

At-Risk Students, Who are They and Why Do We Care?

Menard, Karen, Parkinson, Kelly, Cook, Natasha, Shah, Kieran,
and Davis, Joshua



Presentation Overview

- Introduction
- Who are at-risk students?
- Methodology: Cluster Analysis
- Results
- Conclusion and next steps



About the University of Guelph

- Founding colleges established 150 years ago
 - Ontario Agricultural College, Ontario Veterinary College, Macdonald Institute
 - Now comprises of 7 colleges
- Doctoral, research-intensive university
 - # undergraduate students = 26,572
 - # graduate students = 2,695
 - # faculty = 759



Johnston Hall, University of Guelph

Source: 16/17 Data, Institutional Analysis and Research



Retention Initiatives

- **STARTonTrack** is a program for new undergraduate students that provides resources and support from upper year students for success at University of Guelph
- **STARTOnline** is an online support service which provides information, answers questions and connects new students with others in the Guelph community
- **Bounce Back** is a one-on-one mentoring program in the Winter semester of each year for first-year students



Introduction

- Why do we care about retention?
 - Students who graduate from university earn more (National Center for Educational Statistics, 1989; Parkin & Baldwin, 2009)
 - Increases the institutions income (National Center for Educational Statistics, 1989)
 - Diversity facilitates deeper learning and growth (Bollinger, 2003; Maruyama & Moreno, 2000)
 - The upfront cost for recruitment
- Unfortunately, 20-25% of students drop out after first year and only 60% of students end up graduating (Grayson & Grayson, 2003)



Introduction cont.

- There are common variables associated with attrition/retention
- Creating the “at-risk” student profile to provide support
- Profiles should be institution specific



Who are At-Risk Students?



Defining At-Risk Students

- Two ways literature has defined at-risk:
 1. Students who leave before completing their program (Grebennikov & Skaines, 2008)
 2. Those who underperform academically (Grebennikov & Skaines, 2008)
- At-risk variables:
 - GPA
 - First-generation students
 - Minorities and marginalized groups
 - Financial Support
 - On/off campus
 - Gender and age
 - Distance from home



Admission Grade Point Average (GPA)

- First year students with a higher entering GPA have been shown to have higher retention to second year (Bilodeau & Meissner, 2016; Demetriou & Schmitz-Sciborski, 2011; McKenzie & Schweitzer, 2001; Murtaugh et al., 1999)
- Lower graduation rates among students who had lower entering high school GPAs (Shaienks, Gluszynski & Bayard, 2008)



First Semester/Year GPA

- Using first semester/year GPA as an independent and dependent variable
- Independent: Using GPA to predict success
 - Students' first semester and/or year GPA can be used to predict student retention (Deberand et al., 2004) and graduation (Menard et al., 2012)
 - Greater retention among those with a higher first year GPA, versus those with a lower first year GPA (Deberard et al., 2004; McGarth & Braunstein, 1997)
- Dependent: Using GPA as a measure of success
 - Measuring a GPA pre and post intervention (Bilodeau & Meissner, 2016)



First-Generation Students

- First-generation: Students' whose parents have not attended any post-secondary education
- First-generation students have been shown to dropout at higher rates than students who had at least one parent graduate from college or university (Cataldi et al., 2018; Martinez et al., 2009)
- Shown to be more academically unprepared, lack of financial support and more part-time studies (Cataldi et al., 2018)



Minorities & Marginalized Groups

- Higher attrition rates among students in on-campus minority groups, including religion, race, or sexual orientation (Galicki & McEwan, 1989; Peltier et al., 2000)
- Often time minority groups are also first-generation
- Important to keep a diverse campus (Maruyama & Moreno, 2000)



[This Photo](#) by Unknown Author is licensed under [CC BY-NC](#)



Support (Financial, Social, Emotional)

- Receiving financial aid allows students to focus more on their studies (Parking & Baldwin, 2009)
- Students that engage in meaningful ways with faculty, students, and staff have been shown to stay at university longer (Bilodeau & Meissner, 2016; Davidson et al., 2009; Grayson, 2003; Johnson, 2000)
- Students that feel emotional support from friends and family to finish their degree, along with support of university services (e.g., counselling) also show higher persistence and retention (Bilodeau & Meissner, 2016; Johnson, 2000; Parkin & Baldwin, 2009)



Living in Residence

- Students who live in residence in their first year have been shown to have greater success and retention than commuters

(Academia group, 2016a; Academia group, 2016b)

- At U of G, first year residence students have higher GPA, higher retention and more positive graduation outcome

(Academia group, 2016a)



[This Photo](#) by Unknown Author is licensed under [CC BY-SA-NC](#)



Gender & Age

- On average, females and younger students graduate at higher rates than males and older students (Galicki & McEwan, 1989; Menard et al., 2012)
- Factors contributing to the attrition of mature students (Bergman et al., 2014; Lambart et al., 2004):
 - Working during university
 - Having dependents
 - Living off-campus
 - Lack of social support



Other Predicting Factors

- Mental health and substance abuse contribute to persistence or attrition of students (Deberard et al., 2004; Martinez et al., 2009; Turner & Berry, 2000; Turner, 2012)
- Building a comprehensive profile of a student needs to take into account all the biopsychosocial factors





Methodology

- How our study measures at-risk:
 1. Retention of students from first to second year
 2. Student graduation rates after five years



Cluster Analysis (1/3)

- Cluster analysis allows us to divide students into different groups using just the data.
 - Students are assigned a cluster based on a host of attributes.
- It is similar to a risk score, but its main advantage is that it puts students into discrete clusters which can be interpreted.
- This is of particular use if there are many students with different attributes.

Cluster Analysis (2/3)

- The first step of the analysis is to determine the appropriate number of clusters to divide our data into, using all the data mentioned above, but excluding the at-risk measures.
 - We used the “Elbow Method”, which plots the amount of variance explained by the number of clusters.
 - The more clusters used, the more variance is explained, however, the marginal improvement decreases at some point.



Cluster Analysis (3/3)

- Once we selected the optimal number of clusters, we performed Partitioning Around Medoids (PAM) cluster analysis, which assigned each of the students in our data a cluster based on the variables mentioned above.
- We were then able to identify which clusters contained at-risk students, and which clusters did not based on our study's at risk measures.

Graphical Representation: Retention



Graduation



Cluster Category: ● Highest Graduation Rate ● Lowest Graduation Rate ● Other



Results: Who are At-Risk Students?





Retention to Second Year

Less Likely to be Retained

- Postal Code at Time of Application More Likely between 35 and 75 km (Ontario & Quebec)
- Less Likely to Live in Residence
- More Likely to be Male
- More Likely to be Part-Time in First Semester
- Receive Less Need-Based Awards
- Receive Less Merit-Based Awards
- Less OSAP Issued
- Lower First-Semester GPA
- First Semester Program: Bachelor of Arts, General
- Less likely to be registered in Co-op Stream in First Semester
- STARTOnline: Less Likely to Participate
- STARTonTrack: Less Likely to Participate

More Likely to be Retained

- Postal Code at Time of Application More Likely to be more than 150 km (Ontario & Quebec)
- More Likely to Live in Residence
- More Likely to be Female
- More Likely to be Full-Time in First Semester
- Receive More Need-Based Awards
- Receive More Merit-Based Awards
- More OSAP Issued
- Higher First-Semester GPA
- First Semester Program: Bachelor of Science, Honours
- More likely to be registered in Co-op Stream in First Semester
- STARTOnline: More Likely to Participate
- STARTonTrack: More Likely to Participate

Graduation

Less Likely to Graduate

- More Likely to be between 35 and 75 km
- Less Likely to Live in Residence
- More Likely to be Male
- More Likely to be Part-Time in First Semester
- Average of 4 Full-Time Semesters until Part-Time
- Receive Less Need-Based Awards
- Receive Less Merit-Based Awards
- Less OSAP Issued
- Lower First-Semester GPA
- First Semester Program: Bachelor of Arts, General
- Less likely to be registered in Co-op Stream in First Semester
- More Likely to Withdraw or Deregistered
- More Likely to be Required to Withdraw
- STARTOnline: Less Likely to Participate
- STARTonTrack: Less Likely to Participate

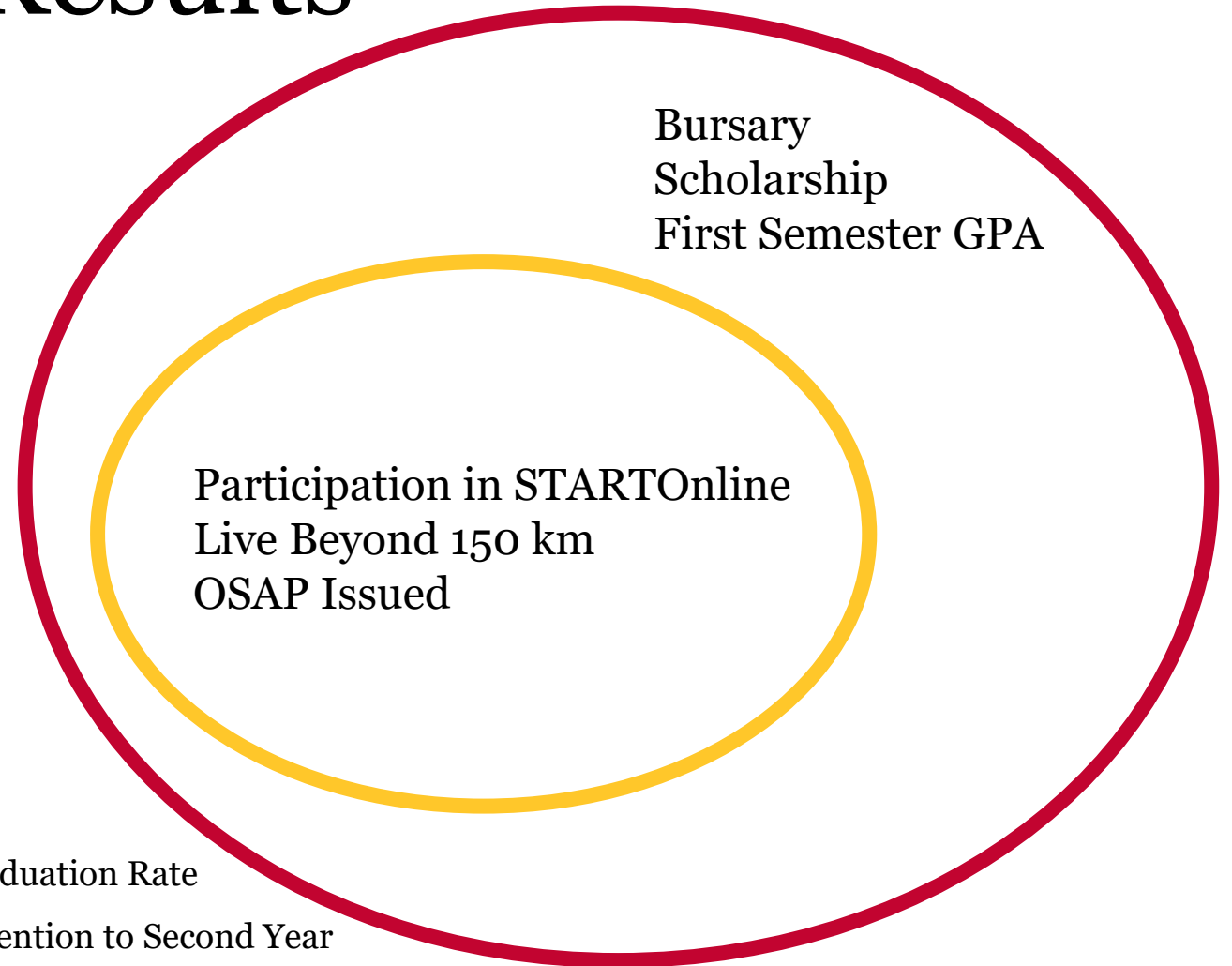
More Likely to Graduate

- More Likely to be more than 150 km
- More Likely to Live in Residence
- More Likely to be Female
- More Likely to be Full-Time in First Semester
- Average of 8 Full-Time Semesters until Part-Time
- Receive More Need-Based Awards
- Receive More Merit-Based Awards
- More OSAP Issued
- Higher First-Semester GPA
- First Semester Program: Bachelor of Science, Honours
- More likely to be registered in Co-op Stream in First Semester
- Less Likely to Withdraw or Deregistered
- Less Likely to be Required to Withdraw
- STARTOnline: More Likely to Participate
- STARTonTrack: More Likely to Participate



Results

- Variables in the 80th percentile that are unique to and shared between the two highest clusters for Retention to Second Year and Graduation Rate:



■ Highest Cluster: Graduation Rate

■ Highest Cluster: Retention to Second Year



Results: Other Interesting Findings

- While not an important predictor of academic outcomes, average entering age is a defining factor in other clusters
- For both Retention to Second Year and Graduation, found clusters where mature students (average age 22.6) were also:
 - Less likely to have registered directly from high school
 - More likely to be part-time in first semester
 - Less likely to live in residence in first year
 - More likely to receive needs-based institutional financial support



Conclusions and Next Steps

- Benefits of an at-risk profile at U of G:
 - Informs development of targeted access and retention initiatives
 - In collaboration with Student Affairs and Institutional Analysis and Research, this profile is guiding the implementation of a multi-year program evaluation for retention support programming
 - This profile is currently being used to inform a three-year funding provincial grant at U of G, the *Ontario Postsecondary Access and Inclusion Program (OPAIP)*
- Moving forward, U of G will engage in data collection efforts across all campuses and incorporate additional data points and variables in future analysis as they become available



Thanks for listening

Questions?



References

- Academia group. (2016a). The value of living learning in residence: University of Guelph. *Association of College and University Housing Officers – International*.
- Academia group. (2016b). The value of living learning in residence. *Association of College and University Housing Officers – International*.
- Bollinger, L. C. (2003). The need for diversity in higher education. *Academic Medicine*, 78(5), 431-436.
- Cataldi, E. F., Bennett, C. T., & Chen, X. (2018). First-generation students: College access, persistence, and post bachelor's outcomes. Stats in Brief. NCES 2018-421. *National Center for Education Statistics*.
- DeBerard, M. S., Spielmans, G., & Julka, D. (2004). Predictors of academic achievement and retention among college freshmen: A longitudinal study. *College Student Journal*, 38(1), 66-80.
- Galicki, S. J., & McEwan, M. K. (1989). The relationship of residence of retention of Black and White undergraduate students at a predominantly White university. *University of College Student Development*, 30(5), 389-394.
- Grayson, J. P., & Grayson, K. (2003). *Research on retention and attrition*. Canada Millennium Scholarship Foundation.
- Grebennikov, L., & Skaines, I. (2008). University of Western Sydney students at risk: Profile and opportunities for change. *Journal of Institutional Research*, 14(1), 58-70.
- Maruyama, G., & Moreno, J. F. (2000). University faculty views about the value of diversity on campus and in the classroom. *Does diversity make a difference? Three research studies on diversity in college classrooms*, 9-35.
- Menard, K., Liu, Y., Zhang, J., & Kielar, M. (2012). A longitudinal analysis of the college transfer pathway at McMaster [PowerPoint slides]. *Pathways in Higher Education Conference, Toronto, January 27, 2012*.
- Murtaugh, P. A., Burns, L. D., & Schuster, J. (1999). Predicting the retention of university students. *Research in Higher Education*, 40(3), 355-371.



Parkin, A., & Baldwin, N. (2009). Persistence in post-secondary education in Canada: The latest research. *Canada Millennium Scholarship Foundation*, 1-17.

Peltier, G. L., Laden, R., & Matranga, M. (2000). Student persistence in college: A review of research. *Journal of College Student Retention: Research, Theory & Practice*, 1(4), 357-375.

National Center for Educational Statistics (1989). *Digest of Educational Statistics* (25th ed.). Washington DC: US Department of Education.

Shaienks, D., Gluszynski, T., & Bayard, J. (2008). *Postsecondary education: Participation and dropping out: Differences across university, college and other types of postsecondary institutions*. Ottawa: Statistics Canada.