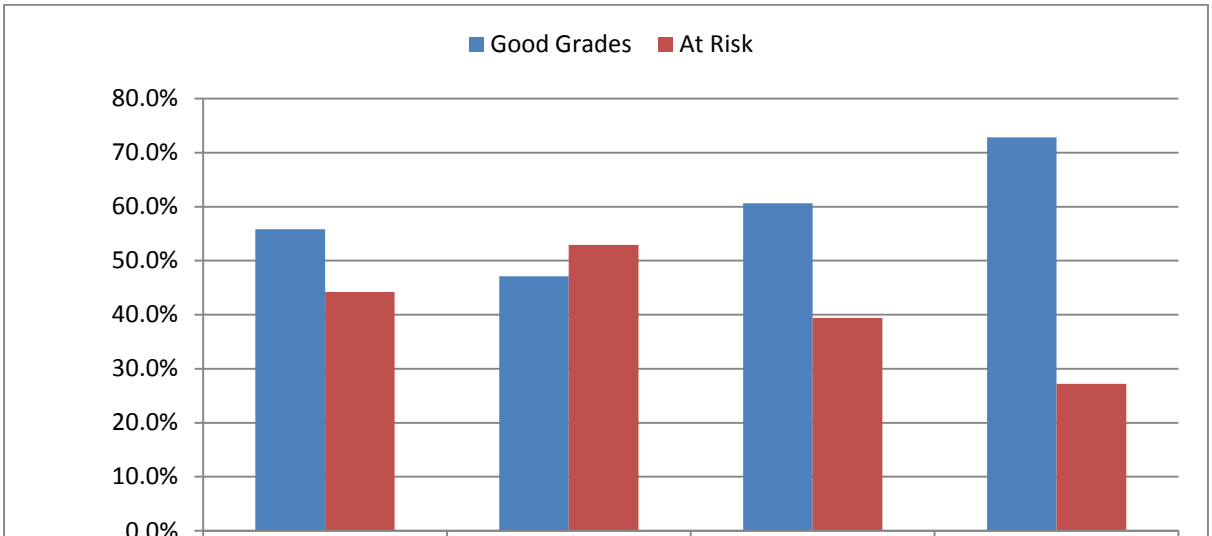


	Overall (n=6,754)	50-59% (n=1,874)	60-69% (n=1,889)	70-79% (n=1,694)	80% & over (n=1,297)
Good Grades	67.4%	52.7%	64.3%	74.5%	84.0%
At Risk	32.6%	47.3%	35.7%	25.5%	16.0%

Figure 2.13: College Mathematics Achievement by Level of Achievement in MCF3M, Fall 2012

Figures 2.12 and 2.13 show the relationship between achievement levels in the two most frequently taken Grade 11 courses and subsequent achievement in college mathematics. Once again the difference between a mere pass in, say, MBF3C and obtaining over 80% in the same course is striking: in the first case only 40.3% of students go on to receive good grades in college mathematics, while, in the second, over 65% of students receive good grades in college.

An important pathway that has been analysed by the CMP reports over the past three years is the one where students take no Grade 12 mathematics, and graduate with a Grade 11 mathematics as their terminal credit in mathematics[15]. Figure 2.14 shows that the proportions of students obtaining good grades in college having only completed Grade 11 mathematics are relatively lower than those who continued to Grade 12.



	Overall (n=3,744)	MBF3C (n=1,846)	MCF3M (n=1,324)	MCR3U (n=574)
Good Grades	55.8%	47.1%	60.6%	72.8%
At Risk	44.2%	52.9%	39.4%	27.2%

Figure 2.14: College Mathematics Achievement of Students whose Terminal Mathematics Course is at Grade 11, Fall 2012

Grade 9 and 10 course pathways

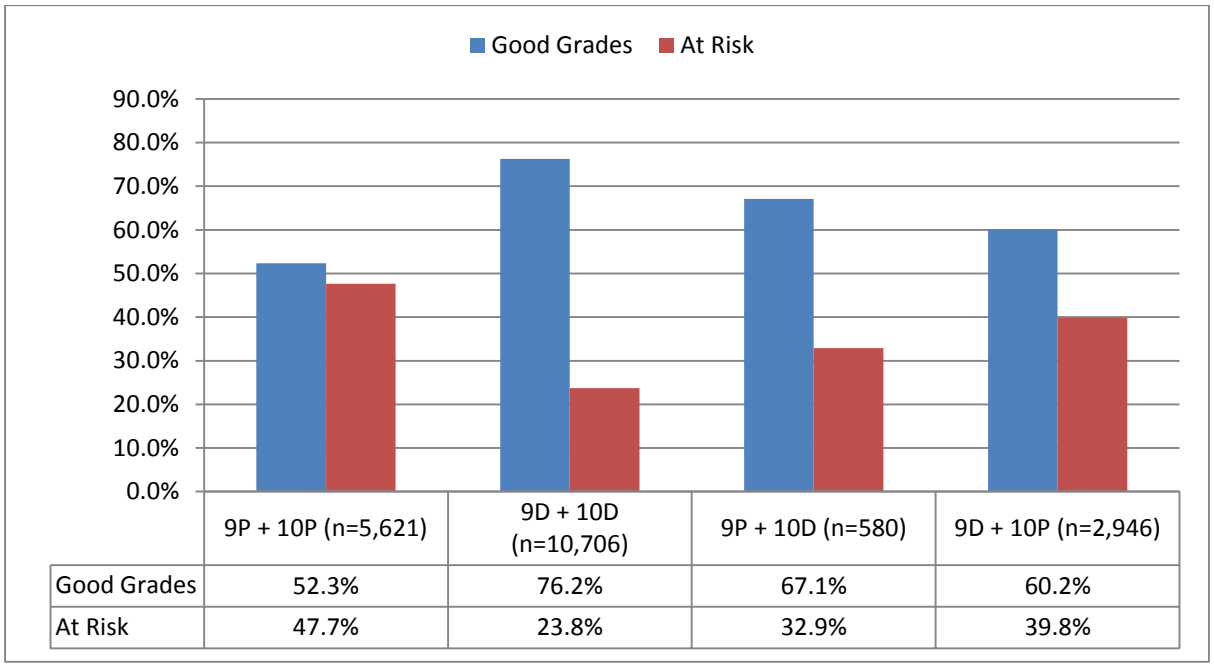
Figure 2.15 shows the college mathematics achievement of students following various mathematics pathways through grades 9 and 10. It should be noted that, unfortunately, a growing number of colleges are unable to supply data relating to the Grades 9 and 10 backgrounds of their students as these data are increasingly not being downloaded from students' applications. This means that the CSAP data is correspondingly weakened with respect to these pathways analyses.

The pathway most commonly taken by students in the fall 2012 cohort is that involving *academic* courses in both Grades 9 and 10 (MPM1D + MPM2D). This pathway also corresponds with the highest level of achievement in college mathematics. The next most commonly taken is that involving *applied* mathematics courses at both Grades 9 and 10 (MFM1P + MFM2P). A significant number of students in the cohort have taken Grade 9 *academic* mathematics (MPM1D) and Grade 10 *applied* mathematics (MFM2P) and a much smaller number have taken Grade 9 *applied* mathematics (MFM1P) and the Grade 10 *academic* course (MPM2D).

For the past several years, we have been following the growth in the numbers of students who have taken Grade 10 applied mathematics followed by the Grade 11 University/College course MCF3M. This transition was made possible by the last round of curriculum revision and enables students who have taken applied courses in Grades 9 and 10 to obtain higher levels of mathematics in the senior

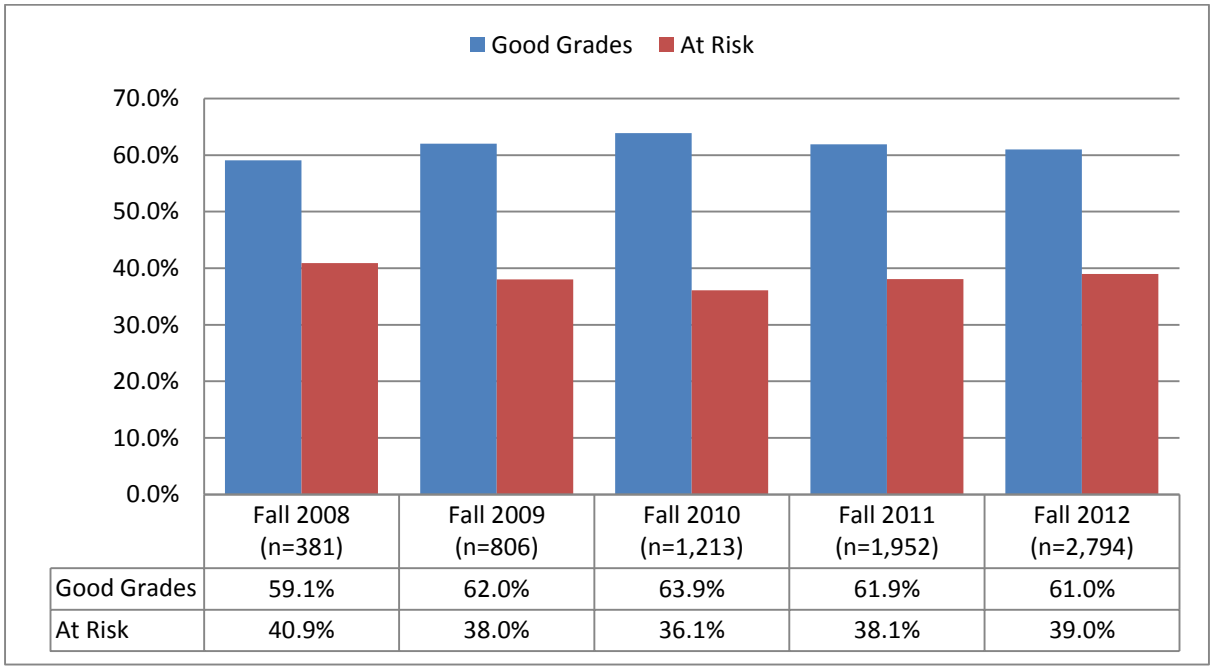
[15] Grade 11 is the highest level of mathematics *required* for graduation with an Ontario Secondary School Diploma (OSSD).

division and thereby to become better prepared for college mathematics. Figure 2.16 shows the number and achievement levels in college mathematics for students following this pathway.



	9P + 10P (n=5,621)	9D + 10D (n=10,706)	9P + 10D (n=580)	9D + 10P (n=2,946)
Good Grades	52.3%	76.2%	67.1%	60.2%
At Risk	47.7%	23.8%	32.9%	39.8%

Figure 2.15: College Mathematics Achievement of ROGs with Alternative Grades 9 and 10 Mathematics Pathways, Fall 2012



	Fall 2008 (n=381)	Fall 2009 (n=806)	Fall 2010 (n=1,213)	Fall 2011 (n=1,952)	Fall 2012 (n=2,794)
Good Grades	59.1%	62.0%	63.9%	61.9%	61.0%
At Risk	40.9%	38.0%	36.1%	38.1%	39.0%

Figure 2.16: College Mathematics Achievement of ROGs with MFM2P and MCF3M, Fall 2008 through Fall 2012

While the achievement of students following this pathway has remained fairly constant, the numbers have grown significantly[16], showing that the pathway has met a need and supported the progress of some students towards the MCT4C course and entry to college technology programs.

Participation in Second Semester Mathematics

Most students continue from first semester to the second semester of their program as shown in Tables 7 and 8 in chapter 1 of this report. In this section, we look at student participation in mathematics courses in second semester. Table 2.6 shows the overall numbers of students taking mathematics by program cluster both in the fall (as shown earlier in Table 2.1) and also in the winter. In some cases, there are mathematics courses in some programs in the second semester where there were none in the first, which accounts for the higher number in the winter than the fall. This Table says more, therefore, about the structure of college programs than it does about student continuation. The lower proportions of students progressing to second semester in General and Foundations programs may be due to the fact that these programs tend to attract students who are still unsure about their future career directions.

Table 2.6
College Mathematics Enrolments (Second Semester), all Mathematics Courses, by Program Cluster, Fall 2012 and Winter 2013

Major Cluster	Fall 2012	Winter 2013	Winter/Fall
Applied Arts	510	703	137.8%
Business	9,843	6,048	61.4%
Foundations	6,119	4,053	66.2%
General	1,818	340	18.7%
Human Services	3,520	1,461	41.5%
Technology	18,276	8,088	44.3%
TOTAL	**40,086**	**20,693**	**51.6%**

Table 2.7 compares the mathematics enrolment of all students with that of Recent Ontario Graduates (ROGs) and Direct Entry students (DEs). It shows that the profile of second semester mathematics students is very similar to that of first semester students in that the proportions of each type in the winter semester is very similar to that of the fall semester.

Table 2.7
College Mathematics Enrolment (Second Semester), all Mathematics Courses, by Student Type, Fall 2012 and Winter 2013

	Fall 2012	Winter 2013	Winter/Fall
All Students	40,086	20,693	51.6%
ROGs	24,944	10,290	41.3%
DEs	10,452	4,249	40.7%

Table 2.8 shows something of the complexity of the concept of a "second semester student." While the most common situation is for a student to take a first semester mathematics course in the fall and a second semester mathematics course in the winter, there are many other possible scenarios

[16] This is true despite the reduced dataset now available to the CSAP.

as was noted in Chapter One, and Table 2.8 shows those of most interest to colleges. In first semester, there are both regular and preparatory mathematics courses in several colleges and in second semester some courses are 'stand-alone' mathematics courses, while others are courses in other subjects (such as accounting or statistics) where the mathematics is 'embedded' in an applied context. In addition, we have observed earlier (Figure 2.1) that a significant proportion of students either fails or withdraws from their first semester mathematics course. Those students may subsequently withdraw from the college, switch programs, re-take the course they had attempted in the fall, or take an alternate course. The possibilities, while not endless, are still numerous and Table 2.8 gives the reader a sense of the numbers of students in our cohort following 6 possible options.

Table 2.8
College Mathematics Enrolment by Course Type, Winter 2013

2nd Semester Mathematics Course Type	Enrolment
2nd semester student taking a 2nd semester math course	11,758
2nd semester student taking a 2nd semester embedded Math course	6,871
2nd semester student taking their 1st math course	1,585
2nd semester student repeating a 1st semester regular math course	2,079
2nd semester student taking a 1st semester regular math course in Winter	1,464
2nd semester student repeating a 1st semester remedial math course	648

Continuation to second semester is influenced in part by the success the student experienced in first semester mathematics and Figure 2.17 shows a simplified picture of this situation in three columns.

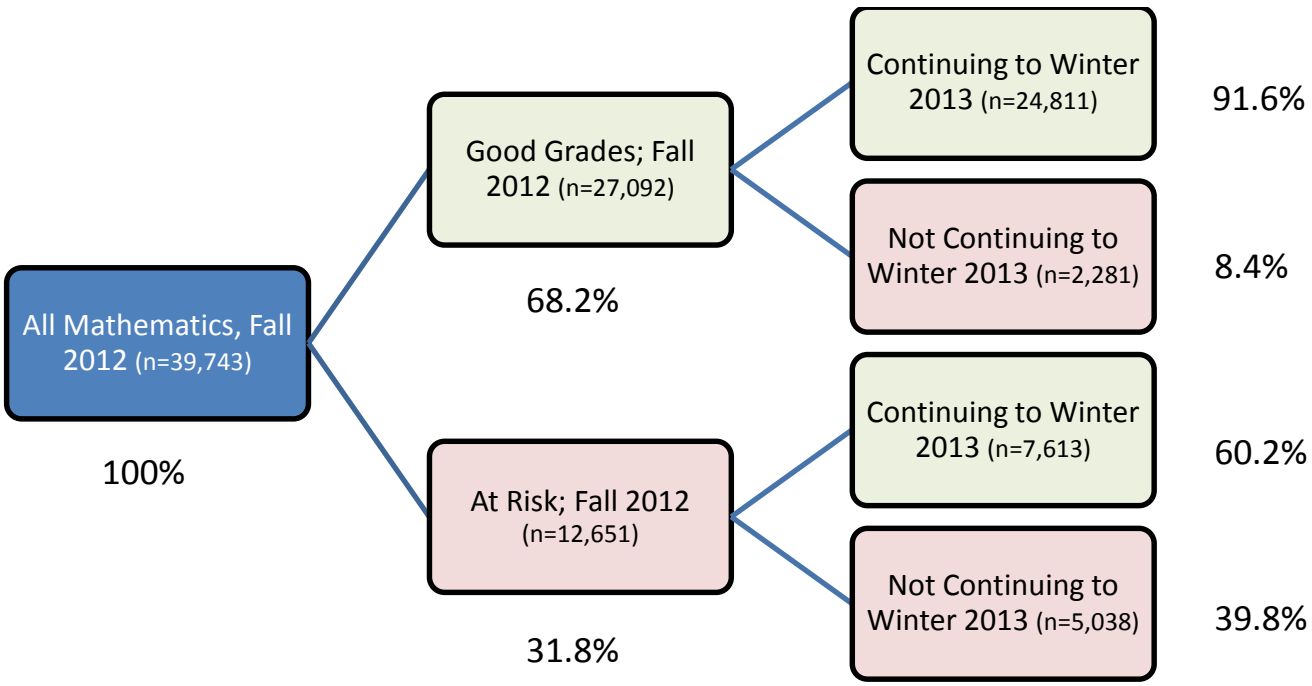


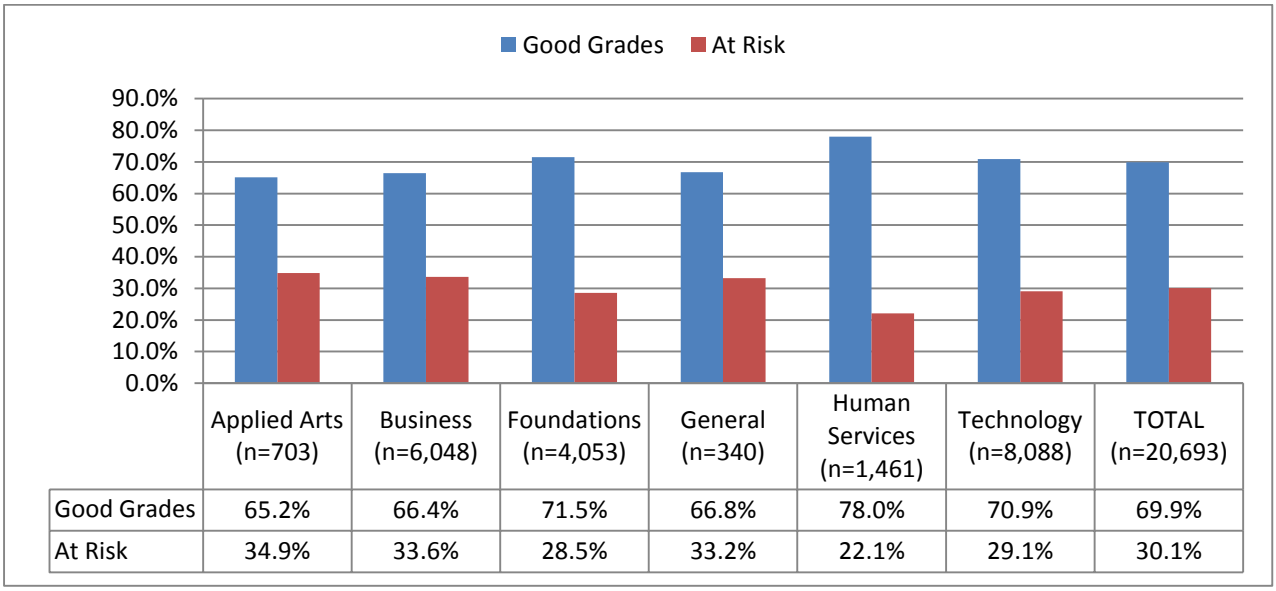
Figure 2.17: Program Enrolment (Second Semester) by Mathematics Achievement (First Semester), Fall 2012 & Winter 2013

The first column shows the overall number of students taking first semester mathematics. The second column shows achievement in the first semester mathematics course in terms of the number

and percentage of students achieving good grades or being at risk. The third column shows, both for those achieving good grades and separately for those at risk, the number and percentage who continue to second semester. This analysis shows that, not surprisingly, the percentage of those achieving good grades in first semester mathematics going on to second semester is much higher than those whose achievement placed them at risk.

Achievement in Second Semester Mathematics

The overall pattern of mathematics achievement of second semester students is shown in Figure 2.18. The achievement levels vary across the program clusters more than was the case in first semester mathematics, with students in the General and Human Services clusters achieving well above the average and students in the Business cluster somewhat below. Those in Applied Arts, Foundations, and Technology achieved close to the overall average of 70.1%.



	Applied Arts (n=703)	Business (n=6,048)	Foundations (n=4,053)	General (n=340)	Human Services (n=1,461)	Technology (n=8,088)	TOTAL (n=20,693)
Good Grades	65.2%	66.4%	71.5%	66.8%	78.0%	70.9%	69.9%
At Risk	34.9%	33.6%	28.5%	33.2%	22.1%	29.1%	30.1%

Figure 2.18: Second Semester Mathematics Achievement by Program Cluster, Winter 2013

Table 2.9 shows the overall second semester mathematics achievement in terms of the categories of student shown in Table 2.8 above.

Table 2.9
Mathematics Achievement by Course Type, Winter 2013

2nd Semester Mathematics Course Type	n	% Good Grades	% At Risk
2nd semester student taking a 2nd semester math course	11,758	70.7%	29.3%
2nd semester student taking a 2nd semester embedded math course	6,871	68.6%	31.4%
2nd semester student taking their 1st math course	1,585	68.8%	31.2%
2nd semester student repeating a 1st semester regular math course	2,079	35.6%	64.4%
2nd semester student taking a 1st semester regular math course in winter having taken a remedial course in the Fall	1,464	55.9%	44.1%
2nd semester student repeating a 1st semester remedial math course	648	53.5%	46.5%

Chapter 3: Language

The approach in this chapter differs from that used in the CSAP Final Report: 2013. On the advice of the CSAP Steering Committee and with the support of the two French-language colleges, the results for the 2012-13 cohort in both English and French-language courses will be reported together, as appropriate, rather than separately. Those familiar with last year's Report will remember how similar the results for English and French-language students were, particularly in criteria such as grades, gender and age. As the same pattern continues this year, it seemed only logical to combine the two and report the results as one. In some sections, such as those related to secondary school pathways, the results will be shown separately.

All colleges teach language courses to students in most one year certificate and two and three-year diploma programs. The course is usually taught in first semester, although some programs at some colleges defer their course to second semester. Some colleges deliver the same course to all students in all programs while others offer courses on a faculty, program cluster or even program basis.

Most of these courses are taught using an expository writing approach, similar to that used in secondary schools. Reading material, fiction and nonfiction, provides the basis for classroom discussion, analysis and essay assignments. Critical and analytical thinking skills are developed as are other essential skills such as oral communication, teamwork and self-management. These courses normally include information literacy, teaching students how to locate research material, and credit it through footnotes and endnotes using either the MLA or APA style. In a later semester, vocational writing courses are often taught, particularly to students in business and technology programs. Other programs, depending on their focus, include language courses relevant to their needs such as academic research and writing courses to students in General Arts and Science programs.

Some colleges, or some programs within a college, use a vocational writing approach in their first course, teaching students the style and formats – letters, memos, email, reports – of business and/or technical writing. A second course, in which these skills are reinforced at a more complex and sophisticated level, often follows. These courses most often include information literacy as well. Some colleges offer courses that combine elements of both approaches.

At many colleges, students write post-admission language skills assessment tests. At five colleges, the results of these tests are used to place students in regular or remedial (usually for first language students) courses. Four colleges in the Greater Toronto Area (GTA) redirect second language students to English for Academic Purposes (EAP) developmental language courses. Students must successfully complete these mandatory remedial or developmental courses before proceeding to the regular first-level course. Second language students whose test scores indicate that they are above the developmental level but below the regular level will be placed in remedial courses. At colleges that do not offer a discrete course, students whose test scores indicate that they are reading and/or writing below the postsecondary level may be redirected to sections of the regular courses with an additional hour of classroom instruction or offered tutorial support through the colleges' learning centres.

Participation in First Semester Language

The overall enrolment in the fall 2012 cohort is 99,091. Approximately 72% or 70,913 students are enrolled in first semester English or French-language courses. The difference between the overall enrolment and the number of students in language courses can be attributed to a number of reasons, including the following:

1) The program does not include a language course;
2) The course is offered in second semester;
3) Students are exempt from the course because they have been granted a Transfer Credit based on a credit from another postsecondary institution; or based on the results of the post- admissions skills assessment test; or, because they have already taken the course;
4) Students did not write the Skills Assessment Test and were not permitted to enrol; or,
5) Students have withdrawn from the course.

As seen in Table 3.1, below, females account for 51.4% of the overall enrolment. The male/female distribution across programs is uneven because of the fact that females are still attracted to traditionally female-dominated programs such as those in the Health and Human Services program cluster while males continue to make up the majority of the enrolment in technology programs, except those in the Applied Science Sub-cluster. Both Business and General programs consist of a balanced male/female enrolment.

Table 3.1:
Language Enrolment, All Students, All programs, by Gender, Fall 2012

Program Cluster	Females	Males	Total	%Female	%Male
Applied Arts	3,890	3,754	7,644	50.9%	49.1%
Business	4,875	4,758	9,633	50.6%	49.4%
Foundations	5,074	3,104	8,178	62.0%	38.0%
General	1,871	1,772	3,643	51.4%	48.6%
Human Services	18,310	9,393	27,703	66.1%	33.9%
Technology	2,404	11,597	14,001	17.2%	82.8%
TOTAL	36,424	34,378	70,802	51.4%	48.6%

As mentioned previously, four types of language courses may be offered in first semester: regular courses using an expository writing approach, regular courses using a vocational writing approach, remedial courses, and developmental courses. Table 3.2, below, illustrates the comparison between the enrolments of the fall 2011 and 2012 cohorts in these four types of courses.

The difference in overall enrolment of 1,069 students is reflected, for the most part in the increases in the expository and vocational writing categories. The number of students in remedial courses has decreased, which may be attributed to the fact that in 2011, seven colleges reported enrolment in these courses while in 2012 only five colleges did so. The enrolment in developmental courses has also decreased with the same four colleges reporting.

Table 3.2:
Language Enrolment by Course Types, Fall 2011 and Fall 2012

Course Types	Fall 2011 Enrolment	Fall 2012 Enrolment
Expository Writing	40,685	42,147
Vocational Writing	16,134	17,334
Remedial	9,537	8,229
Developmental	3,488	3,203
TOTAL	69,844	70,913

Looking specifically at those colleges delivering remedial and developmental courses, a comparison between the numbers of students in each type of courses reveals some interesting data, particularly when the student type demographic is added. In Table 3.3, we see that 17,492 students or 67.4% are registered in regular English and French-language courses. Of these, 10,624 or 60.7% are Recent Ontario Graduates (ROGs) and 4,603 or 26.3% are Direct Entry students (DEs), a subset of ROGs. The remaining students are non-ROGs. Of the total number of students, 6,241, 24.1%, are enrolled in remedial courses and 2,205, 8.5% in developmental courses.

In remedial courses, offered at four English-language colleges and one French-language college, ROGs account for 67.0% of the enrolment and DEs 36.8%. In developmental courses, offered at four English-language colleges, ROGs account for 31.5% of the enrolment and DEs 14.6%.

Within the student types themselves, there are 15,502 ROGS in language courses at these five colleges of which 27.0% are enrolled in remedial courses and 4.5% in developmental courses. Overall, more than 30% are not enrolled in regular language course. There are 7,219 DE students within this group. Of these students, 31.8% are enrolled in remedial courses and 4.5% in developmental courses. In this group, over 35% are not enrolled in regular language courses.

Approximately 40% of ROGs and 35% of DEs are not prepared for regular first semester language courses at these colleges. These results are consistent with those of the 2011 cohort.

Table 3.3
Language Enrolment by Course Type and Student Type at Colleges Delivering Remedial and Developmental Courses, Fall 2012

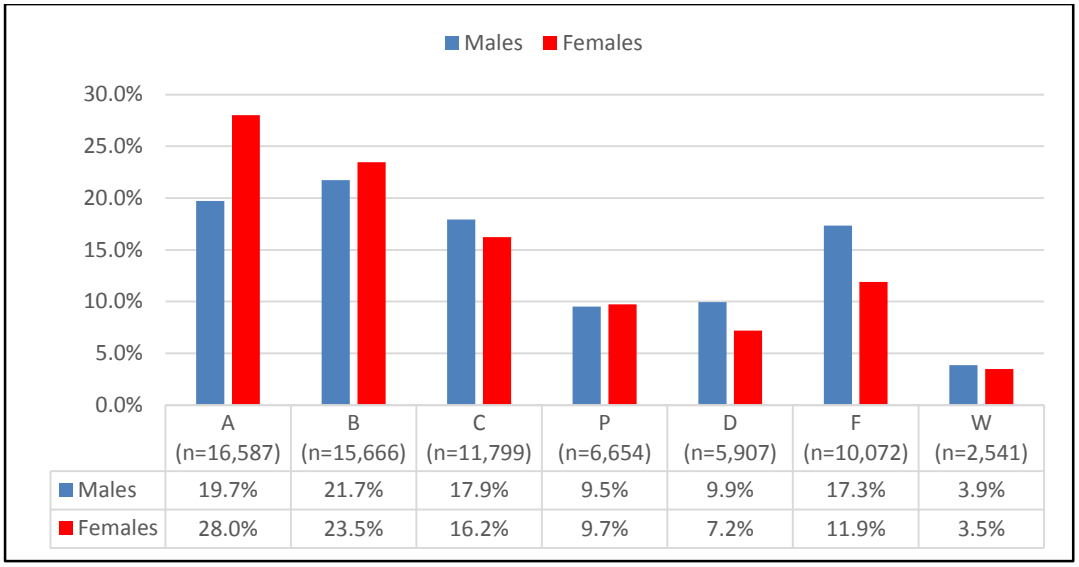
Course Types	All Students	ROGs	DEs
Regular	17,492	10,624	4,603
Remedial	6,244	4,187	2,298
Developmental	2,205	694	323
TOTAL	25,938	15,502	7,222

Achievement in First Semester Language Courses

When all students' grades are shown for all first semester language courses, one feature is immediately apparent, as seen in Figure 3.1. The grades reflect a bimodal pattern with peaks at the A/B and F levels. On analysis, as with the 2011 cohort, a very high percentage of students of the fall

2012 cohort achieved either an A or B grade, 46.8%. [17] Females received more As and Bs than males. They also received fewer Fs and were less likely to withdraw.

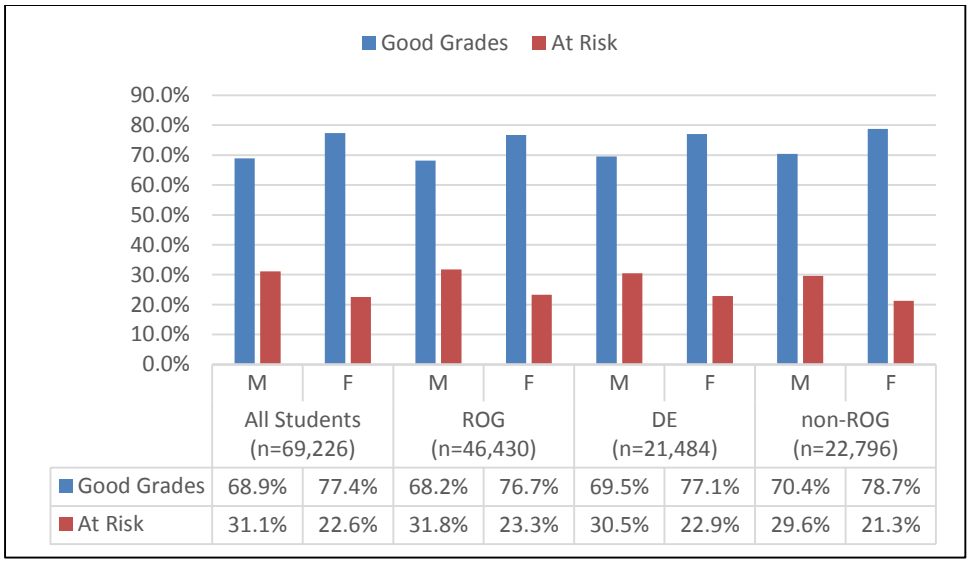
The grading pattern in 2012 is virtually identical with that of 2011. Given anecdotal information about students' language skills, there is again concern with this high percentage of As and Bs.



	A (n=16,587)	B (n=15,666)	C (n=11,799)	P (n=6,654)	D (n=5,907)	F (n=10,072)	W (n=2,541)
Males	19.7%	21.7%	17.9%	9.5%	9.9%	17.3%	3.9%
Females	28.0%	23.5%	16.2%	9.7%	7.2%	11.9%	3.5%

Figure 3.1: Achievement by Grade, All Students, All Language Courses, Fall 2012

When achievement is examined by student type, as in Figure 3.2, we observe that those who are not ROGs show a higher level of achievement than ROGs. These results are almost identical to those of 2011 where 79.1% of non-ROG females and 69.9% of non-ROG males achieved Good Grades. Those students who come to college directly from secondary school, DEs, achieve at a level similar to all ROGs. Females outperformed males in all groups by a significant margin and experienced more success overall.

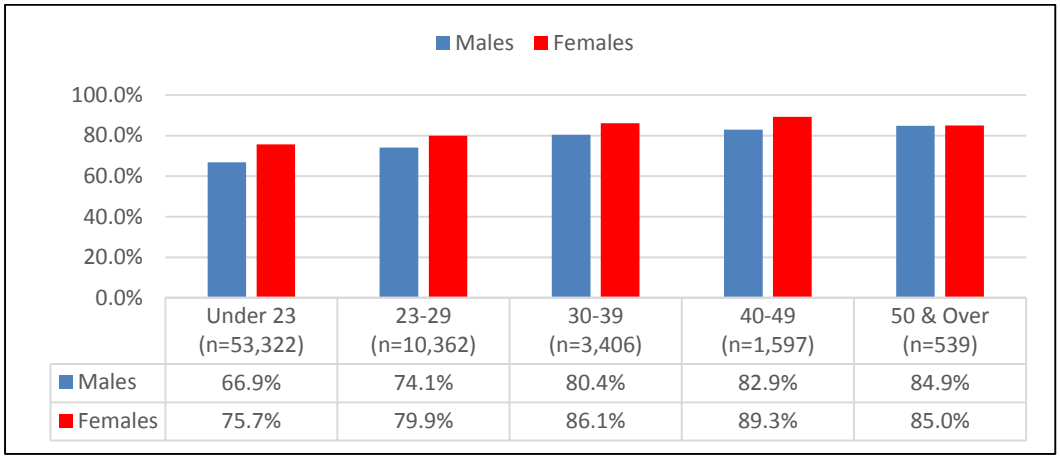


	M	F	M	F	M	F	M	F
	All Students (n=69,226)		ROG (n=46,430)		DE (n=21,484)		non-ROG (n=22,796)	
Good Grades	68.9%	77.4%	68.2%	76.7%	69.5%	77.1%	70.4%	78.7%
At Risk	31.1%	22.6%	31.8%	23.3%	30.5%	22.9%	29.6%	21.3%

Figure 3.2: Achievement by Student Type and Gender, All Students, All Language Courses, Fall 2012

[17] The report on the 2011/2012 cohort can be found at www.csap.senecacollege.ca under the title CSAP Final Report 2013.

Figure 3.3, below, shows a breakdown of achievement by age. Females continue to achieve higher grades than males in each group and success increases with each decade for both males and females until a slight decrease appears in the 50+ group. Interestingly, in the 50+ group, the results for males and females are virtually identical. Again, these results are similar to those observed in the 2011 cohort.

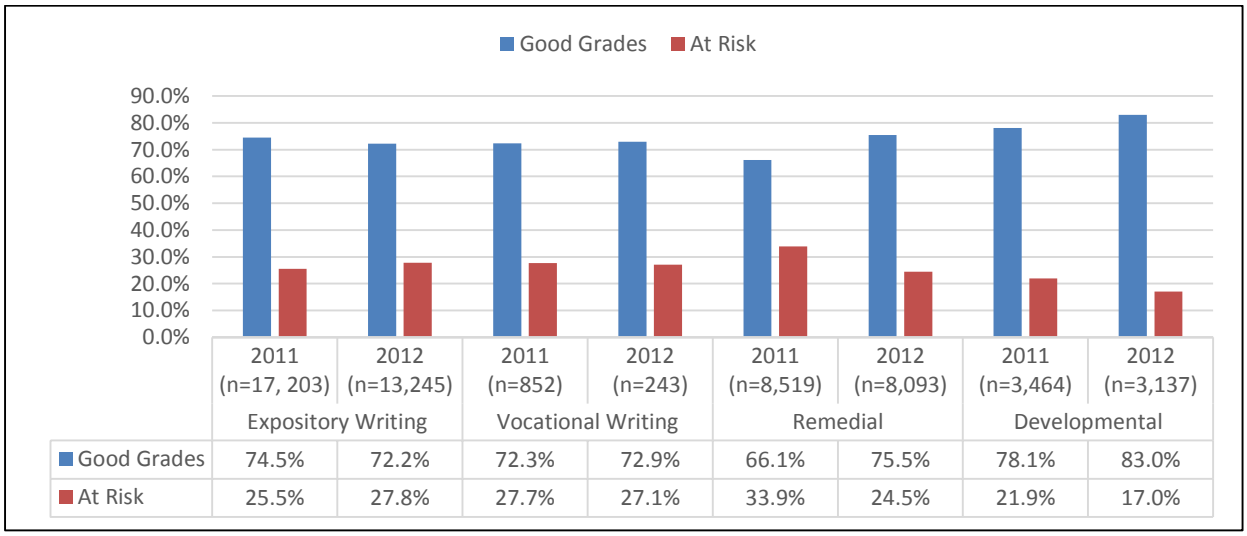


	Under 23 (n=53,322)	23-29 (n=10,362)	30-39 (n=3,406)	40-49 (n=1,597)	50 & Over (n=539)
Males	66.9%	74.1%	80.4%	82.9%	84.9%
Females	75.7%	79.9%	86.1%	89.3%	85.0%

Figure 3.3: Achievement (Good Grades) by Age and Gender, Fall 2012

When we look at the results by course type – expository writing, vocational writing, remedial and developmental – as seen in Figure 3.4, we observe that in the year-to-year comparison, the success rate in expository courses has dropped slightly in 2012 and remained constant in vocational courses. Unlike the 2011 cohort, students achieved success at the same level regardless of the approach used.

In remedial courses, the success rate for all students, that is, English-language students in English remedial classes and French-language students in French remedial classes is 75.5%, a significant increase from last year's rate of 66.1%.[18] In developmental courses, the success rate has increased by approximately 5%.



	2011 (n=17, 203)	2012 (n=13,245)	2011 (n=852)	2012 (n=243)	2011 (n=8,519)	2012 (n=8,093)	2011 (n=3,464)	2012 (n=3,137)
	Expository Writing		Vocational Writing		Remedial		Developmental	
Good Grades	74.5%	72.2%	72.3%	72.9%	66.1%	75.5%	78.1%	83.0%
At Risk	25.5%	27.8%	27.7%	27.1%	33.9%	24.5%	21.9%	17.0%

Figure 3.4: Language Achievement by Course Type, All Students, Fall 2012

[18] The report of the fall 2011 cohort contained results for students in English-language remedial courses only. The results for French-language students were not reported due to the need for college anonymity.

Results for future years of all course types will be needed before patterns can be discerned and commented on.

Secondary School Backgrounds

The English-language admission requirement for most certificate and diploma programs is a credit in a Grade 12 college-destination course (ENG4C). For French-language colleges, the admission requirement is often stated as a senior credit in Français at the college-destination level, meaning that a Grade 11 (FRA3C) or Grade 12 (FRA4C) credit is acceptable. However, one of the graduation requirements to obtain an Ontario Secondary School Diploma (OSSD), a requirement for college entrance, is a Grade 12 credit in English at English-language secondary schools and French at French-language secondary schools.

Although the OSSD requires four language credits, in reality, students often take more than that and apply to college with a range of language credits including Grade 12 university-destination courses (ENG4U or FRA4U) and English or French-language electives. However, according to the Minister's Binding Policy Directive: Admissions and Placement, colleges may not give preferential consideration to applicants with Grade 12 university (U) credits nor to those with any university/college (M) credits.[19]

One of the goals of CSAP is to analyse the language courses students have taken and determine the set of courses that results in the most success in college language courses.

Although, as stated, ENG4C and FRA4C are the maximum requirements allowable for entrance to college certificate and diploma programs, these courses do not result in the highest levels of success in college language courses. In Figure 3.5, a comparison of the results between students with credits in ENG4C and ENG4U for ROG and DE students and in Figure 3.6 between credits in FRA4C and FRA4U for the same students, the following is observed: 65.4% of ROGS and 66.0% of DEs with credits in ENG4C achieved Good Grades in college courses, while 76.8% of ROGs and 77.6% of DEs with credits in ENG4U did. These results are comparable to those for the 2011 cohort.

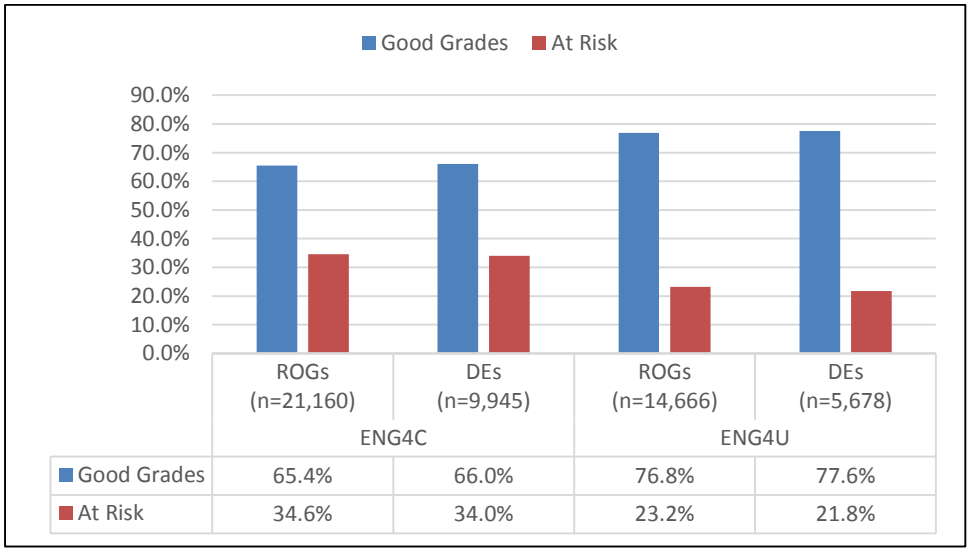


Figure 3.5: English Language Achievement for ROGs and DEs with ENG4C and ENG4U Credits, Fall 2012

[19] Minister's Binding Policy Directive: Admissions and Placement.

For students at French language colleges, the results are similar. For those with a credit in FRA4C, 66.8% of ROGS and 65.9% of DEs achieved success in first semester French-language courses while 79.8% of ROGs and 81.4% of DEs with a credit in FRA4U did.

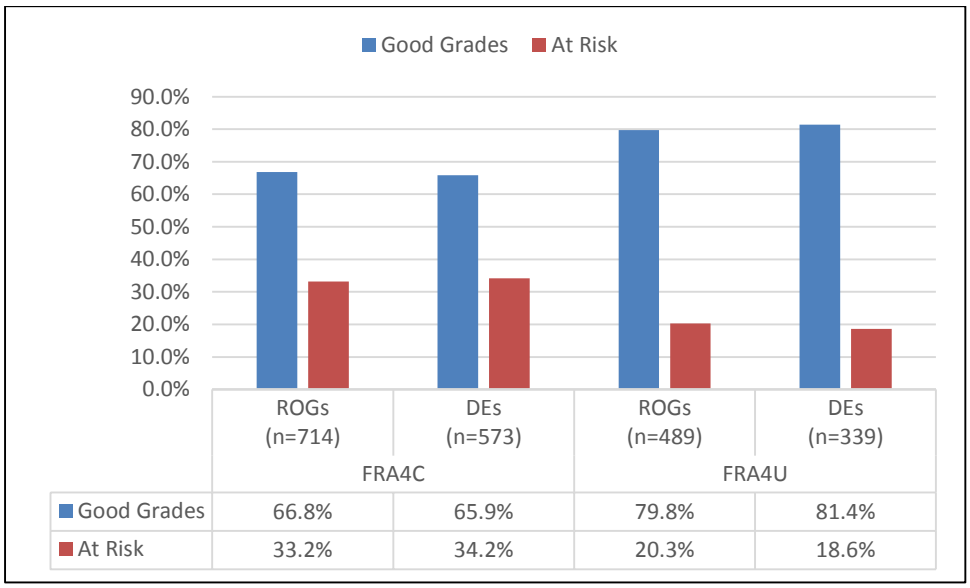
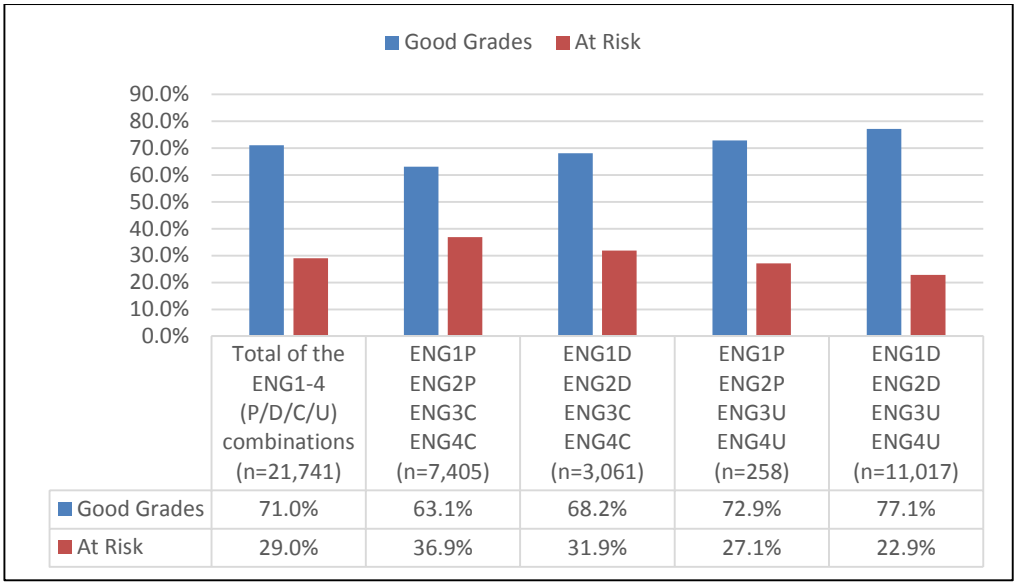


Figure 3.6: French Language Achievement for ROGs and DEs with FRA4C and FRA4U, Fall 2012

Of the 35,826 ROGS in fall 2012 taking English language courses, 59.1% had a credit in ENG4C while 40.9% had a credit in ENG4U. Of the 1,230 ROGs at French-language colleges enrolled in French courses, 60.2% had a credit in FRA4C while 39.8% had a credit in FRA4U.

Figure 3.7 provides a comparison of success rates for four possible routes students might follow to obtain their requisite English language credits and Figure 3.8 for three routes to obtain French language credits. In Grades 9 and 10, students may choose between applied and academic courses and in Grades 11 and 12 between college and university-destination courses. Of those English-language students who followed the route designed for college-bound students, consisting of Grades 9 and 10 applied courses (ENG1P and ENG2P) followed by Grades 11 and 12 college destination courses (ENG3C and ENG4C), 63.1% achieved success in first semester college English language courses. Of those students who followed the route designed to prepare students for university, consisting of Grades 9 and 10 academic courses (ENG1D and ENG2D) and Grades 11 and 12 university-destination courses (ENG3U and ENG4U), 77.1% achieved success. When two other combinations of these courses are analyzed, of students with Grades 9 and 10 academic courses and Grades 11 and 12 college-destination courses, 68.2% achieved Good Grades in college English courses while of those students with Grades 9 and 10 applied courses followed by Grades 11 and 12 university-destination courses 72.9% achieved success. However, this last pathway may be misleading as students usually may not progress directly from Grade 10 applied to the Grade 11 university-destination course, although a few exceptions were found. They normally must first take Grade 10 academic English or Grade 11 college-destination English[20].

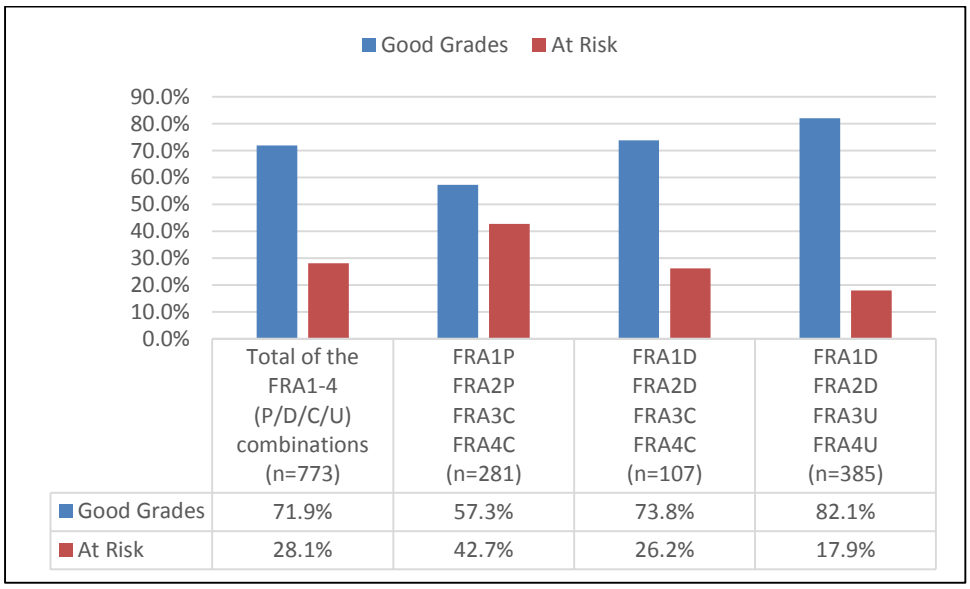
[20] An explanation of Ontario secondary school course codes and the curriculum structure is provided in Appendix B.



	Total of the ENG1-4 (P/D/C/U) combinations (n=21,741)	ENG1P ENG2P ENG3C ENG4C (n=7,405)	ENG1D ENG2D ENG3C ENG4C (n=3,061)	ENG1P ENG2P ENG3U ENG4U (n=258)	ENG1D ENG2D ENG3U ENG4U (n=11,017)
Good Grades	71.0%	63.1%	68.2%	72.9%	77.1%
At Risk	29.0%	36.9%	31.9%	27.1%	22.9%

Figure 3.7: College English Achievement with Alternative Grades 9, 10, 11 and 12 English Pathways

The results for students attending French-language colleges reveal a wider range among success rates in the various pathways. Of those students who follow the applied/college route, only 57.3% achieve success in first semester French-language courses, while 82.1% of those who follow the academic/university route attain Good Grades. Results for one other path lie with this range, with 73.8% of those following the academic/college route attaining Good Grades in their college French courses.



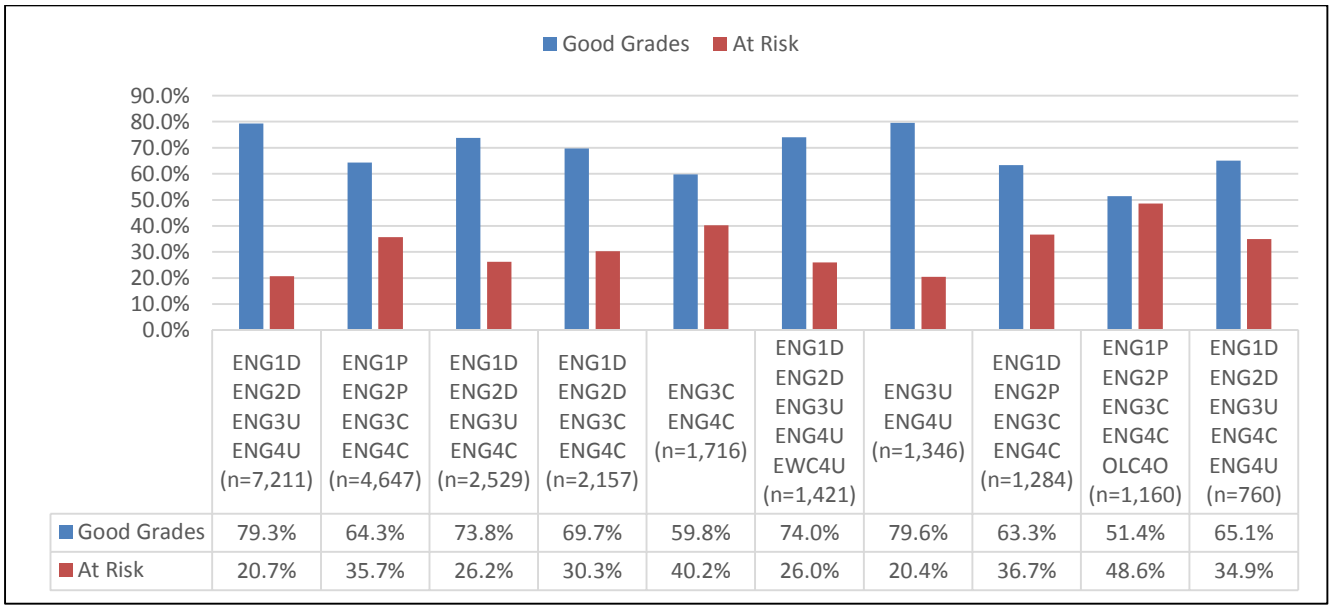
	Total of the FRA1-4 (P/D/C/U) combinations (n=773)	FRA1P FRA2P FRA3C FRA4C (n=281)	FRA1D FRA2D FRA3C FRA4C (n=107)	FRA1D FRA2D FRA3U FRA4U (n=385)
Good Grades	71.9%	57.3%	73.8%	82.1%
At Risk	28.1%	42.7%	26.2%	17.9%

Figure 3.8: College French Achievement with Alternative Grades 9, 10, 11 and 12 French Pathways

We discovered over 1,100 different routes that students follow to achieve their English language credits and over 380 for students pursuing the required French language credits.[21] Below are the ten most popular paths and the success rate achieved in college for those who followed them.

[21] The number of pathways is high for both English and French as it includes repeated courses, electives and the OLC/CCL courses.

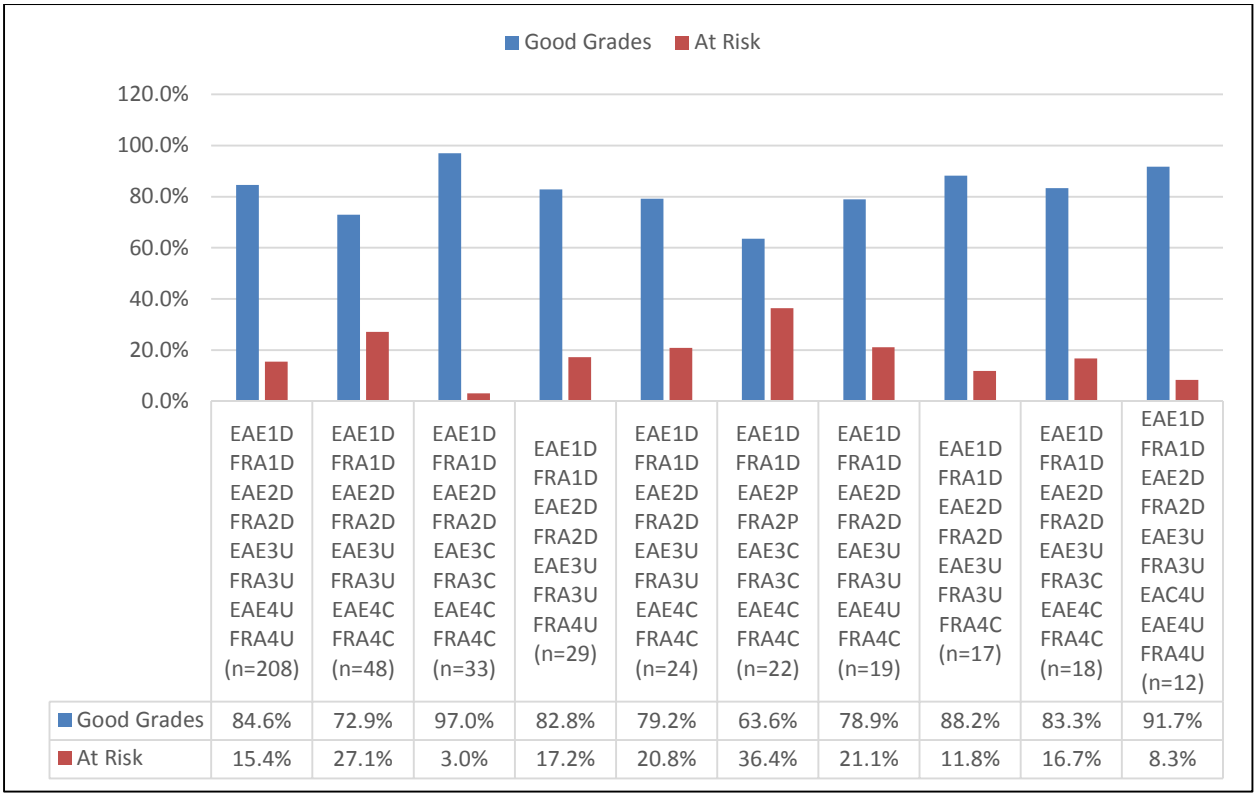
Figure 3.9 indicates results for English-language students and Figure 3.10 for those with French-language credits. It is interesting to note that for English, the highest number of students in a single pathway is for those with academic/university credits (7,211 students) and the second most popular the applied/college route (4,647 students), while for French, the most popular route is also the academic/university path (208 students) but the second most popular contains academic credits in Grades 9 and 10, university-destination in Grade 11 and college-destination in Grade 12 (48 students).[22] As with mathematics, fewer student records containing Grades 9 and 10 credits were available this year resulting in lower numbers in each pathway.



	ENG1D ENG2D ENG3U ENG4U (n=7,211)	ENG1P ENG2P ENG3C ENG4C (n=4,647)	ENG1D ENG2D ENG3U ENG4C (n=2,529)	ENG1D ENG2D ENG3C ENG4C (n=2,157)	ENG3C ENG4C (n=1,716)	ENG1D ENG2D ENG3U ENG4U EWC4U (n=1,421)	ENG3U ENG4U (n=1,346)	ENG1D ENG2P ENG3C ENG4C (n=1,284)	ENG1P ENG2P ENG3C ENG4C OLC4O (n=1,160)	ENG1D ENG2D ENG3U ENG4C ENG4U (n=760)
Good Grades	79.3%	64.3%	73.8%	69.7%	59.8%	74.0%	79.6%	63.3%	51.4%	65.1%
At Risk	20.7%	35.7%	26.2%	30.3%	40.2%	26.0%	20.4%	36.7%	48.6%	34.9%

Figure 3.9: The Ten Most Popular Pathways, English, Fall 2012

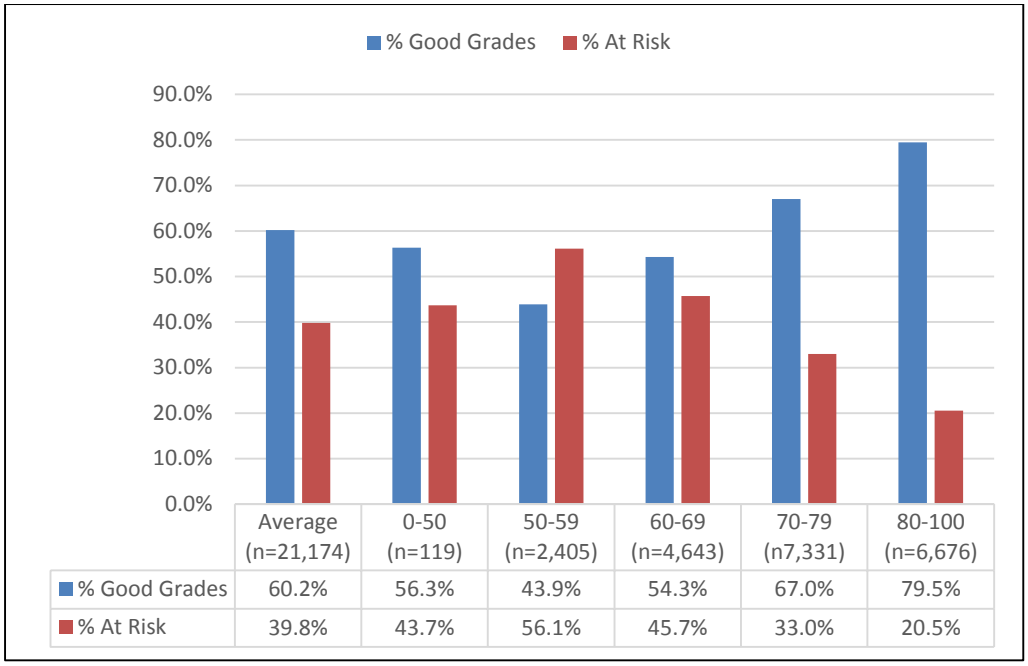
[22] Figure 3.5 indicated that 14,666 students in this cohort had a credit in ENG4U. The difference between this number and that in the first pathway in Figure 3.8 (7,211) is due to the fact that ENG4U appears in many of the 1,100 pathways taken by students (e.g., see the sixth, seventh, and tenth pathways above).



	EAE1D FRA1D EAE2D FRA2D EAE3U FRA3U EAE4U FRA4U (n=208)	EAE1D FRA1D EAE2D FRA2D EAE3U FRA3U EAE4C FRA4C (n=48)	EAE1D FRA1D EAE2D FRA2D EAE3C FRA3C EAE4C FRA4C (n=33)	EAE1D FRA1D EAE2D FRA2D EAE3U FRA3U FRA4U (n=29)	EAE1D FRA1D EAE2D FRA2D EAE3U FRA3U EAE4C FRA4C (n=24)	EAE1D FRA1D EAE2P FRA2P EAE3C FRA3C EAE4C FRA4C (n=22)	EAE1D FRA1D EAE2D FRA2D EAE3U FRA3U EAE4U FRA4C (n=19)	EAE1D FRA1D EAE2D FRA2D EAE3U FRA3U FRA4C (n=17)	EAE1D FRA1D EAE2D FRA2D EAE3U FRA3C EAE4C FRA4C (n=18)	EAE1D FRA1D EAE2D FRA2D EAE3U FRA3U EAC4U EAE4U FRA4U (n=12)
Good Grades	84.6%	72.9%	97.0%	82.8%	79.2%	63.6%	78.9%	88.2%	83.3%	91.7%
At Risk	15.4%	27.1%	3.0%	17.2%	20.8%	36.4%	21.1%	11.8%	16.7%	8.3%

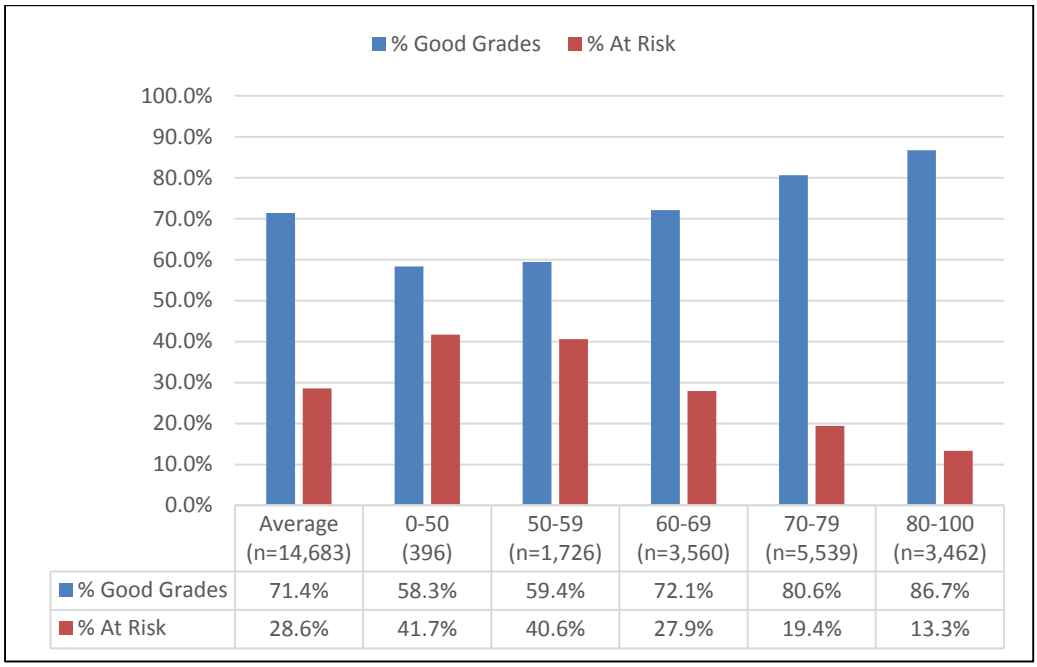
Figure 3.10: The Ten Most Popular Pathways, French, Fall 2012

Over their duration, the College Mathematics Project (CMP) and now CSAP have talked of the importance of the level of achievement in secondary school language and mathematics courses and the impact these grades have on success rates in college courses. The four figures below contain the success rates for students in college language courses with secondary school language credits in ENG4C, ENG4U, FRA4C and FRA4U according to their grades in each. As seen in Figure 3.11, fewer than 50% of students with a credit in ENG4C and grades in the 50-59% range achieved success in college English while of those with a grade over 80% in their secondary school course, 79.5% achieved Good Grades in their college course. For those with a credit in ENG4U (Figure 3.12), all students with grades above 50% achieved success in college courses, but of those with grades of 70% and above, over 80% were successful. Readers may be surprised to see college students with grades below 50% in these courses. Two explanations are available. Some students may have entered college without an OSSD, as Mature students (age 19 and older), and passed the college's entrance exam, demonstrating language skills equivalent to those in the Grade 12 college destination courses (ENG4C/FRA4C). A second explanation may come from the fact that a small number of students have taken the Ontario Literacy Course at the Grade 12 level (OLC4O), which is sometimes accepted as equivalent to a Grade 12 language course for purposes of graduating with an OSSD and for college acceptance.



	Average (n=21,174)	0-50 (n=119)	50-59 (n=2,405)	60-69 (n=4,643)	70-79 (n7,331)	80-100 (n=6,676)
% Good Grades	60.2%	56.3%	43.9%	54.3%	67.0%	79.5%
% At Risk	39.8%	43.7%	56.1%	45.7%	33.0%	20.5%

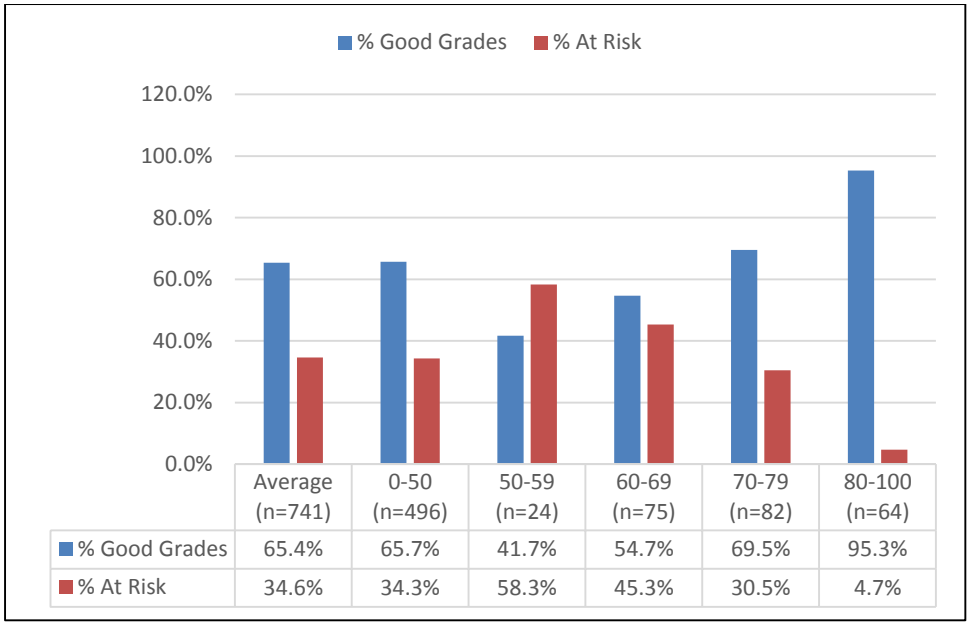
Figure 3.11: Achievement in College English Courses with Grade Range in ENG4C, Fall 2012



	Average (n=14,683)	0-50 (396)	50-59 (n=1,726)	60-69 (n=3,560)	70-79 (n=5,539)	80-100 (n=3,462)
% Good Grades	71.4%	58.3%	59.4%	72.1%	80.6%	86.7%
% At Risk	28.6%	41.7%	40.6%	27.9%	19.4%	13.3%

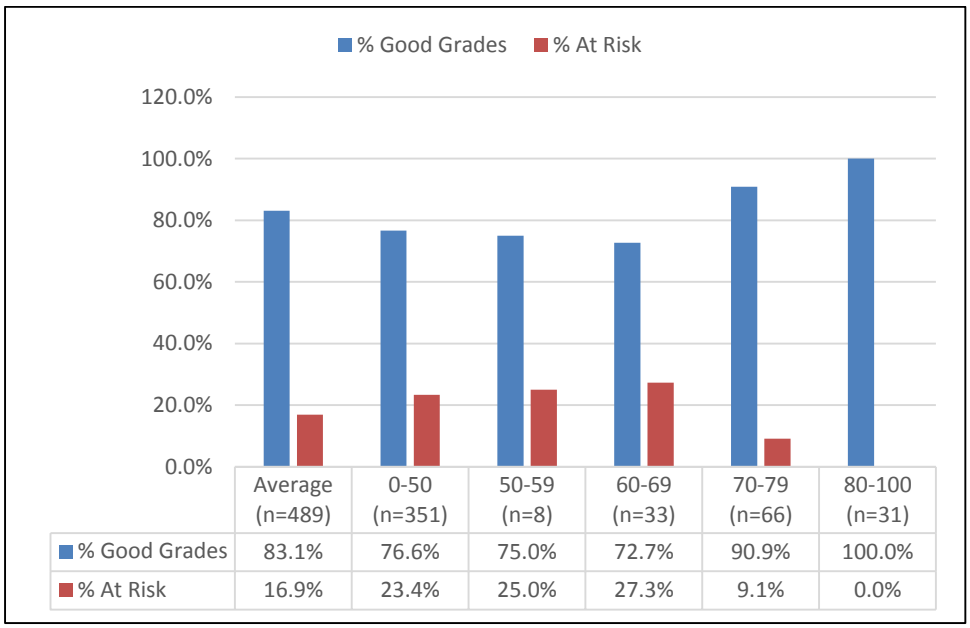
Figure 3.12: Achievement in College English Courses with Grade Range in ENG4U, Fall 2012

Results reveal even more disparity among grades achieved for French language students. For those with a credit in FRA4C (Figure 3.13) only 41.7% of students in the 50 – 59% grade range achieved Good Grades in college French courses while 95.3% of those with a grade over 80% did so. In Figure 3.14, all students with a credit in FRA4U were very successful in college French courses with 90.9% of those with grades over 70% achieving success and 100% of those with grades over 80% doing so.



	Average (n=741)	0-50 (n=496)	50-59 (n=24)	60-69 (n=75)	70-79 (n=82)	80-100 (n=64)
% Good Grades	65.4%	65.7%	41.7%	54.7%	69.5%	95.3%
% At Risk	34.6%	34.3%	58.3%	45.3%	30.5%	4.7%

Figure 3.13: Achievement in College French Courses with Grade Range in FRA4C, Fall 2012



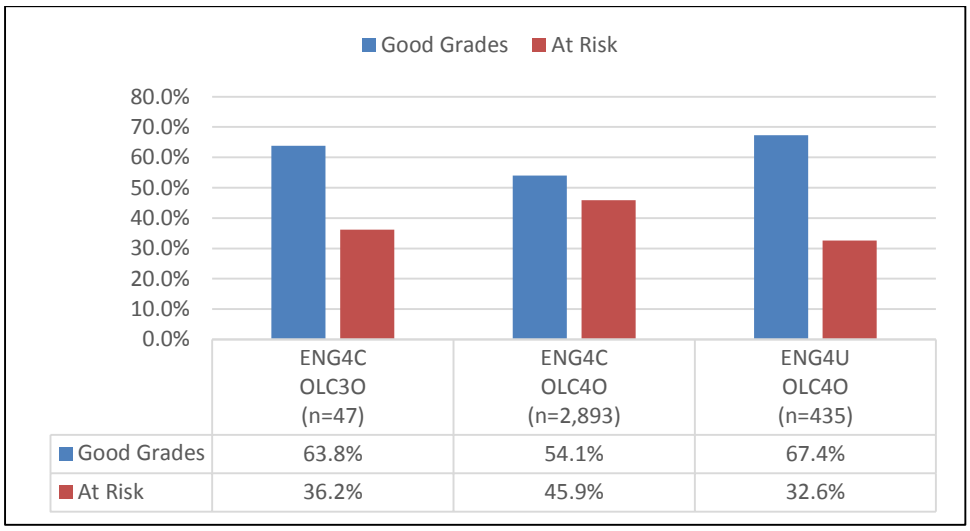
	Average (n=489)	0-50 (n=351)	50-59 (n=8)	60-69 (n=33)	70-79 (n=66)	80-100 (n=31)
% Good Grades	83.1%	76.6%	75.0%	72.7%	90.9%	100.0%
% At Risk	16.9%	23.4%	25.0%	27.3%	9.1%	0.0%

Figure 3.14: Achievement in College French Courses with Grade Range in FRA4U, Fall 2012

All students must pass the Ontario Secondary School Literacy Test (OSSLT), administered to students in the fall of Grade 10, in order to achieve their OSSD. Students who fail the test more than twice may take the Ontario Secondary School Literacy Course (OLC) in place of repeating the test. In English language secondary schools, there are Grade 11 and 12 versions of the course – OLC3O and OLC4O. In French language secondary schools there is only a Grade 12 version – CCL4O.

Figure 3.15 demonstrates results for three combinations of the OLC course and Grade 12 English courses. Success rates in college courses, overall, are not high for those students, but higher when the Grade 11 version is combined with ENG4C and the Grade 12 version with ENG4U. However, because of the small numbers of students involved care should be taken in deriving conclusions. The

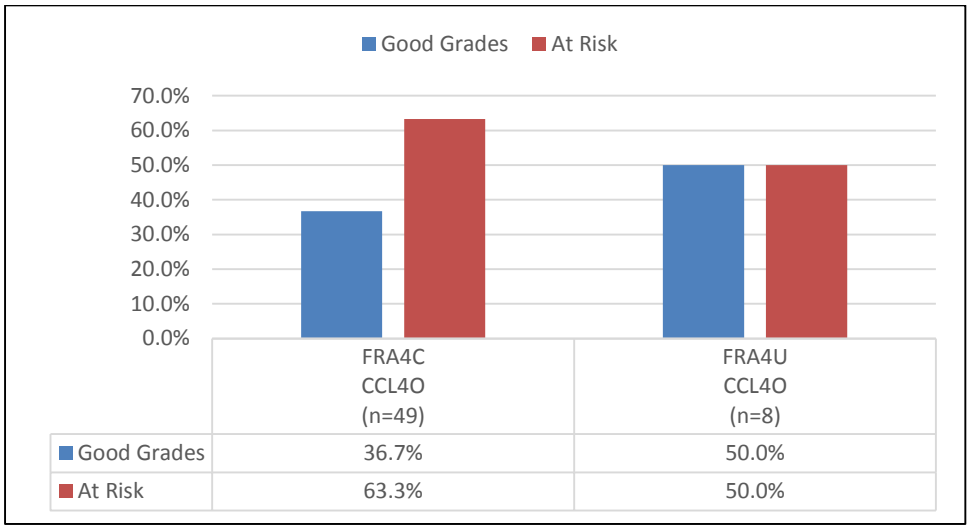
results for the 2011 cohort were much lower and concerns had been raised in that Report about the preparedness of students for college English courses. In light of the difference in these two years, it is clear that more study is needed before a pattern can be discerned and conclusions drawn.



	ENG4C OLC3O (n=47)	ENG4C OLC4O (n=2,893)	ENG4U OLC4O (n=435)
Good Grades	63.8%	54.1%	67.4%
At Risk	36.2%	45.9%	32.6%

Figure 3.15: Achievement in College English Courses with ENG4C/4U and OLC3O/4O, Fall 2012

In Figure 3.16, we see that of the students who take the CCL4O course with FRA4C, only 36.7% achieve success in a college French courses, and, although the total number of students is quite small, we see that only 50.0% of those who took the CCL4O course with FRA4U achieved success in college French courses.



	FRA4C CCL4O (n=49)	FRA4U CCL4O (n=8)
Good Grades	36.7%	50.0%
At Risk	63.3%	50.0%

Figure 3.16: Achievement in College French Courses with FRA4C/4U and CCL4O, Fall 2012

Second Semester Participation

As seen in the Figure 3.17 below, achievement in Semester One language courses plays an important role in retention. For example, of those students who achieved good grades in first semester English or French language courses, 89.5 % continued on to the winter semester while 10.5% did not. The opposite is true for those whose grades were in the "At Risk" category in first semester as only 59.4% continued to second semester and 40.6% did not. The same results were seen for

mathematics in Chapter 2 and confirm the importance of well-developed language and mathematics skills to overall program success.

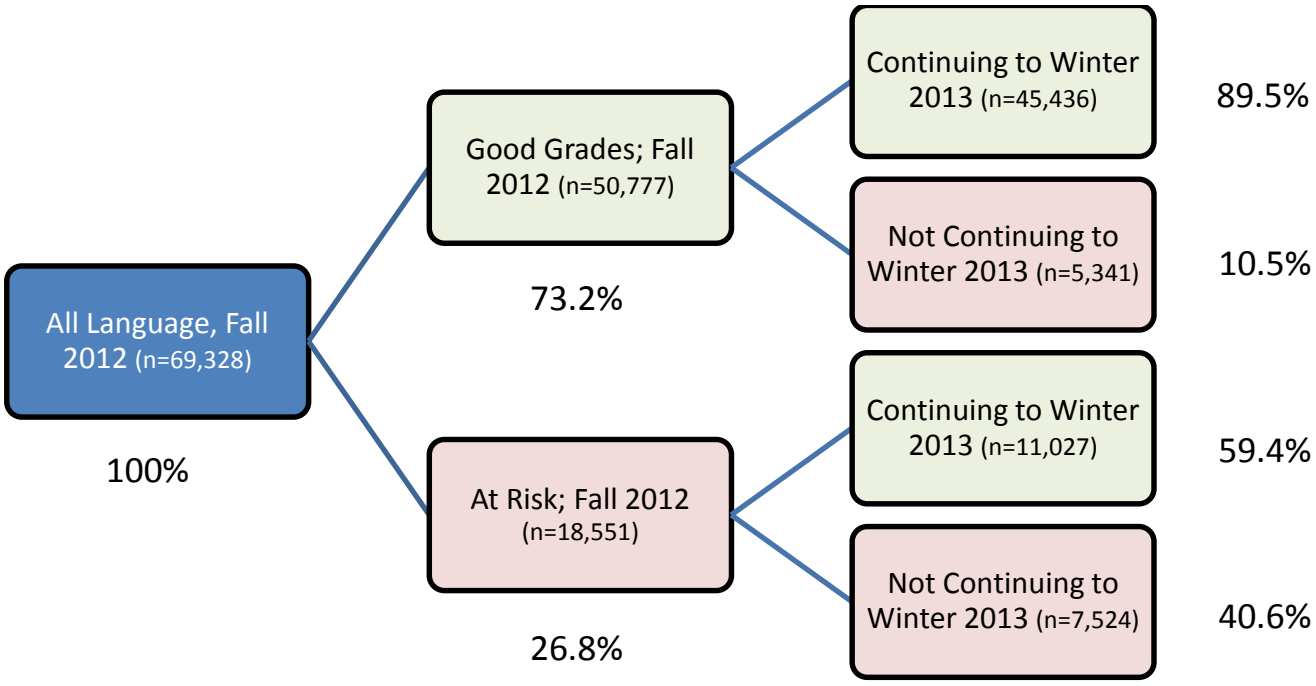


Figure 3.17: Program Enrolment (Second Semester) by Language Achievement (First Semester)

The enrolment in both English and French courses dropped significantly in the winter 2013 semester as fewer language courses are offered in second semester. Many colleges deliver courses such as business and technical writing to students in third semester and above.

For English language students, the courses offered in the winter semester fall into seven categories. The first three consist of regular second semester courses:

Type 1 – Courses that are a continuation of first semester courses
Type 2 – Course that are offered where no English language courses was delivered in first semester
Type 3 – Courses that have a focus that is different from the course delivered in first semester

The next category of course, Type 4, is one for students who had been in remedial or developmental courses in first semester and have now moved on to the next course, either regular or remedial.

The last three categories show students in first semester courses that they had failed or withdrew from and repeated in second semester:

Type 5 – Students repeating a regular course
Type 6 – Students repeating a remedial courses
Type 7 – Students repeating a developmental course

Table 3.4 shows the enrolment in each type of course.

Table 3.4
College English Language Enrolment by Course Type, Winter 2103

Second Semester English Course Type	Enrolment
2nd semester course that is a continuation of a 1st semester course	12,707
2nd semester course where none was offered in 1st semester	6,260
2nd semester course with a focus different from 1st semester course	13,385
Regular or remedial course following a remedial or developmental course	3,881
Students repeating a regular course	2,310
Students repeating a remedial course	606
Students repeating a developmental course	165

There were 39,314 course registrations in the winter semester. Of these, 82.3% of students were registered in regular courses, 9.9% moved to the next course, and 7.8% repeated courses.

For French language students, there were registrants reported in three types of courses in the winter semester:

Type 1 – Courses that are a continuation of first semester courses
Type2 – Courses where no course was offered in first semester
Type 3 – Students repeating a first semester course

Table 3.5 shows the enrolment in each type of course.

Table 3.5
French Language Enrolment by Course Type, Winter 2013

Second Semester French Course Type	Enrolment
2nd semester course that is a continuation of a 1st semester course	85
2nd semester course where none was offered in 1st semester	23
Students repeating a 1st semester course	49

Of the 157 students enrolled in second semester courses, 68.8% were registered in regular courses and 31.2% repeated first semester courses.

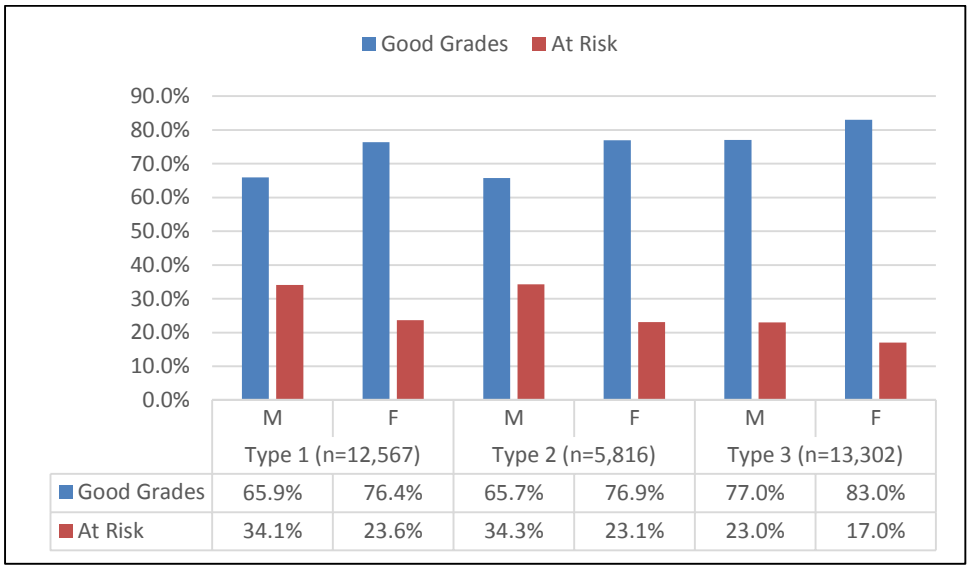
Although it is difficult to assess retention through language courses, we did see In Figure 3.17 that achieving Good Grades in first semester language courses is one factor in affecting persistence into second semester.

One group, normally considered at risk, are those students registered in remedial and developmental courses in first semester. Their persistence can give a sense of the effect this type of intervention may have on student retention.[23] In the fall semester, 8,432 students were enrolled in these two types of courses. In the winter semester, 4,652 or 55.2% had either progressed to the next course or were repeating remedial or developmental courses. Given that this is a very vulnerable group of students, this figure should be seen as representing success as it is quite possible these students may not have been able to continue without these interventions.

[23] Student persistence can be attributed to a number of factors such as the preparedness to learn, and personal characteristics and behaviours, including motivation, commitment, self-regulation, committing to a plan of study, etc. The data suggests only that achieving good grades in language and mathematics courses and interventions such as remedial and developmental courses may contribute to this list.

Achievement in Second Semester Language Courses

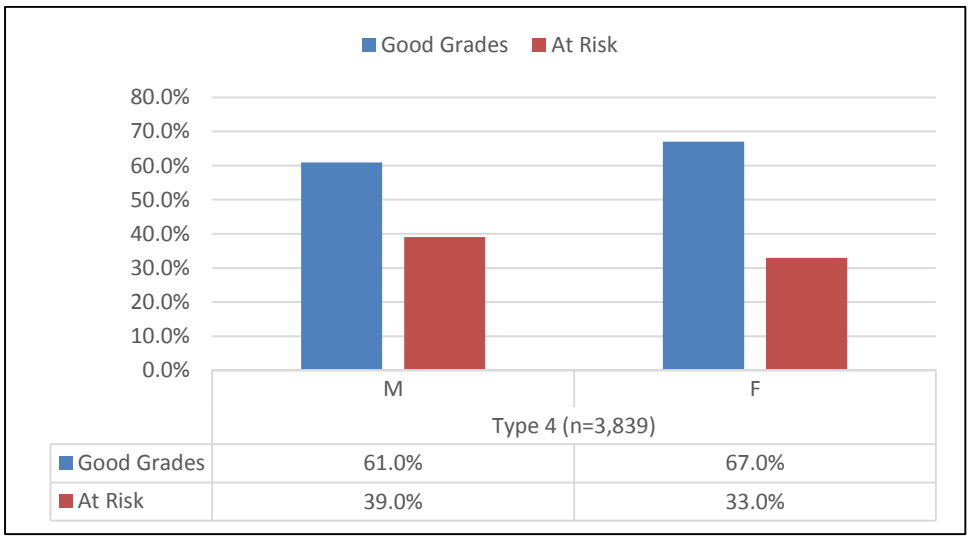
Shown in Figure 3.18 is the achievement for students enrolled in regular (Types 1 – 3) English language courses in second semester. Of those in Type 1, 76.4% of females and 65.9% of males achieved Good Grades while of those in Type 2, 76.9% of females and 65.7% of males were successful. In Type 3, 83.0% of females and 77.0% of males achieved Good Grades. As was noted with last year's cohort, many colleges that offered expository writing courses in first semester deliver vocational writing courses in second. Students are approximately 10% more successful when these courses are taken in second semester.



	M	F	M	F	M	F
	Type 1 (n=12,567)		Type 2 (n=5,816)		Type 3 (n=13,302)	
Good Grades	65.9%	76.4%	65.7%	76.9%	77.0%	83.0%
At Risk	34.1%	23.6%	34.3%	23.1%	23.0%	17.0%

Figure 3.18: English Language Achievement by Course Type 1 – 3 and Gender, Winter 2012

Figure 3.19 contains the results for those students who moved from remedial to regular courses or from developmental to remedial courses. It is encouraging to see that 67.0% of females and 61.0% of males achieved success in these courses.

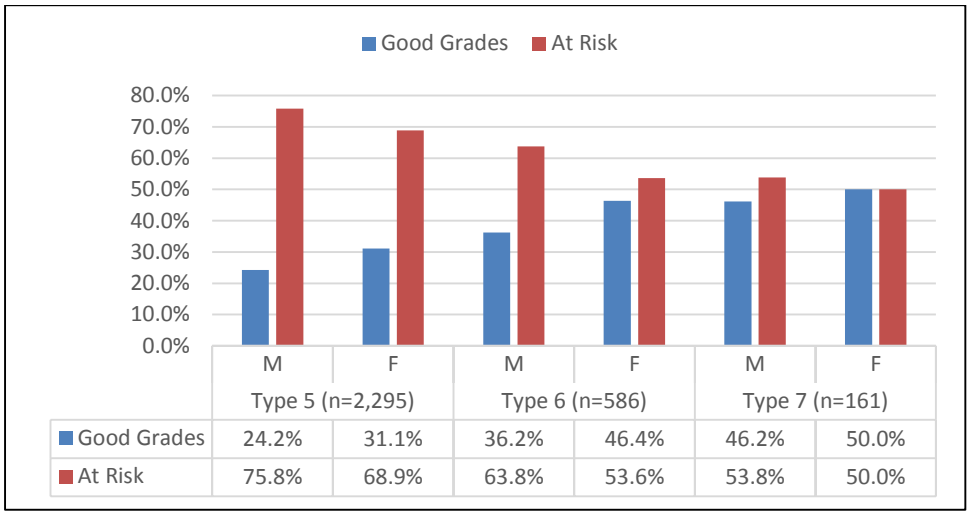


	M	F
	Type 4 (n=3,839)	
Good Grades	61.0%	67.0%
At Risk	39.0%	33.0%

Figure 3.19: English Language Achievement by Course Type 4, and Gender, Winter 2012

Figure 3.20 shows the results for students who repeated courses. Of those repeating a regular course, only 31.1% of females and 24.2% of males achieved good grades. Of the students who

repeated remedial courses, 46.4 % of females and 36.2% of males were successful. In developmental courses, 50% of females and 46.2% of males passed on their second attempt.

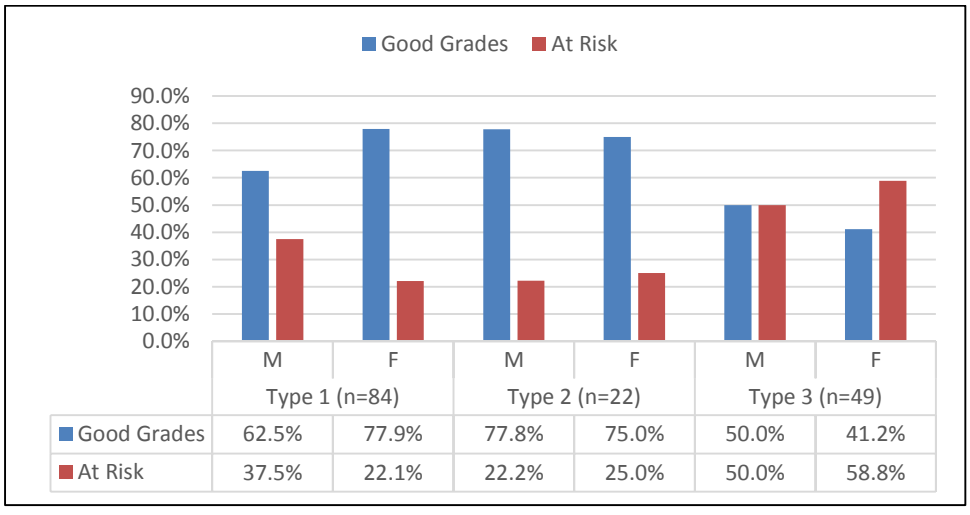


	M	F	M	F	M	F
	Type 5 (n=2,295)		Type 6 (n=586)		Type 7 (n=161)	
Good Grades	24.2%	31.1%	36.2%	46.4%	46.2%	50.0%
At Risk	75.8%	68.9%	63.8%	53.6%	53.8%	50.0%

Figure 3.20: English Language Achievement by Course Type 5 – 7 and Gender, Winter 2012

Similar to the results of the previous year, these results call into question the efficacy of having students repeat a course they failed in the previous semester. More research is needed into the reasons why students fail these courses. If for some students it is due to the fact that they are not prepared for instruction at this level, then certain interventions are needed before requiring them to repeat the course. Other causes would require different strategies.

As seen in Figure 3.21, of French language students enrolled in Type 1 courses, a continuation of a first semester course, 77.9% of females and 62.5% of males achieved Good Grades and for those enrolled in Type 2 courses, a course where one had not been offered in first semester, 75.0% of females and 77.8% of males were successful. As seen with the results for English language students, only 41.2% of females and 50.0% of males who repeated a first semester course (Type 3) were successful. However, due to the small number of students in this sample, care must be taken before drawing conclusions from these results.



	M	F	M	F	M	F
	Type 1 (n=84)		Type 2 (n=22)		Type 3 (n=49)	
Good Grades	62.5%	77.9%	77.8%	75.0%	50.0%	41.2%
At Risk	37.5%	22.1%	22.2%	25.0%	50.0%	58.8%

Figure 3.21: French Language Achievement by Course Type 1 – 3 and Gender, Winter 2012

Chapter 4: CSAP Provincial Forum

Role of the Forum in Relation to the CSAP Research Methodology

The mission of the College Student Achievement Project (CSAP) is to promote increased student success in college through research and deliberation. The Deliberative Inquiry model, which underpins the work of the CSAP and is described in Chapter 1 of this report, sees these two activities as partners in the search for improvements in education. Research without thoughtful and creative deliberation merely adds to the body of knowledge sitting on the shelf. Correspondingly, deliberation without research can be simply anecdotal and lacking in systematic evidence. The deliberations of the Forum participants assist the CSAP team in reaching conclusions and recommendations that are both grounded in the research and in the perspectives of practitioners. The CSAP Forum is, therefore, a critical partner to the research program in developing both recommendations for change and people committed to implementing them.

Organisation of the Forum

The CSAP Provincial Forum brought together 125 representatives from schools, colleges, universities, government, associations and agencies, drawing on their broad array of professional experience and perspective to engage in discussion and interpretation of the CSAP preliminary research findings on the 2012/13 first year student cohort participation and achievement in college language and mathematics courses. Further, the Forum provided an opportunity for participants to reflect on what CSAP is presently doing well and what it could do better in the future. The 2014 Forum also featured the CSAP "Project Showcase", which highlighted the work on the Assessment Development Project, the Learning Outcomes Development Project, and the CSAP database. More detail on the Showcase is presented at the end of this Chapter.

In lieu of a more lengthy preliminary research report, participants were provided with an enhanced PowerPoint presentation with selected research data, presentation notes, and questions for deliberation in advance of the Forum event in order to allow for review of the research and to "prime the pump" in anticipation of deliberative sessions.

Forum sessions consisted of presentations by the Research Team which were organised around three topics: 1) project background, research methodology and database architecture; 2) college mathematics and language participation and achievement data analysis; and 3) secondary school pathways analysis. Presentations were followed by table discussions during which participants answered questions aligned with the topic. A discussion framework was provided to help focus discussions. Specifically, participants were asked to identify what, in these three areas, is working well at present; to push creatively for improvements (what we can do better), and to relate these to both the local and provincial context. Recorders at each table submitted the responses electronically after each discussion. Responses were coded by question and theme and entered into a database.

Forum Introduction – Context Setting

The Forum was introduced by Mary-Jean Gallagher, Assistant Deputy Minister and Chief Student Achievement Officer, Ministry of Education. This was the second year Ms. Gallagher provided opening remarks, and she took the opportunity to continue to emphasize the importance of

leveraging research around transition from secondary school to college and identifying experiences key to student success. Acknowledging the political world that all of the participants operate in and that it is not always easy to have an open conversation, she stated that the success of the Forum was contingent upon engaging in conversations about what we want for Ontario students setting aside the "normal" defensiveness that can arise.

Ms. Gallagher declared herself a champion of the CSAP research, the Forum event and the follow up that takes place as a result of it. She thanked Seneca College for the comprehensive work that the CSAP team has done over a number of years. She identified the Forum as an important opportunity to discuss the performance of our students in mathematics and language and encouraged participants to "dig into research data, learn from it, and use it to influence our decisions and our actions throughout the year."

Emphasizing the role of feedback to improvement, she stated "our students need rich feedback in order to improve their learning and that we as educators need rich feedback in order to improve our teaching and the richest feedback of all comes from following the paths of our students and having conversations that allow us to really inform well what it is we need to change."

The CSAP dataset is powerful because it is detailed, accurate and based on the examination of the actual results and progress of students. Ms. Gallagher spoke about the influence of the CSAP project at the secondary level stating "I know the work of the research project has influenced the work that we as a Student Achievement Division have been doing with school boards across the province. I know it has called our attention to particular issues for our students who are taking applied courses, and I know it is one of the factors that has very powerfully influenced the fact that this year, compared to all the years before on our EQAO tests in our Grade 9 program, our students in the applied classes experienced the most significant single year improvement in their outcomes that we have seen."

Ms. Gallagher spoke of the Ministry of Education's recently renewed vision that students graduating from secondary school will have the knowledge, skills and characteristics to be personally successful, economically productive and actively engaged citizens. She noted that the CSAP project fits well with the renewed vision as it is giving the Ministry the feedback that "we need to move from that good place where we are into an even more successful future for our kids." In particular, the expansion of the study to include second semester and language achievement has provided more information and the opportunity for more discussion with and between school and college educators and administrators, and the Ministry of Education and the Ministry of Training, Colleges and Universities.

The Ministry of Education has been working to extend the Ontario Education Number (OEN) to include kindergarten programs and the college and university sector. Once this is achieved, it will be possible to track students throughout their academic careers. In the meantime, the CSAP project provides a rich linked dataset that enables examination of participation and achievement of college students related to their secondary school course choice and achievement. In addition to helping the Ministry, the CSAP dataset and Forum helps to build relationships between colleges and schools. Ms. Gallagher noted that the CSAP Forum enables educators and the Ministries to both celebrate their successes and tackle the challenging issues of supporting students as they transition from

secondary school to postsecondary “in a way that no other Forum does”.

Ms. Gallagher referenced one of the highlights of the CSAP Cycle 1 Final Research Report which talked about “changing the conversation about achievement”, and noted that we all need to focus on raising awareness among students, parents, educators, and society in general about the benefits of high achievement in secondary school. She noted that “We never move forward as a society and culture if we aim low. We need to change the conversation and help our students and their parents understand and help them produce that difference”, noting that one of the really powerful results of the CSAP study in mathematics is showing that a student who achieves 75 -80% in applied courses do just fine in college; therefore, we must communicate clearly to students that low achievement will result in failure.

Ms. Gallagher referenced the rich dialogue on this subject that is occurring in all schools across the province, and that representatives from the Student Achievement Division have met with every school board to engage them in this conversation. In addition, this new message from the Ministry is being reinforced by secondary school teachers with students. The previous message had been focussed on secondary school graduation attainment. Noting that the province has obtained historical results (moving from a 68% to an 83% graduation rate) and that the benefits of a secondary school diploma are many, Ms. Gallagher stated that “it is time to set our sights higher for our kids. That’s what this project has done: to influence our goals and aspirations across the province thus far”, indicating that to set aspirations for achievement into the 70s and beyond requires that we teach to a level of mastery and that our students need to accept the responsibility for learning to a level of mastery.

Ms. Gallagher asked participants “What is our standard for success as we raise our aspirations and expectations of our students? What should their objective be for success and how do we further help our students raise their personal aspirations and their own personal commitment to excellence?” In closing, she issued a challenge to participants to discuss the implications for their work and students, to focus on how to raise expectations, to think about the ways the dialogue can be continued throughout the year and how each participant can add to the conversation by discussing the issues in meaningful ways.

Perspectives on CSAP Research

The following section provides a synopsis of Forum deliberations. Quotations from participants have been included for illustrative purposes only and do not imply endorsement by the CSAP team. These are presented in italics.

Project overview, goal, research methodology, database structure

The first segment of the morning session provided an overview of the project beginning with the mission, history and context for the CSAP, research methodology, and organization of the project including program clusters, grading policy, student types and course types. As much of this information has already been presented in Chapter 1, it will not be repeated here.

Participation and Achievement Data Analysis

Student participation and achievement data was presented for first and second semester college mathematics, English and French courses. This data included grade distributions for each subject and

achievement by gender and age. Participants were asked three questions pertaining to participation, achievement and progression from first to second semester.

1. We have seen a large increase in the numbers of students in remedial mathematics courses in college over the past few years and also a high percentage of Direct Entry students being directed to remedial and developmental language courses. What changes – at both provincial and local levels – are needed in college and secondary school systems to address this issue and to ensure that all students have the support they need?

Participants had many suggestions for changes within the college and secondary school systems. Themes of teaching, pedagogy, and secondary school-college partnering were prominent. Participants advocated for more dialogue between colleges and schools at the local level particularly in relation to college expectations of incoming students: "*There should be better opportunities for communication and program mapping with elementary and secondary schools so that college expectations can be better communicated to the elementary and secondary school programs. Are [our] expectations set high enough to prepare students for college/university requirements?"*

It was suggested that colleges should have a secondary school mathematics teacher as a member of the (Program Advisory) panel to provide insights into what students in secondary schools are learning to help inform the college program curriculum structure and content. This suggestion should not be limited to mathematics but should also include language. Another attendee commented, "*It appears that colleges need to revise their learning tasks for English courses to build upon, rather than repeat the secondary school experiences. Students at all levels need support in setting reasonable goals, being informed about the expectations, and establishing long-term goals (since this is a challenge for young people) engage students in continuous learning opportunities (self-directed) which allows them to build/strengthen (their skills)."* The latter part of this quotation reinforces the importance of learning skills, a topic that received considerable attention, including recommendations for both secondary schools and colleges at previous Forums.

2. Females outperform males in both mathematics and language courses. Is there anything that can or should be done specifically to support male students at both secondary school and college levels to rectify this imbalance?

This question generated a great deal of discussion. Once again teaching and pedagogy was a dominant theme. As well many participants identified engagement and retention strategies as being essential to the conversation.

Participants discussed the importance of addressing different learning styles for all students, including adding more kinesthetic learning opportunities. One respondent promoted the position for differentiated gender instruction noting, "*Teachers at secondary school and colleges need to be trained in different methodologies. Learning styles differ. Apply different approaches in the classroom to address these differences."* Others noted that *"Active learning benefits all student,."* and that the focus should be on making learning effective for all. Strategies such as tapping into students' interests and providing effective role models were identified. It is "g*ood for males to have effective male role models in the classroom. Often sports figures are role models for males growing up, figures who may not have had to achieve academically. Now Chris Hadfield has a presence, and*

this is a good thing. Technology can help in that there is the potential for students to link to scientists, astronauts, etc."

How we assess was raised, with the suggestion that teachers need to "*Assess to boys' strengths as well. We need to look at what successful boys are doing and apply that to boys in general to help improve their outcomes." "Don't stop doing the positive things that we are doing with female students."*

There were specific suggestions regarding the secondary school curriculum including the idea that secondary school language courses should be adapted to include more vocational content and skills, for example, how to read and decode a college-level textbook. Another suggestion was that the content of "*the courses should have more work and real world application that might appeal to males."* In general there should be *"greater focus on creating the classroom to be more 'boy friendly' based on their 'wiring'".* One table referenced recent research in the field of brain development noting "*Interesting discussion around the research out of McMaster University about brain development in males vs. females and how much of a factor this is. The hypothesis was that it is a significant factor. Predisposition to societal conformation in Males vs. Females."*

It was clear that the participants believed that we should be differentiating our instruction to support the success of all students, noting there are "*Problems around the one size fits all system. It is not working. More differentiation is needed to support the success of all students including male students e.g., experiential learning."*

3. Second semester students repeating first semester courses tend to achieve lower levels of success than second semester students taking second semester courses in both mathematics and language. (CSAP data on the numbers of students repeating secondary school courses suggest that a similar situation may exist in secondary schools also.) What does this suggest about the value of simply repeating a course previously failed? Are there other, better ways in which students can become successful?

Curriculum design, teaching and pedagogy, supports for students, and teacher preparation dominated the discussions. While secondary schools have a credit recovery strategy, there is no consistent approach in colleges. "*Can courses with high fail rates be modularized such that students cannot move on until mastery of previous module has been achieved?"* This comment resulted in a discussion around the construct of college curriculum. It was noted that college curriculum follows an outcomes based design and for the most part is not delivered in modules that would enable students only to learn what they need; therefore students are required to retake full courses. It was noted also that in cases where the curriculum is modular it is easier to determine where students are weak and to target instruction. However, when there is a requirement to demonstrate an outcome across a course, it is difficult to use a modular approach.

Other factors affecting success not directly related to the course itself were noted, including the challenge of making the transition from an adolescent learning environment and model to an adult learning environment, class size, timetabling, and the expectation that students will self-advocate at college.

Secondary School Pathways Analysis

1. Data on secondary mathematics and language course selection ("pathways") and achievement and how this related to achievement in college courses was presented and participants were asked to refer to the results and reflect on the following questions: What can we conclude about student success in college based on secondary school courses taken and levels of achievement in those courses?

Some participants were able to arrive at some conclusions about college destination secondary school courses, "*These results indicate something's not right. If the content at the lower level math requirement matches the college level content requirement, then the student should be successful; even if students do exceptionally well at the 4C level, the results indicate they are still deficient in some way as their achievements do not match those of the 4U achievements. Furthermore, the door may very well be closing for some students who are capable, but are guided into the college level math courses, and some further investigation needs to be done. Additionally, if you address the learning needs at the college level math courses, and provide further training for these students, then results may improve,"* others were not as comfortable, noting that this "*Merits deeper study. We don't really know why the students are successful and why they are not. Since students are not randomly assigned to the courses we don't know if the course is the cause. Why are we calling these college pathway courses when they might not have the material they need to be learning for college?"* Others touched on the theme of setting high expectations for students including well developed learning skills. "*High school teachers of students studying in college level courses need to build their students' self-management skills by having high expectations, including expecting homework to be completed on a regular basis. The level of rigour of skills for college-bound students is significant. It is important to note that the same skills (study skills, writing skills, etc.) are needed at both college and university. Perhaps the 4C and 4U courses need more alignment in terms of the expectations of these skills?"*

In previous research reports, the CMP team emphasized the importance of learning skills to student success at college, including encouraging colleges to consider these skills in their admission requirements. This has not been implemented to date. Question raised by one table "*Is there a way that post-secondary programs can use the information on the report card regarding learning skills in their acceptances? Is there a way that the CSAP data base can use this information in the tracking of success in order to determine what, if any, correlation exists? It is obvious that the importance of both mathematics and English skills for college students is significant and needs to be communicated to all educators,*" should be promoted. Setting high expectations should not be the purview of teachers only: "*The higher the achievement of the student in the course the greater the chance of success at the next course. In addition to demonstrating the mastery of the content, the higher mark is indicative of good skills as a student. Students are sometimes streamed into courses which then pre-determined their future success. Some of the issue is connected to parents' perceptions and expectations for their children. Parents need to have high and unbiased expectations for their children."*

One group promoted the idea that college expectations for success have shifted dramatically over the past several years (and are higher) and that the CSAP data reflects misaligned expectations between secondary schools and colleges. Others believed that colleges need to do a better job of

providing individualized learning; they need to adjust their instruction and assessment to meet individual needs.[24]

The idea that providing the best instruction in applied and college destination courses was brought forward from more than one group. "*Have the very best math teachers for applied math courses, and begin as early as Grade 6, and certainly as of Grade 9. We have just added a year to the B.Ed., but have we upped the math requirement? Yes, to include more practice, but will there be more feedback loops? Don't tell a student that he or she is not good at math or at languages… Pedagogy is important; don't lose sight of that."*

Finally, one person commented on the relative worth of a college education and the emphasis placed on college preparation courses by Faculties of Education. "*There's a math battle and a college battle. We need college-educated people in our economy and we need parents to embrace it--to let their children go to college. To help, let's compare salaries in various trades and fields. Good to encourage days like today --the mixing of those teaching at secondary school and college. In B.Ed. in math teachable courses, we focused on the "U" level courses, not "C" level. I had a teaching placement at a college, which was rare, as far as I know. I had to request it. Make it compulsory that B.Ed. candidates do college visit(s).*"

2. Based on your interpretation of the CSAP data on the college achievement of students who have taken particular secondary school course pathways or who have achieved various mark levels in those courses, what recommendations would you make to improve student success?

Themes included more communication between the panels, with the Ministries and "*Increase the cross-panel discussion in order to build a common understanding of the learning expectations of previous courses (in secondary) and to allow the instructors to make more purposeful connections across the panels (in both secondary and college). This could include cross-panel classroom visits -- perhaps even inquiries and/or co-teaching. We need to move beyond the provincial Forum to engaging teachers in conversations which are on-going and focused on student learning needs. "*

Once again teachers were a dominant theme, including attitudes, preparation and deployment. One Forum participant suggested that we need to "*redeploy the most effective teachers to the college pathway courses*." *"Bring in more advanced teacher training techniques, integrating technology into classroom, mapping outcomes to evaluation, learning styles, etc. At College, important that faculty who are hired have a sound background in Math, preferably with a math degree."* The suggestion of dealing with the construct of the curriculum and attitudes surrounding the relative value of college as a postsecondary destination was voiced by this Forum participant: "*Eliminate multiple/extraneous courses and identify modules that are pertinent to everyone. There are two different ideas, the mathematician vs being literate in math. Remove the prejudice of College vs. University pathways. Teachers need to remove their prejudices as well."*

[24] How does this align with the college program standard program learning outcomes and programs that are accredited?

3. The K-12 mathematics curriculum is currently under review[25]. What are the most important lessons to be learned from the CMP/CSAP research for this review? (Language courses will be reviewed in future years, so a parallel question can also be discussed.)

The discussion varied greatly from table to table. Some noted that the curriculum should be more skill focused instead of mark focused and that we need to move more toward mastery learning and change the way that students are assessed/evaluated, suggesting that tests are not real world. It was observed that problem solving and inquiry learning is important and should be continued as it is essential to instill the importance of learning how to think not just solve math problems. Ensuring the curriculum is rich in contextualized math may help students to make the connections they need to be successful. In terms of the curriculum construct, some participants suggested that the number of Grade 12 courses needs to be reduced, since many schools are not in a position to offer all courses. By streamlining the mathematics course options and embedding key outcomes, the curriculum may better serve the need of students as they enter the workplace or postsecondary institutions. Others suggested abandoning the destination based course sorting system altogether, questioning why we sort and pigeon-hole students.

Another suggestion was to "*align the curriculum mapping from early education all the way through post-secondary education, resulting in one seamless approach. Take end goal and reverse engineer. If college level math is not working, fix it. Start with the employers in terms of math skills, transfer that knowledge to colleges, then work backwards to secondary school, elementary school to ensure they are meeting these requirements*."[26].

The "Critical Friend"

Dr. Charles E. Pascal, an internationally recognized educator with expertise in early and higher education, public policy, leadership/organizational development and strategic philanthropy, attended the Forum in the role of "critical friend". Drawing on his previous experience as a researcher, Deputy Minister of Education and President of Sir Sandford Fleming College, Dr. Pascal moved from table to table to listen to the discussions and at the end of the day provided his perspective on the CSAP research and the deliberations, and challenged participants to think creatively to arrive at strategies to improve student outcomes in Ontario.

Dr. Pascal stressed the importance of pedagogy "how we arrange learning" for students, noting that we need to be more flexible in our models. "We think in too gross of terms pedagogically when it comes to delivery." He advocated for a shift from a course-based model to a modular approach, modelled after the Khan Academy. Modules with clear outcomes that address very specific aspects of a broader topic not only provide flexibility, they can also improve student outcomes. "Implicit feedback loops can be part of remediation, not a whole course, but a specific module."[27]

Dr. Pascal envisions that in 20 years everyone will have a "passport of learning" and each learner will gather "stamps" from institutions, both bricks and mortar and virtual to be able to prove to

[25] The Ministry of Education has indicated it will not be reviewing the K-12 math curriculum in 2015. However, the elementary mathematics curriculum is being reviewed and renewed as per the Math Action Plan.
[26] At the present time we have only one-half of that equation as the colleges do begin with the employer and reflect their requirements and expectations in the college curriculum.
[27] This is the approach taken by the CSAP assessment development team whereby a student who takes the full diagnostic assessment is presented with a report noting strengths and areas for improvement. Targeted remedial modules enable students to concentrate their efforts rather than repeating what they already know.

employers, other institutions, etc. that he/she has mastered a specific set of knowledge and skills, and we need to be ready for this shift.

On the topic of teacher preparation, Dr. Pascal cited many opportunities for improvement. First, he believes that our Faculties of Education have not altered the paradigm regarding preparation of elementary and secondary teachers, which needs to be addressed in a radical manner. He also cited the need for a formal preparation program for college teachers. "College teachers don't get the bad prep that teachers (in elementary and secondary) get. They have no preparation. They teach the way they were taught. That sometimes works out. Sometimes it doesn't." In terms of what makes the best teacher, he noted "the best teachers are not brainiacs. They are people who love the subject matter, are those who had to break it down for themselves, and who want to build a bridge between the individual differences of those whose learning success is their passion."

Given the CSAP data and the provocative and far reaching nature of the issues that were discussed, Dr. Pascal suggested that there is a need for independent research that would enable a fulsome, unrestricted exploration and reporting that in turn would compel meaningful discussion that cuts across jurisdictions.

Finally Dr. Pascal argued that there are two paths for us to consider: "Do we come to the realization that some folks are really, really good at math and we should stop worrying so much about engineering students who we force feed writing and communication courses painfully, and for those in the literacy part of the world, whether we continue to expect of them a level of math expertise that doesn't relate to their career pathways? Do we get comfortable with that and stop spending too much time on trying to force people into things by how we teach and the expectations we have or do we take the path less travelled? Do we take what we know about pedagogy and what we know about preparing people for pedagogy? Do we commit ourselves for ensuring that every kid will be successful? Do we need to redefine what success means in imaginative ways?"

In closing, Dr. Pascal encouraged the group to take the second path and offered some suggestions for where we should begin. First, we need to break down barriers between disciplines and embrace transdisciplinarity, which is different from interdisciplinary and cross disciplinary approaches. Second, we must be willing to discuss the organization of the school year which is based on an outdated agrarian model. Third, we must look at teacher preparation and the supports we provide: how Faculties of Education select and prepare teachers, how college teachers are selected and prepared, and in-service training and support. Finally, we need to consider how technology can be infused into some of the solutions in intelligent and strategic ways.

Project Showcase

As noted previously, a feature of the 2014 CSAP Provincial Forum was the "Project Showcase". The Showcase provided all Forum participants with the opportunity to learn more about the CSAP database and the additional projects undertaken by the CSAP team: the Assessment Development Project and the Learning Outcomes Development Project.

The Assessment Development Project (ADP) was developed both to support student learning through high quality assessment, immediate feedback, and remediation, and to increase student success and retention at college. It has been designed for post-admission student assessment at the college level, secondary school student self-assessment and preparation for college, and prior

learning assessment for secondary school teachers and college faculty. The assessment items were obtained from a variety of sources including college assessments. Each item was analysed for placement within a two-dimensional framework (content and performance expectation) based on the one developed for the Third International Mathematics and Science Study (TIMSS). This framework defined the scope and content of the proposed remedial modules and the relationship between the assessment items and the learning outcomes of the modules. The development team ensured the assessment included items across all content and performance expectation (knowing, applying and reasoning) areas. Psychometric experts provided advice on the number of items, data required from item field testing and the criteria for item selection. Field tests with secondary school and college students were conducted, feedback from teachers of field test classes has been gathered, and adjustments to items have been made as appropriate. Forum participants were provided with an opportunity to try out the assessment.

The result of the Learning Outcomes Development Project, ***Bridging the Mathematics Gap through Learning Outcomes***, is a resource for use by all Ontario colleges. Outcomes have been written for pre-technology, pre-business, and business diploma mathematics courses and follow a framework similar to that used in the TCU program standards and EDU curricular documents. While the goal of the project was to produce the learning outcomes, the reasons for this work also included fostering smooth mathematics transitions between secondary school and colleges, and supporting the transfer of college students between institutions.

Chapter 5: Recommendations and Supporting Suggestions

Recommendations

Over the past ten years the CMP and CSAP have made a number of recommendations. Some have been acted on, and the project is pleased to see that the message about achievement in secondary school courses having an impact on success in college courses, specifically mathematics and English/French, has become a priority at the Ministry of Education and is being promoted through Boards to schools and from teachers to students. As noted by Ministry of Education Assistant Deputy Minister Gallagher at the most recent CSAP Provincial Forum: "We never move forward as a society when we aim low."

At the college level, two projects at or near completion were the direct results of CMP recommendations: the Learning outcomes Development Project and Assessment Development Project. The former project involved collaborating with the colleges to design common learning outcomes for first year mathematics courses in business and technology. The document will help secondary school teachers better understand what is being taught and assessed in first year college mathematics courses, and provides an opportunity for college faculty to work together to design learning materials that can be shared between institutions. The Assessment Development Project has resulted in a validated post- admission mathematics assessment specifically designed to suit the needs of Ontario colleges. If fully implemented, students will not only be able to write the test at any college, they will also be able to receive their results along with the opportunity to address areas for growth before they begin class. The CSAP Research Team along with its Steering Committee is proud of these successes and of the cooperation and support from Ministries, colleges and schools that the projects have received.

Much has been accomplished; much remains to be done. In this Chapter, we would like to highlight first those recommendations tied to the themes of student success, mathematics and numeracy, and language and literacy that have yet to be fully realized, and which we feel can be accomplished with the same level of cooperation received to date. In the second half of the Chapter, we have included a number of suggestions related to the same themes that have arisen from discussions about the data at regional and provincial forums, conferences and consultations with a number of groups.

Student Success

The main goal of the CMP and CSAP has been to increase student success and retention in the Ontario college system. To that end, the data collected and analysed on student participation, achievement and secondary school background, and discussed at first regional and now provincial forums have lead to revisions in policies and practices aimed at improving student success at both the Ministries of Education (EDU) and Training, Colleges and Universities (MTCU). The following overarching recommendation is made in the spirit of continuing the work that has been done to date in assisting students in making the transition from secondary school to college and on promoting their success once there and moving forward into the workplace and keeping in mind the following statement by Premier Wynne in her 2014-15 Mandate Letter to MTCU Minister Moridi: "I ask that you give Ontarians the support they need to be successful in our economy, including help as they

transition from high school to postsecondary education and the workplace."[28] It is critical that each educational sector be refocused to support students in and be accountable for the successful transition to the next phase of their lives be that academic or the workplace:

1. Based on the successes of the CMP and CSAP projects in bringing together representatives of EDU and MTCU, school boards, college administrators, and secondary and postsecondary faculty that has led to meaningful dialogue and a greater understanding between sectors, we encourage the Government of Ontario to broaden its concept of student success to encompass a K – Career perspective and, as a first step, to establish a working group with a composition similar to the one described above, with the addition of university representation, to discuss strategies for promoting student success from primary to secondary to postsecondary education and, from there, to career.[29]

Mathematics and Numeracy

Through CMP and CSAP, ten years of college data on mathematics achievement have been gathered and analysed. Recommendations have emerged on various topics from basic numeracy to college learning outcomes. The Ministry of Education has acknowledged that student achievement in mathematics must be improved. The Premier, in her 2014-15 Mandate Letter to Education Minister Liz Sandals, has charged the Ministry to" ...look at new ways to increase support that improves student performance in math, science and technology.... these will included new learning opportunities in mathematics for educators, and supporting access to TVO's Homework Help, which provides students with free, real-time math tutoring by certified Ontario teachers."[30] The Minister has touched on two issues raised by CMP/CSAP: the need to increase student's basic numeracy and teacher preparation. The following recommendations speak to the first issue:

1. The Ministry of Education should ensure that specific skills important in the college curriculum, such as ratio and proportion, have been mastered by all students. Boards should ensure that all secondary school mathematics teachers are familiar with the learning outcomes of college first level mathematics courses as contained in the LODP Report, "Bridging the Mathematics Gap Through Learning Outcomes".

2. During the next mathematics curriculum review, the Ministry of Education should consider streamlining and simplifying the number of Grade 11 and Grade 12 mathematics courses and consider revising the curriculum in the area of mathematics to better align with first year postsecondary mathematics courses. We have in mind that the concept of "destination-related" mathematics courses refer *not to the institutions* in which mathematics is learned or used (university, college workplace) *but rather the program contexts* in which it is learned and used. Thus, Grades 11 and 12 might contain one sequence of mathematics courses for STEM (science technology, engineering, mathematics) subjects, another for business, social sciences and education, and a third for arts and humanities, where there is typically no postsecondary mathematics.

[28] 2014 Mandate letter: Training, Colleges and Universities, Ontario.ca
[29] A detailed Roundtable Proposal is available on the CMP website: http://collegemathproject.senecacollege.ca
[30] 2014 Mandate letter: Education, Ontario.ca

3. The Ministry of Education should consider increasing the requirements for the Ontario Secondary School Diploma to include a Grade 12 mathematics course thus making the mathematics requirement equivalent to that for language, that is, four courses.

4. The Ministry of Education and the EQAO should consider the development of a numeracy test similar to the OSSLT, to replace the Grade 9 EQAO mathematics assessment, to ensure basic numeracy skills in all students, and the development of appropriate, modularized curriculum to provide additional assistance in specific skills that students have not yet mastered.

5. The Ministries of Education and Training, Colleges and Universities, in collaboration with the School/College/Work Initiative and in consultation with the Ontario College Mathematics Committee (OCMC), Ontario College Mathematics Association and the Ontario Association of Mathematics Education (OAME), should ensure that mathematics teachers at colleges and schools work together to develop a deeper understanding of each other's curriculum and instructional methods in order to better support students' transition from school to college.

6. The Government of Ontario should develop a public awareness campaign to highlight the importance of numeracy both to individuals and society as whole.

7. Colleges should clarify for secondary schools those Grade 11 and 12 mathematics courses and levels of achievement that are most likely to lead to success in each college program (e.g. that MCT4C better prepares students for business and technology programs and MAP4C prepares students for programs not heavily reliant on mathematics) using such communication tools as websites, program brochures and special communications to parents. In addition, Boards should ensure, using all possible means, that all students have access to MCT4C.

Language and Literacy

Although results for language achievement have only been gathered, analyzed and discussed for the past two years, certain patterns have become apparent. However, further research in this area is needed to support and confirm what has been observed to date. Also, in some cases, numbers on which the analyses are based are so small as to be statistically insignificant, particularly in the case of the two French colleges. Care must be taken in drawing conclusions based on this data. The following recommendations are made with that in mind:

1. Based on the disparity in success rates in college language courses for students graduating from college-destination and university-destination English and French secondary school courses, a review should be undertaken by the Ministry of Education of the expectations of student work in each stream, with the goal of ensuring that the quality of work produced in language courses by all secondary school students, regardless of destination, is consistent, with all students being held to the same standard; that is, rather than focusing on 'destination', courses should be tied to the purpose for which students are taking them.

2. Similar to the LODP for mathematics and based on the work already undertaken by the Ontario College Language and Communications Council (OCLCC) using material on college language course topics and outcomes contained in the *CSAP Language Gap Report*, colleges should consider

supporting the development of a common set of learning outcomes for first level regular language courses.

Supporting Suggestions

Over the past ten years, a number of proposals have emerged at each regional and provincial forum and at meetings with various college groups (e.g. Heads of Technology, Heads of Business, Heads of Mathematics, Heads of Interdisciplinary Studies, and the Coordinating Committee for Language and Communication). These ideas are not directly tied to the data collected. However, as the project's research methodology was intentionally established with two distinct goals: first, to analyse student achievement in first and second semester college mathematics and language courses and to relate the findings to students' educational background in secondary school and, second (and just as importantly) to deliberate with members of the college and school communities about ways to increase student success in college, it is difficult to ignore the thoughts that have emerged from these discussions. The suggestions that follow support the recommendations made in the first part of this Chapter and are integral to their successful implementation.

Student Success

The suggestions tied to increasing student success at college fall into a number of sub-themes, as follows:

Making the Transition to College

In order to assist students in making the right secondary school choices as they think about college as their first postsecondary destination and to assist them in making a smooth transition to college and being successful as they begin their college program, we suggest the following:

1. That students and parents should seek information about colleges, their programs, transfer opportunities and the occupations they prepare students for, as well as the mathematics courses recommended, early in a student's secondary school career.

2. That Colleges, Universities and School Boards work together at the local level to develop joint programs aimed at providing all students who intend to go on to postsecondary education sufficient postsecondary knowledge to maximize their chances of success.

3. That secondary school guidance teachers should use data available on the CSAP database to advise college-bound students on the likely consequences of course selection and achievement, particularly in both mathematics and English/French.

4. That colleges record students' scores on the post-admission mathematics skills assessment test in the CSAP database in order to provide feedback to schools and Boards on the aggregate achievement of their graduates.

5. That colleges should share both the mathematics assessment framework and course information with elementary and secondary schools so that teachers at earlier levels understand better the expectations of the college system of students entering into certificate and diploma programs.

6. That secondary schools and colleges should create and use additional opportunities for mathematics and English/French teachers and faculty to observe, collaborate with and, where feasible, exchange with each other in order to share expertise and good pedagogical practice, and also to understand the differences in the teaching and learning environments of colleges and schools.

In addition, that teachers at both levels work together to develop jointly contextualized learning activities related to sector specific college programs.

Valuing Colleges as Postsecondary Destinations

Readers might wonder how this theme is related to this project and its goals. Part of the answer lies in the fact that although colleges have now been around for over forty years, progress is still needed in terms of colleges being recognized as legitimate postsecondary destinations suitable to the learning styles and career aspirations of many students. Every secondary school teacher has had personal experience of university but few have had any experience of college and college programs either as students or teachers. More public education is needed so that students, their parents and their teachers understand the wide variety of programming offered at colleges and the career and transfer opportunities available to students on graduation. Until that time, secondary school students in college-destination courses will not be held to a standard equivalent to those in university-destination courses and will not be properly prepared for the rigour of a college education.

We therefore propose that:

1. Secondary schools (and all teachers and administrators) should become better acquainted with colleges, their programs, transfer opportunities and support for students with specific learning styles in order to promote colleges as destinations of equal value to universities and ensure: that all college-preparation courses are available to students; that students are advised appropriately with respect to course selection; that students receive opportunities to visit colleges and to receive information from school graduates now at college; and that teachers are encouraged to make personal contact with college faculty for professional dialogue and the development of cooperation between levels.

2. The Ontario College of Teachers should require that Faculties of Education provide appropriate experiences in college settings (such as extended visits, internships and teaching practice) for all Intermediate/Senior teacher candidates.

3. Secondary schools should ensure that students have access to important college preparation courses (e.g. MCT4C).

School/College/Work Initiative

The School/College/Work Initiative (SCWI) has been an active and supportive partner of CMP and CSAP. During CMP, the SCWI sponsored the regional forums held across the province where discussions of that year's data took place and recommendations for future action and strategies

emerged. As important as the discussions around the data were, even more importantly, the forums provided a rare opportunity for school and college faculty and administrators to meet, discuss common issues, and learn about each other's sector. Discussions at regional and provincial forums between teachers at secondary school and college reveal the wide gap in understanding of each other's work. This gap creates consequences for students because of the differences between how secondary and postsecondary teachers think and talk about what they do. As stated in the *CMP Final Report 2008: "* Secondary (and elementary) teachers participate in a distinct 'discourse community'; they discuss issues of teaching and learning using a common 'language' of curriculum and pedagogy introduced in teacher education programs, used in Ministry documents, and developed through ongoing professional development. College faculty are members of a different discourse community in which they discuss their work and the issues of college teaching and learning in relation to preparation for professional occupations. Since these two discourses are based on different backgrounds, and different experiences it is as if secondary school and college teacher speak different languages with respect to teaching and learning."[31] It is clear that further discussion among these teachers would only benefit students.

In addition, the forums produced several proposals concerning SCWI and topics such as dual credits and specialist high skills majors, topics aimed at increasing student awareness of college opportunities and of increasing student success at college. We believe that the SCWI has an important role to play and suggest:

1. That the SCWI be asked and provided resources to expand the range of mechanisms for facilitating students' successful transition from school to college as well as maintaining its support for and assistance in the expansion of dual credits.

2. That the SCWI be asked and given the resources for hosting regional forums on an ongoing basis where schools and colleges can come together to discuss implementation of relevant CMP/CSAP recommendations and to continue to support the ongoing relationship-building and understanding of each other's curriculum and pedagogy and that secondary schools and colleges should create additional opportunities for teachers and faculty to observe, collaborate with and, where feasible, exchange with each other in order to share expertise and good pedagogical practice, and also to understand the differences in the teaching and learning environments of colleges and schools

3. That Regional Planning Teams of the SCWI should seek to increase the number of team taught dual credit courses in mathematics and English/French by college faculty and secondary school teachers as a strategy to increase student success.

College Practices

Colleges are open access institutions. However, as many have pointed out over the years, an open door should not become a revolving door. As CSAP is committed to improving student retention, the following recommendations are made regarding changes to college practices in the hope of contributing to that goal:

[31] College Mathematics Project 2008, p. 42. http://collegemathproject.senecacollege.ca

Admissions

1. Based on the data that shows a direct correlation between achievements of a certain grade level in secondary school mathematics and English/French courses and success in college courses, we suggest that college admission information should include recommended levels of achievement in each subject. Colleges should indicate recommended grades in specific courses that have been demonstrated by CMP/CSAP data to lead to increased levels of success in college mathematics and communications courses (e.g. Of students graduating with a credit in ENG4C and a final grade of at least 80%, 79.5% achieved good grades in college communications courses in 2012; of students graduating with a credit in MAP4C and a final grade of 80% and above, 76.6% achieve good grades in first level college mathematics courses in 2012. See Figures 2.8, 2.9, 2.10, 3.11, 3.12, 3.13 and 3.14 for further information on these courses and others.)

2. Based on the evidence that shows that students, who are accepted to college on the basis of a Grade 11 mathematics course at the M or C level with that course being their terminal secondary school mathematics course, are unlikely to be successful in their college mathematics course, we suggest that for those programs with a mathematics requirement that it be at the Grade 12 level.

Assessment and Remediation

1. We suggest that colleges support the implementation and ongoing revision of the CSAP developed post-admission mathematics skills assessment test, using the results to stream students into regular and remedial courses, or, to devise strategies to support those students who score below a specific mark on the assessment, including the development of a system-wide college numeracy course.

2. Based on the success rates of students in remedial and developmental courses, as seen in the CSAP Reports, and on the research that has been undertaken previously on this topic, we feel that the college system should move forward in decisions around a common post-admissions assessment tool for language and in determining the characteristics and components of a successful language remediation program.

Further Research

This chapter of the CSAP is drawing to a close; however, from this project have emerged many ideas about how this type of research and other in related areas should continue. The following are suggestions tied to this theme:

1. Given the success of the two projects to date (LODP and ADP) to have resulted from CMP/CSAP, we suggest that the Government of Ontario should continue supporting research on the secondary-postsecondary interface in order to monitor student success and to continue building data on the impacts of new policies and programs.

2. As only two years of language research have been undertaken to date, we suggest that the Ministries of Education and Training, Colleges and Universities should continue funding research in

the areas of language (French and English) participation, achievement and secondary school background in order that definitive patterns can be observed and conclusions drawn.

3. Given its importance to student success and retention at the postsecondary level, the Higher Education Quality Council of Ontario (HEQCO) should sponsor further research addressing promising practices in the acquisition and assessment of learning/employability skills at postsecondary institutions.

4. Based on the grading patterns seen in the 2013 and 2014 CSAP Reports, particularly the high percentage of A and B grades achieved in first level college language courses, we suggest that the college system or HEQCO should undertake research on college assessments, rubrics and grading schemes in order to better understand what types of assignments are being used and how they are being graded.

5. We suggest that the Ministry of Education through their Boards should undertake research into the ways in which Junior/Intermediate teachers with a mathematics or language background are currently being deployed by school boards and the impact of such deployment on achievement.

Accountability for Learning Skills

At every table at the 2013 and 2014 CSAP Provincial Forums, the topic of learning skills arose. Without well-developed learning skills, students will not have the ability to learn and retain subject matter and participate fully in their education and later on as citizens of the world. The Ministry of Education has recognized the importance of learning skills through the development of the Ontario Skills Passport. The Ontario Skills Passport (OSP) provides clear descriptions of Essential Skills and work habits important for success in work, learning and life. Learners can use the OSP tools and resources to **assess, build, document** and **track** their skills in classroom, cooperative education and other experiential learning opportunities, volunteer and extracurricular activities. This information can help them develop their Individual Pathways Plan (IPP) as they answer the questions: *Who am I? What are my opportunities? Who do I want to become? What is my plan for achieving my goals?* [32] However, although teachers record their evaluations of students' learning skills on report cards that go home to parents, they are not recorded on the Ontario Student Transcript used by colleges and universities for admission purposes. In addition, students know that these evaluations do not count towards course grades and are not considered by PSE for admissions. Students and their parents might therefore see them as less important than evaluations that make up course grades. Course content is easily forgotten; however, learning skills, once ingrained, are there for life.

The Ministry of Training, Colleges and Universities has also recognized that well-developed essential skills are critical to student success at college through the development of the Essential Skills Policy. This document presents eleven learning outcomes in six essential skill categories such as numeracy, critical thinking and problem solving, and information management, and assigns responsibility for student mastery to individual programs by placing the policy in provincial Program Standards documents acknowledging that both the knowledge and skills required in specific occupations form

[32] Information on the OSP can be found at http://www.skills.edu.gov.on.ca/OSP2Web/EDU/Welcome.xhtml

the basis of the skills, attitudes and values essential for career success and that those who lack them may not succeed in their chosen profession.[33]

In order to meet the challenge of both having students understand the importance of these skills and ensuring they possess them, we propose that:

1. That even though learning skills do not contribute to formal grades, students and their parents should pay close attention to the indicators of learning skill development on students' report cards, discussing them at home, and ensuring that learning skills are well developed prior to students reaching college level.

2. That teachers at secondary schools should continue to take every opportunity to stress the importance of learning skills from Grade 9 onwards, developing systematic means for supporting students' development in these areas, improving their methods of assessing learning skill development, and drawing student attention to the lack of skills in specific areas, where this is warranted.

3. That colleges and college faculty should reference the importance of learning skills in their advertised program admission requirements. They should also identify weaknesses in students' learning skills development as early as possible and provide appropriate feedback, advice and remediation.

4. That the Ministry of Education should demonstrate its recognition of the importance of learning skills for success at postsecondary levels, by specific communications to secondary schools, teachers and parents, and by amending the Ontario Student Transcript policy to enable a record of a student's learning skill development to be transmitted to postsecondary institutions along with course marks.

5. That Ministries, Colleges and Schools should continue to give prominence to the importance of the acquisition of learning/employability skills by students through further consideration of policies concerning recording and reporting, through professional development for teachers, and communications to students, parents and the public.

Numeracy and Literacy

The following suggestions are made in support of the recommendations in the areas of numeracy and literacy, and fall into two sub-themes.

Teacher Preparation and Pedagogy

As pointed out repeatedly at CMP/CSAP forums, even with the best curriculum possible, its delivery in the classroom depends entirely on teachers who are appropriately prepared for this huge responsibility. As Dr. Charles Pascal pointed out at the most recent CSAP Forum, "...the best teachers are not brainiacs. They are people who love the subject matter, are those who had to break it down for themselves, and who want to build a bridge between the individual differences of

[33] Samples of Program Standards documents can be found at http://www.tcu.gov.on.ca/pepg/audiences/colleges/progstan/index.html. The Essential Skill Policy can be found at http://www.tcu.gov.on.ca/pepg/audiences/colleges/progstan/essential.html

those whose learning success is their passion." With that in mind, we present the following suggestions regarding teacher preparation in language and mathematics:

1. That Faculties of Education consider the use of literacy and numeracy tests for their students in order to provide remediation, as needed.

2. That increased efforts, through pre-service teacher education, be made to support teachers' mathematical skills and understanding and to help eradicate any negative stereotypes associated with mathematics that can, unconsciously, be communicated from teacher to students. Similarly, that increased efforts be made to support elementary school teachers' language skills to assist them in ensuring students are properly prepared for a lifetime of reading, writing and speaking.

3. That the Ministry of Education should communicate the results of its work with mathematics specialists to the wider educational community and ensure that research on the most appropriate methods for teaching these particular concepts is made available to teachers in elementary schools.

4. That the mathematics and language backgrounds of those planning to become elementary school teachers be strengthened and that those with the strongest backgrounds in these subject areas are deployed to the maximum benefit of students.

5. Given the impact of strong learning skills on student success at all levels of education and in the work force, that Faculties of Education should ensure that methods of integrating the acquisition of learning skills into specific courses form part of pre- and in-service teacher education.

6. That colleges enhance their faculty development and teacher training programs to improve curriculum design and assessment and ensure that faculty have some knowledge of the pedagogy of teaching adults, in particular the principles of universal design for learning (UDL) to improve the achievement of student learning outcomes.

Curriculum Design

The suggestions that follow belong to the theme of secondary school review of the mathematics curriculum. Although a future review of the secondary mathematics curriculum has not been established, we feel that when it does begin the suggestions below, tied to the student achievement observed in CMP/CSAP, should be kept in mind.

Much work has been done by the Ministry of Education and schools in the area of mathematics including developing policy to ensure that mathematics is taught in both an academic fashion and in context using real-life problems. In addition, at the 2011 Provincial forum, Assistant Deputy Minister Gallagher announced that numeracy was going to be a priority in the coming years. However, the fact remains that the level of success in college mathematics courses has not improved over the past five years. The following suggestions are made in an effort to change that pattern:

1. The concept of *numeracy across the curriculum* should be incorporated into curriculum policy.

2. To ensure that students receive constant practice in numeracy skills, all mathematics courses at the secondary level should incorporate a numeracy strand in which fundamental mathematical concepts and skills are embedded in increasingly complex context. The prominence of such a strand

could vary from a relatively modest part of a course to the whole of a course, depending on the grade level and purpose of the course.

3. Examples should be developed to support teachers in all subject areas as they attempt to incorporate *numeracy across the curriculum* in their courses.

4. The overall number of mathematics courses in Grades 11 and 12 should be reduced to a number that can reasonably be delivered by a majority of schools.

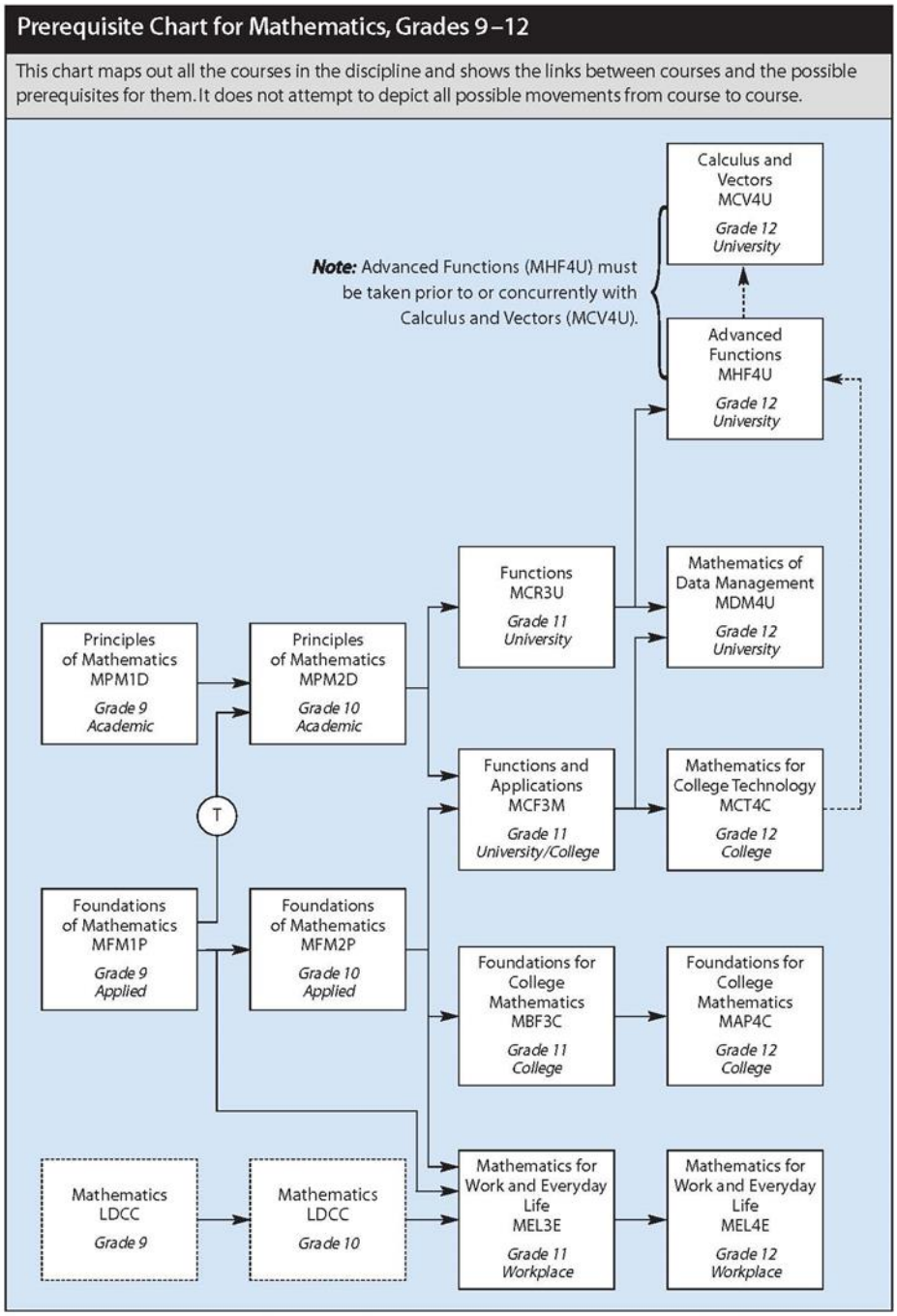
5. The number of mathematics courses required for an OSSD should be increased to four, with the fourth course focussed on ensuring that all students have the requisite numeracy skills for success at postsecondary destinations and in everyday life.

6. Students learn best when mathematics is placed in the context of real world problems as is noted currently in curriculum policy: "Mathematical knowledge becomes meaningful and powerful in application. This curriculum embeds the learning of mathematics in the solving of problems based on real-life situations."[34] Therefore, secondary school mathematics teachers should continue to ensure that a range of examples from real-world mathematics, including examples from specialized workplaces, are included in their teaching and assessment practices. College faculty could be excellent resources in this regard.

It is our hope that the recommendations and suggestions presented in this Chapter will assist in the development of policies and practices aimed at increasing the numeracy and literacy levels of students, help in making the transition from school to college as seamless as possible, and increase the achievement and success of college students.

[34] Ministry of Education. *The Ontario Curriculum, Grades 11 & 12 – Mathematics* (Toronto: Queen's Printer, 2007), p.4

Appendix A: Secondary School Mathematics Courses[35]



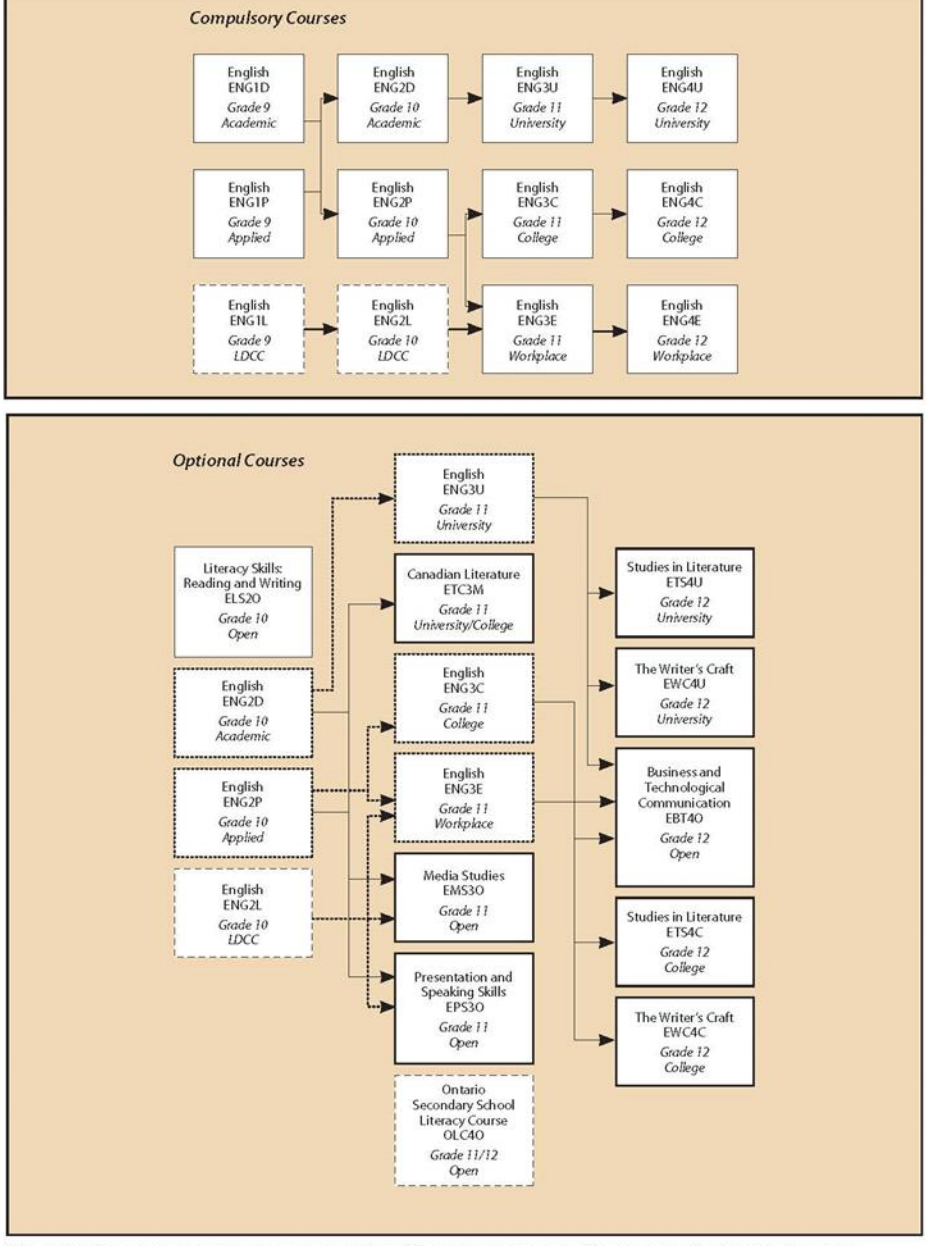
Notes:
- T – transfer course
- LDCC – locally developed compulsory credit course (LDCC courses are not outlined in this document.)

[35] Ontario Ministry of Education (2007): *The Ontario Curriculum, Grades 11 and 12, revised Mathematics, 2007, p. 10.*

Appendix B: Secondary School English Language Courses[36]

Prerequisite Charts for English, Grades 9–12

These charts map out all the courses in the discipline and show the links between courses and the possible prerequisites for them. They do not attempt to depict all possible movements from course to course.



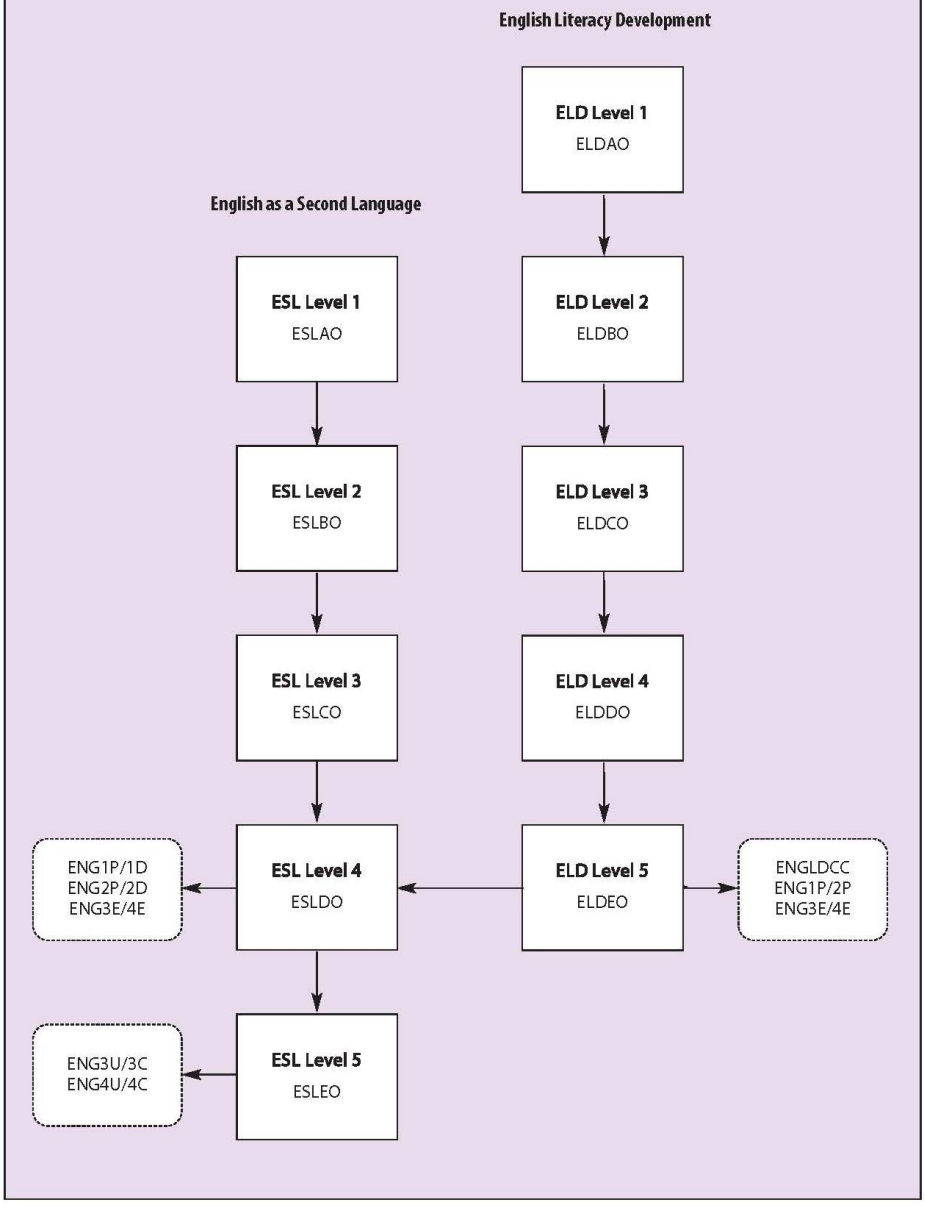
Note: Dotted lines represent compulsory courses. Dashed lines represent courses that are not outlined in this document.

[36] Ontario Ministry of Education (2007): *The Ontario Curriculum Grades 11 and 12, revised English, 2007. p.11.*

Secondary School English as a Second Language and English Literacy Development[37]

Pathways to English

The chart below shows how most English language learners may progress through their ESL and/or ELD courses and into mainstream English courses. Not all students will follow this sequence exactly, and individual students may vary in the rate at which they progress through the levels.



[37] Ontario Ministry of Education (2007): *The Ontario Curriculum Grades 9 to 12, English as a Second Language and English Literacy Development, revised English, 2007. p.14.*

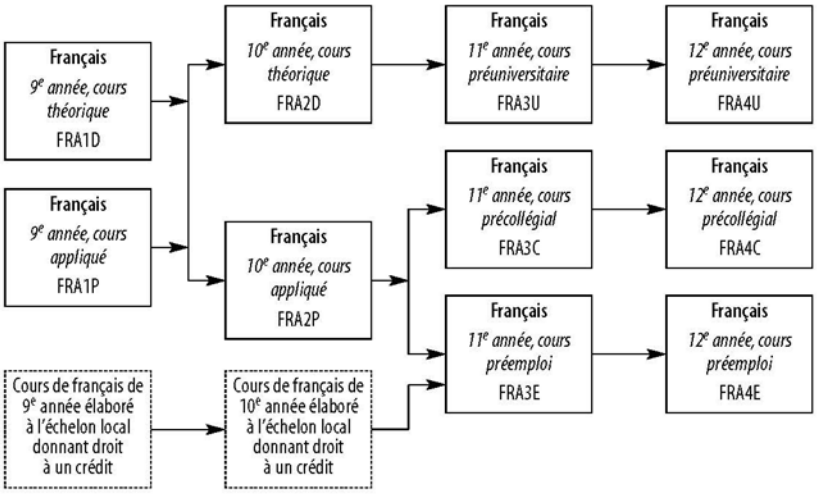
Appendix C: Secondary School French Language Courses[38]

Exigence en matière de compétences linguistiques. L'élève doit réussir le Test provincial de compétences linguistiques (TPCL) administré en 10e année pour obtenir son diplôme d'études secondaires. L'élève qui ne réussit pas le TPCL doit reprendre le test ou suivre et réussir le cours de compétences linguistiques des écoles secondaires de l'Ontario (CCLESO), normalement en 12e année. Le CCLESO peut être utilisé comme crédit obligatoire de français de 11e ou de 12e année.

Organigrammes des préalables pour les cours de français de la 9e à la 12e année

Ces organigrammes présentent l'organisation des cours de français obligatoires et des cours de français optionnels en fonction des préalables. Toutes les options de cheminement entre les cours ne sont cependant pas indiquées.

Cours obligatoires



N. B. : Les élèves qui s'inscrivent au cours Français : Les voix autochtones contemporaines (NBF), de la filière préuniversitaire, précollégiale ou préemploi, peuvent substituer le crédit de ce cours au crédit obligatoire de français de 11e année.

[38] Ontario Ministry of Education (2007): *The Ontario Curriculum Grades 11 and 12, revised French, 2007, p.11.*