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Impact of the Preparation for Academic Success in Science (PASS) High School to University Transition Program

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Impact of the Preparation for Academic Success in Science (PASS) High School to University Transition Program

Abstract

The transition from high school to university can be difficult and stressful for many students who are not sure of how to be successful in their courses and become engaged in extracurricular activities beyond the classroom. This paper describes the design and outcomes of the Preparation for Academic Success in Science (PASS) transition program in the Faculty of Science at the University of Windsor, a mid-sized university in Ontario, Canada. The two-day PASS program, offered in the week before fall classes begin, is designed to introduce incoming students to effective study habits, note taking, and preparation for examinations. Moreover, students are advised on how to get involved in undergraduate research, study abroad, service learning, internships, and student organizations, while balancing their time, health and wellness. Results from PASS cohorts between 2017 and 2019 suggest that students who participated in the PASS program had higher major and overall averages in their first and subsequent years, and significantly greater engagement in extracurricular activities compared to the (control group) students who did not participate in the transition program. PASS is presented as an effective transition program, but it is argued that further study is required to determine how academic performance and engagement are related to the intentionality of the student when they start university, and the importance of the program to building community and a sense of belonging.

La transition entre l'école secondaire et l'université peut s'avérer difficile et stressante pour de nombreux étudiants et de nombreuses étudiantes qui ne savent pas comment réussir à leurs cours et s'impliquer dans les activités extracurriculaires au-delà de la salle de classe. Cet article décrit la conception et les résultats du programme de transition PASS (Preparation for Academic Success in Science) de la faculté des sciences de l'Université de Windsor, une université de taille moyenne de l'Ontario, au Canada. Le programme PASS de deux jours, offert au cours de la semaine qui précède le début des cours en automne, est conçu pour introduire les nouveaux étudiants et les nouvelles étudiantes à des habitudes de travail efficaces, à la prise de notes et à la préparation aux examens. De plus, il est conseillé aux étudiants et aux étudiantes de s'impliquer dans la recherche au premier cycle, dans les programmes d'études à l'étranger, dans l'apprentissage par le service, dans les internats et dans les organisations d'étudiants et d'étudiantes, et on leur indique la manière de le faire tout en équilibrant leur emploi du temps, leur santé et leur bien-être. Les résultats des cohortes du programme PASS entre 2017 et 2019 suggèrent que les étudiants et les étudiantes qui y ont participé avaient obtenu de meilleures notes dans leurs cours de spécialisation ainsi que dans leurs cours en général durant leur première année d'études et les années suivantes, et que leur participation avait été considérablement plus importante dans les activités extracurriculaires par rapport aux étudiants et aux étudiantes du groupe de contrôle qui n'avaient pas participé au programme de transition. Le programme PASS est présenté comme un programme de transition efficace, toutefois il est suggéré qu'une étude plus approfondie est nécessaire pour déterminer comment la performance académique et la participation sont liées à l'intentionnalité des étudiants et des étudiantes quand ils commencent leurs études universitaires, et comment l'importance du programme joue un rôle dans l'établissement d'une communauté et la création d'un sens d'appartenance.

Keywords

transition program, university, high school, student engagement; programme de transition, université, école secondaire, participation des étudiants

Cover Page Footnote

The authors would like to thank the reviewers for their constructive comments, and to the reviewer who recognized that we inadvertently tried to solve the P versus NP computational problem.

The transition from high school to university can be particularly difficult for students who are unsure about how to be successful academically (Blanc et al., 1983; Brooks & DuBois, 1995; Cantor et al., 1987; Cutrona, 1982; Gerdes & Mallinckrodt, 1994; Fletcher & Anderson-Rowland, 2000; Gall et al., 2000; Kanoy & Bruhn, 1996; McLaughlin et al., 1998; Ross et al., 1999; Parker et al., 2004; Perry et al., 2001;). First-year students may also be unaware of the importance of engaging in extracurricular activities beyond the classroom in their own personal development to becoming independent adults. Undergraduate students typically report that stress levels in their first year of study are higher than in subsequent years (Menard et al., 2021; Ross et al., 1999), and it is particularly stressful for those students who are first generation, from marginalized groups, have family obligations and financial concerns, or learning disabilities (DeRoma et al., 2005; Eckes & Ochoa, 2005; Levinson & Ohler, 1998; Lichtman et al., 1989; Murray et al., 2000).

Academic preparation is an important predictor of success in university (Adelman, 1998, 1999; Cabrera & La Nasa, 2000; Hossler et al., 1999; Perna & Titus, 2005; Stampen & Fenske, 1988), but academic performance in high school, as defined by the student's grade-point average (GPA) is not a strong and consistent predictor of post-secondary academic success and retention rates (Adelman, 1999; Berger & Milem, 1999; Mayer & Salovey, 1997; Murtaugh et al., 1999; Randsell, 2001). Results from Bettinger and Long (2005) suggest that approximately one third of entering post-secondary students require remedial or development work, particularly amongst students who attend less-resourced high schools (Gonzalez-Muniz et al., 2012; Horn & Kojaku, 2001; Long et al., 2009; McDonough & Fann, 2007; Perna & Titus, 2005). Moreover, social competencies and emotional intelligence such as interpersonal skills, adaptability, and stress management may be a greater predictor of a successful transition than GPA (Bowman & Denson, 2012; Britton & Tesser, 1991; Conley, 2008; Strayhorn, 2011; Venezia & Jaeger, 2013).

There are programs, prior to a student entering first year, that bridge students from high school to university (see Thayer, 2000; Kezar, 2000). These programs can be an effective approach to improve student retention through the development of supportive networks, the fostering of community amongst first-year students and the introduction of advisors, peer mentors and tutors (Friedlander et al., 2007; Villalpando & Solórzano, 2005; Wilcox et al., 2005). Multi-week bridge programs typically have a developmental or remedial focus, are viewed to address inadequate academic preparation (St. John et al., 2010), and are typically aimed at first-generation, low-income students or those who test poorly (Kallison & Stader, 2012; Murphy et al., 2010). There are also social, cultural, and economic barriers to retention, particularly amongst first-generation and minoritized students (St. John et al., 2010), and many long-term bridge programs also include coaching, mentoring and other support services for students in a living-learning structure that builds community amongst the students.

Shorter bridge programs, herein referred to as transition programs, have little or no focus on remediation and are designed to introduce students to support programs, opportunities for engagement, and effective strategies for success in their coursework. Available support and an introduction to those services improves student GPA and retention (Houser et al., 2015; Murphy et al., 2010; Robbins et al., 2004; Suzuki et al., 2012; Wathington et al., 2016) as well as perceived gains in vocational preparation (Flowers, 2004). As with bridge programs, transition programs offer students an opportunity to understand the norms and culture of their academic program and institution (Wilcox et al., 2005), how to interact with faculty, staff and other students, and the opportunities for them to participate in a wide variety of learning experiences. It is an introduction intended to give the student a sense of identity and belonging (Kuh & Vesper, 1997, McInnis et al., 2000). Without some form of connection and support, the academic struggles some students

face in first year may result in behaviors that lead to attrition and the development of mental and physical health concerns (Hsiao, 1992; Krause et al., 2002; Menard et al., 2021; Moller-Wong & Eide, 1997; Pittman & Richmond, 2008; Seymore and Hewitt, 1994; Tinto, 1993).

While there are qualitative and increasingly quantitative assessments to evaluate summer transition programs (Kluepfel, 1994; Nicpon et al., 2007; Risku, 2002; Sablan, 2013; Wolf-Wendel et al. 1999), there are few studies to describe and evaluate the impact of shorter programs. This paper describes the design and outcomes of the Preparation for Academic Success in Science (PASS) transition program in the Faculty of Science at a mid-sized university in Ontario, Canada. Program outcomes are evaluated based on major and overall averages, retention rates, and engagement in curricular and extracurricular activities beyond the classroom relative to a demographically similar group of students who did not participate in the program.

Preparation for Academic Success in Science (PASS) Program

The Preparation for Academic Success (PASS) Program at the University of Windsor is modeled on the Geosciences Academic Preparation (GAP) Program started by the senior author at Texas A&M University. Both GAP and PASS focus on introducing students to skills that will help them meet their personal and academic goals and were not designed as remedial or developmental program to address shortcoming or deficiencies in their high school preparation. Focus is placed on self-motivation, personal responsibility, peer support systems, engagement beyond the classroom, and based on the idea that students who are involved in curricular and extracurricular activities outside the classroom are more likely to adjust to university life and expectations, earn higher grades and exhibit greater persistence (Kuh et al., 2006; McCarthy & Kuh, 2006; Tinto, 1993). Building on the work of Krause et al. (2005), the PASS program includes discussions of time and workload management, communication strategies with peers, staff, and faculty, effective study and test-taking skills, and being an engaged student in and beyond the classroom. PASS is also centred on four main pillars—Leadership, Engagement, Application and Discovery (LEAD)—and is tied directly to the LEAD Medallion program. Similar to the GAP program, discussions around LEAD are aimed to increase student commitment to seek out high-impact learning experiences. The specific topics covered in the PASS program are provided in Table 1.

Table 1*Structure of the PASS Program and Topics Covered Over the 2-day Program.*

Day 1	Day 2
– What Employers Want	– Learning for Success- Mock Lecture
– Lead through Student-Led Organizations (i.e., Science Society ¹ , SOS ² , USci Network ³)	– Getting to Know Math- Mock Lecture
– Engage in Study abroad, Mentoring Programs	– Academic Program Orientations
– Apply through Service Learning, Internship, Co-op	
– Discover through Undergraduate Research	
– Mental Health and Wellness	

Note. ¹Science Society is the student government body in the Faculty of Science that supports undergraduate students. ²Students Offering Support (SOS) is a national student organization on campus and provides academic support. ³USci Network is an interdisciplinary science program providing opportunities to enrich the student experience.

The PASS program is held during the university's Fall Welcome Week over the two days before classes officially start on the first Thursday after Labour Day in Canada. Incoming first-year students are invited to participate through direct emails from the Faculty of Science to their personal and new university accounts, in addition to direct mailings by the faculty during the recruitment period. The program is also listed as an official university activity through the Welcome Week guide, which means that students from outside the Faculty of Science can also participate in the program. During the PASS program, students meet current undergraduate student leaders (e.g., Science Society elected representatives) and are then encouraged to join them in participating in campus-wide activities and competitions during the remainder of Welcome Week.

Method

While there have been several studies to assess the effectiveness of transition programs, many have been limited by a lack of a demographically similar group of students who did not participate in the program as a control group. With approval from the University of Windsor Research Ethics Board (REB), our study tracked the overall and major grade-point average (GPA), which are calculated as the average of all courses taken and of only core courses required in the major degree plan respectively. The study also tracked retention rate and engagement level for students who participated in the PASS program as compared to the (control group) students who did not participate in the program in 2017 (6 semesters), 2018 (4 semesters) and 2019 (2 semesters). To reduce any potential bias resulting from self-selection based on high school academic performance, all comparisons between PASS participating (P) and non-participating (NP) students are based on the average of their top 6 grade 12 courses used in their university application (70-74.9%, 75-79.9%, 80-84.0%, 85-89.9%, 90-94.9%, and 95-100%). A further division was made based on whether students participated in high-impact and extracurricular activities associated with a LEAD Medallion program (see Table 1). Furthermore, it is recognized that a better predictor might be how willing a student is to seek out help and engage in activities such as the PASS program. No comparisons were made based on program, student origin

(domestic vs. international), program or gender designations. Statistically significant differences at the 95% confidence level between cohorts were tested using a combination of z- and chi-square tests.

Results

Academic performance and engagement were tracked for both students who participated in PASS (P) and those who did not participate in PASS (NP). The number of P and NP students in each year PASS has been offered face-to-face is provided in Table 2. A comparison of final high school GPAs of P and NP students suggests that students with high school GPAs >85% were over-represented in PASS and relatively few students with high school GPAs <85% participated in PASS (Figure 1). The number of participating students reached ~38% of the incoming fall class in 2018 and 2019, a significant increase from when the program was introduced in 2017. In 2020, participation rate was lower due to the COVID-19 pandemic, as the entire PASS program was offered online, which limited the number of activities/modules that could be offered, as well as the interaction amongst students and presenters. The impact of COVID-19 on the program, and its impact on student performance and engagement, will be the focus of a future study.

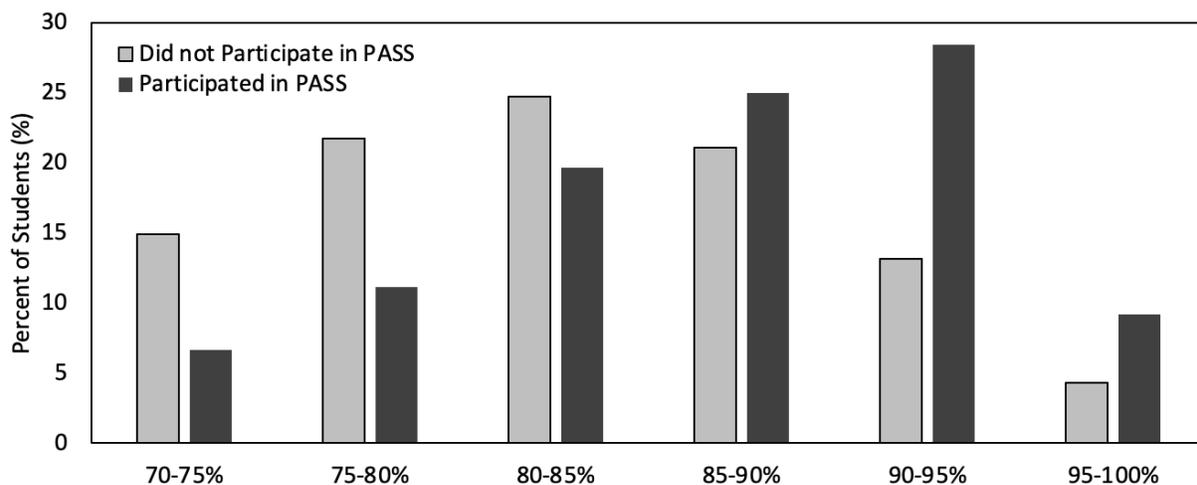
Table 2

Number of Students Participating in PASS (P) Relative to the Total Incoming Class of Undergraduate Students in the Faculty of Science

	Participating Students (P)	Total Incoming Class	Participation
2017	111	534	21%
2018	208	556	37%
2019	213	560	38%

Figure 1

Distribution of P and NP Students Based on Final High School GPAs



A comparison of semester averages for students with similar final high school grades who participated in PASS (P) and those who did not participate in PASS (NP) is presented in Table 3.

For students with final high school averages >95%, P students tended to perform better than NP students in semesters 1,2, and 5 after the PASS program, with no statistically significant difference observed in semesters 3,4, and 6. P students with final high school grades between 90 and 94.9% performed significantly better than NP students in semesters 2, 3, 5, and 6, with no statistically significant difference in semesters 1 and 4 for this small group of students. No significant difference was observed between P and NP students with final high school grades between 85 and 89.9%, but P students in this group did perform better in semesters 3 through 6. P students with final high school averages between 80 and 84.9% performed significantly better than NP students across all semesters. P students with final high school grades between 75 and 79.9% performed significantly better in semesters 1, 3, 5, and 6, while P students with final high school grades between 70 and 74.9% performed better in all semesters except for semester 2 when there was no statistically significant difference from NP students in the same group. Across all groups, P students either performed better than NP students or were not significantly different from NP students, and in no cases did NP students perform better than P students. Except for the 75-79.9% cohort, the difference between P and NP gets larger with time, suggesting continuous improvement of that specific NP cohort.

Table 3

Comparison of Semester Averages for students who participated in the PASS program (P) and those that did not participate in the PASS program (NP) between 2017 and 2019

Final HS Grades		Sem. 1	Sem. 2	Sem. 3	Sem. 4	Sem. 5	Sem. 6
>95	P	93.2	93.8	93.2	93.0	94.5	94.5
	NP	91.3	91.2	93.4	93.3	91.9	92.6
	Z	2.22	2.36	-0.44	-0.57	2.44	1.83
90 to 94.9	P	85.2	85.9	85.6	85.1	86.1	88.6
	NP	85.0	83.9	82.1	85.0	81.2	83.5
	Z	0.64	4.21	6.66	0.11	9.15	9.07
85 to 89.9	P	77.2	77.7	77.4	79.6	81.9	85.7
	NP	77.8	77.2	74.3	77.6	76.1	80.0
	Z	-1.37	0.91	5.92	2.86	11.49	10.55
80 to 84.9	P	73.2	74.0	73.6	75.3	71.8	81.1
	NP	71.4	71.9	68.7	73.2	68.1	72.3
	Z	3.55	4.00	8.92	3.86	6.32	14.82
75 to 79.9	P	67.9	67.0	65.6	67.1	58.9	59.0
	NP	66.3	67.0	62.7	67.4	56.6	56.3
	Z	2.85	0.25	4.38	-0.54	2.01	2.35
70 to 74.9	P	63.9	63.5	59.4	71.9	66.3	69.6
	NP	61.2	63.5	57.6	62.5	51.8	51.2
	Z	2.89	-0.10	2.02	6.37	12.31	15.61

Note. Also shown is the Z-statistic, with statistically significant differences at the 95% confidence level identified by the shading. The courses taken during a semester will be some combination of electives and core major courses.

A further comparison of P and NP students based on major and overall averages at the end of Semester 6 is provided in Table 4 for just the 2017 cohort. Across all high school groups, P

students had a significantly higher overall average compared to NP students at the end of semester 6. For major average, P students performed better than NP students across most high school groups, but NP students with high school grades between 90 and 94.9% and 75 and 79.9% performed better than P students.

Table 4

Comparison of Overall and Major Averages for P and NP Students at the End of Semester 6 for the 2017 Cohort.

Final HS GPA	Overall Averages			Major Averages		
	P	NP	Z	P	NP	Z
>95	94.27	91.31	2.83	94.21	91.32	2.76
90 to 94.9	82.42	80.71	3.28	81.85	85.32	-2.86
85 to 89.9	78.91	75.64	6.67	78.51	74.09	28.81
80 to 84.9	75.19	66.36	15.70	75.53	67.59	22.91
75 to 79.9	64.25	62.72	2.46	64.61	69.23	-7.99
70 to 74.9	65.76	57.96	14.81	65.69	50.06	8.08

Note. Statistically significant differences at the 95% confidence level are highlighted with P>NP in light grey and P<NP in dark grey.

Engagement in high-impact and extracurricular learning experiences was significantly greater for P students compared to NP students. Within the 2017 cohort, ~31% of P students participated in one or more extracurricular activities over 3 years, while only ~6% of NP students participated in similar activities ($\chi^2=54.2$, $p<0.001$). Of the 2018 cohort, ~27% of P students participated in one or more extracurricular activities over 2 years, compared to 7% participation amongst NP students ($\chi^2=44.1$, $p<0.001$). In the year following the 2019 PASS program, ~13% of P students participated in an extracurricular activity compared to only 2% of NP students ($\chi^2=28.5$, $p<0.001$). It is important to note, however, that lower participation rate of 2019 NP and P students may have been influenced by COVID-19 and the university moving completely online in March 2020. Except for students with high school averages between 95 and 100%, participation in one or more extracurricular activities resulted in a statistically significant increase in the major average (Table 5). Similar results were observed for the overall average.

Table 5

Comparison of Major Averages for P and NP Students (from the 2017 Cohort) at the End of Semester 6 Based on Whether they Participated in One or More Extracurricular Activities.

Final HS GPA	P			NP		
	Extra	No Extra	Z	Extra	No Extra	Z
>95	93.94	94.71	-0.45	89.64	92.37	-2.14
90 to 94.9	86.95	78.17	10.95	88.70	78.93	11.20
85 to 89.9	81.39	77.59	3.93	82.29	74.77	11.04
80 to 84.9	80.42	72.78	6.94	74.16	65.78	9.47
75 to 79.9	79.20	52.83	11.35	64.27	53.06	4.99
70 to 74.9	--	65.69	--	--	50.06	--

Note. Statistically significant differences at the 95% confidence level are highlighted with P>NP in light grey and P<NP in dark grey.

As presented in Table 6, participation in PASS appeared to have an impact on student retention. Across all years, P students had stronger retention rates compared to NP students. At the end of 3 years, ~90% of P students from the 2017 cohort were still enrolled in a program at the University of Windsor, compared to only 85% of NP students. The higher retention is not due to the over-representation within PASS by students with high incoming final grades (Table 7). In general, participation in the PASS program is associated with slightly higher retention rates, but there are cases where NP student retention was stronger or equal to that of P students. There is, however, no clear pattern to those cohorts where retention at the University of Windsor is stronger amongst NP students.

Table 6

Retention of P and NP Students for the 2017, 2018 and 2019 Cohorts.

		Entering	Year 1	Year 2	Year 3
P	2017	111	110 (99%)	108 (97%)	100 (90%)
	2018	208	207 (99%)	198 (95%)	
	2019	213	210 (99%)		
NP	2017	423	407 (96%)	395 (93%)	361 (85%)
	2018	348	321 (92%)	307 (88%)	
	2019	347	334 (96%)		

Table 7

Retention of P and NP Students for 2017, 2018 and 2019 Cohorts Based on Final High School Grades.

		Year 1		Year 2		Year 3	
		P	NP	P	NP	P	NP
2017	>95	100%	100%	100%	100%	100%	100%
	90 to 94.9	97%	95%	97%	91%	90%	82%
	85 to 89.9	100%	89%	100%	93%	90%	79%
	80 to 84.9	100%	95%	100%	85%	89%	85%
	75 to 79.9	100%	96%	85%	85%	92%	88%
	70 to 74.9	100%	90%	80%	81%	80%	76%
2018	>95	100%	93%	100%	93%		
	90 to 94.9	100%	100%	94%	91%		
	85 to 89.9	100%	97%	94%	93%		
	80 to 84.9	100%	98%	90%	95%		
	75 to 79.9	90%	83%	85%	82%		
	70 to 74.9	100%	88%	87%	65%		
2019	>95	100%	94%				
	90 to 94.9	98%	100%				
	85 to 89.9	100%	98%				
	80 to 84.9	97%	95%				
	75 to 79.9	94%	96%				
	70 to 74.9	91%	90%				

Note. Shading is used to show the cohort with the larger retention rate.

Discussion

This study assesses the effectiveness of a short transition program for first-year students starting at a mid-sized university in Ontario, Canada. While there have been several other studies to assess the effectiveness of transition programs, many of those studies do not include a control group who did not participate in the transition program. Moreover, many studies are focused on longer programs that require more resources, coordination and are remedial in nature. In the current study, we compared students who participated in the PASS Program at University of Windsor to those who did not participate in the program (the control group). Based on the overall and major GPA, results suggest that the PASS Program leads to stronger academic performance amongst P students compared to NP students in general and across cohorts defined by their entrance high school GPA. While a stronger GPA is not observed across all semesters, there are more semesters where P students had stronger semester GPA averages (Table 3), and there are no semesters in which NP students have a significantly stronger GPA. At the end of 6 semesters, the overall and major averages for P students from the 2017 cohort was significantly greater than the NP students, except for students who had a final high school GPA between 75 and 79.9%. It is not clear why this group of NP students performed better than the respective P students, which highlights the need for tracking of additional cohorts over multiple years.

Given that the mock lecture and test-taking interventions were only completed on a single day of the PASS program, the stronger GPA for P students is interesting. Although the P and NP students come from different high schools and backgrounds, both group of students would have

attended class and taken tests and quizzes throughout high school, and thus it is unlikely that a single intervention made such a difference. Further study is required to determine if and how the mock lectures and quizzes provide students with effective strategies on how to approach their courses including tips on note taking, study habits, and test taking and determine the reason for the better performance compared to the NP students. It is reasonable to expect that the mock lecture and test taking interventions reinforced a greater pre-existing intentionality amongst the P students. While it is possible that the differences between P and NP students are associated with pre-existing intentionality, the introduction to course preparation immediately prior to the start of classes also increases students' self-confidence, familiarity with staff and sense of belonging among their peers. In this respect, the effectiveness of the mock lectures and entire intervention may be associated with the introduction to academic support and peer mentoring programs available in the Faculty of Science and across University of Windsor (Houser et al., 2015; Murphy et al., 2010; Robbins et al., 2004; Suzuki et al., 2012; Wathington et al., 2016). This is consistent with the findings of Mikami et al. (2019) who noted that positive interactions amongst students leads to greater academic and emotional adjustment to university. The community-building and sense of belonging may be the most important impact of the PASS program.

Results of the study also suggest that participation in the PASS program is associated with greater participation in high-impact and extracurricular activities. The importance of high-impact and extracurricular activities is introduced on Day 1 and incentives to participate are discussed with respect to a LEAD Medallion program that encourages student participation in Leadership, Engagement, Application and Discovery experiences. This suggests that more P students participated in one or more high-impact or extracurricular activities than NP students in direct response to being introduced to those activities and the LEAD medallion program on Day 1. Engagement not only provides a student with an expanded peer network but can also be an effective approach to improve student retention through the development of support systems that foster of a sense of identity, community and belonging (Kuh & Vesper, 1997, McInnis et al., 2000) amongst first-year students. It also introduces students to advisors, peer mentors and tutors, and increases their communication and interaction with faculty and staff (see Fletcher et al., 2001; Friedlander et al., 2007; Houser et al., 2011; McCurrie, 2009; Villalpando & Solórzano, 2005; Wilcox et al., 2005), thus strengthening the path to their future career (Flower, 2004). However, it is important to note that the students who chose to participate in PASS might be more inclined to join high impact activities, build a larger peer network, and seek out support from advisors, peer mentors, and tutors. Recognizing that, a better predictor might be the intentionality of the student and their willingness to seek out help and engage in activities such as the PASS program. Further study is required to isolate the importance of a student's pre-existing intentionality.

The connection and support provided through engagement with high-impact and extracurricular activities may help students succeed in the difficult courses of the first year and supports their mental and physical wellbeing (Krause et al., 2002; Menard et al., 2021; Moller-Wong & Eide, 1997; Hsiao, 1992; Pittman & Richmond, 2008; Rogers et al., 2000; Seymore & Hewitt, 1994; Tinto, 1993). For science students, these courses include introductory calculus, physics, chemistry, and biology courses. However, the improvement in overall and major GPA with engagement in high-impact and extracurricular activities was not observed for P students who had high-school entrance grades >95%. Engagement by NP students with entrance grades >95% resulted in a significant decrease in both major and overall averages of more than 2.5%. Maintaining such a strong GPA may not provide students with much time for anything beyond the classroom, and there is a greater potential that these (NP) students are not aware of academic and

mental health support programs introduced through the PASS program. Further study is required to understand why this cohort did not see an increase in GPA with engagement in high-impact and extracurricular activities and their relative awareness of support programs within the Faculty of Science and across the University of Windsor. While many professional schools use a strict percentage cutoff as a first pass, a decrease in GPA with engagement may not negatively impact the success of student above this threshold being accepted to professional or research-based graduate program. The decrease in GPA is not only balanced by an increase in engagement, but the greater connection to faculty can also lead to strong reference letters that highlight a student's overall transferable skills and real-world experiences. These would include time management, communication, leadership, ethical standards, and the shadowing of other professionals in the field. The development of these skills often occurs outside the classroom and through experiential learning opportunities, many of which students can also effectively communicate through applications and interviews. For students who do not engage in high-impact and extracurricular activities, reference letters and the interview responses may be no more than verification of a student's academic record.

The PASS program appears to have a positive impact on student retention. With a few exceptions, P students show greater persistence at the University of Windsor with the vast majority remaining within the Faculty of Science. It is reasonable to assume that greater retention is associated with a student's engagement in high-impact and extracurricular activities, greater sense of identity and direction and awareness of support programs (Fletcher et al., 2001; McCurrie, 2009; Friedlander et al., 2007; Villalpando & Solórzano, 2005; Wilcox et al., 2005). Specifically, the combination of support programs and increased student engagement may provide students with improved intrapersonal skills, adaptability, and stress management (Bowman & Denson, 2012; Britton & Tesser, 1991; Conley, 2008; Parker et al., 2004; Sternberg et al., 1993; Strayhorn, 2011; Venezia & Jaeger, 2013). Further study is required to understand how these influences support student retention and whether there are differences amongst students based on program and demographics, particularly for students from marginalized groups. However, results of this assessment suggest that even short transition programs for students starting university can have a significant impact on student performance, engagement, and retention. But to achieve true success, there is a need to increase student participation in the program.

Conclusion

This study assesses the impact of the Preparation for Academic Success in Science (PASS) transition program in the Faculty of Science at the University of Windsor, a mid-sized university in Ontario, Canada. Results from PASS cohorts between 2017 and 2019 suggest that students who participate in the PASS program have higher major and overall averages, and that their engagement level in extracurricular activities is significantly greater. Combined with increased awareness of support programs, the PASS program also appears to result in improved student retention. Further study is required to determine how the results were influenced by the intentionality of the student, and the importance of such transition programs to building community and a sense of belonging.

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