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The Effects of Developmental Communication Instruction on Language Skills and Persistence at Four Ontario Colleges

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Executive Summary

With a mandate to prepare students for the labour market, ‘communication’ figures prominently among the essential employability skills that Ontario’s colleges are expected to develop in students prior to graduation. As a result, many colleges have instituted measures to help shore up the skills of students who are admitted to college yet who do not possess the expected ‘college-level English’ proficiency. Several have addressed this challenge by admitting these students into developmental communication classes, which are designed to build their skills to the expected college level.

This study assesses the effects of developmental communication courses on students’ communication skills and persistence at four Ontario colleges. To do so, it measures student performance on a standardized communication test (Accuplacer’s WritePlacer) both before beginning (incoming) and after completing (outgoing) the developmental communication course. It also investigates persistence through the first academic year for students who took the course.

The report outlines three research questions:

1. Which factors influence incoming and outgoing test scores?
2. Is there a relationship between performance in the communication course (i.e., the developmental communication course) and incoming and outgoing test scores?
3. Is there a relationship between persistence and performance in the communication course?

Participants in the study were 1,316 students who entered college in Fall 2012 and had been sorted into developmental communication by their institution. Because there is no common post-admission communication assessment tool at the four participating colleges, the sorting process differed at each institution. However, the WritePlacer test provided a baseline assessment of student ability prior to beginning the developmental communication course, whose content and curriculum also differed at each participating institution. Participating students also completed a demographic questionnaire and granted researchers access to their academic records at the college.

While the student populations and student performance on the incoming and outgoing tests differed across the four participating colleges, the study finds that the majority of students (55%) made improvements on the WritePlacer test overall. We cannot, however, attribute this improvement to the developmental communication course as other factors, such as course work from other classes, may have impacted student performance.

In response to the first research question, we find that students who entered college directly from high school are more likely to have higher incoming test scores. Students with higher incoming test scores and students who are not first-generation are more likely to outperform their peers on the outgoing test. Marks in grade 12 English were found to have little impact on incoming and outgoing test scores; however, this could be a result of being unable to control for high school English pathway and course type (e.g., university preparation, university/college preparation, college preparation and workplace preparation).

In response to the second research question, we find that students with higher incoming test scores and higher fall semester GPAs have an increased likelihood of passing the communication course. Students enrolled in a non-applied arts program (i.e., business, health or technology) also have an increased likelihood of passing the communication course. However, outgoing scores did not have a significant impact on the probability of a student passing the course.

Finally, in response to the third research question, we find a statically significant relationship between status in the Fall 2013 semester and performance in the communication course. Students who passed the communication course are more likely to have a status of active in the Fall 2013 semester. Whether a student came directly from high school and fall semester GPA also had a significant impact on Fall 2013 semester status.

The report closes by reflecting on the lessons learned in conducting this study. While some of these point to difficulties in using the WritePlacer for this kind of assessment, others highlight the challenges of conducting multi-institutional research in Ontario's college sector. For example, obtaining ethics clearance from several institutions can be a lengthy and time-consuming process, though current work on a common application form provides a light at the end of the administrative tunnel. The decentralization of data within the colleges and differences in data infrastructure at each institution also create complications for sharing student data across institutions.

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Note on Terminology

‘post-admission course placement assessments’

Fisher and Hoth (2010) determined that “some form of post-admission formal assessment of language proficiency, for placement purposes, was reported by 62 per cent of Ontario colleges” (p. 2). All four colleges participating in the study administer such assessments. ‘Post-admission course placement assessments’ is used to designate the test or combination of tests of reading, writing and/or speaking skills that are used by each college to place students into a specific entry-level communication course.

‘developmental communication course’

For the purposes of this report, ‘developmental communication course’ refers to a first-semester communication course for students whose post-admission course placement assessments demonstrated deficits in language proficiency. Such courses are often referred to as ‘remedial,’ which may be a more familiar term. However, the term ‘remedial’ invites a pejorative interpretation of student under-preparedness as a malady to be ‘cured’ by an external party administering treatment. While ‘developmental’ has its own potentially infantilizing connotations, it is often judged to be less pejorative a term than ‘remedial’ and its use is thus becoming more commonplace (Kozeracki, 2002, p. 84).

There is a degree of institutional variation in the nature of these courses. At some institutions, developmental courses are mandatory not-for-credit courses; students who pass the developmental course will go on to take the standard first-semester communication course in a subsequent semester. At other institutions, the developmental course is a for-credit equivalent to the regular first-semester communication course.

‘regular communication course’

‘Regular communication course’ refers to a for-credit first-semester communication course for students whose post-admission course placement assessments did not establish deficits in language proficiency.

‘semester’

The word ‘semester’ is used in this report to refer to the three major divisions in the college academic year: the fall semester (September-December), winter semester (January-April) and spring/summer semester (May-August).

List of Acronyms Used in the Report

| | |
|--------|--|
| ANOVA | Analysis of variance |
| CCL | Canadian Council of Learning |
| CMP | College Math Project |
| CSAP | College Student Achievement Project |
| GPA | Grade point average |
| HEQCO | Higher Education Quality Council of Ontario |
| HESA | Higher Education Strategy Associates |
| HS | High school |
| OECD | Organisation for Economic Co-operation and Development |
| OEN | Ontario Education Number |
| OLS | Ordinary Least Squares |
| POS | Program of study |
| PSE | Postsecondary education |
| YITS-B | Youth in Transition Survey – Cohort B |

Introduction

Background

In 2010, HEQCO released a report surveying the variety of strategies that Ontario's 24 colleges have adopted to address incoming students' literacy needs (Fisher & Hoth, 2010). With a mandate to prepare students for the labour market, 'communication' figures prominently among the essential employability skills that Ontario's colleges are expected to develop in students prior to graduation. As a result, many colleges have instituted measures to help shore up the skills of students who are admitted to college yet who do not possess the expected 'college-level English' proficiency. Fisher and Hoth's review documented a wide variety of practices, from mandatory post-admission communication skills assessments whose results are binding on students to less formal strategies such as the availability of student support services.

The authors note a significant degree of commonality across colleges in terms of regular level 1 and level 2 communication courses, the mandatory language courses included in the curricula of many college programs to facilitate the development of literacy skills. However, when it came to developmental communication courses, designed for students who do not meet the expected level of communication proficiency at admission, Fisher and Hoth found "a landscape characterized by a wide range and diversity of activities, terminology, methods, benchmarks, instruments, service models, delivery agents, and measures of effectiveness" (p. 4).

This study follows up on Fisher and Hoth's findings by assessing the effects of developmental communication courses on students' communication skills and persistence at four Ontario colleges. To do so, we measure student performance on a standardized communication test both before beginning and after completing the developmental communication course. We also investigate persistence through the first academic year for students who took the course.¹ This report begins by reviewing relevant literature on the effects and effectiveness of remediation instruction before describing the methodology and findings of this study in detail.

Attrition, Retention and Persistence

The importance of developmental communication instruction can be understood in the context of the association between a postsecondary education and increasingly positive outcomes in the labour market. Students who leave high school without the expected level of skill, especially in communication and math, and who do not find the necessary supports at the college level may be at increased risk of not completing their postsecondary education.

The growing importance of a completed postsecondary education is one of the few areas of consensus in the literature on remediation and retention. The Canadian Council on Learning (2010) suggests that, for

¹ Finnie, Childs and Qiu (2010) find that the majority of postsecondary student attrition occurs in the first academic year of study.

many, “higher education can mean the difference between a paycheque and unemployment, between prosperity and poverty” and that only 6% of new jobs are available to people with less than a high school education, many of them at minimum wage. The average university graduate will earn 40% more than the average high school graduate, or roughly \$1 million over a lifetime, and enjoy better health and greater longevity (CCL, 2010). As early as 2002, the Organisation for Economic Co-operation and Development (OECD) noted that rising skill demands have made the attainment of a PSE qualification “a minimum for successfully entering the labour market and a basis for further participation in lifelong learning” (CCL, 2010, p. 30). This vision is echoed by the presidents of Ontario’s 24 public colleges, who state that student success is critical given the aging population to avoid skills shortages. As a result, they suggest funding first-year initiatives to support students in their transition to PSE, as well as an enhanced role for the colleges in improving literacy rates (Colleges Ontario, 2009). Taken in this context, the first-year attrition rates at Fanshawe College reported by Fisher and Engemann (2009, p. 20) become worrisome:

The current study revealed that, of the 6,447 beginning full-time students who began their college programs in the fall of 2007, 2,408 (37.3%) were no longer enrolled after one year (as of Sept. 30, 2008). This figure was higher than the average freshman year attrition rate of 32% across the Ontario college system reported by Stoll and Scarff (1983), lower than the average attrition rate of 43.5% reported for Ontario colleges from 1998-2003 (Ontario Ministry of Education and Training, 2004), and generally consistent with the historical mean for postsecondary attrition reported by Tinto (1993).

Finnie et al.’s (2010) analysis of student persistence among college students in Ontario presents slightly higher values, suggesting that 23.1% of students had neither graduated nor earned a credential five years after first registering in college. Still, this falls behind the national average of 21.3%.²

The authors also note a lack of consensus among researchers on how to define retention, stemming to some extent from limitations on the ability to track students who move around within the PSE sector. While some studies consider graduation rates alone to assess retention, others account for transfers between programs and institutions and others still account for individuals who leave their studies for a time, only to return later on. While the method chosen will depend on the quality of the data available, each will obviously yield different retention values. While Finnie et al. (2010) use Statistics Canada’s Youth in Transition Cohort B (YITS-B) to track students, there is hope that the expansion of the Ministry of Education’s Ontario Education Number (OEN) to PSE will provide a new avenue to track students from kindergarten through to PSE and across institutions (MTCU, 2014).

² This value stands for the rest of Canada, excluding Quebec. See Finnie et al., 2010, p. 16.

Remediation

When surveying the research into the impact of remediation on students, a number of key challenges become clear. The first involves the narrow scope of the extant research into remediation, which tends to exclude the college sector. Hoyt (1999) and Fisher and Engemann (2009) observe that more than 90% of all studies they identified focus solely on universities. Pascarella and Terzini (2005) estimate that of more than 2,500 studies into attrition, only 5% focus on students at community colleges, while Townsend, Donaldson and Wilson (2004) state that community colleges are only mentioned in 8% of articles they examined for a meta-analysis of postsecondary attrition studies. Furthermore, even the literature that examines the American community college sector has only limited application to Ontario's college sector, and studies considering Ontario's colleges are even fewer in number.

This leads us to the second challenge, which involves the literature's geographical focus on the United States. Of the few sources that study attrition within Canadian institutions, Fisher and Engemann (2009) observe either a focus on attrition at universities or a conflation of university and college data within the majority of studies. This balance, however, may slowly be changing. For example, Finnie et al.'s (2010) study of persistence focused solely on Ontario college students. In addition, the College Student Achievement Project (CSAP) has analyzed data on Ontario college students' performance in first-year communication courses (including both regular and developmental courses) and correlated this with their pathway through the high school English curriculum.³ CSAP's ultimate goal is to improve the retention and achievement of first-year students in Ontario's colleges by identifying barriers to student success, as well as determining effective ways of supporting students' success (CSAP, 2014). Our study locates itself within this same line of inquiry and seeks to continue filling the void in primary research on the college sector in Ontario.

The limited literature on remediation in Ontario's colleges still provides a firm foundation upon which we might build. Fisher and Engemann's (2009) study of more than 6,000 students at Fanshawe College sought to identify variables associated with increased student retention, including date of admission, program choice, academic preparedness, student engagement and gender. While all five variables played a statistically significant role in students' decisions to withdraw, gender, date of admission and program choice were not strong determinants of attrition. By contrast, academic unpreparedness was found to explain 15% of the variance in enrolment status, and lack of student engagement 37%. Students who successfully completed academic upgrading programs had significantly lower attrition rates than the student cohort as a whole and had dramatically lower attrition rates than students who attempted but failed to complete an academic upgrading program. These findings further help support the value of remediation programs in helping students persist in their postsecondary studies.

One of the largest studies into the impact of remediation, Bettinger and Long (2009) draw data from the Ohio Board of Regents to track over 28,000 full-time first-year 18 to 20 year olds in public colleges over a period of six years to assess the impact of remediation on academic performance and persistence. They find

³ CSAP's latest report can be found at <http://csap.senecacollege.ca/en/Revised%20CSAP%20Final%20Report%20Cycle%201.pdf>

that students in English remediation are 9.3% more likely to drop out by the spring semester and 8.9% percent less likely to complete a four-year degree within six years than students not in remediation. Students who successfully complete remediation are found to be 12% less likely to drop out and 11% more likely to graduate within six years of starting PSE than students not in remediation. Bettinger and Long's data also suggest that students whose communication skills are only slightly below the expected college level will benefit the most from a semester of remediation, while students who show a greater degree of under-preparedness will be more likely to drop out during their first semester of PSE.

Research Questions

This report sets out to answer three research questions:

1. Which factors influence incoming and outgoing test scores?
2. Is there a relationship between performance in the communication course (i.e., the developmental communication course) and incoming and outgoing test scores?
3. Is there a relationship between persistence and performance in the communication course?

To measure change in communication skills, participating students were asked to complete the same writing assessment, WritePlacer, at the beginning (which we term the 'incoming' test) and the end (the 'outgoing' test) of their developmental communication course. Institutions provided demographic and retention data on participating students, making it possible for us to address our second research question.

This study was run concurrently at four Ontario colleges, whose anonymity is preserved throughout this report. While this approach helped increase the size of our sample, it did present a number of challenges, not the least of which was cost. The WritePlacer assessment, which is a retail product of the College Board, had to be graded by the company that created it. This process cost \$12 US per student, not including shipping costs. Because there is no common post-admission communication assessment tool at the four participating colleges, and because students had already been sorted into developmental communication by the time the study began, the WritePlacer score provided a common baseline assessment of communication skills that could be collected across institutions. The WritePlacer test itself asks students to compose an essay response to a given prompt on the two lined pages that are part of the test paper. This response is then graded by two blinded and normed graders using a holistic scale ranging from 8 (the highest possible score) to 1 (the lowest possible score).

The need for experimental purposes for a common remediation curriculum across institutions also posed a challenge. Ideally, all students would have followed the same developmental communication course regardless of their institution, with the same instructor, course content and assessment scheme. This was impossible given the multi-institutional context of our study. As a result, the study can only assess the effects of four different developmental communication curricula rather than those of one, standardized curriculum applied across several institutions.

It was also impossible to achieve a true experimental design, which would have involved randomly assigning students to a treatment (remediation) or a control (no remediation) condition. Because all students had

been assessed by their institution as requiring developmental communication courses to help increase their chances of success at the college level, it would have been unethical to deny them a treatment that was judged to be in their best interest. Given that in a number of colleges students register into common sections of compulsory courses such as communication regardless of their program, rather than having dedicated sections of the course for each program, an ideal random assignment was again impossible. The study was approved in the form described below by the research ethics boards at each of the participating institutions.

Methodology

Given the above, our methodology was as follows:

1. The principal researcher secured ethics clearance from the research ethics board at each participating institution.
2. At the time the study was initiated, students at each participating institution had already been identified as requiring language support by the various sorting mechanisms each institution used. Sections of the developmental communication course at each institution were selected for inclusion in the study.
3. Faculty members, research assistants or support staff explained the study to students in the selected course sections. At the recommendation of the research ethics boards, researchers were not involved in this process. Informed consent to participate in the study was sought from these students.
4. For those who provided informed consent, the institutional research department at the lead college gathered post-admission communication course placement assessment data from institutional records. Institutional Research requested this information for participating students from other colleges.
5. All consenting students were asked to complete a demographical questionnaire.
6. All consenting students completed the WritePlacer Form F prior to the beginning of the developmental communication course. All tests and demographic questionnaires were sent to the principal researcher.
 - a. A unique identifier was assigned to every student. Information from the demographic questionnaires was entered in a secure database.
 - b. Exams were stripped of identifying information, including the name of the college. Identifiers for each student and college were assigned to each exam.
 - c. The anonymized WritePlacer exams were submitted to College Board for double-blind human grading by normed graders, who assigned each paper both a holistic mark out of 8 and six category marks.
 - d. Holistic and category marks were returned to the principal researcher and entered into the database.
7. At the end of teaching but before the final exam for the course, all consenting students completed the WritePlacer Form G. The same process as described above was followed to obtain marks for the database.

8. At the end of the winter 2013, spring/summer 2013 and fall 2013 semesters, information concerning student registration status and GPA was requested for participants from each institution.
9. All data were combined and transferred to HEQCO for statistical analysis.

The study ran during the fall semester of 2012, using a single cohort of students who were admitted to their respective college in fall 2012. Registration data on participating students were collected until the fall 2013 semester to determine retention.

As mentioned above, participating students had already been identified by their respective institution as requiring language support before the study began. Each participating institution had a different way of determining which students would benefit from developmental communication instruction. At College A, all students completed the Accuplacer Reading Comprehension test, the Accuplacer Sentence Skills test and a short, hand-written essay on a topic assigned by faculty in the communication department. If a student scored below 60 on the Accuplacer Reading Comprehension test, his/her short essay was assessed. Based on the essay assessment, the student was assigned to either an English-as-first-language developmental communication course or an ESL developmental communication course.

At College B, almost all students complete the Accuplacer Reading Comprehension test and a short, hand-written essay, which is graded on a 4-point scale. The Accuplacer Reading Comprehension test mark is factored into the placement, but a far greater weight is applied to the essay mark for placement considerations. If a student scored 4 on the short essay, s/he was exempt from the regular first semester communication course. If a student scored between 3 and 4 on the short essay, that student was assigned to the regular first semester communication course. If a student scored below 3 on the short essay, that student was assigned to the developmental communication course.

At College C, all students complete the Accuplacer Reading Comprehension and Accuplacer Writeplacer assessments. Students were assigned to either an English-as-a-first-language developmental communication course or an ESL developmental communication course based on various permutations of performance on these two assessments. For example, a student who scored below 3 (out of 8) on the Accuplacer Writeplacer assessment would be assigned to developmental communication, as would a student who scored both below 6 on the Writeplacer and below 50 (out of 100) on the Accuplacer Reading Comprehension assessment. A variety of such permutations exist. In essence, these allow students to be placed into the regular communication stream if they do well on one assessment but slightly less well on the other, essentially averaging the two scores.

At College D, all students wrote the Accuplacer ESL Listening assessment. Students who performed well on this first assessment would go on to write the Accuplacer Reading Comprehension assessment; those who did less well would write the Accuplacer ESL Reading Skills assessment. Both streams of students would then write the Accuplacer Writeplacer. As with the college above, students were then streamed based on their performance in the series of assessments.

At College A, 17% of students assessed in fall 2012 were assigned to developmental courses. Of these, 23 sat the incoming test for this study and all 23 consented to participate. At College B, 32% of students assessed in

fall 2012 were assigned to developmental courses. 424 students sat the incoming test for this study; of those, 329 consented to be part of the study. At College C, 27% of students assessed in fall 2012 were assigned to developmental courses. 432 students sat the incoming test for this study; 430 consented to be part of the study. At College D, 49% of students assessed in fall 2012 were assigned to developmental courses. 596 students sat the incoming test for this study; of those, 541 students consented to be part of the study. This information is summarized in Table 1 below.

Table 1: Student Participation by Institution

| Institution | Students assigned to developmental communication (as a % of those assessed) | Students who sat the study's pre-course assessment | Students who consented to participate in study |
|-------------|---|--|--|
| College A | 17% | 23 | 23 |
| College B | 32% | 424 | 329 |
| College C | 27% | 432 | 430 |
| College D | 49% | 596 | 541 |

Description of the Data

This report addresses our research questions by drawing from two sources of data. The first contains administrative data on participating students from each of the four colleges and includes demographic characteristics, high school characteristics, performance in the remedial language course, fall term GPA, and persistence in the fall 2012, winter 2013 and fall 2013 terms.

High school characteristics, such as grade 12 English marks and whether a student entered college directly after high school, were provided for students who graduated from an Ontario high school. Since the majority of students who attend an Ontario college come from Ontario⁴, we still capture a very large portion of the students participating in this study despite this limitation. It is important to note that our data set does not allow us to distinguish between students who took grade 12 college English (English ENG4C) or grade 12 university English (ENG4U). Results from the College Student Achievement Project (CSAP) suggest that students who took grade 12 college English (English ENG4C) had a slightly higher average (70.6%) in first-year college communication classes than did students who took grade 12 university English (67.4%).⁵ We therefore anticipate difficulty identifying a relationship between high school grades and performance in the remedial language course.

⁴ 95% of students who attended the four colleges included in this study came from their province of residence in 2012. This finding is based on data from the Ministry of Training, Colleges and Universities' College Enrolment Statistical Reporting system and uses headcounts from the fall 2012 term.

⁵ This CSAP finding applies to recent Ontario graduates (graduates who are younger than 23 and possess an Ontario Secondary School Diploma).

The following summary table provides a comparison of the observable demographic characteristics both overall and for each of the participating colleges. The four colleges have been anonymized and are labelled College A, College B, College C and College D.

Table 2: Comparison of Demographic Characteristics across Participating Colleges

| | College | | | | Total |
|--------------------------------------|---------|-----|-----|--------------|--------------|
| | A | B | C | D | |
| Observations | | | | | |
| Target sample | 23 | 329 | 430 | 541 | 1,316 |
| # with incoming and outgoing scores | 18 | 207 | 290 | 308 | 823 |
| % with incoming and outgoing scores | 78% | 63% | 68% | 58% | 63% |
| Demographics | | | | | |
| Median age | 19 | 19 | 19 | 19 | 19 |
| % female | 61% | 50% | 53% | 54% | 53% |
| % first-generation | 30% | 52% | 32% | 41% | 40% |
| % who came directly from high school | 48% | 37% | 46% | 79% | 56% |
| % domestic | 96% | 90% | 91% | 98% | 94% |
| Median Grades | | | | | |
| Grade 12 English | 73% | 74% | 70% | 70% | 71% |
| Fall term GPA | 72% | 69% | 64% | 71% | 67% |
| Remedial languages course | 76% | 64% | C+ | Satisfactory | |
| Program | | | | | |
| % arts | 0% | 48% | 42% | 38% | 41% |
| % business | 100% | 29% | 37% | 48% | 41% |
| % health | 0% | 0% | 0% | 4% | 2% |
| % technology | 0% | 23% | 21% | 10% | 17% |
| Persistence | | | | | |
| % active in fall 2012 term | 91% | 73% | 96% | 81% | 84% |
| % active in winter 2013 term | 87% | 62% | 90% | 71% | 75% |
| % active in fall 2013 term | 78% | 70% | 70% | 67% | 69% |

The second source of data includes the results from the WritePlacer test, which students wrote at both the beginning and the end of the fall 2012 semester, after having completed their developmental communication course.

Scores on the incoming and outgoing test are reported on a scale of 0 to 8, where 4 to 8 represent passing scores (with 4 being a low pass and 8 being a perfect performance). Table 3 outlines WritePlacer’s holistic score descriptions.

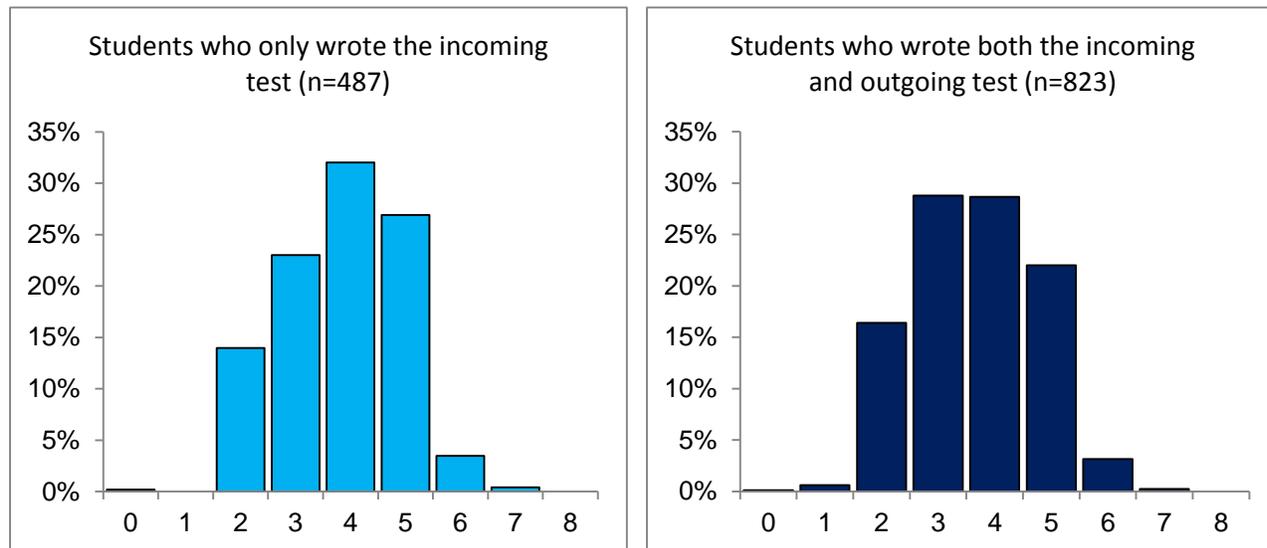
Table 3: WritePlacer Holistic Score Descriptions

| Score | WritePlacer holistic score descriptions |
|-------|---|
| 8 | The essay demonstrates clear and consistent mastery of on-demand essay writing. |
| 7 | The essay demonstrates consistent mastery of on-demand essay writing. |
| 6 | The essay demonstrates reasonably consistent mastery of on-demand essay writing. |
| 5 | The essay demonstrates adequate mastery of on-demand essay writing. |
| 4 | The essay demonstrates developing mastery of on-demand essay writing. |
| 3 | The essay demonstrates little mastery of on-demand essay writing. |
| 2 | The essay demonstrates very little mastery of on-demand essay writing. |
| 1 | The essay demonstrates no mastery of on-demand essay writing. |
| 0 | No holistic score: This essay has not been given a holistic score or the six dimensional scores because it is either a blank page, incoherent/illegible, insufficient (too short to assess), in a foreign language, or off topic. |

Source: College Board (2011)

As we can see in Figure 1, of the 1,316 students who consented to participate in the study, 823 (63%) completed both the incoming and outgoing test, 487 wrote only the incoming test, 3 wrote only the outgoing test and 3 wrote neither. The following figures present the distribution of incoming test scores for students who only wrote the incoming test and for students who wrote both the incoming and outgoing test. 63% of students who wrote the incoming test scored 4 or higher, compared to 54% of students who wrote both the incoming and outgoing test.

Figure 1: Distribution of Incoming Test Scores



Using an independent samples t-test, we find a significant difference in incoming test scores between students who only wrote the incoming test ($M=3.83, SD=1.11$) and students who wrote both the incoming and outgoing test ($M=3.65, SD=1.13$); $t(1,308)=2.8, p=0.002$). Table 4 compares the population of students who only wrote the incoming test with that of students who wrote both the incoming and outgoing test. 29% of students who wrote only the incoming test either withdrew from the course or failed the fall 2012 term. The remainder of the students did not write the outgoing test due to absence on the test day.

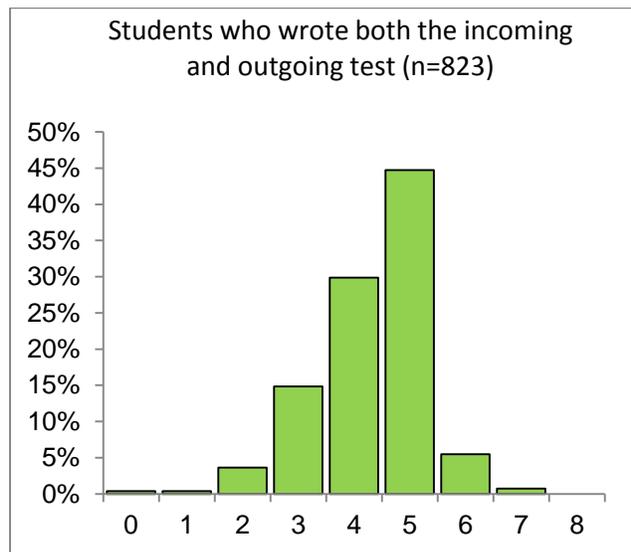
Table 4: Comparison of Students who only Wrote the Incoming Test and Students who Wrote both the Incoming and Outgoing Tests

| | Incoming score only | Incoming and outgoing score | All students |
|--------------------------------------|---------------------|-----------------------------|--------------|
| N | 487 | 823 | 1,316 |
| Demographics | | | |
| Median age | 19 | 19 | 19 |
| % female | 50% | 54% | 53% |
| % first-generation | 39% | 41% | 40% |
| % who came directly from high school | 54% | 58% | 56% |
| % domestic | 91% | 95% | 94% |

| | Incoming score only | Incoming and outgoing score | All students |
|----------------------------------|---------------------|-----------------------------|--------------|
| Median Grades | | | |
| Grade 12 English | 70% | 71% | 71% |
| Fall 2012 term GPA | 61% | 69% | 67% |
| Program | | | |
| % arts | 40% | 42% | 41% |
| % business | 42% | 40% | 41% |
| % health | 1% | 2% | 2% |
| % technology | 17% | 17% | 17% |
| Persistence | | | |
| % active in fall 2012 term | 71% | 92% | 84% |
| % active in the winter 2013 term | 60% | 84% | 75% |
| % active in fall 2013 term | 53% | 78% | 69% |

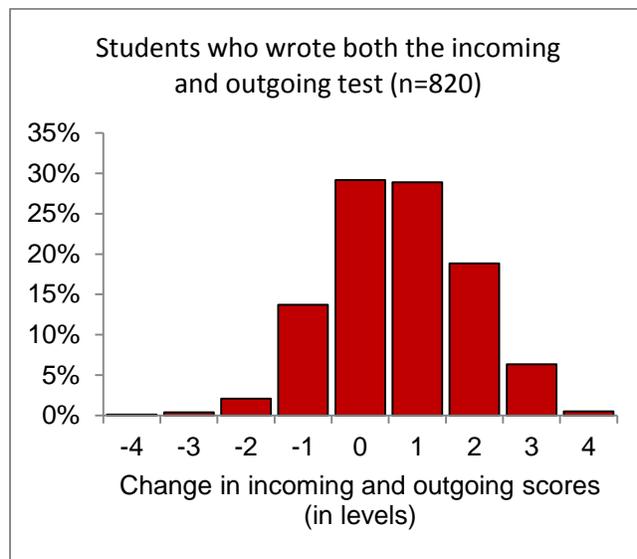
Figure 2 presents the distribution of outgoing test scores for students who wrote both the incoming and outgoing test. 81% of students scored 4 or higher on the outgoing test.

Figure 2: Distribution of Outgoing Test Scores



As shown in Figure 3, when we compare incoming and outgoing test scores we find that 55% of students scored at least one level higher on the outgoing test than on the incoming test, 29% of students scored at the same level and 16% of students scored at least one level lower on the outgoing test than on the incoming test. The figure below presents the distribution of the change in incoming and outgoing test scores, represented in levels.

Figure 3: Distribution of the Difference between Incoming and Outgoing Test Scores



While we find that average test scores improve overall after the remedial language course, we also observe some variation in performance across the participating colleges.

Table 5: Mean Incoming and Outgoing Test Scores by College

| | Incoming test only | Students with an incoming and outgoing test score | | |
|----------------|--------------------|---|----------------|------------|
| College | Incoming score | Incoming score | Outgoing score | Difference |
| College A | x | 2.7 | 3.4 | 0.7 |
| College B | 3.4 | 3.2 | 3.7 | 0.5 |
| College C | 3.4 | 3.4 | 4.4 | 1.0 |
| College D | 4.3 | 4.2 | 4.7 | 0.5 |
| Average | 3.8 | 3.7 | 4.3 | 0.7 |

An analysis of variance (ANOVA) was used to determine whether the differences in mean test scores across colleges were statistically significant. We used a Bonferroni correction to account for the fact that multiple comparisons are being conducted and that some differences could be significant by chance. Tables 6 and 7 provide overviews of the results. A checkmark indicates that the difference in mean test scores is statistically significant at the 5% level.

Table 6: Statistically Significant Differences in Mean Income Test Scores

| | College A | College B | College C | College D |
|-----------|-----------|-----------|-----------|-----------|
| College A | | | | |
| College B | x | | | |
| College C | ✓ | x | | |
| College D | ✓ | ✓ | ✓ | |

Table 7: Statistically Significant Differences in Mean Outgoing Test Scores

| | College A | College B | College C | College D |
|-----------|-----------|-----------|-----------|-----------|
| College A | | | | |
| College B | x | | | |
| College C | ✓ | ✓ | | |
| College D | ✓ | ✓ | ✓ | |

While the student populations and student performance on the incoming and outgoing tests differ across the four participating colleges, the majority of students (55%) made improvements on the WritePlacer test overall. In the following section we explore whether any observable student characteristics are associated with performance on the incoming and outgoing tests, whether test scores are correlated with performance in the developmental communication course, and whether students who pass the course are more likely to remain in college the following academic year compared to students who do not pass the course.

Analysis

Controlled experiments, which involve both an experimental group and a control group, are often used to determine the effectiveness of an intervention. These experiments minimize the effects of external factors that may influence the outcome of the experiment. Since the developmental communication course is mandatory for students who are identified as needing it at each of the participating colleges, it was not possible to design a controlled experiment in this case out of fairness, as it would require that some students attend the course while others who would benefit from the experience not be allowed. An

alternative approach would involve examining students who are near the threshold for being classified as remedial in English but who do not quite meet the criteria for that category. These are students who were slightly above the threshold for remedial English (and therefore were not required to take the mandatory remedial course).

This study, however, only includes a sample of students who were identified as developmental at the four colleges. Due to the study design, we are unable to measure the effectiveness of the developmental communication course. Instead we examine the following:

- a. The relationship between test scores and demographic characteristics
- b. The relationship between test scores and performance in the developmental communication course
- c. The relationship between performance in the developmental communication course and persistence

a. Relationship between Test Scores and Demographic Characteristics

Our first analysis uses an ordered logistic regression to determine whether any observed demographic characteristics correlate with incoming and outgoing test scores. Incoming and outgoing scores are ordinal and range from 0 to 8. Since few students scored at the extreme ends we grouped students who scored 0, 1 or 2 together and students who scored 6 or 7 together.⁶ The results are shown in Table 8.

For the first regression, where our dependent variable is incoming test scores, we included all students who wrote the incoming test regardless of whether they wrote the outgoing test. The only variable included in the model that was statistically significant was whether a student came to college directly from high school. Holding all other variables constant, the odds of scoring a 6 versus a 5, 4, 3 or 2 on the incoming test are 1.72 times higher for students who came directly from high school than for students who started college more than one year after graduating high school. These results hold true when examining students who wrote both the incoming and outgoing tests.

For the second regression, where our dependent variable is outgoing test scores, we only include students who wrote both the incoming and outgoing test since we control for incoming test scores. We find that incoming test scores and whether a student was a first-generation student are the only statistically significant variables in the model. Students who score higher on the incoming test and students who are not first-generation students are more likely to outperform their peers on the outgoing test. For a one-unit change in incoming test scores, the odds of scoring a 6 versus a 5, 4, 3 or 2 are 1.36 times higher, holding all other variables constant.

⁶ No student achieved an 8 on either the incoming or outgoing test.

Table 8: Effects of Student Demographic Characteristics on Incoming and Outgoing Test Scores

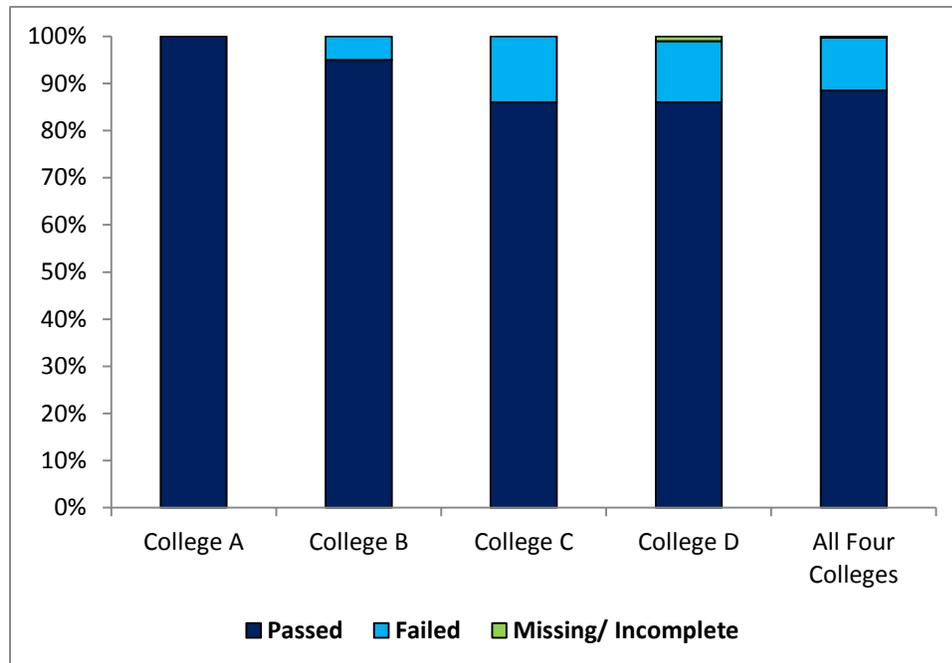
| | <u>Incoming Scores</u> | | | | <u>Outgoing Scores</u> | | | |
|---------------------------|------------------------|----------------|---------|------------|------------------------|----------------|---------|------------|
| | Coef | Standard error | p-value | Odds ratio | Coef | Standard error | p-value | Odds ratio |
| Incoming score | | | | | 0.59*** | 0.08 | 0.00 | 1.80 |
| Male | -0.05 | 0.12 | 0.70 | 0.95 | -0.06 | 0.16 | 0.73 | 0.94 |
| Age | 0.00 | 0.02 | 0.85 | 1.00 | -0.02 | 0.03 | 0.54 | 0.98 |
| HS direct | 0.54*** | 0.14 | 0.00 | 1.72 | 0.30 | 0.20 | 0.11 | 1.36 |
| First-generation | 0.06 | 0.12 | 0.61 | 1.06 | -0.51*** | 0.16 | 0.00 | 0.6 |
| Grade 12 Eng | 0.00 | 0.01 | 0.97 | 1.00 | 0.00 | 0.01 | 0.79 | 1.00 |
| Arts | -0.13 | 0.12 | 0.27 | 0.87 | -0.09 | 0.16 | 0.63 | 0.92 |
| Fall term GPA | | | | | 0.01 | 0.00 | 0.13 | 1.01 |
| Observations | 943 | | | | 587 | | | |
| McFadden's R ² | 0.007 | | | | 0.059 | | | |

*p<0.10; **p<0.05; ***p<0.01

b. Relationship between Test Scores and Performance in the Developmental Communication Course

Students who perform well on the incoming and outgoing test should hypothetically also perform well in the developmental communication course. Since each of the four participating colleges uses a different scale to report performance in the developmental communication course, we created a binary variable equal to 0 if the student failed the course or 1 if the student passed the course. Of the 1,316 students in our sample, 69% passed the course, 19% failed and 12% had a missing or incomplete grade. Since we are examining the relationship between test scores and performance in the course, we only include students who wrote both the incoming and outgoing tests. Of the 823 students who wrote both the incoming and outgoing tests, 728 students passed (88.2%), 92 failed (11.9%) and 3 had a missing or an incomplete grade (0.4%). The three students who had a missing/incomplete grade were also excluded from this part of the analysis. Figure 4 shows the performance in the developmental communication course for the participating students who completed both the incoming and outgoing tests for each college and overall.

Figure 4: Performance in the Developmental Communication Course for Students who Wrote both the Incoming and Outgoing Test by College and Overall



Using a logistic regression, we examine the likelihood of a student passing the developmental communication course given their incoming and outgoing test scores and other observed demographic characteristics. Students with both an incoming and outgoing test score and students who had a pass/fail grade in the developmental communication course were included in the analysis. The regression results are presented in the following table. Results are reported in terms of odds ratios, which are used to compare the relative odds of an outcome given a particular exposure to an event. For example, the odds ratio of males indicates the odds by which males are more likely to pass the developmental communication course compared to females while holding all other variables constant. An odds ratio greater than 1 indicates that males are more likely to pass the course, while an odds ratio lower than 1 indicates that females are more likely to pass the course. An odds ratio equal to 1 indicates that males and females are equally likely to pass the course.

Students with higher incoming test scores, higher fall term GPAs, and students enrolled in a non-applied arts program (business, health or technology) have an increased likelihood of passing the developmental communication course. Outgoing test scores, gender, age, whether a student came directly from high school and whether a student is first-generation did not have an impact on performance in the developmental communication course.

The analysis in section a above found that incoming test scores were correlated with outgoing test scores. In other words, students who performed well on the incoming test generally also performed well on the outgoing test. Since the likelihood of a student passing the developmental communication course is also correlated with incoming test scores, this suggests that students who do well on the incoming test have an increased likelihood of passing the course.

Table 9: Likelihood of Passing the Developmental Communication Course

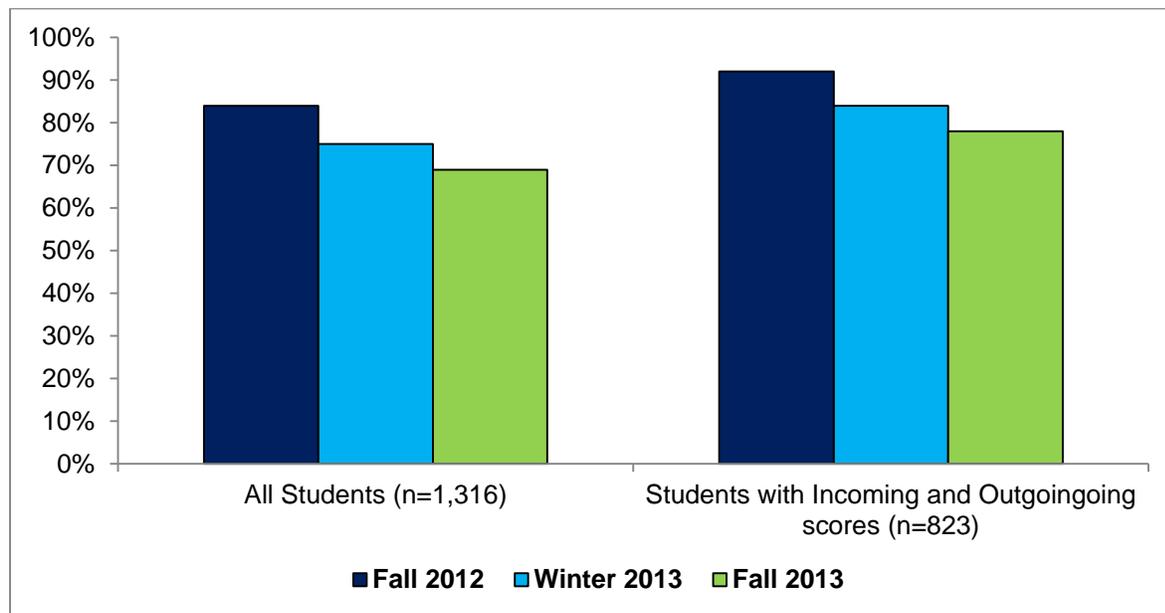
| Independent variables | Coefficient (b) | Standard error (s.e.) | Significance (p-value) | Odds ratio Exp(b) |
|---------------------------|-----------------|-----------------------|------------------------|-------------------|
| Incoming score | 0.21* | 0.12 | 0.09 | 1.23 |
| Outgoing score | 0.13 | 0.13 | 0.34 | 1.14 |
| Male | 0.11 | 0.28 | 0.70 | 1.11 |
| Age | -0.03 | 0.03 | 0.32 | 0.97 |
| HS direct | 0.29 | 0.30 | 0.34 | 1.33 |
| First-generation | 0.19 | 0.27 | 0.48 | 1.21 |
| Fall term GPA | 0.05*** | 0.01 | 0.00 | 1.05 |
| Applied arts | -0.74*** | 0.28 | 0.01 | 0.48 |
| Constant | -1.67* | 0.97 | 0.09 | |
| Observations | 668 | | | |
| McFadden's R ² | 0.17 | | | |

*p<0.10; **p<0.05; ***p<0.01

c. Relationship between Performance in the Developmental Communication Course and Persistence

Are students who pass the developmental communication course less likely to drop out of college than students who do not pass the course? The registration status for each student is recorded for each term of study. Figure 5 shows the percentage of students who had a status of ‘active’ (i.e., registered) in the fall 2012 term (the term in which students took the remedial course), the winter 2013 term and the fall 2013 term. The students who were not classified as active either failed, did not register or withdrew from their courses midway through the semester.

Figure 5: Percentage of Students who have a Status of ‘Active’ by Term



We find that a student’s status in the fall 2013 term – one year after taking the developmental communication course – is not correlated with performance on either the incoming or outgoing test. Using a one-way ANOVA, we find that the difference in mean incoming test scores by student status is not statistically significant for all students ($F(1,1308) = 0.04, p=0.846$) or for students who completed both the incoming and outgoing tests ($F(1,821) = 0.13, p=0.721$). Differences in mean outgoing test scores are also not statistically significant for all students ($F(1,824) = 3.66, p=0.0562$) or for students who completed both the incoming and outgoing tests ($F(1,821) = 3.65, p=0.0564$).

While performance on the incoming and outgoing tests is not correlated with persistence, we also examine whether performance in the developmental communication course is associated with persistence. Looking at a simple cross-tabulation between performance in the developmental communication course and status in the fall 2013 term, we find that most students who pass the course have a status of active the following year, as shown in Table 10.

Table 10: Cross Tab between Performance in the Developmental Communication Course and Status in the Fall 2013 Term

| | Performance in the Developmental Communication Course | | Total | |
|------------------|---|------|-------|-------|
| | Fail | Pass | | |
| Fall 2013 status | Non-active | 128 | 195 | 323 |
| | Active | 119 | 718 | 837 |
| | Total | 247 | 913 | 1,160 |

Note: Non-active includes students who failed, did not register or withdrew midway through the semester

Using a χ^2 (chi-square) test we find that there is a statistically significant relationship between status in the fall 2013 term and performance in the developmental communication course for all students (χ^2 with one degree of freedom = 89.797, $p=0.000$) and for students who wrote both the incoming and outgoing tests (χ^2 with one degree of freedom = 8.551, $p=0.003$).

We further ran a logistic regression to predict the probability that a student has a status of active in the fall 2013 term by controlling not only for performance in the developmental communication course but also for gender, age, high school characteristics, fall term GPA and program. Incoming and outgoing test scores were not included in the model since differences in mean scores were not statistically significant for students who were active and students who were non-active in the fall 2013 term. Our dependent variable, status in the fall 2013 term, is a binary variable where $Y=1$ if a student has a status of active and $Y=0$ if a student does not have a status of active.

The regression results are presented in Table 11 below. Students who passed the developmental communication course, students who came directly from high school and students with higher fall term GPAs were more likely to have a status of active in the fall 2013 term. As one would expect, the results show that students who pass the developmental communication course are more likely to persist in their studies than students who do not pass the course.

Table 11: Likelihood of Having a Status of Active in the Fall 2013 Term

| | Coefficient | Standard error | P-value | Odds ratio |
|----------------------------|-------------|----------------|---------|------------|
| Passed the remedial course | 0.40* | 0.23 | 0.08 | 1.50 |
| Male | 0.09 | 0.18 | 0.63 | 1.09 |
| Age | 0.05 | 0.04 | 0.18 | 1.05 |
| HS direct | 0.53*** | 0.21 | 0.01 | 1.70 |
| Grade 12 English | 0.00 | 0.01 | 0.94 | 1.00 |
| First-generation | 0.00 | 0.18 | 0.98 | 1.00 |
| Fall term GPA | 0.03*** | 0.00 | 0.00 | 1.03 |
| Applied arts | -0.18 | 0.19 | 0.34 | 0.83 |
| Constant | -2.38** | 1.02 | 0.02 | |
| Observations | 781 | | | |
| McFadden's R ² | 0.104 | | | |

*p<0.10; **p<0.05; ***p<0.01

Conclusion

There were 1,316 students included in our sample across the four participating colleges. Of these students, 823 (63%) wrote both the incoming and outgoing tests. Of the students who wrote both the incoming and outgoing tests, 55% scored at least one point higher on the outgoing test than on the incoming test. We cannot attribute this improvement to the developmental communication course as other factors, such as course work from other classes, may have impacted student performance.

Using test scores and administrative data, we posed the following questions:

1. Which factors influence incoming and outgoing test scores?
2. Is there a relationship between performance in the communication course (i.e., the developmental communication course) and incoming and outgoing test scores?
3. Is there a relationship between persistence and performance in the communication course?

Using an ordered logistic regression, we found that students in our sample population who entered college directly from high school are more likely to have higher incoming test scores. Students with higher incoming test scores and students who are not first-generation are more likely to outperform their peers on the outgoing test. Marks in grade 12 English were found to have little impact on incoming and outgoing test scores; however, this could be a result of being unable to control for high school English pathway and course type (e.g., university preparation, university/college preparation, college preparation, and workplace preparation).

Using a logistic regression to look at the probability that a student passes or fails the communication course, we find that students in our sample population with higher incoming test scores and higher fall semester GPAs have an increased likelihood of passing the communication course. Students enrolled in a non-applied arts program (i.e., business, health or technology) also have an increased likelihood of passing the communication course. However, outgoing scores did not have a significant impact on the probability of a student passing the course.

Finally, we look at the relationship between persistence and performance in the communication course. The results from a χ^2 (chi-square) test indicate that there is a statically significant relationship between status in the fall 2013 semester and performance in the communication course for students in our sample population. Students who passed the communication course are more likely to have a status of active in the fall 2013 semester. Whether a student came directly from high school and fall semester GPA also had a significant impact on fall 2013 semester status.

Lessons Learned

Use of the WritePlacer brought with it a number of obstacles. In addition to the cost of grading, the paper format of the test resulted in challenges with slow marking, errors in marks returned and other serious logistical problems. In addition, the exam booklet provides very little room for students to draft their written responses, especially for students with large handwriting. A number of students asked for and received extra paper in order to complete their answer, even though College Board requests that only the booklets be used to facilitate grading.

Given that some of these obstacles stem from the need to ship the exams to College Board and from their desire to keep student responses digitalizable for grading, they might be overcome were Colleges Ontario to develop a common post-admission course placement test for Ontario's college sector. This test could be marked onsite according to a rubric based on best practices and current research. Graded exemplars could be used to ensure consistency and to calibrate grading across institutions. A made-in-Ontario assessment could also reflect the language and structure of the college sector.

A key logistical issue for a multi-college project is the range of documentation and processes required for ethics review at different institutions. Although not widely publicized, a number of Ontario colleges are piloting multi-site ethical review documentation, which serves to streamline the process by reducing the paperwork required to essentially a single form. It also creates the possibility for one college to expedite review based on another college's prior approval of the project. This form might also serve to reduce the burden placed on college research ethics boards, whose workload is growing given the recent increase in both internal and published research from Ontario colleges. From the researcher's standpoint, a common form would help ensure that all REB submissions are complete and accurate, reducing the need for REBs to request, and researchers to generate, additional documentation and amendments.

Another key issue involves access to institution data. There is a vast amount of data available at each college, but these data are frequently distributed between student records, testing centres, institutional

research offices, departments, schools... and the list could go on. In short, the differences in data infrastructure at the colleges represents a significant barrier for researchers conducting studies within their colleges, but particularly for researchers conducting research involving other colleges. In order to share data across colleges, each college needs a contact person who can provide guidance to the researcher on the data infrastructure within the institution, the principal contact for each data repository within the college and the processes that the researcher should follow when approaching each data repository (which often vary within institutions). If institutions could create a common data access and retrieval process, that would be a good transitional step. The ideal would be to unify institutional data access into a single process where the researcher requests and gains clearance for all of his/her data needs, and data specialists then distribute the data requests within the college.

Finally, this project demonstrates the limitations of research that seeks to tie students' high school performance to their postsecondary work. While all four colleges were extremely helpful in the data acquisition process, some key secondary records are unusable, as they are based on students' voluntary completion of a field in the application process; for example, we cannot get reliable data on students' grade 12 English pathways. Projects such as the College Mathematics Project (CMP) and the College Student Achievement Project (CSAP) bridge this data divide, but we need to build on this model of data transfer between secondary and postsecondary institutions in order to improve the quality of both secondary and postsecondary research. This need will only become more pressing as the percentage of secondary students who enrol in postsecondary education increases each year.

While IV analyses can control for differences between populations when comparing remedial and non-remedial populations, the methodological flaw that Bettinger and Long (2009) identified in remediation research stemming from direct, unmodified comparisons of these disparate populations, particularly with regards to retention statistics, still leads studies and their readers to draw the conclusion that lower retention rates in developmental courses prove that developmental courses are not working as intended. Moreover, remedial courses are wisely often placed in the first semester of the student's Program of Studies (POS), so as to address the students' skill deficit as soon as possible, but when we factor in the fact that the majority of student attrition among both remedial and non-remedial students occurs in the first semester, we can see why attrition rates in first semester developmental writing courses are so high.

All institutions are seeking to improve student retention, but in order to understand clearly the effects of remediation, as well as the patterns of student attrition, we need to correct for the differences between remedial and non-remedial populations, and between populations in different semesters, rather than seeing attrition in every course in every semester as a comparable, accurate measure of each course's success. If we accept that students who enter a college and whose post-admission communication course placement assessments indicate that their reading and/or writing and/or math skills are below the minimum level that correlates with success in the college setting, then we have to categorize those students as unlikely to succeed without intervention in PSE.

Moreover, as a number of studies have shown, the greater the number of developmental courses a student is assigned, the greater the likelihood that the student will not persist. If we decide from a high attrition rate that remediation does not work, then we cannot fully ascertain the extent of the skills deficit problem or the

success of the treatment. A skills deficit in a foundational skill such as reading, writing or math should indicate that the student will not pass and will not persist without assistance. As such, the students who pass the developmental course and are retained represent a retention success, as without the treatment of their skills deficit, those students could not have succeeded at college.

Future Research

This study measures the impact of four very different institutions' very different first semester developmental communication courses. In this multi-institution study, however, we compare a snapshot of students' written communication skills at entry into college with a snapshot of the same skill at exit from the developmental course. The next phase of this research will likely be carried out at the level of individual institutions, as we must gather data on student communication skills as they progress through the complete range of communication courses at the institution.

In addition to longitudinal research measuring the change in students' communication skills over the course of their Program of Studies, as well as through the institution's particular ladder of communication courses, we need to conduct research into the efficacy of pedagogical models used in the classroom, class sizes, and the institutional supports offered to students. Critical factors to consider here would include class sizes, course hours, delivery mode (web enabled, blended, online), type of communication produced (expository vs. professional writing), and available/targeted/mandatory institutional supports (counselling, peer tutoring, peer-staffed writing centre, faculty-staffed writing centre).

To conduct research that can look for causal relationships in any of these areas, however, it is critical that colleges explore how to conduct random assignment evaluations of developmental courses using valid control groups without violating institutional requirements for course equivalency and students' self-enrolment rights. We need to measure the effectiveness of different course models and delivery models for diverse developmental communication populations and then explore options for those students whom remediation does not help. We could start this work by comparing preparatory developmental teaching semesters with developmental courses offered within the students' regular program of studies.

Another critical area for research is assessment, both in terms of the type and the number of assignments, the opportunities for in-class editing, draft submission for marks or draft submission for comments before final submission for marks. We need to conduct research into rubrics and instructor norming as well as grade inflation and evaluate the extent to which cuts in PSE funding exert a pressure on colleges to pass students.

Beyond the students' academic experience, we need to continue the research by Fisher and Engemann (2009) and Finnie et al. (2010) into the wider range of PSE experiences, to see how multiple experiences affect students' persistence. One key support for this research is the introduction of the Ontario Education Number (OEN) into PSE, which will allow researchers to measure college retention more accurately at a provincial level, allowing for student transfer between colleges and from college to university.

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