TRANSFER STUDENT SUCCESS IN ALBERTA CASE STUDY: UNIVERSITY OF ALBERTA

For the Alberta Council on Admissions and Transfer

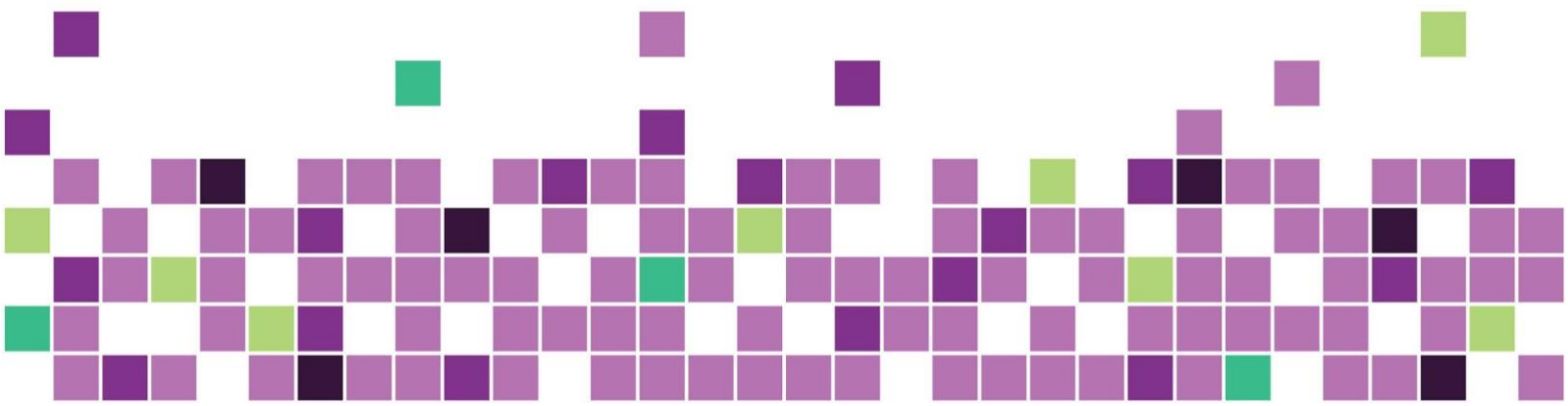**ANDREW DRINKWATER**
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Executive summary

The Alberta Council on Admissions and Transfer (ACAT) contracted Plaid Consulting to perform a comprehensive review of transfer student success metrics at the University of Alberta (UAlberta). Plaid is a data and analytics consulting agency focused on helping post-secondary institutions, councils, and governments make data-informed decisions. This report is written from the perspective of UAlberta as a receiving institution for transfer students.

The high-level goal of the project is to begin addressing a gap in Alberta's post-secondary system learner pathway and mobility data: transfer of students between post-secondary institutions. While there is current data on the mobility of students within the system, that data is limited to tracking student enrolments at and between institutions. This project aims to improve the data available by beginning to develop and analyze measures of post-secondary transfer student success. The project is focused on measuring the success of post-secondary transfer students and how transfer students perform in comparison to direct entry students.

This project looked at ways of measuring transfer student success at UAlberta. The proposed metrics for this report's analysis were developed using a mixed methods approach that consisted of
- applying recommendations for best practices for methodology and parameters for analysis identified in the literature review,
- contextualizing the analysis within information gained from the environmental scan about UAlberta, which included informal qualitative data in the form of conversations with targeted representatives from UAlberta, and
- focusing the report's core analysis and conclusions on a regression analysis of quantitative UAlberta data that were based on targeted data metrics for analysis of transfer student success in comparison to direct entry students.

Prior research

The literature review highlighted a number of key points in regards to transfer student success. In the Canadian context, studies have looked at Statistics Canada data in the form of the now inactive Youth in Transition Survey and the ongoing Postsecondary Student Information System. These data illustrated that reporting on student success from the perspective of an individual institution underreports progress from a system perspective, because a single institution does not generally know whether a student transferred and continued their studies elsewhere, or left the system altogether. In developing success metrics that are fair to both transfer and direct entry students, it has been shown, when selecting key performance indicators, that having consistent definitions and data collection across the system, measuring results (both outcomes and outputs), measuring validity and reliability of data and metrics, and understandable and transparent performance indicators are important. Existing metrics of student success are criticized for being overly focused on the traditional university learner: first-time, full-time, degree seeking students. In response, the Integrated Post-secondary Education Data System (IPEDS), from the US Department of Education, has recently created new definitions to better encompass both part-time and non-first-time attendees.

The case study conducted for this report includes both part- and full-time students who were admitted during the study period. Further filtering is done for particular metrics to ensure students had attended long enough to achieve those metrics. For example, graduation rate at 100% of program length considers

the proportion of students who graduate within the expected program length (4 years for baccalaureate degrees). In turn, at least that number of years had to have elapsed since the student was admitted.

This UAlberta case study was conducted at a time that the landscape of postsecondary education in Alberta is changing quickly: institutions that formerly were large sending institutions are now completing institutions, changing the nature and dynamics of what it means to be a transfer student. Findings from this report should be considered from the perspective of a snapshot in time when changes are occurring.

For this report, we categorize institutions according to Alberta's six sector model, which includes publicly funded institutions in Alberta (Alberta Advanced Education, 2007). The University of Alberta is categorized in this way as a Comprehensive Academic and Research Institution. The other sectors are Baccalaureate and Applied Studies Institution, Polytechnical Institutions, Comprehensive Community Institutions, Independent Academic Institutions, and Specialized Arts and Culture Institutions. Some post-secondary institutions in Alberta are outside the six sector model, such as First Nations Colleges, but do participate in Alberta's Transfer and Pathways System and may have transfer students moving to UAlberta. Further definitions of these sectors are available in key terms.

Environmental scan

The environmental scan revealed that UAlberta currently has a number of metrics associated with transfer student as compared with direct entry student success, including time to completion, entering admission average, performance of students from specific institutions, course performance based on entry GPA from another institution, and graduation rate. Our approach to the environmental scan involved speaking with both leadership from the Office of the Registrar (OR) and from the faculties as UAlberta is relatively decentralized. This approach yielded insight that both the OR and some faculties conduct data analysis related to the success of direct entry and transfer students; additionally, some faculties have utilized services in the OR and Strategic Analysis and Data Warehousing (SADW) to have custom reports built based on their needs. The existing metrics are discussed further in summary of existing metrics from the environmental scan. There may be additional metrics employed in different faculties who were unable to participate in the environmental scan.

Additionally, the environmental scan highlighted some internal challenges within the institution around how admission GPAs are recorded and the timeliness of transfer credits being granted, which impact modelling and planning.

Demographics and Previous Institution

Females represented about 54% of direct entry students, 55% of internal transfer students, and 62% of external transfer students.

Indigenous students accounted for about 7% of internal transfer students, 2% of direct entry, and 4% of external transfer students.

In terms of previous institution attended (for students with transfer credit), 32% transferred to UAlberta from a baccalaureate and applied studies institution, followed by 26% from comprehensive community institutions, and 26% from outside Alberta.

Case study

The case study performed in this report analyzed metrics both with descriptive statistics and using regression analysis. Descriptive statistics are summary level information about a particular group. The descriptive statistics included in this case study are: time to completion, graduation rate, and average credits over time. Regression analysis is used to estimate relationships among variables, with a focus on a dependent variable (for example, GPA at graduation) and multiple independent variables (for example, gender, academic program, and indigenous status). The regression analyses included in this case study are: time to completion and grade point average at graduation. For more information on the metrics used, please see key metrics.

The case study performed in this report illustrates that the lens through which we view transfer student success impacts the outcomes. This analysis included undergraduate programs at UAlberta, but limits were placed for many metrics on only first-entry type programs that can be entered directly from high school. The logic to excluding second-entry and professional programs is that they have different program lengths that did not align with the metrics studied. For most metrics, we utilized three lenses: an unadjusted model, where students were compared without adjustment to the baseline; a normalized to 30 credits version, where students were compared as of the time they had completed 30 credits at the institution, or were awarded 30 transfer credits; and, a normalized to 60 credits version, where students were compared as of the time they had completed 60 credits at the institution. By normalizing the data, we allow for a comparison from a common starting point, whereas using time of admission gives transfer students an advantage because they have already completed some work towards graduation. In addition, normalizing to 30 credits aligns with methods employed by the Strategic Analysis and Data Warehousing group at UAlberta, where transfer students and direct entry are compared based on a common starting point of 30 credits (via external transfer or at UAlberta). Normalizing the data in this way illustrates an important point: the lens through which you view transfer student success changes the outcome metric.

Time to completion

Time to completion measures the difference, in years, between a starting point and graduation. Using the recommended approach of normalizing to 30 credits (see a more detailed overview in key metrics), this study showed that internal transfer students complete their credentials the fastest of those studied, at 27 months (just over 2 years), followed by external transfer students at 35 months (nearly 3 years), and direct entry students at 47 months (nearly 4 years). Regression analysis showed these trends held even when other factors such as program, national status, gender, Aboriginal status, and year of admission are controlled for. When these factors are controlled for, each transfer credit awarded allows a transfer student to complete their credential 0.031 years sooner, which translates to finishing one term (4 months) sooner with about 10.6 transfer credits, two terms sooner (8 months) with 21.2 transfer credits. This regression illustrates that Alberta's purpose-built transfer system does help external transfer students graduate.

Graduation rate
Graduation rate analysis over 4 years, using the normalized to 30 credits model, showed about 68% of internal transfers completing their credentials within 4 years, compared to 65% of external transfers and 50% of direct entry students. Expanding this analysis out to 6 years, again using the normalized to 30 credits model, the proportion of students graduating increased for all groups: about 60% for direct entry, and 65% for external transfers, and 75% of internal transfers. This study showed minimal differences in graduation rate based on last institution sector.

Progression
The case study also looked at progression from one year to the next and classified students into four categories: registered, active but not registered (and returned later), graduated, or left. Using the 2009-10 admit cohort, the earliest provided for this study, we see that 66% of direct entry students had graduated by 2016-17, 29% had left, and 6% were still registered.

Progression from the admit year to future years was also considered. Using the recommended normalized to 30 credits model direct entry and internal transfers were about equally likely to register in years 1 and 2, but in year 3 and beyond, internal transfers were less likely to continue registering (in part due to their faster completion times) than either external transfer or direct entry. External transfer students were less likely to register in years 2, 3, and 4, but by year 5 were similar to internal transfer students in terms of their likelihood of registering. By year 7, direct entry students were only 5% likely to continue registering.

GPA at graduation
The analysis of the calculated GPA at graduation showed that external transfer students tended to have slightly lower GPAs at graduation than direct entry students. Within the external transfer population, those students with more transfer credits tended to have higher graduation GPAs than those with fewer transfer credits.

Transfer student success
The case study generally shows strong performance by direct entry, internal transfer, and external transfer students. One of the reasons this transfer student performance is possible is because Alberta has a purpose built, transparent, transfer system that does not isolate different types of institutions from one another. This system helps ensure that transfer students are able to complete credentials quickly when changing institutions, while earning credit for their prior academic work.

Lastly, we discussed the notion of "success" at the University of Alberta. As further illuminated in the literature review, institutions struggle with a single definition of success. For example, success from the perspective of one student is very different than success from the perspective of a different student. Finishing sooner may not be a good thing, from the perspective of a student. The university's existing metrics signify that UAlberta does measure some forms of transfer student success based on metrics including time to completion, admission average versus grade point average, aggregate and course level performance, and graduation rate. However, in our conversations with UAlberta, it was felt that these were not the only ways success could be defined, but merely a starting point.

This study aims to help further the conversation around transfer student success metrics in Alberta by beginning to define aspects of transfer student success based on available University of Alberta metrics. These findings may also help to inform future baseline measures for transfer student success in Alberta.

The results of this study, along with the academic literature, suggests the biggest challenges lie in correctly defining who is a transfer student, which cohort to include them in, and finding a dataset that goes back far enough to accurately analyze both part- and full-time student success. These definitional challenges make it difficult to compare direct entry and transfer student populations, groups that have different academic experiences. This study attempted to make the groups more comparable using normalization methods to ensure a common starting point. Further efforts to make the groups comparable could include delving into individual program patterns, full- and part-time status, and from even more granular starting points. The study highlights that transfer students see similar outcomes to direct entry students over similar timeframes when the basis of comparison is normalized to a similar starting point.

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Introduction

The Alberta Council on Admissions and Transfer (ACAT) contracted Plaid Consulting to perform a comprehensive review of transfer student success metrics at the University of Alberta (UAlberta). Plaid is a data and analytics consulting agency focused on helping post-secondary institutions, councils, and governments make data-informed decisions.

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This project consists of 3 main parts: an environmental scan reviewing existing metrics and perceptions of transfer student success, a literature review emphasizing recent Canadian research into student success, and a case study utilizing metrics proposed as part of this project. These elements are brought together to inform the conclusions and recommendations in this report.

This project looked at ways of measuring transfer student success at UAlberta. The proposed metrics for this report's analysis were developed using a mixed methods approach that consisted of
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The case study conducted for this report includes both part- and full-time students who were admitted during the study period. Further filtering is done for particular metrics to ensure students had attended long enough to achieve those metrics. For example, graduation rate at 100% of program length considers the proportion of students who graduate within the expected program length (4 years for baccalaureate degrees). In turn, at least that number of years had to have elapsed since the student was admitted.

A number of key terms that define different types of students and institutions are used throughout this report. Please refer to key terms for further information.

Environmental scan

Plaid conducted an environmental scan during May, June, and July of 2017 within the University of Alberta to determine which areas are responsible for monitoring and measuring the outcomes of transfer student success. Our initial search began with the Office of the Registrar (OR), who recommended that we first speak with representatives of the faculties as UAlberta has a fairly decentralized model when it comes to monitoring the success of transfer students.

We spoke to two Associate Deans representing the Alberta School of Business and the Faculty of Kinesiology, Sport, and Recreation about what metrics may exist to measure the success of transfer students at UAlberta. While each conversation evolved based on the topics that UAlberta representatives elaborated on, the core questions asked to each are listed in appendix A. It should be noted that the case study in this report studies most faculties at UAlberta (excluding professional programs), not just the two faculties we were able to speak to.

We also confirmed that each faculty determines which transfer credits are applicable to their own programs. This means that a student with a group of transfer courses could receive different credits applied towards one program or another. If the student later transfers from one faculty to another, the transfer credit would be re-evaluated for applicability to the new program.

Another faculty representative we spoke to noted that their faculty has not historically observed transfer student success too closely, but this is beginning to change alongside the process of regular unit reviews. The faculty is trying to get a better understanding of transfer students relative to direct entry and other students, by asking for additional reports to be created that look specifically at these types of students, examples of which are: time to completion, entering admission average versus UAlberta grade point average, measuring performance of students based on which institution they transferred from, and graduation rate 6 years from admission. Further metrics are listed in Summary of existing metrics from the environmental scan. While the faculty earlier did analysis internally, there has been a shift to using the resources available in the OR and Strategic Analysis and Data Warehousing (SADW) to create new types of reporting.

It was also noted that more conversations are occurring on campus around transfer student success as compared to the success of direct entry students.

Speaking with the faculties also led us back to central groups. As the conversations around transfer student success on campus are growing, a number of different units have assisted the faculties in preparing the required data and analysis to look into transfer student success.

Subsequent interviews were held with senior leaders in the OR, the International Recruitment office, as well as the SADW group. One of the gaps identified by central groups was that the admissions GPA wasn't stored in the system in a way that it can be used well for modelling and planning.

Registrarial leadership noted that it would be important to distinguish "system access" (such as Visiting Students attending on Letters of Permission, which are a method by which a UAlberta student can attend another institution to take an approved number of credits as a visiting student) and transfer (as defined by UAlberta as a basis of admission. For further definition, see key terms). Here it is important to note that

there are multiple ways to define transfer. One method of defining a transfer student is based on the whether a student received transfer credit (aligning with the provincial definition of transferability in key terms). Another method is to view transfer as a basis of admission, where transfer students are those surpassing a certain threshold of transfer credits awarded (at UAlberta, this is 24 transfer credits). The case study in this report is based on the latter concept of basis of admission as the definition for transfer. It was also noted that within the transfer student population there may be a difference between programs that are 2+2 structured transfer programs (2 years at a sending institution, followed by 2 years at UAlberta) versus pathways that were not pre-defined. The case study in this report was not able to differentiate transfer students participating in a 2+2 structured program from other transfer students. This notion dovetails with the literature review where Hossler et al (2012) mention the directionality of transfer; and McCormick (2003) identifies subsets of transfer students. It should be noted that these definitions of transfer are explicitly different from the admit type variant of transfer used in this study, which is a category of admission to UAlberta.

The Strategic Analysis and Data Warehousing (SADW) group maintains dashboards that compare high school admits to post-secondary admits. This compares the completion rate over 5 years for post-secondary or second entry students as compared to 6 years for direct entry students.

Many current reports on campus use Tableau software to measure retention, but often exclude external transfer students. This is in part because of common definitions used for student success, such as that employed by the CSRDE that consider only first-time, full-time, degree seeking students, and in part due to challenges in ensuring when transfer students are included that they are compared in a fair way to direct entry students. However, UAlberta has developed a number of metrics which do make comparisons with transfer students (such as time to completion), and can ask key questions like how many students began studying in a particular year, and how many graduated, stay in the same faculty, or leave in the following year.

SADW also produces a report on Admission GPA versus 1st year (at UAlberta) GPA by faculty and last school attended. In the future, SADW would like to augment the existing designs to leverage better visuals using Tableau for visual analysis. They would also like to explore having KPIs for each faculty.

Registrarial staff felt that data challenges prevent some evaluation of transfer student success - for example, some faculties evaluate their transfer credits at a much later time in the admission cycle than others. This can cause transfer applicants to wait a longer period of time for an admission offer than a direct entry student, particularly if the student needs to retrieve course outlines from a previous institution for courses that UAlberta has not previously evaluated. If the waiting period is significant, it has the potential to impact the student's ability to register in their preferred courses, as space in courses is limited.

Lastly, we discussed the notion of "success" with UAlberta. As further illuminated in the literature review, institutions struggle with a single definition of success. For example, success from the perspective of one student is very different than success from the perspective of a different student. The university's existing metrics signify that UAlberta does measure some forms of transfer student success, including time to completion, admission average versus grade point average, aggregate and course level performance, and graduation rate. However, in our conversations with UAlberta, it was felt that these were not the only ways success could be defined, but merely a starting point.

The focus of this report is to begin to define initial aspects of transfer student success based on available UAlberta metrics. These findings may help to inform future baseline measures for transfer student success in Alberta.

Key terms

This report uses the Government of Alberta's definitions related to transfer and student mobility, where possible, as provided in the data dictionary for the Learner Pathways System (Alberta Council on Admissions and Transfer, 2017c), and the visiting student definitions as provided by the University of Alberta (2018). Terms that are not part of the Government's definitions are also used in this report, including the admit types of direct entry, internal transfer, and external transfer, which are used in the case study and analysis related to it. These latter terms are important because they provide a more specific mechanism for defining transfer students than the general definition currently used in Alberta in the Alberta Transfer and Pathways System, which is important in order to begin comparability between transfer and direct entry students."

The key terms employed are:

- Student Mobility (Provincial definition): Refers to a learner's ability to access different learner pathways (routes) during his/her program of study(s) in post-secondary education, including movement into, within, from, or back into post-secondary education. Mobility allows students to earn credits toward a credential at more than one institution, ladder from one credential to another credential, build on foundational learning and high school upgrading to enter post-secondary studies, and/or access to many other learner pathways (Alberta Council on Admissions and Transfer, 2017c).

- Transferability (Provincial definition): Refers to a student's ability to successfully receive transfer credit for an applicable course(s) and/or program(s) when he/she moves between post-secondary institutions and/or between program areas (Alberta Council on Admissions and Transfer, 2017c).

- Admit Types (used in the case study):
  - External transfer: a student meeting or exceeding a particular threshold of transfer credits at the time of admission. At UAlberta, this threshold is 24 credits for degree programs.
  - Internal transfer: a student who has applied to, been accepted to, and registered in a different academic program at UAlberta. For example, a student transferring from Arts to the Alberta School of Business would be considered an internal transfer. This group of students will have normally completed at least 24 credits at UAlberta prior to transferring.
  - Direct entry (High school): a student not meeting the criteria for either external or internal transfer.
    - It is important to note that the direct entry will include students who have up to the threshold of credits noted in the transfer definition. For example, a degree student with 23 transfer credits would be coded as one of direct entry (student is an external high school student).

- Visiting Student (University of Alberta students visiting another institution): A student pursuing courses towards their UAlberta credential at another recognized post-secondary institution. Permission is granted by the student's faculty. Requirements from the Faculty of Arts, for

example, include "academically justifiable reasons such as planned participation in an Education Abroad or language bursary program" (University of Alberta, 2018), in addition to being in an Arts degree program, having completed 24 credits at the University of Alberta, and being in satisfactory academic standing. Permission will not be granted for a course if it is offered on an Edmonton UAlberta campus in the same term, except in the case of Education Abroad, nor will permission be granted if a student already has the maximum allowable 60 transfer credits (University of Alberta, 2018).

- ○ note: there are also visiting students from other institutions who attend UAlberta as visiting students with permission of the faculty. These students are not included in this report.

In addition to terms related to defining students, a number of terms defining institutional categories are used. For this report, we categorize institutions according to Alberta's six sector model, which includes publicly funded institutions in Alberta (Alberta Advanced Education, 2007). The University of Alberta is categorized in this way as a Comprehensive Academic and Research Institution. The six types of institutions are categorized by their academic programs, research activity, and learner focus.

Institutional Sector	Institutions	Academic Programs	Research Activity	Learner Focus
Baccalaureate and Applied Studies Institutions	MacEwan University Mount Royal University	Certificate Diploma Applied Degree Bachelor's Degree (in specified areas) University Transfer Post-Diploma Certificate Graduate Certificate	Applied research and scholarly activity to enhance their instructional mandate.	Learners interested in an education oriented to employment or academic study.
Comprehensive Academic and Research Institutions	Athabasca University University of Alberta University of Calgary University of Lethbridge	Bachelor's Degree Post-Bachelor's Certificate Post-Bachelor's Diploma Master's Degree Post-Master's Certificate Post-Master's Diploma Doctoral Degree Post-Doctoral Certificate Post-Doctoral Diploma University Certificate University Diploma	The University of Alberta, University of Calgary and University of Lethbridge conduct pure and applied research in a wide range of disciplines. Athabasca University conducts research primarily in the area of distance delivery education.	The University of Alberta, University of Calgary and University of Lethbridge are campus-based institutions serving the needs of learners interested in a comprehensive, research intensive environment. Athabasca University is an open university that provides education through distance delivery. It focuses on learners interested in open, flexible learning opportunities.

Institutional Sector	Institutions	Academic Programs	Research Activity	Learner Focus
Comprehensive Community Institutions	Bow Valley College Grande Prairie Regional College Keyano College Lakeland College Lethbridge College Medicine Hat College NorQuest College Northern Lakes College Olds College Portage College Red Deer College	These institutions provide a broad range of programs that prepare learners for employment or for further study. Academic Upgrading Applied Degree Bachelor's Degree (in collaboration with a degree-granting institution) Bachelor's Degree with Applied Focus Certificate Diploma Journeyman Certificate (using Apprenticeship and Industry Training certification standards) Post-Diploma Certificate Graduate Certificate	Applied research and scholarly activity to enhance their instructional mandate.	Learners interested in preparatory, career, and academic programming.
Independent Academic Institutions	Ambrose University Burman University Concordia University of Edmonton The King's University St. Mary's University	These institutions primarily provide liberal arts, science, and education baccalaureate degree programs. They may also offer graduate programs in niche areas. Not all programs provided by these institutions are subject to approval by the Government of Alberta. Other programs may have met the quality assurance of other regulatory bodies. Approved programs: Academic Upgrading (in specific areas) Baccalaureate Degree (in niche areas) Master's Degree (in niche areas) May also offer: Divinity Degree Post-Baccalaureate Certificate Post-Baccalaureate Diploma	Applied research and scholarly activity to enhance their instructional mandate.	Learners interested in academic programs within a faith-based educational environment.

Institutional Sector	Institutions	Academic Programs	Research Activity	Learner Focus
Polytechnical Institutions	Northern Alberta Institute of Technology Southern Alberta Institute of Technology	Academic Upgrading Applied Degree Baccalaureate Degree (in specified areas) Certificate Diploma Journeyman Certificate (Training Component) Post-Diploma Certificate Graduate Certificate	Applied research and scholarly activity to enhance their instructional mandate.	Learners interested in career and technical programming.
Specialized Arts and Culture Institutions	Alberta College of Art and Design The Banff Centre	These two unique institutions specialize in providing fine arts and cultural programming at the undergraduate, graduate or professional development level. Applied Degree Baccalaureate Degree (in niche areas) Certificate Diploma Master's Degree (in niche areas) Doctoral Degree (in niche areas) Post-Diploma Certificate	Applied research to enhance their instructional mandate. Alberta College of Art and Design also engages in scholarly activity.	Learners interested in the fine arts and creativity. In particular, Alberta College of Art and Design serves the needs of learners interested in career and academic programming. The Banff Centre serves the needs of learners with prior academic and professional experience.

Some post-secondary institutions in Alberta are outside the six sector model, such as First Nations Colleges, but do participate in Alberta's Transfer and Pathways System and may have transfer students moving to UAlberta.

Lastly, the term "sending institution" or "transfer institution" is used to refer to the institution a transfer student attended prior to transferring to the University of Alberta. "Receiving institution" or "Completion institution" is used to refer to the University of Alberta, following a student's transfer.

Summary of existing metrics from the environmental scan

The University of Alberta currently employs a number of metrics to measure the success of transfer students compared to direct entry students.

- Metric 1: Time to completion (transfer versus high school)
- Metric 2: Entering admission average versus UAlberta grade point average after one year (direct entry or following post-secondary transfer).
- Metric 3: Comparing the performance of students transferring from one institution versus those transferring from another.
- Metric 4: Comparing individual course performance based on entry GPA from another institution.

- Metric 5: Graduation rate at 6 years from admission (150% of expected program length).
  - When split by direct entry versus transfer, direct entry students are given 6 years, and transfer students are given 5 years (their first year is at a different institution).

Several of these metrics, or variants on them, are studied as part of the case study in this report. Most of the metrics in the case study contain unadjusted, normalized to 30 credits, and normalized to 60 credits models, which allows for some similarity with UAlberta's existing models, and some new ways to consider transfer student success.

Metric 1 (time to completion) is most similar to the unadjusted form of time to completion in the case study.

Metric 2 wasn't directly studied but GPA at graduation was studied in lieu. We used graduation rather than end of first year as a way to ensure that part-time students were evaluated at a consistent point in time to full-time students.

Metric 3 wasn't directly studied in this report but performance by last institution sector was included. This choice was made as the focus of the study was not on performance by individual institution.

Metric 4 was not studied in this report as we did not have course level performance information.

Metric 5 (graduation rate at 6 years from admission (or 5 for transfer students) is most similar to the normalized to 30 credits version of graduation rate in this case study, which looks at graduation rate 6 years following the time at which a student achieved 30 credits at UAlberta or via transfer.

The metrics used in the case study for this report are more fully explained in key metrics.

Literature review

Incoming transfer students account for a significant student population at many of Alberta's post-secondary institutions (PSIs) and are key to ACAT's role in providing oversight for "learner pathways and mobility throughout the advanced learning system"(Alberta Council on Admissions and Transfer, 2017a). While the number of students continuing in publicly funded institutions grew during the period of 2004-2013, the number of students demonstrating system mobility by continuing at a new institution declined over the same period (Alberta Council on Admissions and Transfer, 2017b). Facilitating more seamless transfer processes for Alberta students could influence these trends by ensuring students are able to obtain appropriate credit for prior learning and able to move between institutions and sectors as their educational plans change. In the historical context, one of the roles of college (the sending institution) was to prepare students for university transfer, often in two year programs that laddered into four year programs at the university (the receiving institution). The landscape has changed considerably since then: there are more students, a greater variety of institutions to choose from across Alberta's Six Sector Model for Advanced Education (Alberta Advanced Education, 2007), and different societal needs for credentials. Enrolment patterns are changing as students are seeking to move fluidly from one sector to other sectors, and "a new view may prove useful, one in which students are the unit of analysis and institutions are viewed as stepping stones along a diverse set of educational paths" (Hosler et al., 2012).

For this report, we categorize institutions according to Alberta's six sector model, which includes public institutions in Alberta (Alberta Advanced Education, 2007). For further definition of these sectors, see key terms.

This literature review is further divided among two major themes: Canadian transfer student success research, and research comparing direct entry and transfer student success.

Canadian transfer student success research

Research on student persistence in the Canadian context has grown in recent years. Baseline indicators from within individual academic institutions tell one aspect of the story. More recently, researchers have begun utilizing longitudinal surveys, administrative, and earnings data from Statistics Canada: the Youth In Transition Survey (YITS), and the Postsecondary Student Information System (PSIS), and tax records.

Baseline persistence within an individual institution
Prior to work involving the YITS or the PSIS, most research has focused on persistence within a single institution (Parkin & Baldwin, 2009). This research showed that around 60% of students could be expected to complete their studies (Grayson & Grayson, 2003). Highlighting this point, Martinello (2008) found that 40% of students at the bachelor's level left or changed their first program of study, aligning with Gilbert's (1991, as cited in Martinello, 2008), finding that 42% of students enrolled full-time in the fall of 1985 in several Canadian universities dropped out after 5 years had elapsed; he further estimated that 10% of the initial cohort transferred to another institution.

Youth In Transition Survey
YITS "is designed to examine the patterns of, and influences on, major transitions in young people's lives, particularly with respect to education, training and work" (Statistics Canada, 2011). The YITS was developed by Human Resources and Skills Development Canada and Statistics Canada, in consultation with provincial and territorial ministries responsible for labour and education. The survey measures major transitions in young people's lives encompassing formal educational experiences, most labour market experiences, achievement, aspirations, expectations, and employment experiences. YITS consists of two cohorts: Cohort A (herein referred to as YITS-A) were born in 1984 and were aged 15 at the start of the survey in 1999; and Cohort B (herein referred to as YITS-B) were born between 1979 and 1981, and were aged between 18 and 20 in 1999. Follow up surveys of these cohorts were conducted every two years, in 2002, 2004, and 2006, and 2008. The initial sample size for YITS-A was 38,000 while YITS-B was 29,000.

Because the YITS (for both cohorts) is both longitudinal and focuses heavily on tracking individuals' educational experiences, academic backgrounds, aspirations and expectations, it is a very strong tool for analyzing student persistence (Finnie and Qiu, 2009).

Finnie, Childs, and Qiu (2010) calculated transition rates in Ontario focusing on four broad statuses for each student in each year: Graduate, Continuer (in the same institution), Switcher (began studying at a different institution), and Leaver (left PSE without graduating, or no longer in the data file for this regional study). Because the YITS-B dataset contains information not only on whether the student graduates from their first program of study, but any program, they found a number of important differences between their results and research into persistence: nearly 80% of students either obtain a degree or continue to be

enrolled in the post-secondary system five years following entry, with 71% graduating in 5 years and 6% who are still studying. This 71% compares to 58% if only the initial program started were being measured. Further, they note that a significant number of students follow non-traditional pathways, including switching programs, taking breaks, and moving in and out of PSE; including these students shows higher persistence rates - "while 26.9 of Ontario college students leave their first PSE program by the end of the first year, over a third of these (10.1 percent of the total) switch immediately to another PSE program" (Finnie, Childs, & Qiu, 2010 p.29-30), with 23.5% returning within a year of leaving, many at the same institution in a new program.

These results are further enforced by Lambert, Zeman, Allen and Bussiere (2004) using the YITS-B dataset for the first two cycles: 15% of those who had enrolled in PSE left without completing their program. This research was followed up by Shaienks, Eisl-Culkin, and Bussiere (2006) which showed 15.7% for the third cycle.

Finally, a study by Martinello (2008) showed that 50-60% graduated from the first program they started, with an additional 10-12% completing a credential in their second program, while 12-13% were still studying in their second program. Martinello additionally showed that only 8.7% of students left post-secondary entirely, once transfers to new programs or institutions were taken into account.

The YITS also has limitations: the sample size isn't large enough to analyze certain pathways at a more granular than national level, and it lacks specific information identifying post-secondary institutions, as well as selection and response bias (Finnie & Qiu, 2009). The YITS is also now inactive, and has not been replaced.

Statistics Canada's Postsecondary Student Information System

Statistics Canada's Postsecondary Student Information System (PSIS) "collects information pertaining to the programs and courses offered at an institution, as well as information regarding the students themselves and the program(s) and course(s) in which they were registered, or from which they have graduated" (Statistics Canada, 2017) for all public post-secondary institutions in Canada. PSIS is an annual submission. There is no sample associated with PSIS - it contains the population for the institutions that participate.

Finnie and Qiu (2009) utilized the PSIS to analyze student persistence across Atlantic Canada at all academic levels: college, bachelor's, master's, doctoral, and first professional degrees, with an emphasis on college and bachelor's students due to the sample sizes and related policy concerns. The Atlantic region was chosen in part because it had near universal participation among public institutions for the reporting period between 2001 through 2004. The researchers linked individual student records both within each reporting year (where a student enrolled in multiple programs) and over time, allowing them to uniquely identify and track students pathways in PSE. Finnie and Qiu focused on four broad statuses for each student in each year: Graduate, Continuer (in the same institution), Switcher (began studying at a different institution), and Leaver (left PSE without graduating, or no longer in the data file for this regional study).

One of the key reasons for studying persistence at a regional level, rather than from the perspective of an individual institution, is that individual institutional data doesn't provide insight into how students switch institutions, which causes an overestimation of the number of leavers.

The major findings from Finnie and Qiu (2009) on basic persistence rates were:
- The first year "dropout rate" at the university level, for 17-20 year olds beginning their first program, was 20.2%, at the individual institution level.
- Some of those noted as "leavers" are in fact "switchers" changing institutions: 5.1% in absolute terms. In effect, this leads to substantial bias in the leaving rates for PSE when a single institution is analyzed. This means that "true" leavers were only 15.1% at the university level (22.6% at the college level, where switching institutions was negligible).
- Switching and leaving rates are considerably lower in the second year as compared to the first with the leaving rates declining from 15.1 % to 11.7%, and switching rates declining from 5.1 % to 4.2%.
- Expanding the list of programs to include short courses, language training, etc. increases the number of students who would be considered switchers, resulting in a corresponding drop to the leave rate to 13.8%.

When comparing college students to bachelor's students they found that leaving rates were higher for college students at 22.6% versus 15.1% for bachelor's students in the first year. The switching rates were almost negligible for college students but were substantial for bachelor's students. The PSIS data also showed that the leaving rate increases substantially with age for bachelor's students, whereas switching rates decline with age. For college students, leaving rates are slightly lower for older students and switching rates remain negligible.

Comparing leaving rates across genders the data showed that men leave at much higher rates than women at the university level (28.4% versus 21.9% by the end of year 2). Conversely, women showed slightly higher switching rates than men. The patterns by sex at the college level are almost identical by the end of year 2 (33.1% for men and 33.6% for women). The authors underscore the important implication of these findings that since men enter university at substantially lower rates than women, and are also less likely to persist in their studies, the resulting gender differences in final graduation rate will be skewed even more than the access rates commonly looked at would indicate. When leaving and switching rates are combined (the "quit rate" from the individual institutional perspective), the gender differences in persistence in PSE are clearly understated.

Finnie and Qiu (2009) also found that 25% of bachelor's leavers return to PSE over time, with about half of these returning to the same institution, and a quarter staying at the same level but changing institutions (it should be noted that "level" is not necessarily the same as Alberta PSE sectors). 11.5% of college leavers return to their studies, with most returning to the same institution. This points to the conclusion that overall leaving rates are substantially overstated when these "leaver-returners" are not taken into account. This is referred to as the "stop-out" phenomenon.

It is possible that Finnie and Qiu (2009) study underestimates continuance rates, as it was limited geographically to just records from Atlantic Canada, meaning any student who moved to an institution in another province would be considered a leaver.

The authors concluded that the PSIS data provides a useful perspective on persistence in PSE which will be of interest to those concerned with student pathways.

Post-graduation earnings

The Educational Policy Research Initiative (EPRI), conducted research on the post-graduation outcomes of PSE graduates by "constructing and analyzing a dataset linking 14 Canadian PSE institutions' administrative data with tax data [from 2005-2013] held at Statistics Canada" (Finnie, Dubois, & Miyairi, 2017, p.4). The students were grouped by whether they were direct entry from high school or transfer students. The study grouped students on the basis of direct entry (DE), or non direct entry (non-DE, i.e., transfer). These groups were further divided according to age at graduation: younger and older, with the age-at-graduation cutoff being 23 for diploma graduates, and 24 for degree graduates.

For diploma graduates, younger and older DE groups as well as the younger non-DE group showed substantial jumps in earnings following graduation, while the older DE group showed a more modest increase.

For diploma graduates, the younger DE group saw the largest jump in salary, moving from below $10,000 prior to PSE, to just under $30,000. The older DE group earnings were mostly flat at around $20,000. Of the non-DE groups, the younger group saw a large uptick from below $10,000 to around $30,000, while the older group showed a modest increase of about $4,300 compared to their pre-PSE salary. However, the older non-DE group also exhibited an earnings decline in the two years prior to PSE, unlike the other groups - when this is accounted for, the increase is about $12,000 relative to two years prior to PSE (Finnie, Dubois, & Miyairi, 2017).

For degree graduates, younger and older DE groups as well as the younger non-DE group had pre-PSE salaries of approximately $10,000 and post-PSE salaries of approximately $30,000, while the older non-DE group had a pre-PSE salary of $30,000 and a post-PSE salary of $43,000 (Finnie, Dubois, & Miyairi, 2017).

Hango (2010) also looked at earnings following study in PSE, but focusing on the comparison between 1-2 and 5-6 years post-graduation for students who took a direct route to post-secondary or an indirect route. In this study, direct entry students showed an average lift between years 1-2 and 5-6 following graduation of 10.25% whereas those who followed an indirect route to PSE showed a lift of nearly 16%.

More recently, the Government of Alberta published the Labour Market Outcomes of Graduates of Alberta Post-Secondary Institutions in February 2018. This report did not directly compare direct entry to transfer students, but did highlight that Alberta post-secondary graduates see significant increases in income following graduation, though this varied by credential and field of study. The study also noted that students who graduate in a recession year may have lower earnings, both initially and in the long run, compared to those who graduate in non-recession years. Further, field of study is just as significant as credential type in predicting earning potential, though higher level credentials usually lead to higher income (Government of Alberta, 2018a). The Government of Alberta has also made earnings data available through the ALIS career, learning, and employment portal (Government of Alberta, 2018b).

Research comparing direct entry and transfer student success

Beyond the examples identified above, there is limited Canadian research into frameworks for effectively comparing direct entry and transfer student success on key metrics.

In the Canadian context, British Columbia has a provincial level data exchange initiative, the Student Transitions Project (STP), that brings together data from the secondary and post-secondary systems and reports on outcomes (Government of British Columbia, April 4, 2018). BC's STP provides annual high level reporting and newsletters containing highlights of transfer patterns across all types of institutions as it contains data from research-intensive universities, teaching-intensive universities, colleges and institutes. Of particular relevance to this report is the ability to see transfer patterns across different institutions. We note that the STP is distinct from BC's Central Data Warehouse (CDW) which does not include BC's research universities. The Maritime Provinces Higher Education Commission (MPHEC) reports publicly on student progress and outcomes for institutions in New Brunswick, Nova Scotia, and Prince Edward Island. As a joint commission, MPHEC can report both whether a student has persisted or completed at a particular institution and whether they have persisted or completed at an alternate maritime university (Maritime Provinces Higher Education Commission, April 4, 2018). Ontario's universities use a 7-year graduation rate for a cohort of full-time, first-time, first-year students who were attending in the Fall semester (Council of Ontario Universities, 2017). Ontario's colleges use a similar metric: certificate and diploma programs are based on the percentage of students who graduated within twice the time for standard program duration, while for degree students it is based on seven years (Higher Education Quality Council of Ontario, 2017). Previously, Ontario's colleges used a reverse cohort model, where graduation rate is based on the number of "students who complete diploma/certificate programs within a minimum time frame expressed as a percentage of entering students", which the colleges found to be highly problematic as it overinflated results for some institutions and underinflated results for others (Donner and Lazar, 2000). Newfoundland and Labrador measures its graduation rate for the college by taking the number of graduates per year as a percentage of the total entrants within expected program duration (Donner and Lazar, 2000). The Pan-Canadian Consortium on Admissions and Transfer (PCCAT) commissioned a survey and report on student mobility across Canadian jurisdictions, which touched briefly on transfer student performance by noting that many institutions do not keep a historical record of historical averages of performance measures at a point in time (such as GPA at end of first year), but tend to keep better records of completion so could more readily calculate historical graduation rate (Heath, 2012).

In the past decade, there have been significant efforts to improve the reporting of transfer student success. For example, British Columbia developed KPIs that aim to show that system goals have been achieved. These principles guided the selection of the KPIs (Donner and Lazar, 2000):
- Consistent data definitions and collection across college system;
- Emphasis on measuring results (outcomes and outputs);
- Valid measures of what they are intended to measure;
- Reliability over time; and
- Clear, understandable, and transparent.

Types of transfer students

Transfer students come from a variety of different backgrounds. The literature notes that students can transfer in several directions and that there are different subsets of transfer students.

Hossler et al. (2012) note that transfer can occur in several directions:
- Lateral transfer: a student moving from one institution to an institution in the same sector, such as from NAIT to SAIT.
- Traditional, or vertical, or upward transfer: a student moving from a two-year institution to a four-year institution, such as from moving from a regional college to a university.
- Reverse transfer: a student moving from a four-year institution to a two-year institution, such as moving from a university to a regional college.

McCormick (2003) identified several subsets of transfer students:
- Trial enrollers: students experimenting with the possibility of transferring to another institution.
- Special program enrollers: students doing most of their work at their home institution who also take advantage of unique programs offered at other institutions.
- Supplemental enrollers: students enrolling at an additional institution for a term or two to supplement or accelerate their program. This often allows students to take courses not available at the home institution, reduce expenses by enrolling where costs are lower, or make up for a shortfall in credits. Note that this can also be used strategically: a student fearing a low grade could take a course elsewhere to ensure it isn't included in the GPA of their home institution.
- Concurrent enrollers: students enrolling in courses at multiple institutions simultaneously.
- Consolidated enrollers: students who take a substantial share of their coursework at multiple institutions, but still meet their home institution's residency requirements.
- Serial transfers: Students who make one or more intermediate transfers on the way to a final transfer destination.
- Independent enrollment: students pursuing work unrelated to their degree program who transfer no credits (professional certifications and licensing are examples).

With such a wide variety of transfer students and directions they can take, it can be difficult to accurately portray success of these students. Many traditional metrics of student success focus on key completion related elements including graduation rate, time to completion, and retention rate. Typically, graduation rate is viewed in the context of some percentage of "normal" program completion - the Consortium for Student Retention Data Exchange (CSRDE) and the Integrated Post-secondary Education Data System (IPEDS) both use 150% of normal time, which most often translates into reporting on a six-year graduation rate for students in undergraduate degree programs, while Ontario's universities usea seven-year graduation rate. Time to completion is nominally the time elapsed between when a student begins study at an institution and when they complete a credential. Retention rate doesn't have a universal definition, but is often reported as the percentage of first-year students retained to second year or third year. Many institutions participate in data exchange consortia to allow comparison of these metrics to peer groups, and in some cases be able to report on outcomes for students who have left the institution but continued to study elsewhere.

The two largest exchange consortia in this realm are CSRDE and IPEDS. The CSRDE includes nearly 400 institutions, of which 36 are in Canada, including the Universities of Alberta, Calgary and Lethbridge and Mount Royal University (Consortium for Student Retention Data Exchange, n.d.). CSRDE is based

on data submitted by member institutions. IPEDS has more than 7,500 members exclusively located in the United States and its territories in the Pacific Ocean and Caribbean Sea (National Center for Education Statistics, n.d.). Both the CSRDE and IPEDS report on graduation rate, time to completion, and retention rates, and are based on submissions provided by member institutions through survey instruments. Generally, the data is comparable but not identical, with CSRDE reporting being slightly faster than the equivalent IPEDS reporting (Consortium for Student Retention Data Exchange, 2016).

Criticism of both CSRDE and IPEDS reporting on student success tends to revolve around how cohorts of students are defined. Both initiatives currently base their reporting on an incoming cohort of first-time, full-time, degree seeking students. This definition excludes significant subsets of the student population, in particular part-time students and transfer students which serves neither the sending nor receiving institutions well (Horsch, 2008; McLaughlin et al., 2016, Cook, 2012). For example, in Massachusetts, nearly two-thirds of community college students do not meet the criteria to be included in the IPEDS graduation rate (Massachusetts Board of Higher Education, 2007); a more extreme example can be found at Marylhurst University in Oregon "a four-year institution that has been recognized for serving adult students, reportedly had a 23 percent, six-year completion rate – namely because a very small subset of its students (just one percent) fall in the first-time, full-time cohort used to calculate completion rates." (U.S. Department of Education, 2015). This exclusion of subsets of student population consequently under-reports student achievement as it does not properly account for "an increasingly mobile student population" (Student Achievement Measure, 2013a). A further criticism of IPEDS data is how it categorizes institutions: any institution offering four-year baccalaureate degrees is deemed a four-year institution, even if four-year programs are a very tiny part of their mission (Ma and Baum, 2016). Additionally, it is felt that the survey instruments used by IPEDS are not nimble enough to keep pace with the changes occurring in the higher education landscape (Engle, 2016). Further, even those students who originally met the criteria can end up outside the reporting boundaries: using the 150% of "normal" time as a graduation rate would be too short of a time window and ultimately exclude students who opted to study part-time later in their careers as a result of life changes, students who participated in additional non-credit training such as literacy or numeracy work, or those who repeated too many courses. Some studies have recommended including "full-time only", "part-time only", and "mixed" categories for reporting (Soldner et al., 2016).

The same challenges exist when discussing persistence metrics like retention rate due to the cohorts being defined in the same way. However, there "is still no universally accepted definition or measurement (operationalization) of retention. This makes comparisons very difficult" (Van Stolk, et al. 2007).

There is also criticism over using and publishing metrics: some suggest that institutions actively manage their cohorts to improve their graduation rate by deferring potentially less-qualified students to a non-Fall start term (which isn't currently counted by IPEDS) (Soldner et al., 2016) .

When defining metrics, it is important to keep in mind that many are used by outside organizations. For example, the College Scorecard is a public facing website that "provides students and families the critical information they need to make smart decisions about where to enroll for higher education" (U.S. Department of Education, 2013) and is part of the accountability initiatives of the US Department of Education. Ranking agencies such as Times Higher Education World University Rankings, QS World University Rankings, and Maclean's University Rankings Canada routinely consider student success-related metrics as part of their publication. Prudency in determining where new metrics could be used by external agencies reduces the chance that the metrics are used incorrectly.

Notwithstanding the above criticisms, the use of the traditional first-time, full-time, degree seeking definition allows for easy comparison of results across programs both within institutions and across the post-secondary sector. Additionally, the CSRDE members began studying the inclusion of transfer students in 2005, finding that the tremendous variation in transfer student characteristics was a challenge to be overcome. Out of this process, the CSRDE did create a data sharing protocol aimed at including transfer students who had completed at least one year of community college (McLaughlin et al., 2016).

IPEDS also includes a transfer-out rate for those institutions who have a core transfer mission, which is reported separately from graduation rate (National Center for Education Statistics, 2017). Reporting this transfer-out rate is optional for non-transfer institutions, however, and some studies found it to be underreported because institutions have limited access to data at other institutions (IPEDS Technical Review Panel, n.d.).

In response to much of this criticism from institutions and in the research literature, IPEDS expanded its also expanding its data collection for the 2016 cycle to include transfer and part-time students in its completion rates (U.S. Department of Education, 2015). Consequently, the new IPEDS cohort now consists of 4 Outcome Measure Student Groups beginning with the 2015-16 and 2016-17 cohorts: First-Time Full-Time (FTFT) - similar to what has been collected since the 1990s, First-Time Part-Time (FTPT), Non-First-Time Full-Time (NFTFT), and non-First-Time Part-Time (NFTPT). For these expanded cohorts, IPEDS now reports awards conferred at 6 and 8 years following graduation. If the student did not graduate, they have to reported as still enrolled, transferred, or unknown (Jones, 2017).

Conceptual framework: student transitions

This report focuses on comparing the success of direct entry, internal transfer, and external transfer student populations. It includes full and part time students from all faculties at UAlberta (note, however, that the case study performed in this report interviewed 2 faculties and representatives from central administration). The key metrics studied can be used for students not traditionally captured by student success metrics (for example, part-time students who were not transfer students). Additionally, many of these measures will work for programs that are not four-year degree programs; however, the challenge then becomes making meaningful comparisons for benchmarking purposes - is it reasonable to compare a two-year program to a four-year program? The answer will depend on the context in which the institution operates, and the mix of programs available.

The case study utilizes the conceptual framework developed by Finnie and Qiu (2009) called a "spell time" approach, whereby time was represented in event-years defined as the number of years elapsed since the student began studying. Finnie and Qiu focused on four broad statuses for each student in each year: Graduate, Continuer (in the same institution), Switcher (began studying at a different institution), and Leaver (left PSE without graduating, or no longer in the data file for this regional study). Because the case study data is limited to a single institution, the Switcher status will be reported as Left. The case study uses a mixed methods approach based on best practices identified in the literature review, in contextual conversations with UAlberta, and focusing the analysis and conclusions comparing direct entry with internal and external transfer students based on the key metrics used in this report.

Finnie and Qiu's original model is shown in Figure 1.

Figure 1: Finnie and Qiu's conceptual framework. Adapted from Finnie and Qiu, (2009,) p.23.
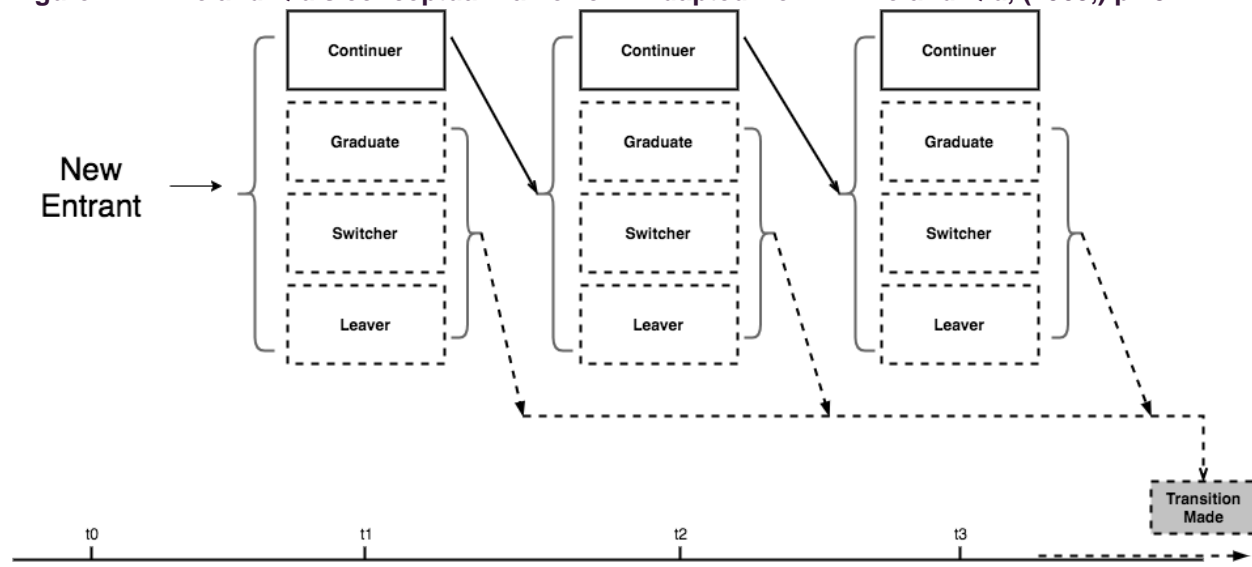
For the purposes of this research, the term "Registered" will be used in a similar way to Finnie and Qiu's "Continuer", but note there may be continuing students not registered in courses at the university that this study will otherwise consider as a leaver. Similarly, "Graduated" is used to represent students who complete their credentials. Because this is a single institution study, "Left" will encompass both "Switcher" and "Leaver". More details on definitions can be found in key terms.

Student success metrics

In order to accurately gauge student success, particularly for non-traditional students, we utilized the following principles as identified by the American Institutes for Research principles for the inclusive measurement of student outcomes (IMSO) (Soldner et al., 2016):

1. Include all entering students, without restriction;
2. Include the outcomes those students achieve at all known institutions;
3. Collect yearly measures of student outcomes, measured from the perspective of the student, and report those outcomes yearly.

IMSO holds that it is important to include all students in measures of persistence and completion because it would provide more complete information to students, educators, and policymakers. The report also notes that the concept of measuring enrolment intensity (full-time vs. part-time) is becoming timeworn: as students enroll at an increasing number of institutions for a smaller number of credits, this measurement becomes increasingly meaningless (Cook, 2016). IMSO's yearly outcome reporting suggests presenting both completion and persistence rates for every year of a six-year period, regardless of program. Further support for the first two principles can also be found in Answering the Call: Institutions and States Lead the Way Toward Better Measures of Postsecondary Performance, a research report written for the Bill and Melinda Gates Foundation (Engle, 2016).

Research demonstrates that adding an additional cohort of transfer students who have completed 30-credit hours at a transfer institution is sufficiently reliable and valid as a predictor of student success (McLaughlin et al., 2016).

Based on both the literature review and the insight gained from the environmental scan, we studied the following metrics at the University of Alberta:

- Time to completion: number of elapsed years between when the student began studying and graduation. Graduation rate at the following points in time relative to expected program completion times:
  - 100% and 150%.
    - Here we note that longer than 200% or longer would be optimal, particularly for students who are part-time, but with data starting in 2010, this is not realistic at this time.
  - Transfer student Graduation rate at 100% of expected program completion by last institution sector.
- Progression and Retention (percentage of students continuing at the institution):
  - Progression over time (registered, active but not registered, left, or graduated).
  - Retention to student term (ie: 1st term, 2nd term, 3rd term, etc)
- GPA at graduation regression analysis
- Average credits taken over time

The regression analyses makes further use of demographic and academic information provided and, where applicable, metrics will be further divided by the academic and demographic information provided for the case study: student faculty in first registration term, GPA for each registration year, full / part-time status, demographic information (national status, aboriginal status, gender).

Where these metrics diverge from the common metrics used by organizations like the CSRDE and IPEDS is that they will focus on all students, rather than just first-time, full-time, degree seeking students. This approach enables some opportunities but also some challenges. The opportunity is that institutions can gain a stronger understanding of populations not well served by the traditional student success metrics, better aligning with the principles of IMSO. The challenge is whether grouping these types of students together is perceived as fair or accurate. For example, because part-time students and full-time students behave so differently, it may be more prudent in the institutional context to separate part-time and full-time students in certain completion and project metrics.

The metrics used for the case study in this report are further defined in key metrics.

An additional challenge related to this study is that we are relying on institutional rather than regional or system data and therefore student success and persistence will be underrepresented due to the nature of students transferring to different institutions, or taking a longer break from their studies as noted by Finnie and Qiu (2009).

Case study

Methodology

This project looked at ways of measuring transfer student success at UAlberta. The proposed metrics for this report's analysis were developed using a mixed methods approach that consisted of

- applying recommendations for best practices for methodology and parameters for analysis identified in the literature review,
- contextualizing the analysis within information gained from the environmental scan about UAlberta, which included informal qualitative data in the form of conversations with targeted representatives from UAlberta, and
- focusing the report's core analysis and conclusions on a regression analysis of quantitative UAlberta data that were based on targeted data metrics for analysis of transfer student success in comparison to direct entry students.

Students in all faculties registered both full-time and part-time at UAlberta between 2009-10 and 2016-17 were included in the report's case study.

Data transformation summary

The University of Alberta provided Plaid with a dataset containing 234,669 anonymized student enrolment records by term, representing 84,999 unique students pursuing credentials at UAlberta. The case study period started in the 2009-10 reporting year, and ended in the 2016-17 reporting year. The UAlberta reporting year is an annualized record, commencing in Fall (September) and ending in Summer (August). Term records are aggregated to an annual basis, and an indicator for which terms are included is provided.

For this case study, we took the base data provided by UAlberta and transformed it into a number of database tables that could be utilized specifically for student success type analysis:

- term_tbl: a list of all terms included in this study
- student_term: this table houses enrolment records for each student in each term they were enrolled.
- student_program: this table houses records for each student at the time of admission. This table also houses bio-demographic information, where provided, including gender, indigenous status, and national status.
- student_progression_term: this table brings together information from term_table, student_term, and student_program. It ensures that reporting on student status from the time of entry until 10 years in the future is conceptually possible (though limited by length of the dataset)

Data was transformed primarily using Safe Software's FME, data analysis was primarily conducted in Tableau, and regressions were run in Jetbrains' PyCharm CE using an Anaconda-based Python 3.6

Jupyter installation and the numpy, scipy, and scikit-learn Python modules. These tables, and the transformations required to build them, are further described in the sections that follow.

Further information on the data structure and associated transformations is provided in appendix B.

The count of the number of transfer credits provided by UAlberta included transfer credits awarded to a student for prior work completed at a post-secondary institution recognized by UAlberta, calculated at the time of admission to UAlberta. It may also include transfer credit for work completed at the secondary level (such as Advanced Placement or International Baccalaureate). Dual credit completed simultaneously at the secondary level and UAlberta is included as regular work completed at UAlberta. It does not contain work completed after admission to UAlberta at another post-secondary institution such as courses taken on a Letter of Permission.

In order to enable our data analysis, we recoded the UAlberta data so that it could be used for further analysis as consistently as possible with the case studies on three other institutions (the University of Lethbridge, Mount Royal University and MacEwan University) that Plaid completed for ACAT. Generally, this consisted of the following processing of the data:
- Admit Type: The institutional definition was used.
- Demographic variables: Age was used as presented if available. Gender was converted to a short code using the first character of the institution provided Gender field. Domestic/International was renamed to National Status and represented as D (Domestic), I (International), or U (Unknown). Indigenous or Aboriginal indicators were renamed to Indigenous and assigned a flag of Y (Yes) or N (No).
- Academic Program type information was assigned to the field Program, based on the field Faculty_Program provided by UAlberta.
- Admit Term, Current Term, and Last Enrolled/Completion/Graduation Term were recoded based on the field UA Reporting Year (an annualized year) provided by UAlberta. Graduation terms were also recoded to be the end date of the students last enrolled term to best ensure a fair representation of time to completion regardless of convocation ceremony date. These calculated term end dates were used in calculating the number of years from the start of the admit term to graduation.
- A graduated flag (Y/N) was calculated based on the graduation date in the base data.
- Cumulative earned credits was calculated based on term credits passed.
- Plan type was proxied as "Degree". This is imperfect as some programs are non-Degree credentials. We were not able to identify which students were in a non-Degree type credential, as the data provided was aggregated at the faculty level, rather than at the program level.
- Annualized credits passed was used as the indicator of how many credits the student had completed and forms the basis of cumulative earned credits.
- A calculated number of registered years was created for each student for use in progression metrics.
- A status variable was created, which includes 4 possible statuses: registered, active but not registered (and returned later), graduated, and left. If the student is registered in courses, status is set to "registered". If the student is enrolled in a subsequent term but not the current term, they will show as "active but not registered". If the student has graduated and is no longer registered, they will show as "graduated" starting from their graduation term. If the student is neither registered nor graduated then they will show as "left".

Limitations

This case study is limited in several ways, and all results should be considered in the context of these limitations. Key limitations include the length of the study period, meaning that certain metrics, such as graduation rate within 200%+ of expected program completion time are not possible. Additionally, the study excludes anyone who was admitted prior to the start of the study period, as it was not possible to determine student behaviour between the admission term and the start of the study. This study also does not have full insight into institutional rules around course repeats. It is possible that GPAs provided as part of the base data could change if a student repeats a course after the end of the study period.

This dataset is aggregated to the faculty level. Our study assumes that all students in the dataset are pursuing four-year degree programs. However, a small proportion of the data includes students who are pursuing different types of credentials or degrees of different lengths. This means, for example, that students pursuing shorter programs will be included in statistics measuring their progress against a four or six year benchmark, which may impact the accuracy of some metrics.

Further, UAlberta provided an annualized dataset, which assumes the beginning of each year is September and the end of each year is August. For the small proportion (less than 4%) of students who begin their studies in Spring or Summer, this study assumes they began in Fall. Graduation dates are also coded to reflect an end of August completion, rather than UAlberta's convocation dates in June and November. The base data provided by UAlberta also excludes open studies students.

Lastly, there are rules applied to each of the metrics in the name of comparability (within the institution but not outside) and reasonability, which are further documented in each of the key metricsof the study. By way of example, graduation rate at 150% of expected program completion time require that students have attended the institution for at least 6 years for degree programs. This limits the number of admission cohorts that can be assessed in the study period to only the first one to two cohorts (2009-10 and 2010-11). In the case of students classified as transfer, these rules limiting which cohorts can be included in the key metrics make the sample size quite small relative to the full dataset, which may make the conclusions drawn here not representative of the fuller experience at UAlberta. An example of the effect of filtering on cohort sizes can be seen in Figure 18, which shows the 2009-10 external transfer admission cohort consisting of 142 students who have graduated and been at the institution at least 6 years.

For future research of this type, we would recommend a longer study period, to ensure sufficiently longitudinal metrics are possible. We would also recommend term based data rather than annualized - this would open up additional possibilities of measuring outcome metrics such as grade point averages and credits completed in a more granular way than was possible in this study, as well as showing a more accurate representation of time spent at the institution. Additionally, having a flag for the program type (professional programs (such as pharmacy) versus first admission programs (such as arts), or diplomas versus degrees, and so on) would assist in ensuring the metrics were applied correctly to the right programs. These limitations, in part, inform the future research recommendations in this project, which generally recommend datasets with a wider variety of variables (such as academic program, plan, additional demographic variables, or more detailed course enrolment information) and for a sufficient period of time.

Credit normalization

In several of the key metrics for this study, we have employed normalization to provide a fairer comparison between direct entry and transfer students. Where applicable, three versions of a metric are presented: unadjusted, normalized to 30 credits, and normalized to 60 credits. In the normalized versions, direct entry students are assessed from the time that they amass the requisite number of credits within the institution and compared with transfer students with similar number of transfer credits. The normalized versions exclude internal transfer students with external transfer credit so that they can be more accurately compared to direct entry students.

To determine the appropriate number of credits to normalize with, we used a combination of analysis of the transfer credits presented in the data (see Figure 2), and conversations with the institution to ensure that the choices made in this research aligned with their own internal methods. The spread of transfer credits presented in the data is shown in Figure 2 below. Important for the purposes of the case study performed here are 30-32.9 and 60-62.9 transfer credits awarded.

We chose to compare direct entry students from the time they amassed 30 credits (to a maximum of 36) within the institution with transfer students possessing 30-36 transfer credits. The decision to normalize to 30 credits was based on consistency with reporting standards used within UAlberta. A similar analysis was conducted for direct entry and transfer students from the time they amassed 60 credits (to a maximum of 66) versus transfer students with 60-66 transfer credits.

Figure 2: Distribution of transfer credits awarded to student entering the University of Alberta
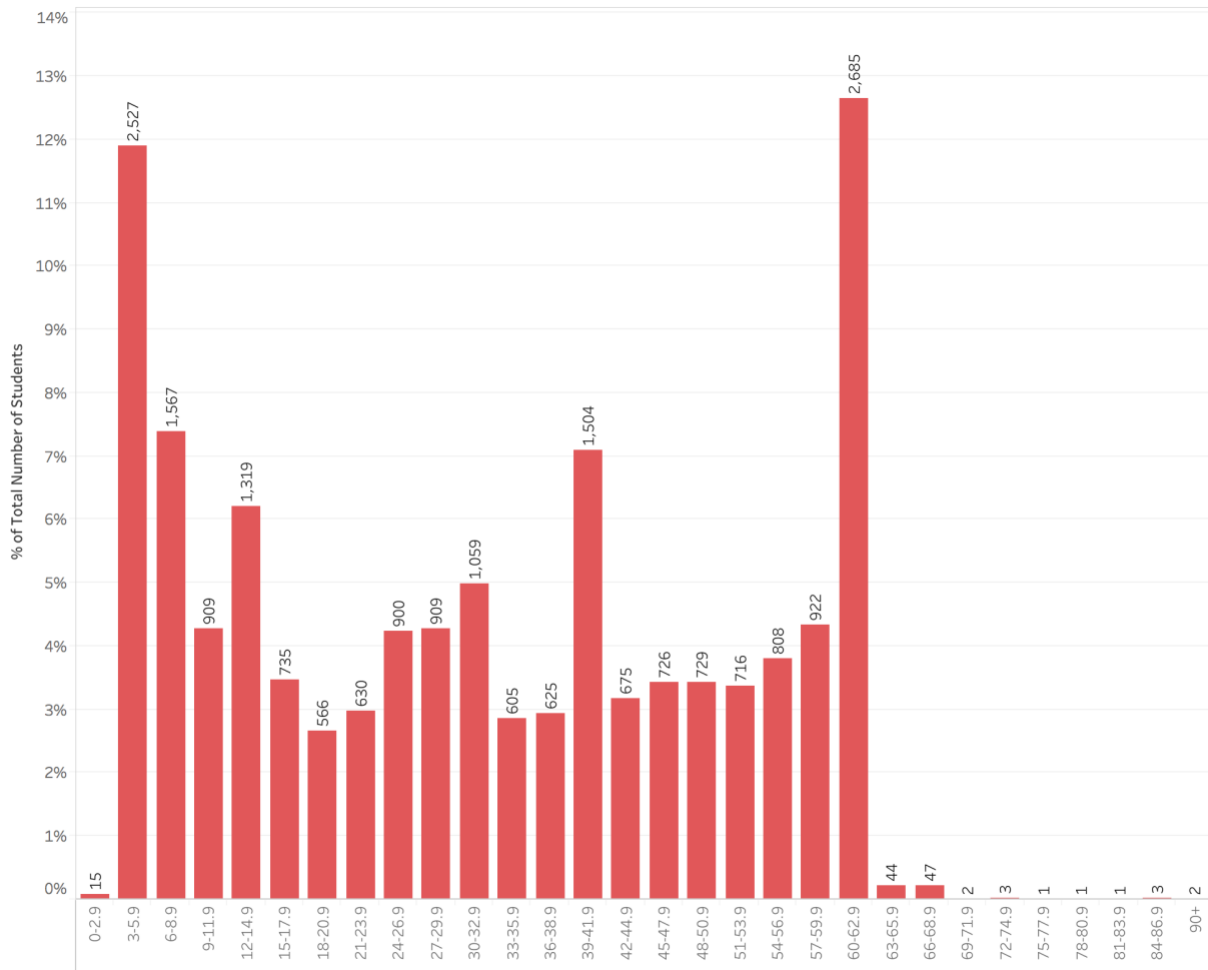
Definition of transfer student

This study utilized the admit type definitions provided by UAlberta. We recoded "External" as Transfer, and "High School" as direct entry. We also included "Internal" transfer students who completed coursework at UAlberta prior to their internal transfer. Of the internal transfer population, we excluded students who were awarded transfer credit when normalizing the baseline (see credit normalization) so that the analysis would not conflate them with external transfer students. The threshold for external transfer is 24 credits as defined by the institution's admissions website. Other admit types, including graduate admission, previous student, not applicable, and unknown were excluded from the study as they were not directly comparable to the study focus of direct entry and transfer. The table below shows number of students within each category.

Table 1: Total students records by Admit Type
* Internal Transfer students with external transfer credits were excluded from the normalized to 30 credit and normalized to 60 credit versions of this analysis.

Admit Type

Direct Entry	44,214
Internal Transfer (with no external transfer credit)	12,254
Internal Transfer (with external transfer credit)*	2,673
External Transfer	24,364
Graduate Admission	4
Not Applicable	174
Previous Student	618
Unknown	698
Total	**84,999**

In order to conduct an analysis that accurately compared transfer students and direct entry students, we excluded students who were admitted prior to the start of the study period, graduate admissions, not applicable, previous students, and unknown. Internal transfers were a special category included at the request of UAlberta. Since the data only included the student's most recent admit term, we kept only internal transfers who had zero external transfer credits when normalizing the baseline to 30 or 60 credits so that they could be treated similarly to direct entry students for the analysis. Note that internal students complete credits at UAlberta prior to internally transferring. These early filters narrowed the dataset with 67,013 unique students for further analysis.

Table 2: Students records analyzed by Admit Type
* Internal Transfer students with external transfer credits were excluded from the normalized to 30 credit and normalized to 60 credit versions of this analysis.

Admit Type	
Direct Entry (High School)	38,651
Internal Transfer (with no external transfer credit)	5,463
Internal Transfer (with external transfer credit)*	2,529
External Transfer	20,370
Total	**67,013**

Demographics and previous institution

UAlberta provided information on both Indigenous status and the gender of students.

Figure 3 shows the breakdown of students by Indigenous status. This field is based on the Aboriginal flag provided by UAlberta at the time the students were admitted to the institution. The internal transfer group sees the largest proportion of Indigenous students at 7%, followed by the external transfer group at 4.2%, and the direct entry group at 2.3%. As Indigenous status is self-declared, some students may not have declared their status to UAlberta.

PLAID

Figure 3: Indigenous status by admit type

% of Total Number of Records

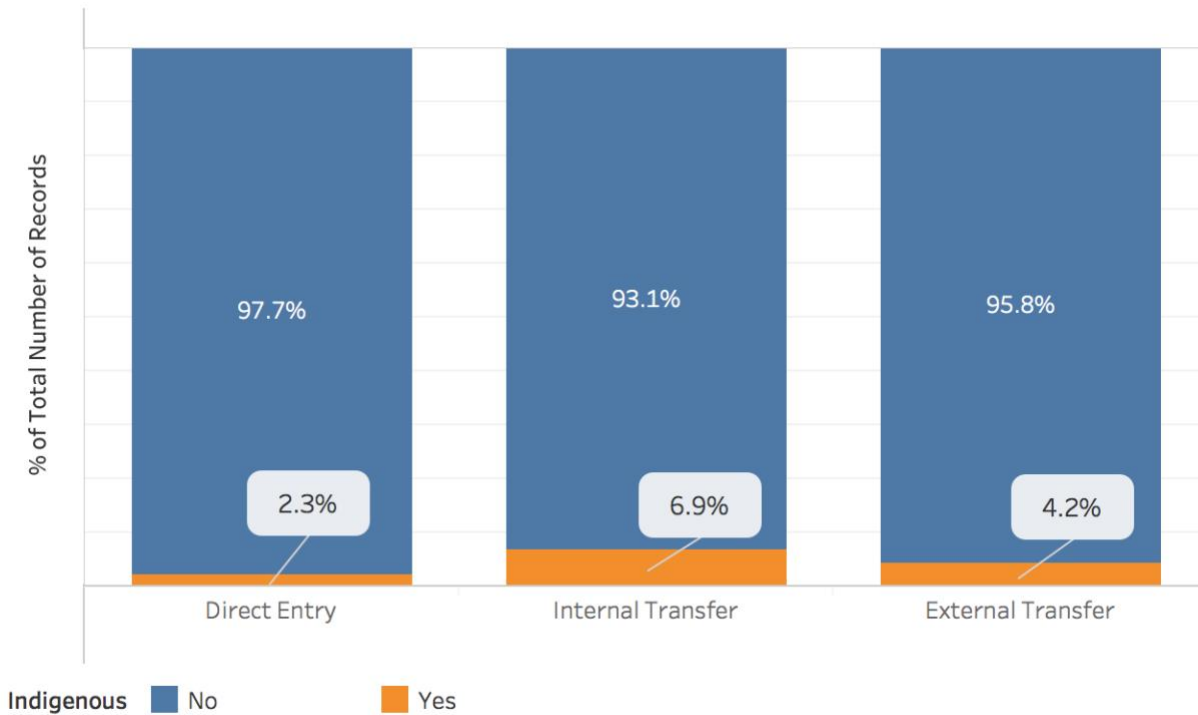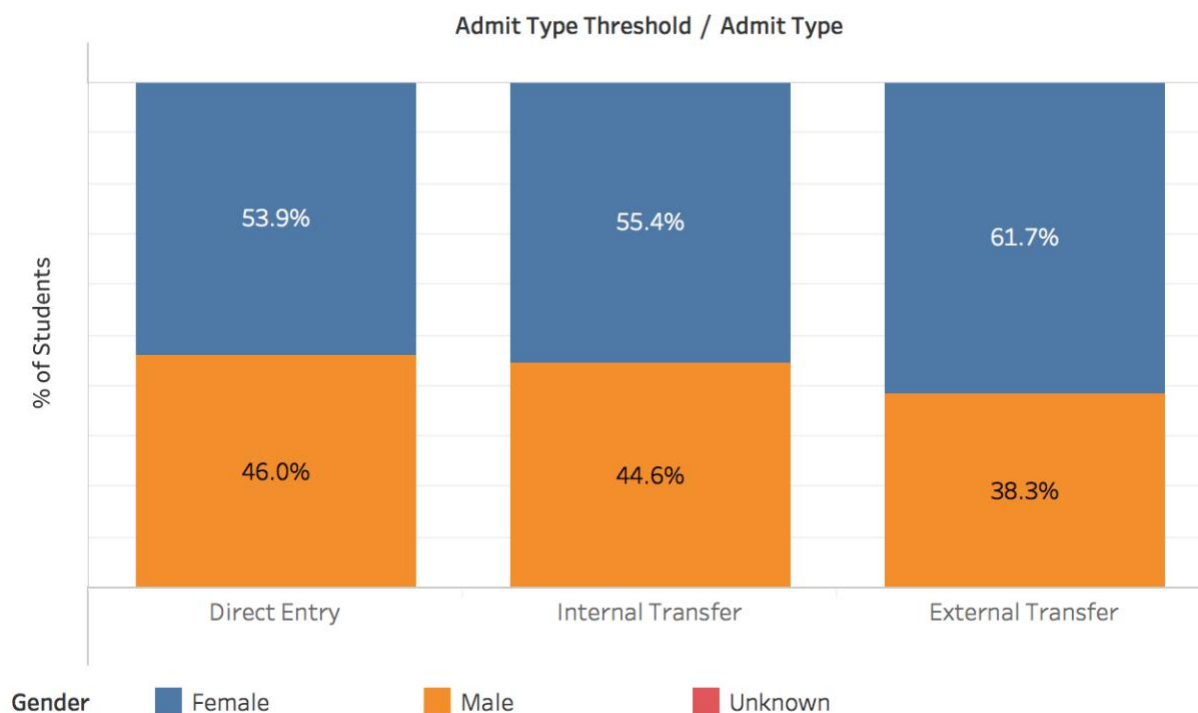| Direct Entry	Internal Transfer	External Transfer
97.7%	93.1%	95.8%
2.3%	6.9%	4.2%

Indigenous ■ No ■ Yes

Figure 4 shows the breakdown of students by gender. UAlberta records 3 separate gender identifiers (male, female, and unknown) but the number of students listed as "unknown" (N=8 across all admit types) are sufficiently small that they are not discernable in the figure. The "Unknown" gender option was added only recently to UAlberta's systems, meaning some students currently listed as male or female may have chosen a different option if it was available at the time of their application. Males make up a smaller proportion of external transfer students (38.3%) than direct entry students (46%), with the difference being 8 percentage points (pp). Internal transfers have a slightly lower proportion of males than direct entry students.

**Figure 4: Gender breakdown of University of Alberta students**

In addition to demographic information, UAlberta provided the most recent school attended by the student before their entrance to UAlberta; this information is shown in Figure 5 for external transfer students only. Institutions were classified based on where they fit within Alberta Advanced Education's Six Sector Model of publicly-funded institutions (Alberta Advanced Education, 2007), as outside the Model but within Alberta, or as external to Alberta. The largest group of transfers to UAlberta (excluding Open Studies students) came from baccalaureate and applied studies institutions (32.3% of external transfers), a group which includes MacEwan and Mount Royal Universities. The second-largest group (26.6%) comes to UAlberta from comprehensive community institutions, which includes several colleges such as Grand Prairie Regional College, Medicine Hat College, and Red Deer College. The third-largest group that comes to UAlberta is from outside Alberta (25.8%).

Comprehensive academic and research institutions make up the fourth-largest group (8.1%). This group includes the Universities of Calgary and Lethbridge (the University of Alberta is also a member of the group, but these students would be considered internal transfer generally) and Athabasca University.

Polytechnical institutions make up the fifth-largest group (2.9%) which includes the Northern and Southern Alberta Institutes of Technology. Independent academic institutions make up the sixth-largest group (2.6%). Institutions within Alberta that are outside the Six Sector Model are the seventh-largest group (1.6%), followed by specialized arts and culture institutions (0.1%).

Figure 5: Previous institution breakdown of students transferring in to UAlberta
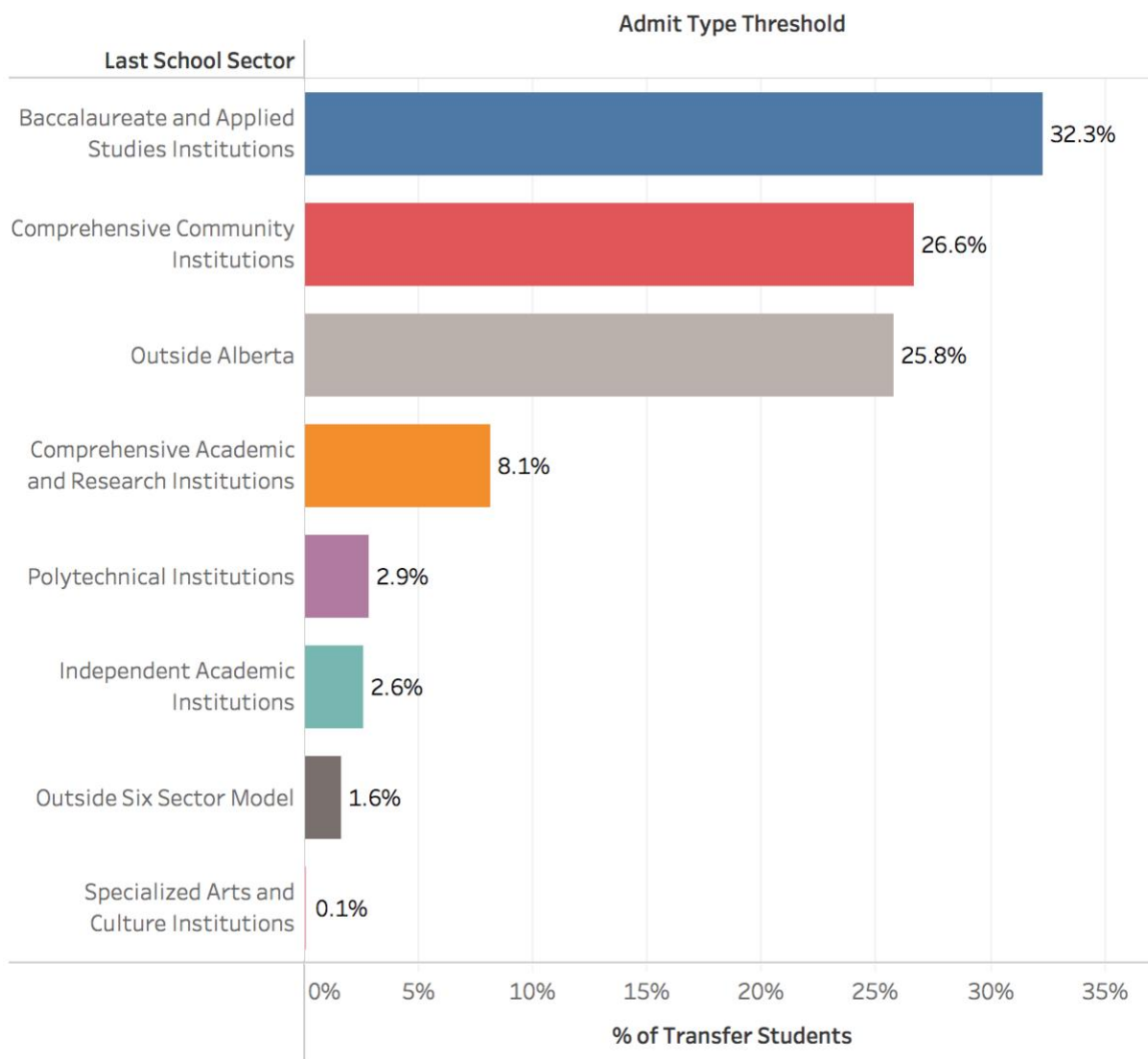
Key metrics

This section focuses on key metrics that compare the success of transfer students and direct entry students. For UAlberta, each metric is grouped according to whether a student is coded as direct entry (high school), internal (internal transfer), or external transfer (transfer from another PSI). Additionally, several metrics are framed in the context of normalizing the data. For example, on the time to completion metrics, there is an "unadjusted" version which just compares transfer and direct entry. Predictably, transfer students finish their degrees quicker (owing to their transfer credits received). There are also normalized metrics for time to completion at 30 credits and 60 credits. For the 30 credit version, direct entry students are measured from the time they hit 30 credits at UAlberta, and are compared to transfer students with between 30 and 36 transfer credits. As a rough proxy, this means comparing a direct entry

student at the start of their second year with a direct entry student who has transferred in enough credits to begin second year. The 60 credit normalization compares students from the time they achieve 60-66 credits.

For these measures, a proxy of 4 years was assumed to be the length of all programs for the purposes of this study. We acknowledge there are some programs that are not 4 years, and have attempted to filter those out based on the data presented. To best allow for this, the time to completion and graduation rate metrics have the following non-direct entry faculties excluded: Business, Education, Medicine and Dentistry, Pharmacy & Pharmaceutical Science, Nursing, and Law. The faculties noted here offer professional programs, which typically require a certain amount of pre-professional study time before being able to commence these programs. As an example, the entry-to-practice PharmD program in the Faculty of Pharmaceutical Sciences requires students to complete 60 credits of transferable work, including 8 specific courses as prerequisites, prior to commencing 300 and 400 level courses in Pharmacy.

Further caution should be exercised as these records were provided on an annualized basis. This effect would be most pronounced for students commencing their studies in a non-Fall term, and ending their studies in a non-Summer term. Out of the 84,999 students in the base dataset prior to filtering, 97.4% (N=82,784) were admitted in Fall, with 1.1% admitted in Spring (N=931), and 1.5% (1,281) admitted in Winter (3 students, or 0% were admitted in Summer). In terms of graduation dates, 42% (N=35,675) had not yet graduated, 50.4% (N=42,794) graduated in June, and 7.3% (N=6,204). graduated in November. The 7.3% who graduated in November, numbering 6,204 in total, would not be listed as graduated in the case study for this report until the following August, lengthening their time to completion due to annualization effects. 0.4% (N=326) graduated in a different month, with most of these (N=300) being in May. For example, a student commencing studies in the Winter 2010 (January) term would be a part of the 2009-10 reporting year which began in September 2009, and a student graduating in Winter 2015 (January) would be part of the 2014-15 reporting year, which ends in August. This could introduce an extra term or two of noise to the metric.

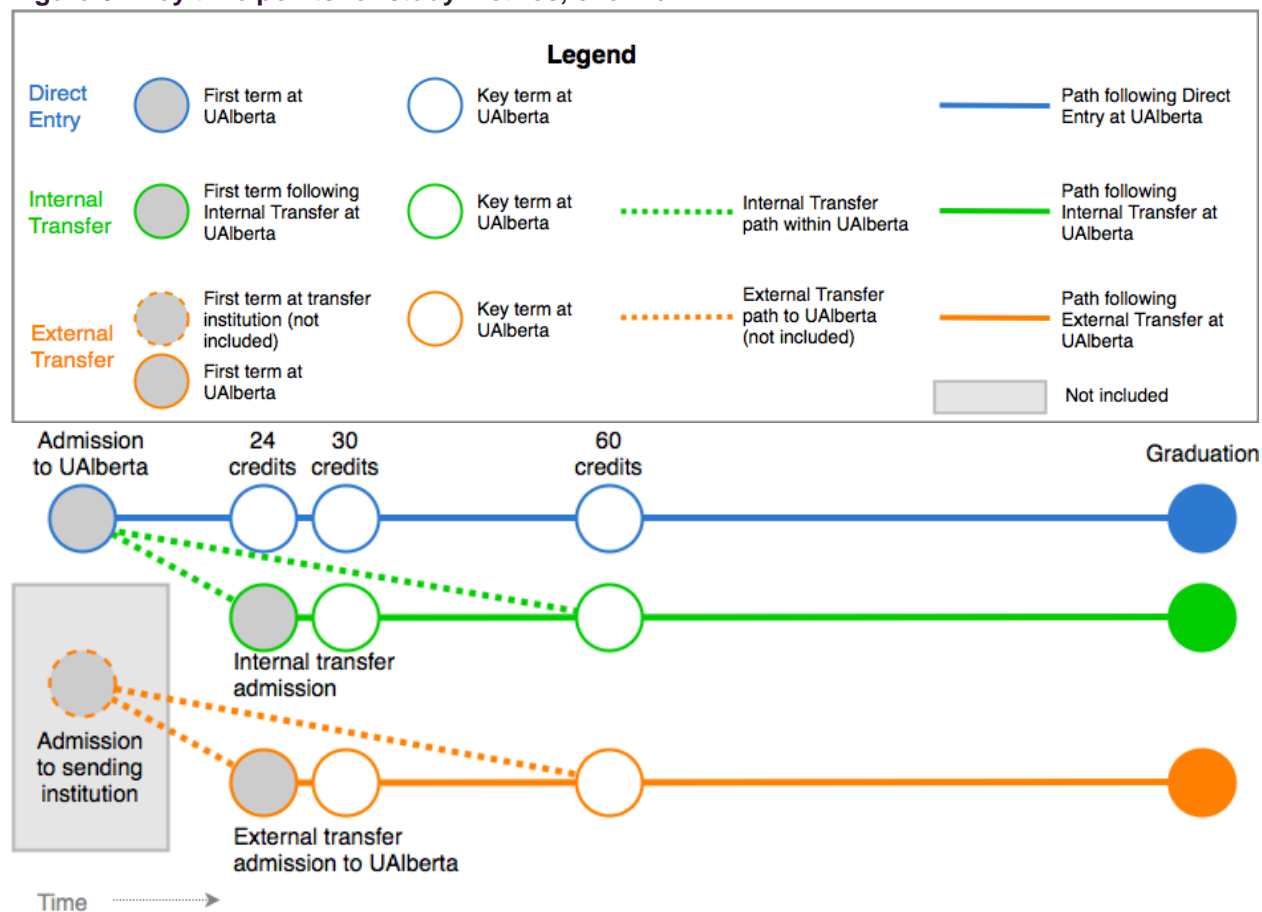This report contains 5 major metrics:

- Study metric 1: time to completion
- Study metric 2: graduation rate
- Study metric 3: progression
- Study metric 4: grade point average at graduation
- Study metric 5: average credits over time

Within these metrics, time to completion, graduation rate, and progression (study metrics 1-3) contain unadjusted, normalized to 30 credit, and normalized to 60 credit models. Time to completion (study metric 1) has both a descriptive statistics version and a regression version, and grade point average at graduation (study metric 4) contain regression analyses, while the other metrics (study metrics 2, 3, and 5) are descriptive statistics. Regression analysis allows the study to better control for the effect of different variables such as faculty, gender, or indigenous status, while descriptive statistics show a high-level summary for the group.

Figure 6 illustrates key points in the student's academic career: the time of admission to UAlberta (or when an internal transfer was made for the internal group), 24 credits (the earliest point at which internal

or external transfers are coded as these groups), 30 credits (end of first year), 60 credits (end of second year), and graduation. Note that the time of admission to the sending institution for external transfer students is shown here for illustrative purposes but is otherwise not known to this study.

Figure 6 - Key time points for study metrics, overview

Time to completion (study metric 1) calculates how long, in years, it takes students from a key start point at UAlberta to graduation. Graduation rate (study metric 2) calculates what proportion of the admit cohort achieved graduation within 4 or 6 years.

Grade point average at graduation (study metric 4) is calculated at the time of graduation also shown in these figures. For each of these metrics, graduation is a fixed point in time.

Figure 7 augments Figure 6 by adding an overlay that shows the 3 models (unadjusted, normalized to 30 credits, and normalized to 60 credits) employed for these study metrics.

The unadjusted model compares from the start of the UAlberta admission year to the end date of the graduation year, as shown in Figure 7, with the start point illustrated by the leftmost grey dashed line. All groups here are measured from their most recent admission year to graduation. Note, however, that internal and external transfer groups will have amassed at least 24 credit hours via internal or external transfer.

The normalized to 30 credits model is a method to compare these admit groups using a common baseline of 30-36 credits achieved, either within UAlberta or externally. Figure 7 illustrates this concept, with the start point shown by the middle grey dashed line. In this model, students are compared from the same starting point (30-36 credits) through graduation.

Similarly, the normalized to 60 credits model is a method to compare these admit groups using a common baseline of 60-66 credits achieved, either within UAlberta or externally. Figure 7 illustrates this concept, with the start point shown by the rightmost grey dashed line. In this model, students are compared from the same starting point (60-66 credits) through graduation.

Study metric 4, average GPA at graduation is calculated at the point of graduation for each of the direct entry, internal transfer, and external transfer.

**Figure 7 - Key time points for study metrics, by model**
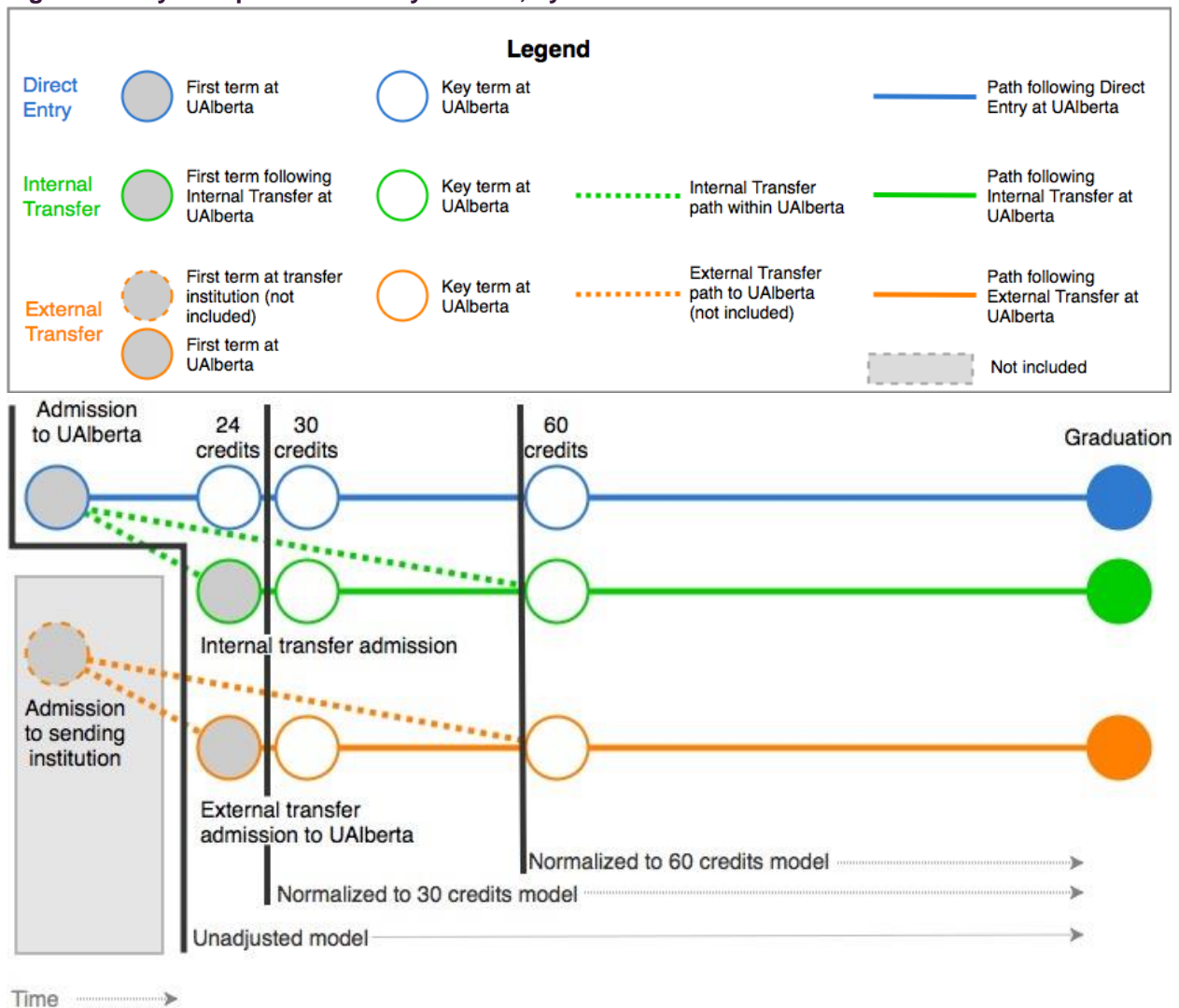
Study metric 3 (progression) has two forms. The first form is a progression status in each year, as shown in Figure 8. This metric begins with a particular admission cohort who were registered in the previous year, and shows the proportion of that cohort in one of four statuses: left, registered, active but not registered (and returned later), and graduated. Further definitions on the terms used in this report can be found in key terms.

Figure 8 - Annual progression
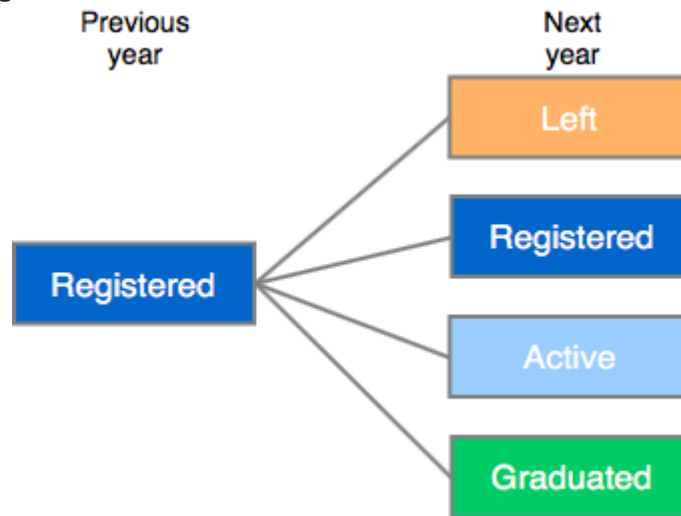
The second progression metric is progression to a particular registration year (see Figure 9) . This metric considers the proportion of an admit cohort who continued to register after a specific number of years. The start point (start / y0) is dynamic in much the same way as the previous metrics: there is an unadjusted model, where the start point is the admission term; a normalized to 30 credits model, where the start point is the completion of 30-36 credits; and, a normalized to 60 credits model, where the start point is the completion of 60-66 credits. In the figure below, y0 represents the start point of the model, while y1 means the student has completed 1 year, y2 means completed 2 years, and yN means completed N years.

Figure 9 - Progression to registration year
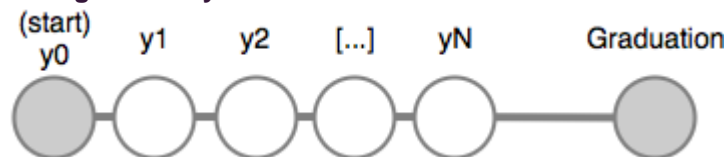
Study metric 5, average number of credits over time, shows the average number of credits pursued in particular years for each admit type group (see Figure 10). In this representation of the metric, y0 represents the starting point, with y1 representing the number of credits in year 1, y2 representing the number of credits in year 2, and yN representing the number of credits in year N.

Figure 10 - Average number of credits
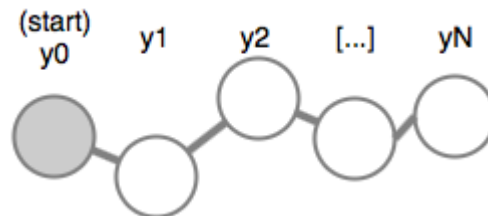
Each metric is now explored in more detail.

Study metric 1: Time to completion

The following section focuses on time to credential completion defined as the number of elapsed years between when the student began studying and graduation.

Time to completion descriptive statistics

This measure of time to completion was limited to students who:
1. graduated
2. were admitted at least 5 years prior to the end of the study period
3. were admitted after the start of the study period.
4. were in a faculty offering direct entry to four year programs (excludes Business, Education, Medicine and Dentistry, Pharmacy and Pharmaceutical Science, Nursing, and Law)

Figure 11, using the unadjusted model, shows that external transfer students, graduate a little more than one year faster than direct entry students, while internal transfer students graduate about 4 months sooner than external transfers.

Figure 12, where direct entry students and internal transfer are normalized as of the point that they first complete 30 credits shows a similar effect: external transfer students complete their credentials about one year faster than direct entry students, and internal transfers finish about 8 months faster than transfer students. Note that the normalized models exclude internal transfer students who were awarded external transfer credits.

Figure 13, where direct entry and internal transfer students are normalized as of the point that they first complete 60 credits, shows a levelling effect between internal transfer and direct entry students, where both finish their credentials in under 3 years, with external transfers taking about 2 years from 60 credits to complete their credentials. Internal transfers appear to take slightly longer in the normalized to 60 credits model relative to the unadjusted or normalized to 30 credits models, suggesting that there is some possibility that changing programs later in one's academic career has a stronger chance that not all courses will count towards the requirements of the new program. Conversely, for direct entry and transfer students the time to completion in the 60 credit model is lower than it is in the 30 credit and unadjusted models. This may indicate that direct entry and transfer students are pursuing required courses in order to complete their credentials, whereas internal transfers are changing programs. Note that the normalized models exclude internal transfer students who were awarded external transfer credits.

It is possible that the lower N values seen for the normalized to 30 credit model (Figure 3) is impacted by the number of transfer students who had 39 credits (see Figure 1) and were consequently excluded from the normalization to 30 credits (which used a maximum of 36).

Table 3 summarizes the results of the 3 models.

Figure 11: Time to completion descriptive statistics (unadjusted)
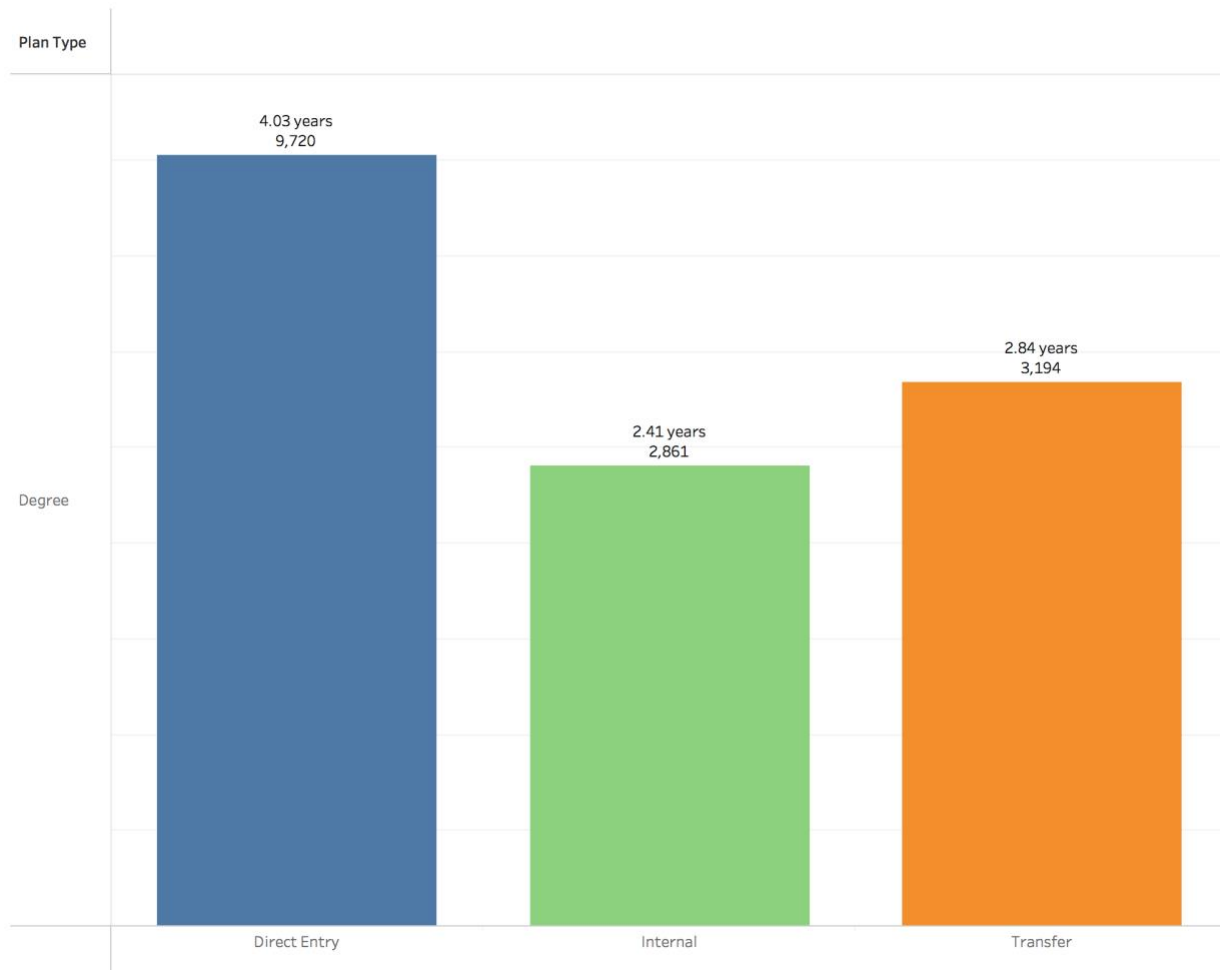
Figure 12: Time to completion descriptive statistics (normalized to 30 credits)
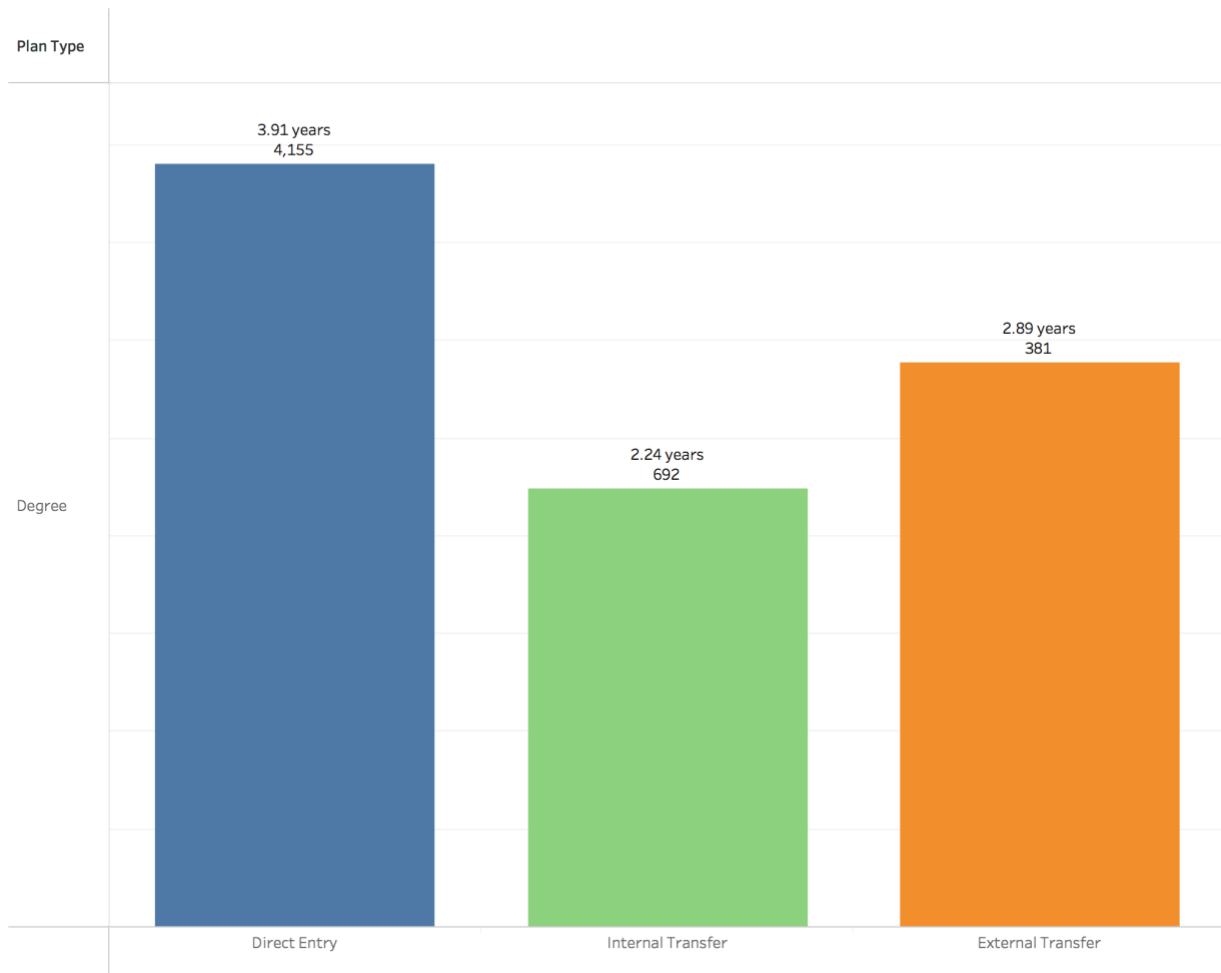
Figure 13: Time to completion descriptive statistics (normalized to 60 credits)

Table 3: Time to completion descriptive statistics (all models)

Model	Avg. Time to Completion			Number of Students		
	Direct Entry	Internal Transfer	External Transfer	Direct Entry	Internal Transfer	External Transfer
Unadjusted	4.03	2.41	2.84	9,720	2,861	3,194
Normalized to 30 credits	3.91	2.24	2.89	4,155	692	381
Normalized to 60 credits	2.75	2.69	1.98	3,583	825	396

Time to completion regression

To see how transfer status and transfer credits would affect a student's time to completion, we performed an ordinary least squares (OLS) linear regression on the information provided by UAlberta. The variables we included in the model were:

- International (from the national_status field, 0=D or domestic, 1=I or international)
- Female (from the gender field, 0=M or male, 1=F or female)
- Indigenous (from the indigenous field, 0=N or non-indigenous and 1=Y or indigenous)
- Student program (from the program field, re-coded as dummy variables with 0 indicating the student was not in that particular program and 1 indicating they were)
- Admit academic year (based on the student's first enrolled term at UAlberta, re-coded as dummy variables with 0 indicating the student did not begin in that year and 1 indicating that they did; 2010-11 was used as the reference category)

We included in the model all students who began at UAlberta in Fall 2009 or later and who had graduated by Summer 2017, the last term finalized before the data was produced. We excluded students of unknown gender (2) as the numbers were sufficiently small that their inclusion in the model could have produced strange results.

Students in programs in Business, Education, Medicine & Dentistry, Pharmacy & Pharmaceutical Science, Nursing, and Law were excluded as these programs do not accept students via direct entry from high school. We limited our data to those students who entered either directly from high school or via transfer from an external postsecondary institution, as those were the primary categories we sought to compare; this excluded internal transfers, those re-admitted to UAlberta after having previously completed some studies, and those marked "unknown." We also included only students who began their studies at UAlberta at least 5 years prior to the end of the study period.

Our model dataset included 12,914 students, of which 3,194 were transfer students and 9,720 had directly entered from high school. Programs varied from 3,838 graduates (Arts) to 39 (Native Studies), and total admission in an academic year varied from 4,388 graduates (2010-11) to 4,195 (2011-12). The average time to graduation across all 12,914 students was 3.73 years.

Generating the OLS model with the variables listed above (international, female, indigenous, program, and admit academic year) provides an R^2 of 0.049, meaning that 4.9% of the variance in time to graduation can be explained by those factors alone. Students who were international (-0.252) or female (-0.079) tend to graduate slightly faster, while the indigenous indicator was not statistically significant. While not a statistically significant finding, contextually among programs, Kinesiology, Sport, and Recreation and Agricultural, Life, & Environmental Sciences students tended to graduate soonest, while Science students took the longest to graduate.

In order to interpret the results from the OLS model, there are several different results we need to look at. The first is the model's R^2, which provides information on how much of the variation in time to completion can be attributed to the inputs; a value of 0 means that our regression is no better than using a base case of assuming everyone will graduate at the average time to completion, while a value of 1 means that our regression perfectly predicts the time to completion. The R^2 can be read as the percentage of the differences in time to completion that is predicted by the model, such as a model with R^2 of .279 is said to predict 27.9% of the variation. The second element to look at is the coefficient for each input to the regression, which indicates how that input affects the result of the regression. In this case, using time to

completion, if an input had a coefficient of 0.5 then the generated model suggests that for each increase of 1 in that coefficient the time to completion would be 0.5 years longer. (Some coefficients, like the transfer flag, are either 0 or 1, while others, like the number of transfer credits, could be many different values.) The final element is the input's p-value, which provides a measure of the statistical significance of the input. Similar to R^2, p is measured between 0 and 1; in p's case, however, we want lower values and below $p = 0.05$ an input can be called statistically significant. In our model analysis here, we will concentrate on the R^2 for the overall model as well as the coefficient and p values just for the transfer flags.

When we included the transfer indicator into the regression, our R^2 became 0.220, and the transfer flag ($p < 0.001$) had a coefficient of -1.148, suggesting students who are transfer students will graduate over a year (nearly 14 months) sooner than an otherwise similar student who was not a transfer. Based on this result, we further created a model that looked solely at the transfer flag. This model had an R^2 of 0.195, indicating that transfer status alone accounted for 19.5% of the variability in student time-to-graduation in the group we studied.

Looking at transfer credits provides similar results. When adding the student's number of transfer credits to the base model we end up with an R^2 of 0.255, with each transfer credit ($p < 0.001$) brought to UAlberta indicating the student graduated about 0.031 years earlier than a similar student without the transfer credit. This translates to 10.6 credits of transfer credit to graduate 4 months or 1 term earlier, and 21.2 transfer credits to graduate 8 months or 2 terms/1 academic year earlier. We further created a model that looked solely at transfer credits, which provided a similar coefficient for transfer credits (-0.032, $p < 0.001$) and an R^2 of 0.224.

Finally, we created a model that combined both the transfer flag and a variable for the number of transfer credits a student brought to UAlberta beyond the threshold of 30. In this case, our model had a R^2 of 0.266, a 1.1 percentage point improvement over including transfer credits only. In this model the transfer flag had a coefficient of -0.610 ($p < 0.001$) and the transfer credits over threshold had a coefficient of -0.038 ($p < 0.001$). If we look solely at the transfer flag and transfer credits without the international, female, indigenous, program, or admit term indicators, however, we end up with an R^2 of 0.239 and coefficients of -0.668 for the transfer flag ($p < 0.001$) and -0.037 for transfer credits over threshold.

Based on these results, information about a student's transfer status appears to give substantially more information about their expected time to graduation than any other indicator available within the data that UAlberta provided.

In keeping with our descriptive statistics analysis above, we also looked at how long it took students to graduate from the point at which they had obtained 30 and 60 credits. We also created an additional indicator for the number of credits above the 30 or 60 credit threshold the student came into the term with, allowing us to account for the fact some students will have, for example, 33 credits and some 30 and compare appropriately.

The graduation-from-30-credits model had 4,155 direct entry students, 692 internal transfer students without external transfer credit, and 1,334 transfer students. Students were included if either they were a transfer student who entered UAlberta with between 30 and 36 credits, or if they were a direct entry or internal transfer student who entered a term at UAlberta with between 30 and 36 credits. The model has an R^2 of 0.289, and the transfer flag has a coefficient of -1.057***, meaning a transfer student will take

approximately 12.7 fewer months to graduate after having achieved 30 credits than an otherwise similar direct entry student would.

The graduation-from-60-credits model looked at 3,583 direct entry students, 549 internal transfer students without external transfer credit, and 1,419 transfer students. Students were included if either they were a transfer student who entered UAlberta with between 60 and 66 credits, or if they were a direct entry or internal transfer student who entered a term at UAlberta with between 60 and 66 credits. The model has an R^2 of 0.189, and the transfer flag has a coefficient of -0.607***, meaning a transfer student will take approximately 7.3 fewer months to graduate after having achieved 60 credits than an otherwise similar direct entry student would.

These results suggest that the differences seen above in Figures 12 and 13 between transfer students and direct entry students in time to graduation from similar starting points of 30 credits or 60 credits persist even when various other factors - such as program, national status, gender, Aboriginal status, and year of admission - are controlled for.

Study metric 2: Graduation rate

Graduation rates measure the proportion of students who have graduated within a specific time period relative to when they were admitted. For this study, we have used 4 years (100% of expected program length) and 6 years (150% of expected program length). A more detailed definition can be found in key metrics.

The following graduation rate indicates the percentage of students from an entering admit year cohort (regardless of which term within the year they were admitted) who completed their program in 100% (4 years), and 150% (6 years) of expected program completion time. We note that 200% and longer would be optimal, particularly for part-time students, but the data range for this study is too short to allow for that. Similar to the time to completion metrics, these rates exclude the faculties of Business, Education, Medicine and Dentistry, Pharmacy & Pharmaceutical Science, Nursing, and Law.

The analysis was further limited to only those entering cohorts who had been at the institution for at minimum the length of the program multiplied by the percentage metric. For example, for the graduation rate at 150% of expected program length, only entering cohorts who had been at the institution for 6 years were included (4 years x 150%).

Students studying part-time were included in the analysis. The risk, however, of this inclusion is that part-time students will likely take longer than even 200% of expected program length, so graduation rate will be underestimated until such time as a significant longitudinal dataset (10 entering cohorts or more who have had 10 years or more to complete) is available. In the context of this data, that would mean data stretching back to include the cohorts from between 1997 and 2007, allowing for 10 years to graduate by 2017.

Graduation rate at 100% of expected program length

Table 4 summarizes the size of the entering cohort by admit academic year, after applying filters identified previously.

Table 4: Size of entering cohorts by Admit Type for graduation at 100% of program length (4 years)

Program Length (Years)	2009 - 10 Direct Entry	2009 - 10 Internal	2009 - 10 Transfer	2010 - 11 Direct Entry	2010 - 11 Internal	2010 - 11 Transfer	2011 - 12 Direct Entry	2011 - 12 Internal	2011 - 12 Transfer
4	4,620	2,731	1,441	4,814	549	1,418	4,771	296	1,426

The charts below show the proportion of entering students who completed their program within the expected program length from different measurement points.

Figure 14 illustrates a large divergence, with a significantly higher percentage of external transfer students finishing their degrees in the normal length of time (4 years). Internal transfer students fell largely in between the other two groups on this metric.

Figure 15, where direct entry and internal transfer students are normalized to a baseline of the first academic year after they have completed 30-36 credits at UAlberta, shows a different effect: internal transfers become most likely to graduate within 4 years, while direct entry and transfer students are comparable, depending on the year. Note that the normalized models exclude internal transfer students who were awarded external transfer credits.

Figure 16, where direct entry and internal transfer students are normalized to 60 credits, shows only marginal difference between the three groups. Note that the normalized models exclude internal transfer students who were awarded external transfer credits.

Figure 14: Graduation rate at 100% of program length (unadjusted)

Figure 15: Graduation rate at 100% of program length (normalized to 30 credits)

Plan Type

Admit Type
- Direct Entry (blue)
- Internal Transfer (green)
- External Transfer (orange)

Degree

% of Total

	2009 - 10	2010 - 11	2011 - 12
Internal Transfer	80% / 537	67% / 64	70% / 28
External Transfer	71% / 132	56% / 91	66% / 123
Direct Entry	59% / 1,078	58% / 1,059	60% / 1,016

Figure 16: Graduation rate at 100% of program length (normalized to 60 credits)

Graduation rate at 150% of expected program length

Table 5 summarizes the size of the entering cohort by admit academic year, after applying filters identified previously.

Table 5: Size of entering cohorts by admit type for graduation at 150%

Program Length (Years)	2009 - 10 Direct Entry	2009 - 10 Internal	2009 - 10 Transfer	2010 - 11 Direct Entry	2010 - 11 Internal	2010 - 11 Transfer
4	4,620	2,731	1,441	4,814	549	1,418

The charts below show the proportion of entering students who completed their program within 150% of the expected program length.

In Figure 17, the unadjusted model shows degree-seeking transfer students are marginally more likely than direct entry students to graduate within 6 years.

Figure 18, the normalized to 30 credit model, shows a much narrower gap in terms of graduation rate. In this case, transfer students and direct entry students are relatively equally likely to complete their credentials within 150% of normal time.

Figure 19, the normalized to 60 credit model, shows that all groups are equally likely to complete their credentials within 150% of normal time.

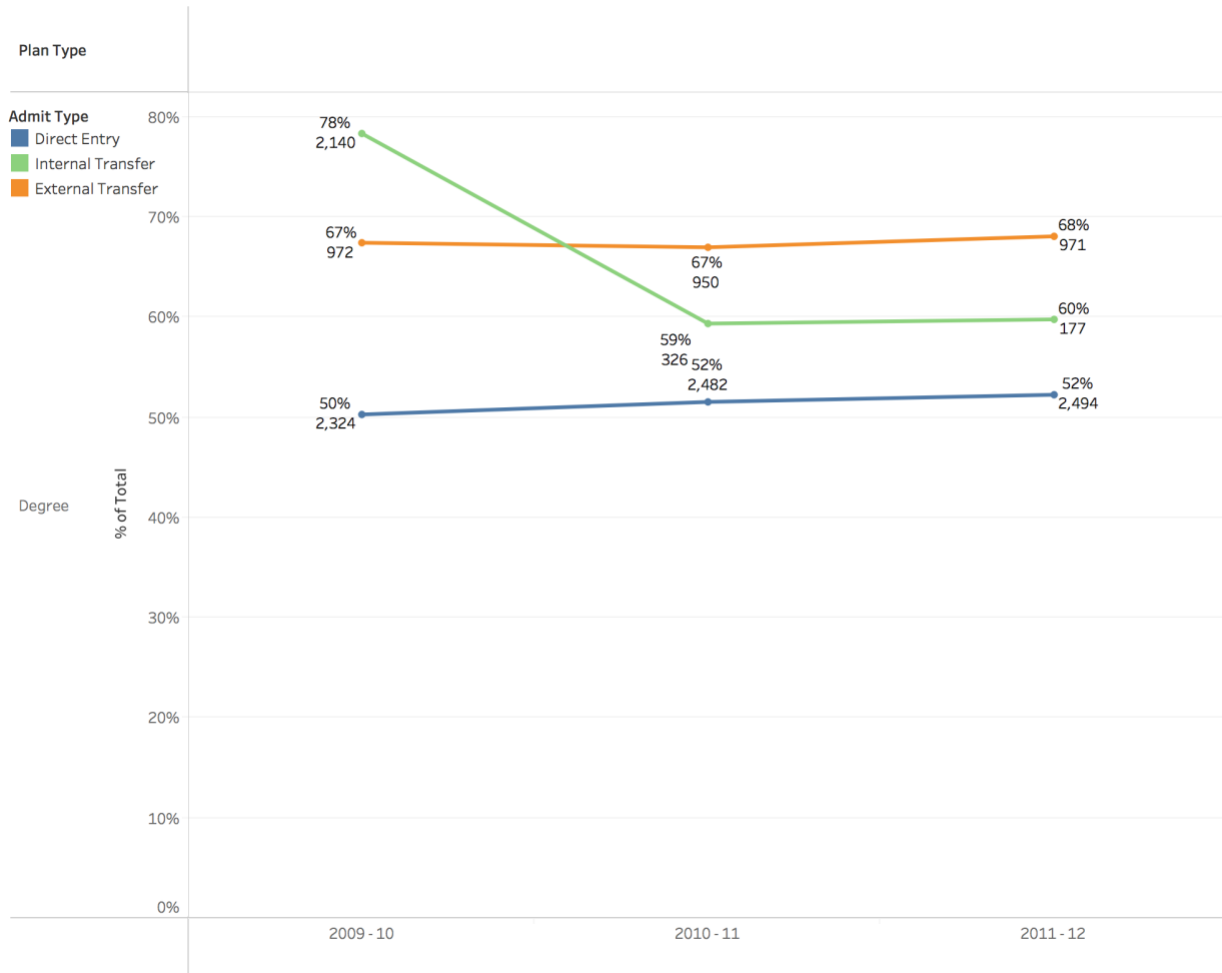**Figure 17: Graduation rate at 150% of program length (unadjusted)**

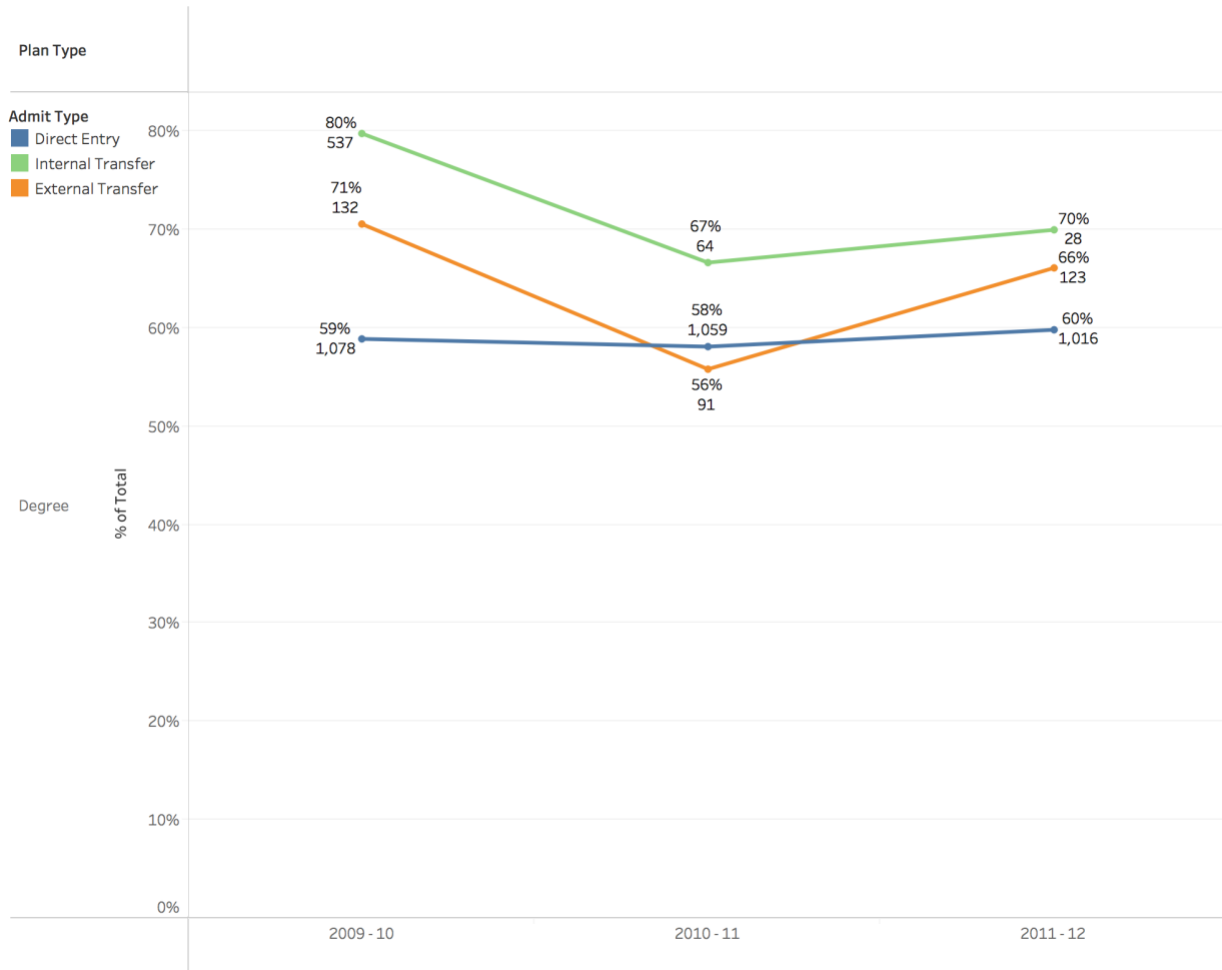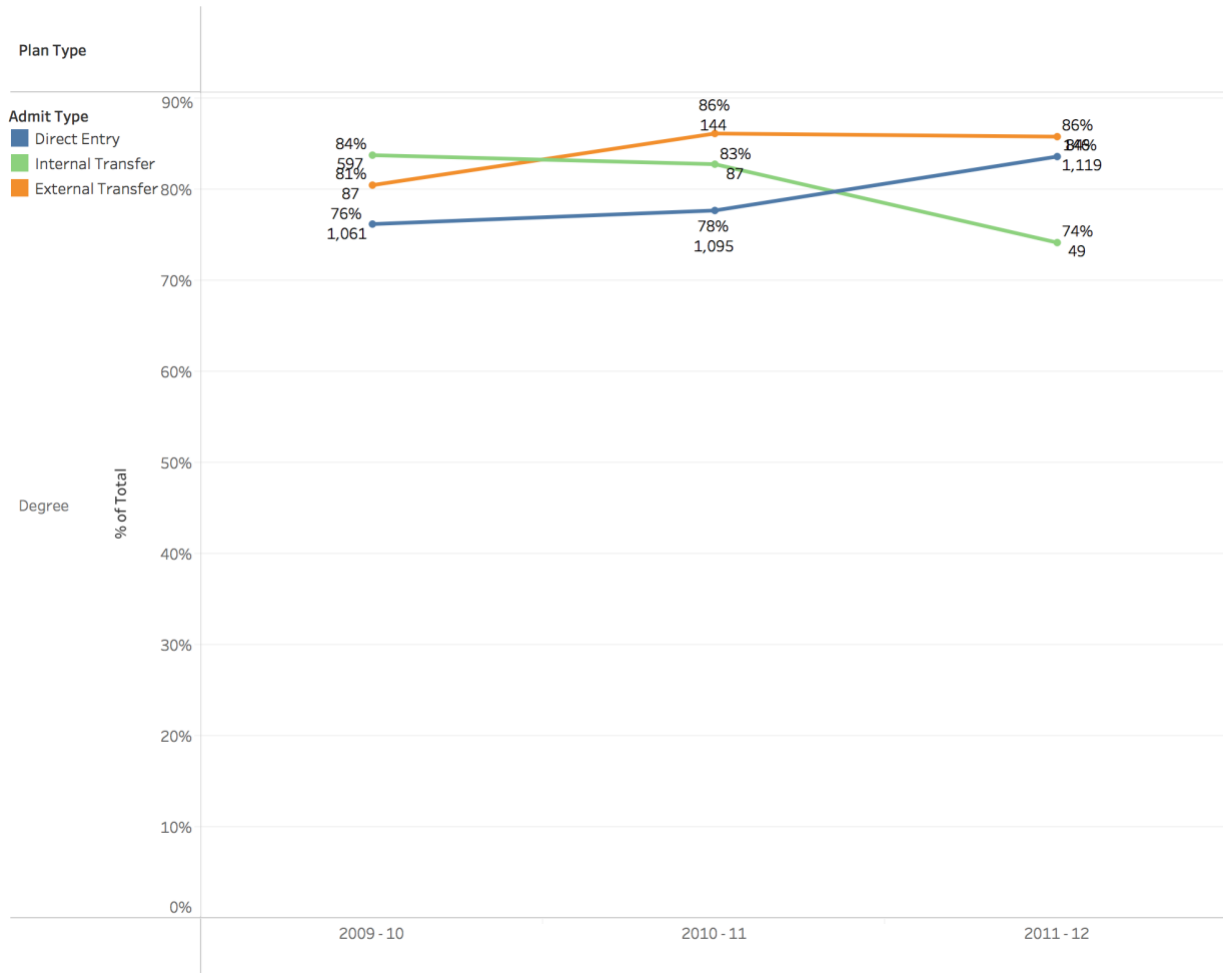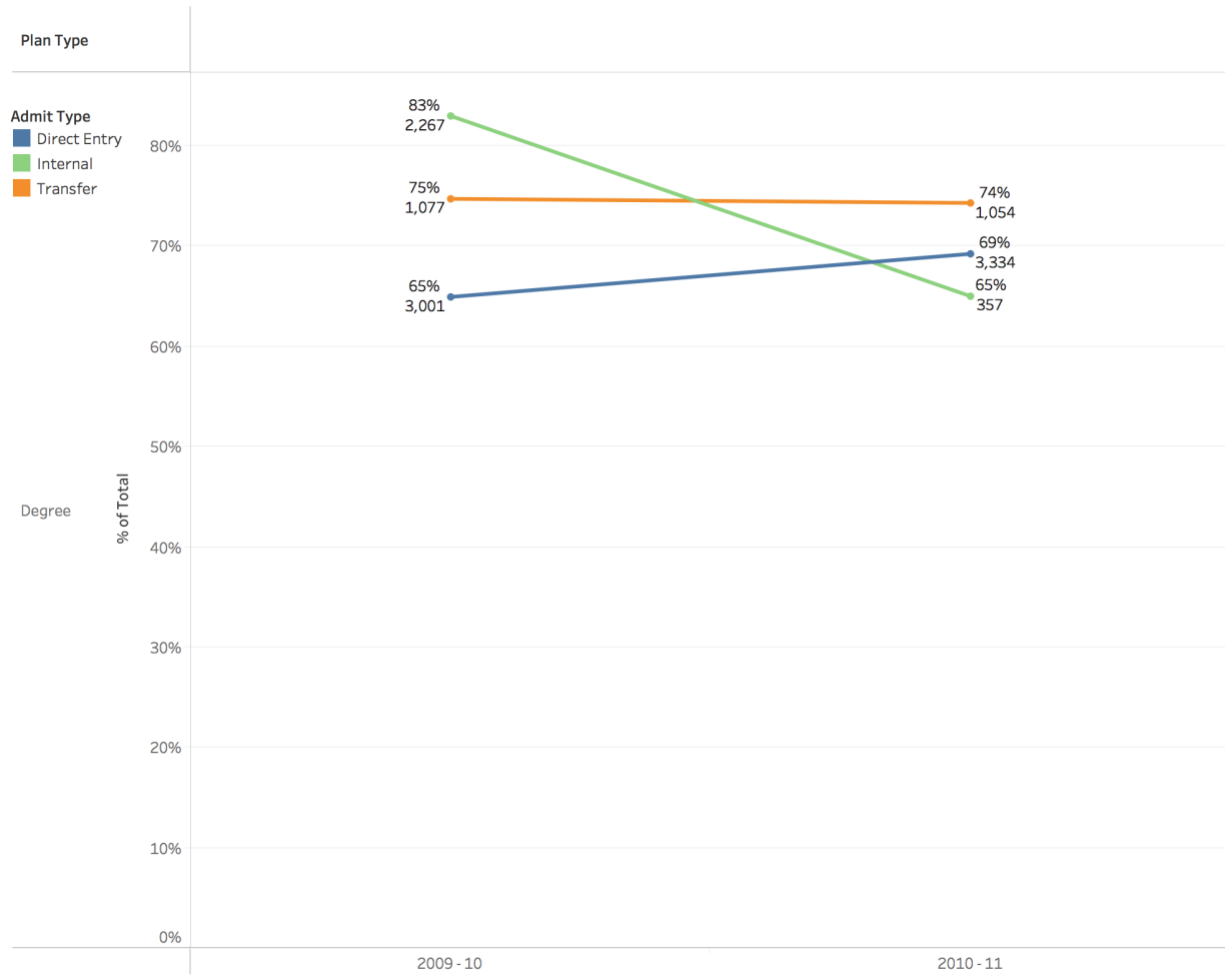**Figure 18: Graduation rate at 150% of program length (normalized to 30credits)**
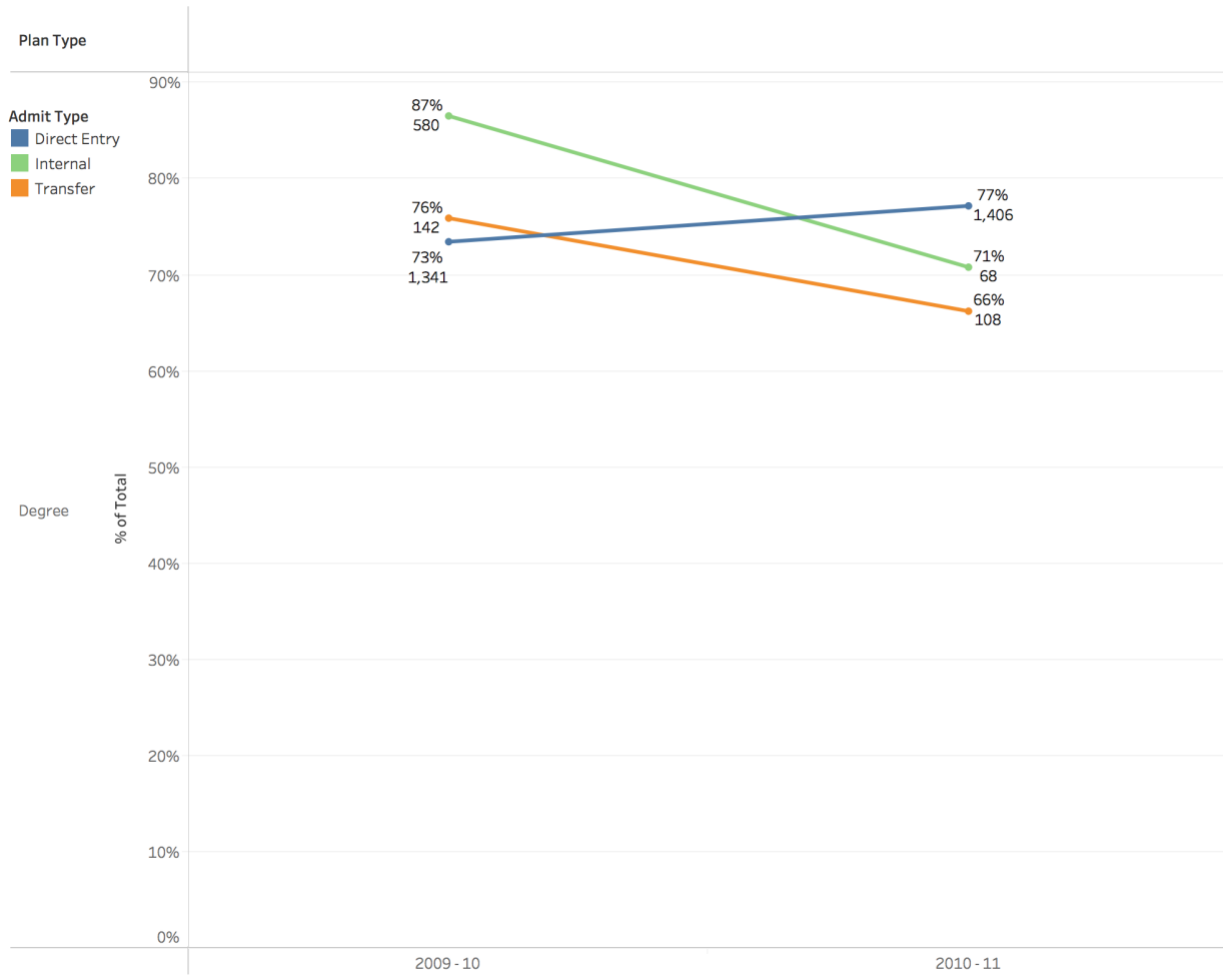
Figure 19: Graduation rate at 150% of program length (normalized to 60 credits)
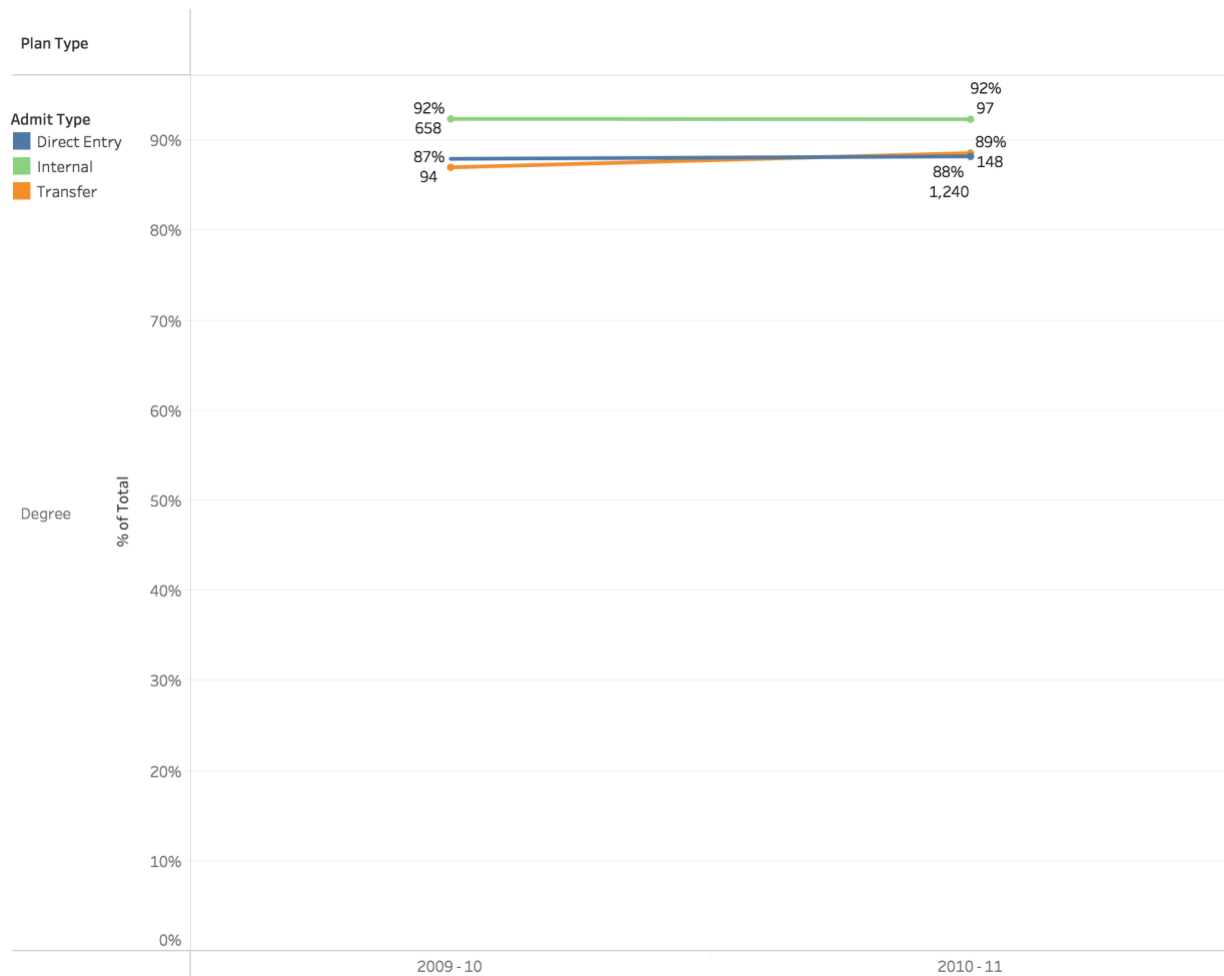
Graduation rate at 100% of expected program length, by last institution sector

Figure 20 considers the Alberta PSE sector of the previous post-secondary institution for transfer students. It shows that students transferring from Baccalaureate and Applied Studies Institutions and Comprehensive Community Institutions have slightly higher graduation rate than other transfer students. Students transferring from a Comprehensive Academic and Research Institute have slightly lower rates compared to all transfer students, but higher rates than the Unknown or Outside Alberta category. Students transferring from Independent Academic Institutions had lower rates as well, but have very small N values. There were too few transfers from Specialized Arts and Culture Institutions to include them in this metric.

Figure 21, which is normalized to 30-36 transfer credits, shows slightly higher graduation rate from all sectors, but a similar overall gap between different sectors as that seen in Figure 12. Note that the normalized models exclude internal transfer students who were awarded external transfer credits.

Figure 22, which is normalized to 60-66 transfer credits, shows higher graduation rate and minimal difference between sectors. Note that the normalized models exclude internal transfer students who were awarded external transfer credits.

Figure 20: Graduation rate at 100% of program length, by Alberta post-secondary sector
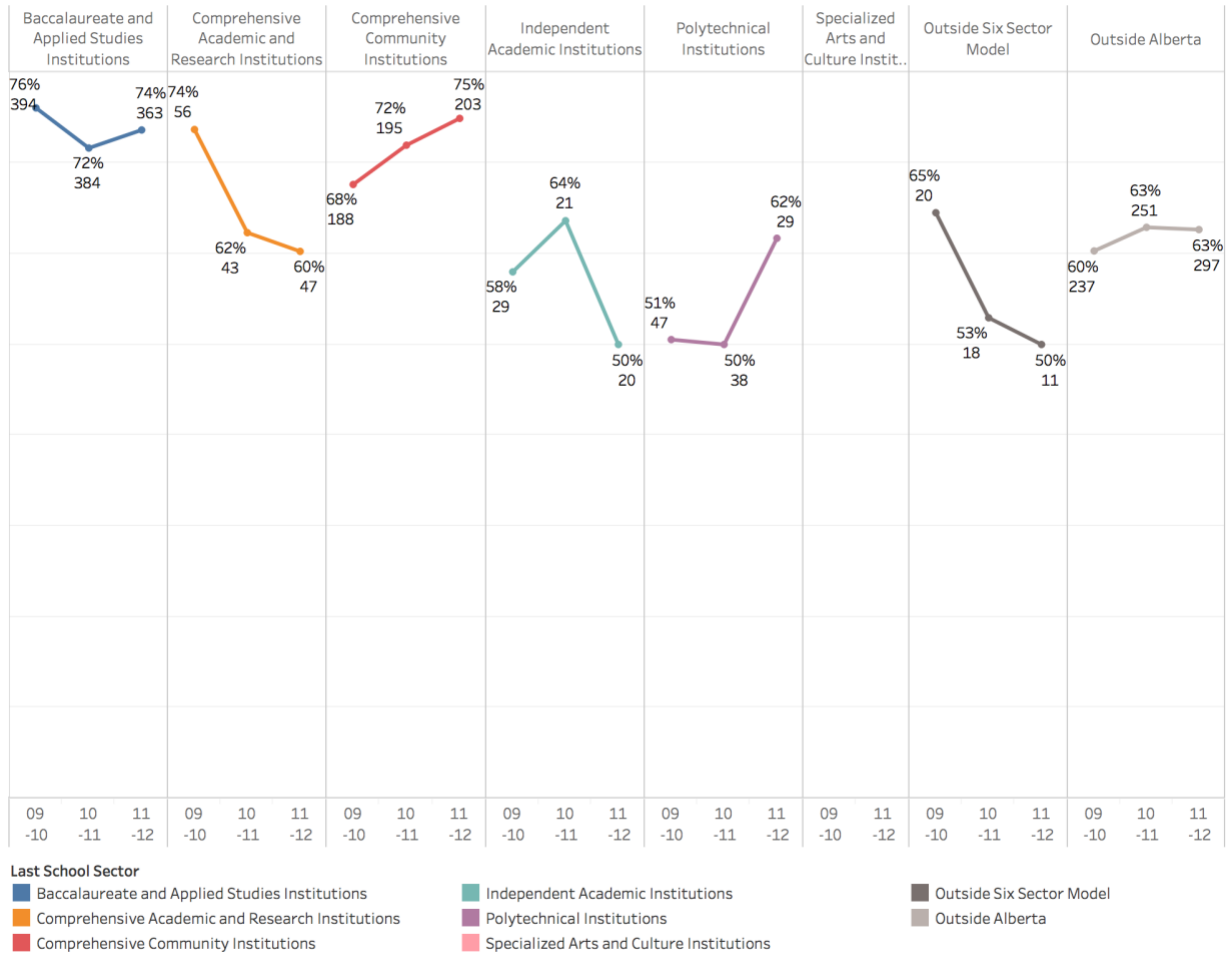
Figure 21: Graduation rate at 100% of program length, by Alberta post-secondary sector (normalized to 30 credits)
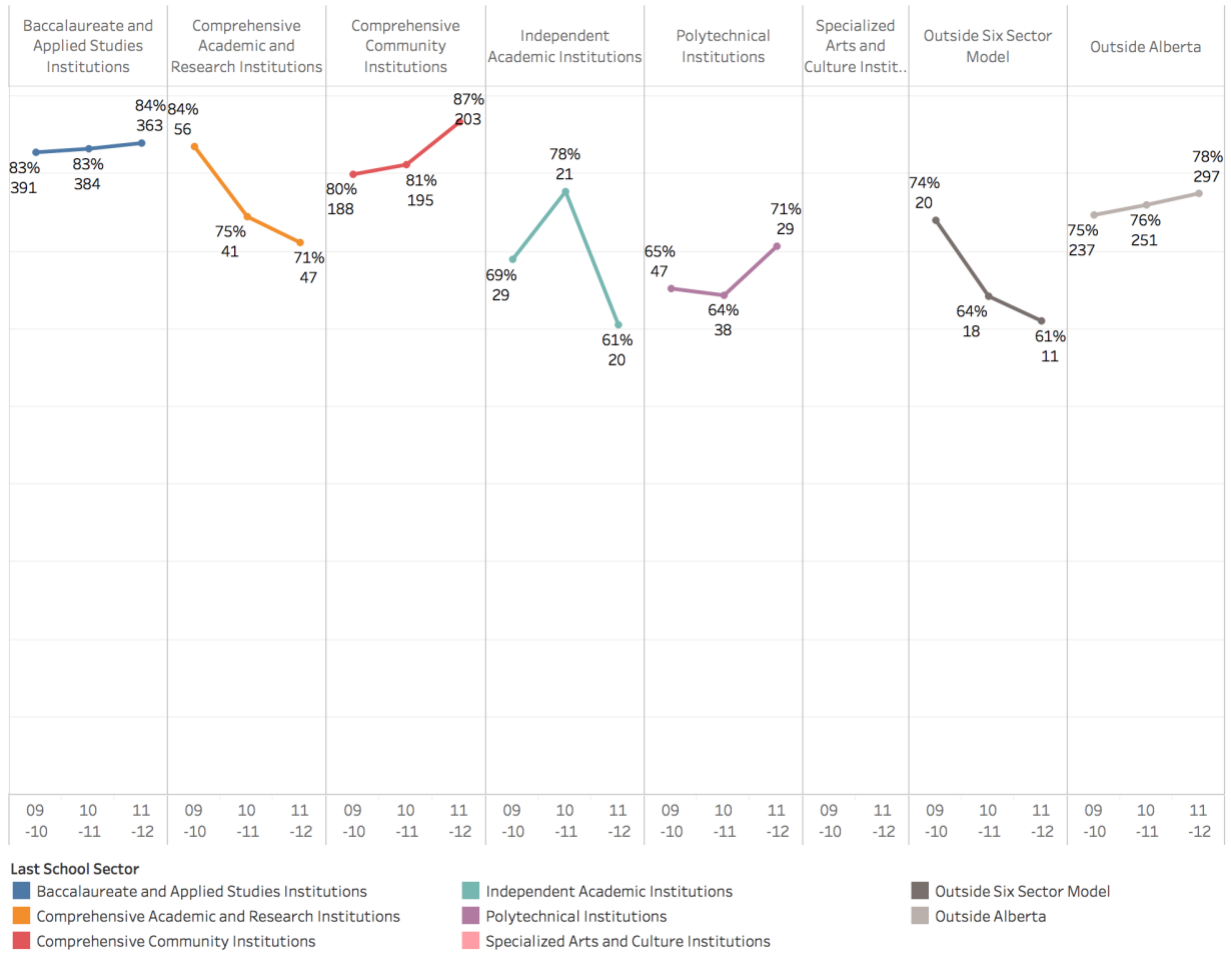
Figure 22: Graduation rate at 100% of program length, by Alberta post-secondary sector (normalized to 60 credits)

| | Baccalaureate and Applied Studies Institutions | Comprehensive Academic and Research Institutions | Comprehensive Community Institutions | Independent Academic Institutions | Polytechnical Institutions | Specialized Arts and Culture Instit.. | Outside Six Sector Model | Outside Alberta |

Last School Sector
- Baccalaureate and Applied Studies Institutions
- Comprehensive Academic and Research Institutions
- Comprehensive Community Institutions
- Independent Academic Institutions
- Polytechnical Institutions
- Specialized Arts and Culture Institutions
- Outside Six Sector Model
- Outside Alberta

Study metric 3: Progression

This section focuses on student progression and retention, measuring whether a student returned for studies at particular points in time.

Progression - annual, by admit year

This metric looks at student progression from one fall term to the next, and codes students as either registered, active but not registered (and registered again later), graduated, or left.

Similar to the graduation rate at 150% of program length analyses, progression - annual is limited to only students who had attended the institution for at least 6 years (150% of the expected program length). Figure 23 looks at the end of the study cycle, the 2016-17 academic year, based on the 2009-10 admit year. About 66% of degree direct entry students had graduated, 29% had left, and 6% were still

registered. For transfer students, 84% had graduated, 15% had left, and about 1% were still registered. For internal transfer students, 87% had graduated, 11% had left, and 2% were still registered.

Figure 24 looks at the end of the study cycle, the 2016-17 academic year, based on the 2009-10 admit year. About 62% of degree direct entry students had graduated, 28% had left, and 10% were still registered. For transfer students, 82% had graduated, 16% had left, and about 2% were still registered. For internal transfer students, 76% had graduated, 22% had left, and 2% were still registered. The shorter time frame available for this metric means that some students who are currently coded as left may in fact return later and continue their studies.

Figure 23: Annual progression: 2009-10 admit year
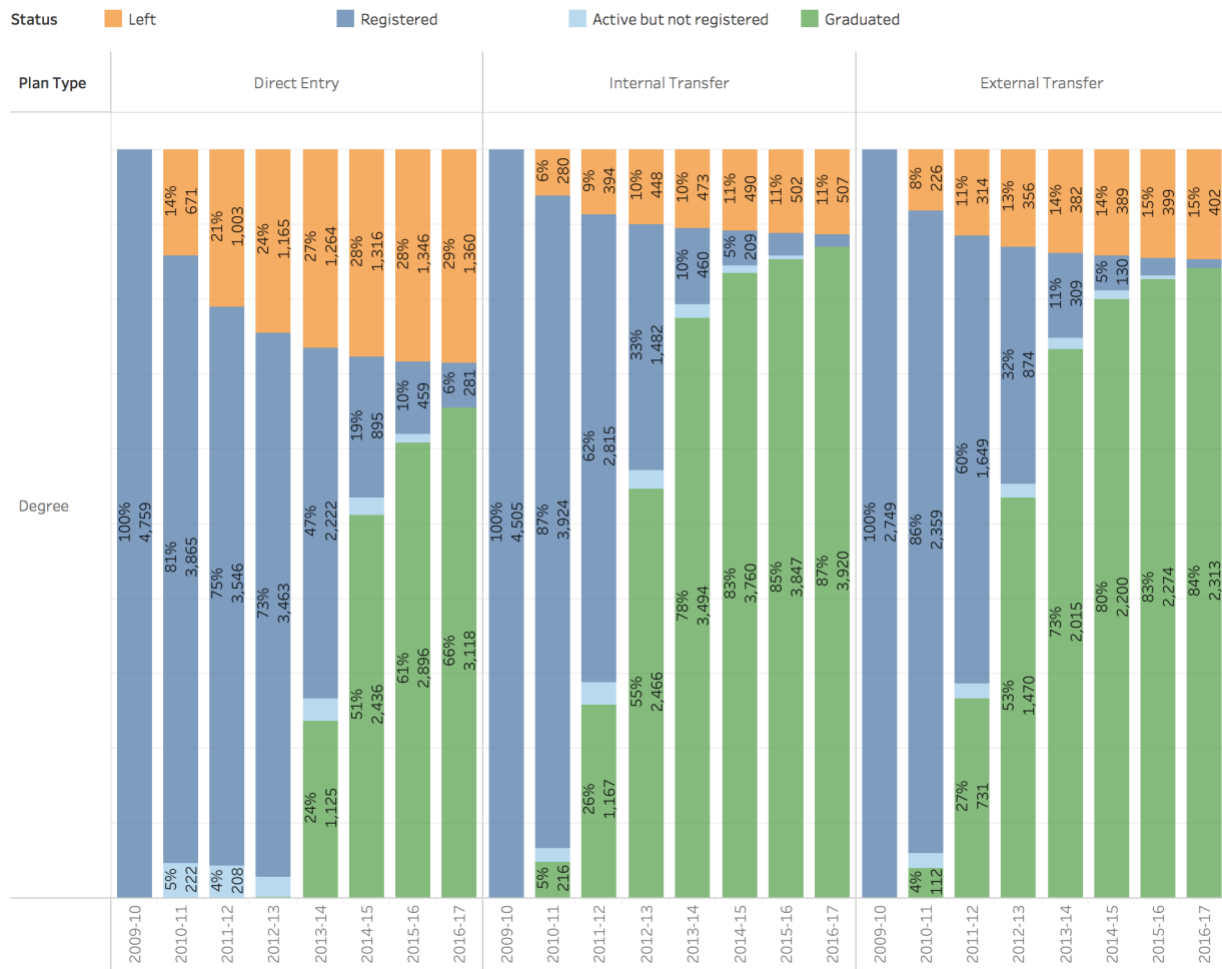
Figure 24: Annual progression: 2010-11 admit year
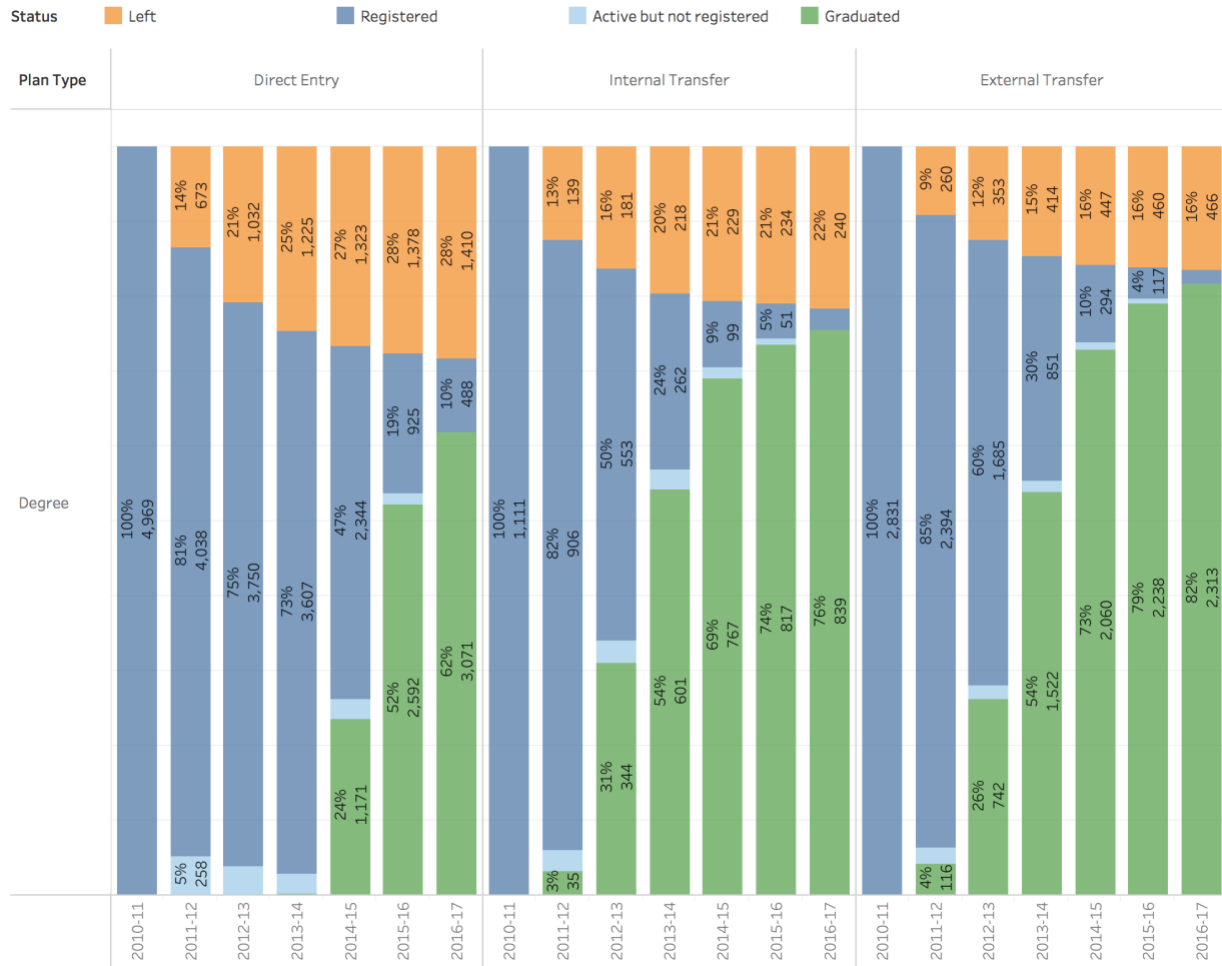
Progression to registration year

This set of metrics is based on the student progressing to the number of years within the institution. For example, a student commencing studies in the 2009-10 reporting year who stays enrolled in the 2010-11 reporting year would be retained to Year 2, regardless of the number of credits the student is enrolled in. This type of metric can be useful for year to year retention, and can include part-time students.

The risk of using a metric like this, based solely on registration, is the design of it can have the unintended effect of suggesting that longer is better, when in fact it may be desirable for students to complete their studies in a reasonable amount of time.

Figure 25 compares the number of terms that transfer and direct entry students enrolled at UAlberta, based on an unadjusted model. On this measure, internal transfer and direct entry students are virtually indistinguishable. What it shows is that the vast majority of both external transfer and direct entry/internal transfer students enroll at UAlberta for 3 years before the trends start to diverge. This divergence gets a little larger during the 4th year, prior to converging again in the 5th and 6th years. In this regard, transfer

and internal students are virtually indistinguishable. This divergence is likely caused by students with more internal or transfer credits completing their credentials and graduating, removing the need to enroll for further years.

Figure 26 outlines the normalized to 30 credit model, with a narrower gap between the three groups. In this view, direct entry students are more likely to be enrolled in all future years beyond year 1 than their transfer counterparts. Internal transfers are equally likely to be enrolled as direct entry students up to year 2, but after this are less likely than either transfers or direct entry to be enrolled in subsequent years. Note that the normalized models exclude internal transfer students who were awarded external transfer credits.

Figure 27 shows that after the 60 credit normalization there is a narrower gap between direct entry and transfer students. In this case, direct entry students are more likely to enroll in years 2, 3, and 4. By year 5, direct entry and external transfer students are virtually indistinguishable. Conversely, internal transfers are substantially less likely to register beyond year 1 than their direct entry and transfer peers. Note that the normalized models exclude internal transfer students who were awarded external transfer credits.

This analysis is limited only to students who have been studying at UAlberta for 125% of expected program length (5 years).

Figure 25: Annual progression to registration year (unadjusted)

Plan
Type

Transfer
Threshold

Admit Type
- Direct Entry
- Internal Transfer
- External Transfer

Degree

100%
8,338

87%
7,261

86%
12,622

78%
11,405

73%
10,740

61%
5,079

46%
6,736

31%
2,622

31%
1,965

15%
2,249

10%
827

9%
574

4%
567

3%
181

1%
116
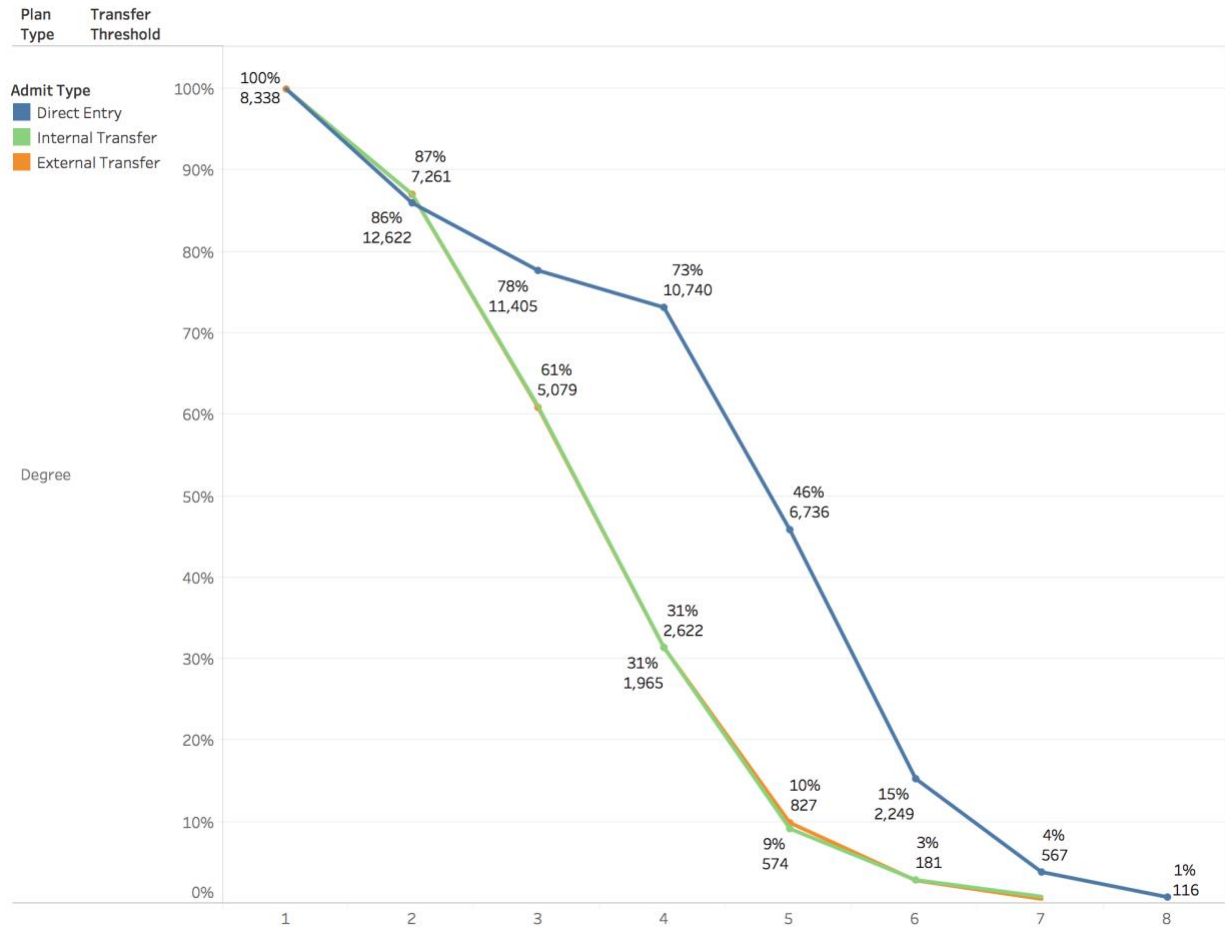
Figure 26: Annual progression to registration year (normalized to 60 credits)
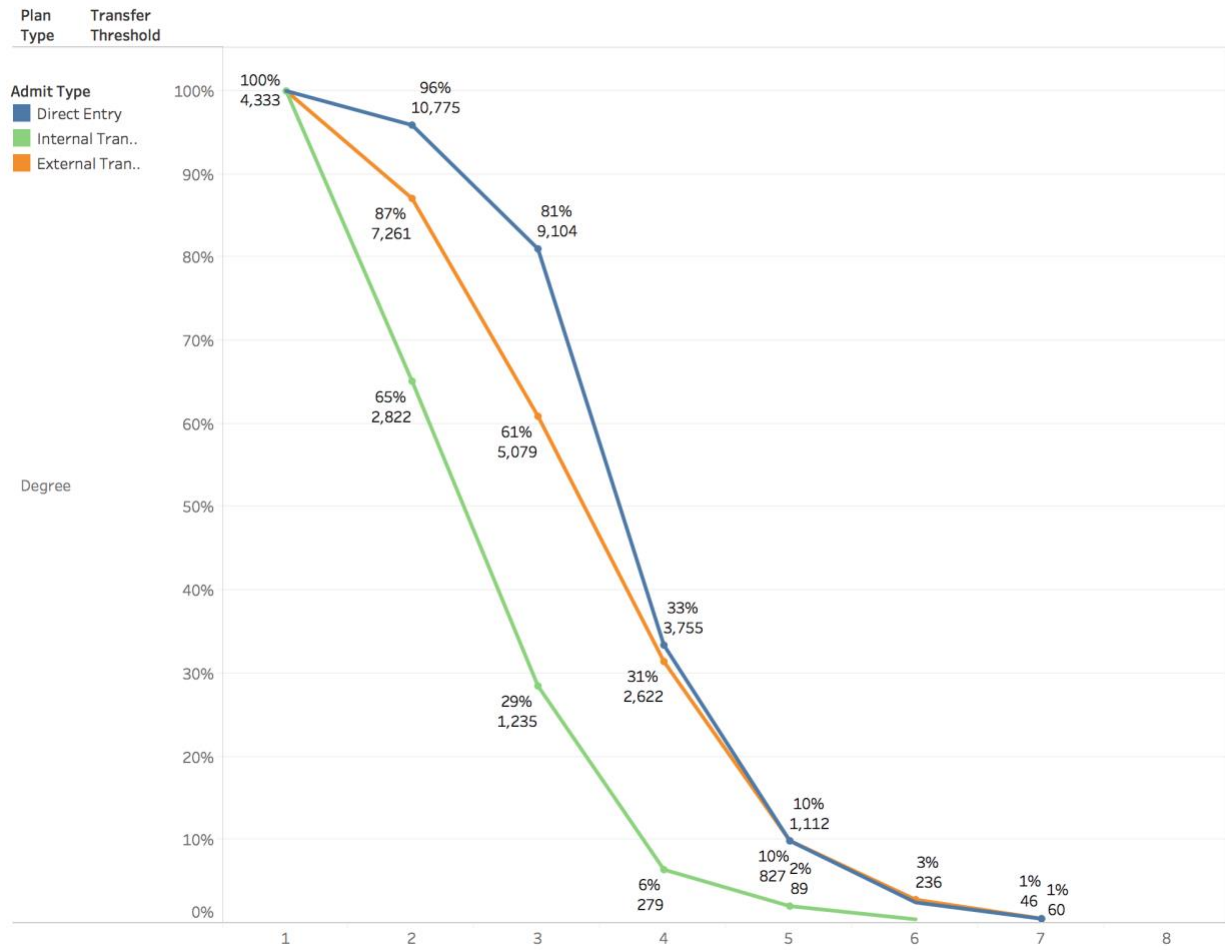
Figure 27: Annual progression to registration year (normalized to 60 credits)
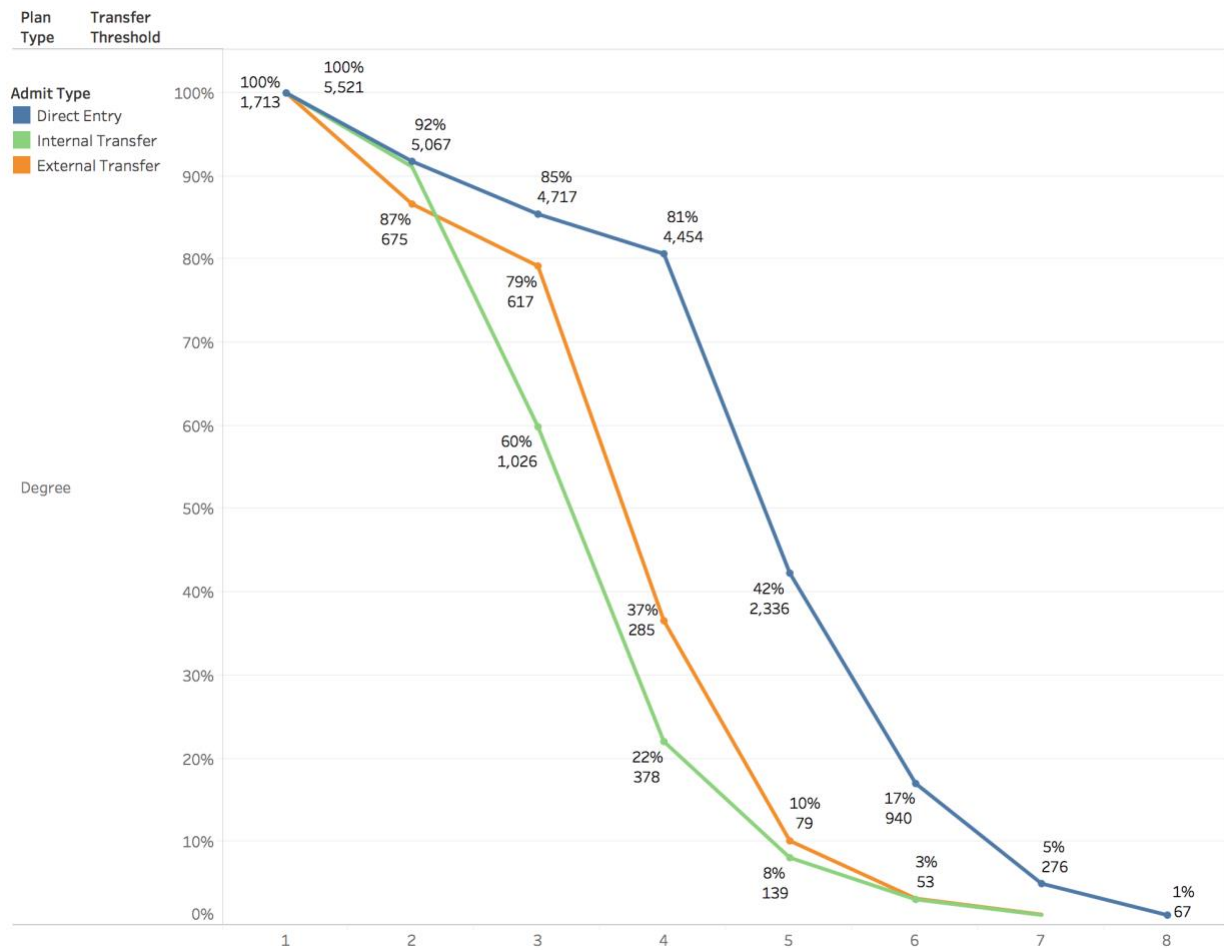
Study metric 4: Grade point average at graduation

Similar to the time to completion metric, we used ordinary least squares (OLS) linear regression to look at how transfer status impacts a student's grade point average at graduation. The variables we included in the model were:

- International (from the national_status field, 0=D or domestic, 1=I or international)
- Female (from the gender field, 0=M or male, 1=F or female)
- Indigenous (from the indigenous field, 0=N or non-indigenous and 1=Y or indigenous)
- Student program (from the program field, re-coded as dummy variables with 0 indicating the student was not in that particular program and 1 indicating they were)
- Admit academic year (based on the student's first enrolled term at UAlberta, re-coded as dummy variables with 0 indicating the student did not begin at the UAlberta in that year and 1 indicating that they did; 2010/11 was used as the reference category)

We included in the model all students who began at UAlberta in Fall 2009 or later and who had graduated by Summer 2017, the last term finalized before the data was produced. We excluded students of unknown gender (2) as the numbers were sufficiently small that their inclusion in the model could have produced skewed results.

We excluded students in programs in Business, Education, Medicine and Dentistry, Pharmacy and Pharmaceutical Science, Nursing, and Law as these programs do not accept students via direct entry from high school. We limited our students to those who entered either directly from high school or via transfer from an external postsecondary institutions, as those were the primary categories we sought to compare; this excluded internal transfers, those re-admitted to UAlberta after having previously completed some studies, and those marked "unknown." We also included only students who began their studies at UAlberta at least 5 years prior to the end of the study period.

We calculated a cumulative GPA across a student's time at UAlberta based on the annualized GPAs provided along with the number of credits in which the students enrolled that would be included in the GPA. It is not clear from the documentation provided by UAlberta that these numbers are necessarily calculated across the same courses within the year; in particular, it appears that GPA is provided either only for the Fall/Winter 2-term session or, failing registration in that session, the Spring/Summer 2-term session. This may mean we are not providing the most accurate calculation of a particular student's GPA.

Our model dataset included 12,914 students, of which 3,194 were transfer students and 9,720 had directly entered from high school. Programs varied from 3,838 graduates (Arts) to 39 (Native Studies), and admission academic years varied from 4,388 graduates (2010/11) to 4,195 (2011/12). The average cumulative GPA at graduation across all 12,914 students was 3.066.

Generating the OLS model with only taking the variables listed above (international, female, indigenous, program, and admit academic year) provides an R^2 of 0.051, meaning that 5.1% of the variance in graduation GPA can be explained by those factors alone. Students who were international (-0.250) or indigenous (-0.140) tend to have slightly lower GPAs while females (+0.068) had slightly higher GPAs. GPAs at graduation tended to be lowest among students in Kinesiology, Sport, and Recreation and Agricultural, Life, & Environmental Sciences, and highest in the Faculté Saint-Jean and Science.

When we added the transfer flag to the model, we ended up with an R^2 of 0.053 and the transfer flag had a coefficient of -0.046 ($p < 0.001$), indicating transfer students would tend to have a slightly lower cumulative GPA at graduation compared to an otherwise similar non-transfer student. A model that looked at transfer credits in addition to the base variables provided the same R^2 of 0.51 as did the base model, and the number of transfer credits was not statistically significant. Using the transfer flag model along with an indicator for the number of transfer credits over UAlberta transfer threshold of 24 also provided little additional value, with R^2 of 0.053 and a coefficient on the transfer credits over threshold of 0.002 ($0.01 < p < 0.05$), suggesting transfer students with more transfer credits will generally see very slightly higher graduation cumulative GPAs than transfer students with fewer transfer credits.

Study metric 5: Average credits over time

This final metric compares direct entry, internal, and transfer students average credits enrolled at the institution over time (see Figure 28). It highlights that credit loads are decreasing over time, part of a broader societal trend. In the late 2000s, external transfer students enrolled in more credits than their direct entry counterparts. Starting in 2011, the situation reversed. By 2016, the two groups are virtually indistinguishable. Internal transfers show a different pattern, with a sharper decline between 2009 and 2013, before levelling out again for the final 4 years.

Figure 28: Average credits taken over time
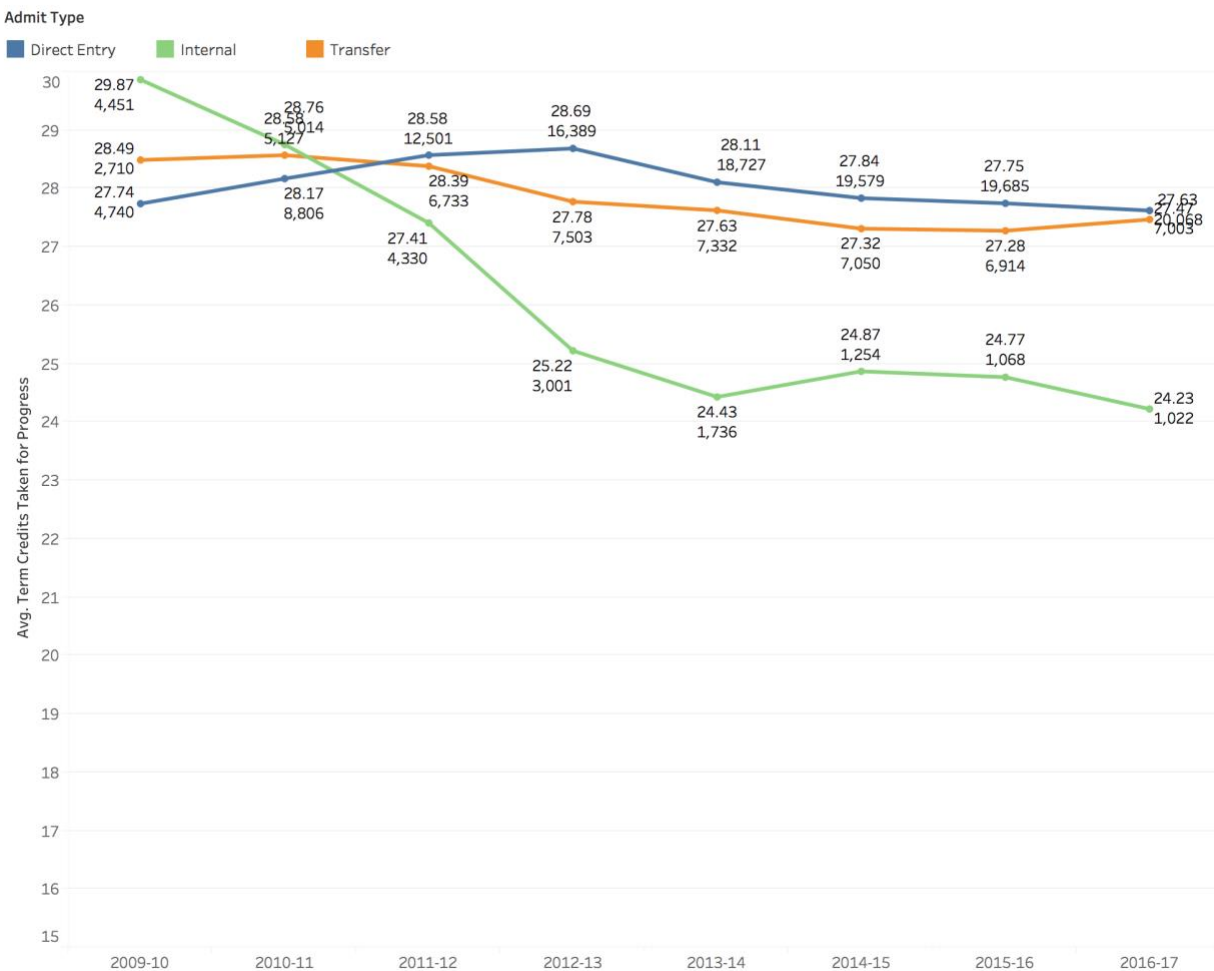
Future research recommendations

As noted in the literature review, studies focusing on student success from the perspective of a single institution lack insight into all the educational pathways a student may pursue. While a student leaving UAlberta could be seen as a loss for the institution, if that student found a better academic fit at another institution, this could be a win for both the student and the overall post-secondary system in Alberta.

In this context, we recommend investigating five options to expand understanding of transfer student populations and pathways at UAlberta and in the province of Alberta.

Recommendation #1: Study internal transfer student pathways in depth.

Internal transfer students are an important group of students at the University of Alberta, representing nearly 18% of the students in Table 1. These students were treated similarly to direct entry students for the purposes of analysis as we did not have information on their academic experience prior to internal transfer. This group of students could be further split into students who were admitted as post-secondary transfer students and received external transfer credit upon initial admission to UAlberta, and those who were admitted as direct entry students from high school without transfer credit.

Further, including the time prior to their internal transfer at UAlberta would allow for a deeper analysis of the enrolment patterns of these students and create a more natural comparison between direct entry, internal transfer, and external transfer. In effect, including this longer time period would allow comparisons to be made between direct entry students who stayed in the same program and direct entry students who changed to a new program, as well as between external transfer students who stayed in the same program and external transfer students who changed programs.

Recommendation #2: Normalize comparisons between transfer and direct entry.

This study highlighted the importance of normalizing the data so that reasonable comparisons between direct entry, internal transfer, and external transfer students could be made on standard metrics like time to completion, graduation rate, and progression. For the University of Alberta, this study used two normalization points: from the time students had achieved 30 credits or 60 credits. Alternately, UAlberta internally reports on transfer student graduation rates 5 years following admission, versus 6 years for direct entry. The institution's existing method, or the normalized to 30 credit method, result in a similar time period of comparison for direct entry and external transfer students. In the absence of a dataset that provides additional insight into external transfer student experiences prior to (and potentially after) their studies at UAlberta, we recommend normalizing the data as the most fair method of comparison between two unique groups of students. Recommendations 3 and 5 suggest datasets that could help close this information gap further.

Recommendation #3: Explore the feasibility of using Statistics Canada's Post-Secondary Student Information System data to measure student success.

This study considered student success metrics from the perspective of data provided by an individual institution. One of the gaps in this information is further insight into student behaviour prior to commencing studies at UAlberta. For example, this study looked at time to completion within UAlberta, but a more comprehensive understanding of how long it took a student to complete a credential would include the time spent at institutions prior to UAlberta.

A study similar to Finnie and Qiu (2009) focused on the entire public post-secondary system in Alberta (or perhaps all of Western Canada) would yield further insight than what this study was able to deliver. Finnie and Qiu used Statistics Canada's Post-Secondary Student Information System (PSIS) data to study student transitions in Atlantic Canada and found that single institution studies typically underestimate student retention, and consequently student enrolment.

The primary advantage of using the PSIS data for this task is that it contains information about institutions and both the academic programs and individual courses in which students enroll. The PSIS data will provide insight into where a student came from prior to attending the institution and where they went after attending the institution. Data from individual institutions do not provide this broader picture of a student's learner pathway and thus the PSIS data is more effective for assessing some transfer student success metrics. Additionally, Statistics Canada is working on expanding data linkages between PSIS and other datasets, such as provincial primary- and secondary-level educational experience and postsecondary applications for admissions (Frenette, 2018). While these linkages are still in the early stages, they may ultimately allow for deeper research into student success than is currently possible.

Using this data, future research could mine considerably more deeply into the patterns of student behaviour that may influence student success. Further, the PSIS already contains data from all public post-secondary institutions in Canada, which would enhance comparability across institutions and over time providing a measure of transfer student outcomes from across Alberta rather than at a single institution.

In the context of the University of Alberta, PSIS data could provide insight into the student's academic experience prior to, during, and after their time studying at UAlberta. Information of this type could improve understanding of formal and informal transfer pathways into and out of UAlberta. As the PSIS is longitudinal in nature, commencing in the academic year 1999-2000, it would provide longer term data that is more directly comparable than what was included in this research study. Longer term data would better facilitate additional metrics, such as considering a 200% graduation rate for degrees, a measure which would better reflect the actual outcomes of part-time students.

While the Youth in Transition Survey, discussed in the [literature review](), would form a good complement to the PSIS data, the YITS is no longer in production, reducing its utility as time passes.

Recommendation #4: Expand the labour market outcomes of graduates of Alberta post-secondary institutions analysis to compare direct entry and transfer students.

This study has highlighted that there is an interest at UAlberta in better understanding outcomes of direct entry, internal transfer, and external transfer students. One area where the institution would benefit from additional insight and access to data is around graduate earnings. Research by Finnie, Dubois, & Miyairi (2017) looked at the earnings by discipline of direct entry and non-direct entry students at 14 Canadian institutions. As the research did not identify participating institutions, it is not known if UAlberta was a participant.

Institutions we spoke with appreciated the research conducted into labour market outcomes for post-secondary institutions conducted by the Alberta government and felt that being able to compare labour market outcomes of transfer students and their direct entry counterparts would be a useful complement to the existing study.

Additional insight into labour market outcomes for different types of students can be used in a variety of ways at UAlberta: recruiting and advising students, curriculum design, and work integrated learning, among others. We recommend following up on that report to include the possibility of analyzing labour market outcomes for direct entry and transfer students, as well as other kinds of student mobility.

We recommend following up on that report to include the possibility of analyzing labour market outcomes for direct entry and transfer students, as well as other kinds of student mobility.

Recommendation #5: Explore the feasibility of creating a provincial dataset that measures transfer student outcomes.

In the interviews with PSIs related to this study it was noted that the existing mobility reports published by the Advanced Education Ministry could better meet their needs to separately analyze different types of mobility from one another. For example, it is not currently possible to differentiate visiting students from students switching institutions, nor is it possible to differentiate students with a small number of transfer credits versus students with a larger number of transfer credits. This points to the potential for development of a provincial dataset.

Further conversations with institutions to better understand what data is available and what kinds of questions they would like to answer on an Alberta post-secondary-wide basis would assist in the formation of a potential provincial dataset.

British Columbia's Student Transitions Project is one example of such a model. The STP "links student data from the B.C. Ministry of Education with public post-secondary student data. The data allows investigation of student transitions, mobility, and outcomes from the Kindergarten-Grade 12 (K-12)

education system to the public post-secondary system, while protecting individual privacy" (Government of British Columbia, April 4, 2018). The STP also allows for a variety of post-secondary focused mobility and pathway related analyses between individual post-secondary institutions, sectors, and regions. This robust dataset has allowed for annual reports including student mobility, pathways, and transitions between regions, sectors, and institutions, as well as special topic reports focused on high school graduates and non-graduates, degree completers, simultaneous enrolment at multiple institutions, and international students. This array of reporting would provide additional value beyond Alberta's current mobility reports. Note that the STP is distinct from BC's Central Data Warehouse (CDW), which BC's research institutions do not currently submit data for.

Institutions participating in this project expressed a strong desire for better access to transfer student outcome data that could be analyzed in conjunction with institutional data. Their needs would be best served by having the ability to connect directly to the transfer student outcome data, rather than working only with summary level information.

A potential provincial dataset would aid UAlberta in better understanding student's academic experiences both prior to and following their studies at UAlberta. Such insight could be used towards ensuring transfer pathways are seamless and provide the appropriate transfer credits, to provide additional student supports based on previous or future institution, for partnerships between UAlberta and other institutions, or new academic programming at UAlberta.

A project like this one is likely a more substantial undertaking than the third recommendation, and may be a good follow up from that project.

Conclusion

This research project on transfer student success at the University of Alberta has brought to light a number of important issues related to measuring transfer student success in Alberta. The study was conducted at a time that the landscape of postsecondary education in Alberta is changing quickly: institutions that formerly were large sending institutions are now completing institutions, changing the nature and dynamics of what it means to be a transfer student.

This project looked at ways of measuring transfer student success at UAlberta. The proposed metrics for this report's analysis were developed using a mixed methods approach that consisted of
- applying recommendations for best practices for methodology and parameters for analysis identified in the literature review,
- contextualizing the analysis within information gained from the environmental scan about UAlberta, which included informal qualitative data in the form of conversations with targeted representatives from UAlberta, and
- focusing the report's core analysis and conclusions on a regression analysis of quantitative UAlberta data that were based on targeted data metrics for analysis of transfer student success in comparison to direct entry students.

Prior research suggests that a longer window of time, beyond 150%, for expected program completion would be most appropriate, particularly for students who do not fall into the standard first-time, full-time, four year degree-seeking cohort often used for student outcomes analysis. As the study period used in

this report was short, we were unable to produce metrics that would be optimal for a longer term longitudinal study.

Environmental scan

The environmental scan revealed that the University of Alberta currently measures transfer student success in a variety of ways, which could be augmented by some of the metrics pursued in the case study. It also highlighted some internal challenges within the UAlberta around how admission GPAs are recorded and the timeliness of transfer credits being granted.

Defining transfer students

The literature review, environmental scan, and case study all highlight that one of the biggest challenges is in creating a reasonable definition of a cohort for the purposes of developing measures for transfer student success. One method of defining a transfer student is based on whether a student received transfer credit (aligning with the provincial definition of transferability). Another method is to view transfer as a basis of admission, where transfer students are those surpassing a certain threshold of transfer credits awarded (at UAlberta, this is 24 external transfer credits for degree programs). This study is based on the latter concept of basis of admission as the definition for external transfer. Also included in the study were internal transfer students, who move programs within UAlberta following completion of 24 credits.

These differences in definition illustrate one small component of a much larger challenge. Direct entry, internal transfer, and external transfer students are very different: with different starting institutions, admission terms, and course enrolment patterns, comparing these groups in a fair way is difficult. This study attempted to level these differences by using normalization techniques, but further division of groups to ensure the most accurate comparisons would be helpful.

Demographics and previous institution

Indigenous students accounted for about 7% of internal transfer students, 2% of direct entry, and 4% of external transfer students.

Females represented about 54% of direct entry students, 55% of internal transfer students, and 62% of external transfer students.

In terms of previous institution attended (for students with transfer credit), 32% transferred to UAlberta from a baccalaureate and applied studies institution, followed by 26% from comprehensive community institutions, and 26% from outside Alberta.

Normalization and appropriate points in time for comparison

One of the key findings to emerge from this report is based on the point in time at which comparisons are made. As this study was based on information provided by UAlberta as a receiving institution, it lacked full insight into the experience of students prior to their studies at UAlberta. To account for this gap, we employed 3 variants to the key metrics of time to complete, graduation rate, and progression to registration term: an unadjusted model, which considered the admit term with no adjustment relative to either graduation or a particular term number; from the point of achieving 30 credits at UAlberta (for direct entry and internal transfer students) or via transfer (for external transfer students); and from the point of achieving 60 credits.

Table 6: Time to completion descriptive statistics (all models)

Model	Avg. Time to Completion			Number of Students		
	Direct Entry	**Internal Transfer**	**External Transfer**	**Direct Entry**	**Internal Transfer**	**External Transfer**
Unadjusted	4.03	2.41	2.84	9,720	2,861	3,194
Normalized to 30 credits	3.91	2.24	2.89	4,155	692	381
Normalized to 60 credits	2.75	2.69	1.98	3,583	825	396

Of these, the normalized to 30 credits model had the most robust results, as shown in Table 6, providing a meaningful comparison of direct entry versus internal and external transfer. In this case, internal transfers still finish fastest, taking about 30 months to complete their credentials from 30 credits. External transfers take about 35 months, and direct entry students take closer to 4 years. This method also aligns well with prior research by McLaughlin et al. (2016), which recommends including a direct entry comparison with transfer students based on a 30-credit threshold (2016). Additionally, this technique is similar to methods currently used by UAlberta to measure the success of transfer students. We recommend a similar technique be used in future analyses comparing direct entry and transfer students.

The unadjusted model wasn't optimal as it inadvertently favours internal and external transfer students because it doesn't have an allowance for or insight into their experience prior to transferring programs or institutions.

The normalized to 60 credit model also didn't apply well to UAlberta's context, as it showed internal transfer students taking longer to complete than they had in the normalized to 30 credits model. This metric may be impacted by the point in time at which internal transfers change programs, which may give

the appearance that internal transfer students perform poorly on this metric, when in fact changing programs is likely in their best interest.

Transfer student success at UAlberta: Completion time, graduation rate, and progression

Time to completion

One of the key metrics studied was time to completion. Using the recommended comparison of normalizing to 30 credits, internal transfer students complete their credentials the fastest, at 2.24 years (27 months), followed by external transfer students at 2.89 years (35 months) and direct entry students (nearly 4 years).

Regression analysis on time to completion confirms these assumptions, with transfer status explaining almost 20% of the variability in time to completion in the unadjusted model. Roughly, each external transfer credit a student is granted at UAlberta allows them to complete their credential 0.031 years earlier, which translates to 10.6 transfer credits for one term sooner, or 21.2 for two terms sooner. Among programs, Kinesiology, Sport, and Recreation and Agricultural, Life, & Environmental Sciences students tended to graduate soonest, while Science students took the longest to graduate. When normalized to 30 credits, transfer status was able to explain nearly 29% of the variance in time to completion, with external transfer students graduating in 12.7 fewer months than direct entry students. Normalization to 60 credits suggests graduation 7.3 months faster for external transfer students than direct entry students. These results suggest that differences between transfer and direct entry students persist, even when factors such as program, national status, gender, Aboriginal status, and year of admission are controlled for.

Graduation rate

Analysis of graduation rate was conducted at two different times: 4 years (100% of expected program length) and 6 years (150% of expected program length). In the 4 year version, when normalizing to 30 credits completed or transferred, this study showed about 68% of internal transfers completing within 4 years, compared to 65% of external transfers, and 50% of direct entry. An additional analysis was conducted based on the students' last institutional sector in Alberta, which showed minimal difference between sectors in terms of graduation rate. Using the graduation within 6 years metric, this study saw a higher proportion of students completing their studies in the 6 years: around 60% of direct entry, 65% of external transfers, and 75% of internal transfers.

Progression

We also looked at progression from one year to the next. Classifying students into four categories: registered, active but not registered (and returned later), graduated, or left, showed the 2009-10 admit cohort with different rates for each of direct entry, internal transfer, and external transfer. 66% of direct entry students had graduated by 2016-17, 29% had left, and 6% were still registered. 87% of internal transfer students had graduated by 2016-17, 11% had left, and 1% were still registered. 84% of external transfer students had graduated by 2016-17, 15% had left, and 1% were still registered.

In addition to looking at progression to specific years, we also assessed how many registration years students completed. In the unadjusted model, the majority of transfer, internal, and direct entry students enroll for 3 years before the groups start to diverge. By year 5-6, the trends converge again. In this model, transfer and internal students were virtually indistinguishable. Normalizing to 30 credits completed shows less of a gap between the groups. Here, direct entry students were more likely than the other groups to

beyond year 2. This trend holds true until year 8, with both transfer and internal students being substantially less likely to still be enrolled by year 5.

Grade point average at graduation and credits enrolled per year.
Considering a calculated cumulative GPA at graduation, transfer students tended to have a slightly lower GPA at graduation compared to an otherwise similar non-transfer student. However, transfer students with more transfer credits will see slightly higher cumulative GPAs than transfer students with fewer transfer credits.

The final metric studied was the average number of credits per year. In this regard, transfer and direct entry students were remarkably similar, taking nearly the same number of credits per year in recent years. The average credit load of internal transfers in this dataset dropped noticeably, but this result could be impacted by this study's decision to exclude internal transfers who possessed transfer credits, as well as the very nature of when internal transfer occurs within UAlberta.

Perspectives on data challenges

This study has illustrated that UAlberta collects sufficient information to be able to build measures of transfer student success similar to those used in this report. However, the challenge associated with this is not necessarily collecting the right information, but in how it is used. As evidenced by most of the metrics in the case study, and highlighted further in the literature review, these metrics tend to be oriented towards the traditional first-year, four-year, first-time, degree-seeking student. Adjustments made to the metrics to better level the playing field between transfer and direct entry, such as normalizing to 24 and 60 credits, show that the lens through which we consider transfer student success influences how the outcomes are reported.

In addition, to being able to define the appropriate starting point for the metrics, this study also highlights that having an appropriate length of time to study available is crucial. This study was unable to produce intended graduation rates at 200% and 300% of program length due to the length of the study. These longer time frames may better illustrate outcomes for part-time students. While UAlberta has data spanning many more years than this study focused on, this study looked only at more recent history.

The case study generally shows strong performance by both direct entry and transfer students. One of the reasons this transfer student performance is possible is because Alberta has a purpose built, transparent, transfer system that does not isolate different types of institutions from one another. This system helps ensure that transfer students are able to complete credentials quickly when changing institutions, while earning credit for their prior academic work.

When UAlberta thinks of "transfer", it most often considers transfer from the perspective of a basis of admission, using 24 transfer credits awarded as the cutoff for determining external transfer status. The existing provincial definitions look at mobility functions. As such, further conversation and collaboration among Advanced Education, Alberta's institutions and the Alberta Council on Admissions and Transfer could allow for a more nuanced approach to defining transfer on a provincial basis, perhaps by credential type. Additional conversation could expand the definition to include the most appropriate ways to categorize students who have some post-secondary experience, but fewer transfer credits than the

threshold used within institutions. Identifying the potential for a more refined definition and metrics for transfer and transfer credit student success was a key focus of this ACAT case study for UAlberta.

Alberta's post-secondary institutions are interested in finding further ways to support the success of their transfer student populations. While this study had several limitations, it creates an opportunity to further conversations on campus about the success of transfer students.

References

Alberta Advanced Education (2007). *Roles and mandates policy framework for Alberta's publicly funded advanced education system.* Retreved April 9, 2018 from: http://advancededucation.alberta.ca/post-secondary/policy/roles/.

Alberta Council on Admissions and Transfer (2017a). *ACAT governance.* Retrieved April 10, 2018 from: https://acat.alberta.ca/about/council-membership-governance/acat-governance/

Alberta Council on Admissions and Transfer (2017b). Mobility reports. Retrieved April 10, 2018 from: https://acat.alberta.ca/research/mobility-reports/

Alberta Council on Admissions and Transfer (2017c). Data dictionary (version 2.1). Retrieved April 10, 2018 from: https://acat.alberta.ca/media/1105/ats_datadictionary_201702.pdf

Consortium for Student Retention Data Exchange (n.d.). *Members: Our members.* Retrieved April 4, 2018 from: https://portal.csrde.ou.edu/members/

Consortium for Student Retention Data Exchange (2016, August 24). *How can we help?* Retrieved April 4, 2018 from: https://csrde.ou.edu/about/news/

Council of Ontario Universities (2017). *Key performance indicators, degree completion rate for undergraduate cohort, new year 1 students (K2A) table notes.* Retrieved April 4, 2018 from: http://cudo.cou.on.ca/

Cook, B.J. (2012, November 8). Incomplete completers: Analysis of a comprehensive graduation rate. Retrieved April 4, 2018 from American Council on Education website: http://www.acenet.edu/news-room/Documents/GradRate-110812.pdf

Donner, A., & Lazar, F. (2000, March 20). *Measuring graduation and attrition at Ontario colleges: A discussion of measurement issues and their usefulness as indicators of student success.* Retrieved April 4, 2018 from Colleges Ontario website: http://www.collegesontario.org/outcomes/accountability/CO_MEASURING_GRADUATION.pdf

Engle, J. (2016). *Answering the call: institutions and states lead the way toward better measures of postsecondary performance.* Retrieved April 4, 2018 from: https://postsecondary.gatesfoundation.org/wp-content/uploads/2016/02/AnsweringtheCall.pdf

Finnie, R., Childs, S., & Qiu, H. (2010). *The patterns of persistence in post-secondary education among college students in Ontario: New evidence from longitudinal data.* Retrieved April 10, 2018 from Colleges Ontario website: http://www.collegesontario.org/research/research_reports/report_patterns_of_persistence_ontario.pdf.

Finnie, R., & Qiu, T. (2009). *Moving through, moving on, persistence in postsecondary education in Atlantic Canada, evidence from the PSIS* (Research Paper, Catalogue no. 81-595-M no. 72). Ottawa, ON: Statistics Canada.

Finnie, R., Dubois, M., Miyairi, M. (2017). How *student pathways affect labour market outcomes: Evidence from tax-linked administrative data*. Ottawa, ON: Ontario Council on Articulation and Transfer.

Frenette, M. (2018, April). *Trends in social mobility: Education and labour market outcomes.* Presentation at the meeting of the Higher Education Quality Council of Ontario, Toronto, ON.

Government of Alberta (2018a). Earnings by post-secondary field of study. Retrieved April 10, 2018 from the ALIS website: https://alis.alberta.ca/occinfo/earnings-by-post-secondary-field-of-study/.

Government of Alberta (2018b). *Labour market outcomes of graduates of Alberta post-secondary institutions.* Retrieved April 4, 2018 from Open Alberta: https://open.alberta.ca/publications/9871460137185.

Government of British Columbia (n.d.). *Student transitions project.* Retrieved April 4, 2018 from: http://www2.gov.bc.ca/gov/content/education-training/post-secondary-education/data-research/student-transitions-project

Hango, D. W. (2010). *Labour market experiences of youth after leaving school: Exploring the effect of educational pathways over time* (Research Paper, Catalogue no. 81-595-M no. 87). Ottawa, ON: Statistics Canada.

Heath, N. (2012). *Student mobility in Canada across Canadian jurisdictions.* Retrieved April 4, 2018 from: http://pccatweb.org/media/1244/pccat_mainreport_final-en-full-document-with-logos.pdf

Hosch, B. J. (2008, May 26): *The tension between student persistence and institutional retention: An examination of the relationship between first- semester GPA and student progression rates of first- time students.* Presented at the meeting of Association for Institutional Research. Retrieved from: http://player.slideplayer.com/15/4845367/#

Hossler, D., Shapiro, D., Dundar, A., Ziskin, M., Chen, J., Zerquera, D., Torres, V. (2012). *Transfer & Mobility: A national view of pre-degree student movement in postsecondary institutions.* Retrieved April 4, 2018 from: https://nscresearchcenter.org/wp-content/uploads/NSC_Signature_Report_2.pdf

IPEDS Technical Review Panel (n.d.). Report and suggestions from IPEDS Technical Review Panel #37, select outcomes of the advisory committee on measures of student success. Retrieved April 4, 2018 from: https://edsurveys.rti.org/IPEDS_TRP_DOCS/prod/documents/Report%20and%20Suggestions%20from%20IPEDS%20TRP%2037%20-%20FINAL.pdf

Jones, G. (2017, October 10). Expanding student success rates to reflect today's college students [Web log post]. Retrieved April 4, 2018 from: https://nces.ed.gov/blogs/nces/post/expanding-student-success-rates-to-reflect-today-s-college-students

Lambert, M., Zeman, K., Allen, M., & Bussiere, P. (2004). *Who pursues postsecondary education and why: Results from the youth in transition survey* (Research Paper, Catalogue no. 81-595-MIE no. 26. Ottawa, ON: Statistics Canada.

Ma, J., Baum, S. (2016, April). *Trends in community colleges: Enrollment, prices, student debt, and completion* (Research Brief). Retrieved April 4, 2018 from: https://trends.collegeboard.org/sites/default/files/trends-in-community-colleges-research-brief.pdf

Maritime Provinces Higher Education Commission (n.d.). *The Maritime Provinces Higher Education Commission mandate*. Retrieved April 4, 2018 from: http://www.mphec.ca/about/mandateandact.aspx

Martinello, F. (2008). *Student transitions and adjustments in Canadian post-secondary education* (MESA Project Research Paper 2008-7). Toronto, ON: Canadian Education Project.

Massachusetts Board of Higher Education (2007). *Final report from the task force on retention and completion rates at community colleges*. Retrieved April 4, 2018 from: http://www.mass.edu/bhe/lib/reports/CCTFReport.pdf

McCormick, A. C. (2003). Swirling and double-dipping: New patterns of student attendance and their implications for higher education. *New Directions for Higher Education 2003*(121), pp 13-24. doi: 10.1002/he.98.

McLaughlin, G.W., McLaughlin, J.E., McLaughlin, J.S., Howard, R.D., Whalen, S (2016, June). *Measuring the success of transfer students: A new metric evaluated*. Presented at the meeting of the Association for Institutional Research. Retrieved April 4, 2018 from: https://csrde.ou.edu/wp-content/uploads/Measuring_the_Success_of_Transfer_Students_A-New_Metric_Evaluated.pdf

National Center for Education Statistics (2017). IPEDS: Graduation Rates for Less than 2-year institutions: Does my institution need to report transfers-out? Retrieved May 11, 2018 from: https://surveys.nces.ed.gov/ipeds/VisFaqView.aspx?mode=reg&id=6&show=all - 184

National Center for Education Statistics (n.d.). *IPEDS: Find your college*. Retrieved April 4, 2018 from: https://nces.ed.gov/ipeds/Home/FindYourCollege

Parkin, A., & Baldwin, N. (2009). *Persistence in post-secondary education in Canada: The latest research* (Research Note no. 8). Montréal, QC: Canada Millennium Scholarship Foundation.

Shaienks, D., Eisl-Culkin, J., & Bussiere, P. (2006). *Follow up on education and labour market pathways of young Canadians aged 18 to 20 – Results from YITS Cycle 3* (Research Report, Catalogue no.81-595-MIE no. 45). Ottawa, ON: Statistics Canada.

Soldner, M., Smither, C., Parsons, K., Peek, A. (2016, May). *Toward improved measurement of student persistence and completion*. Washington, DC: American Institutes for Research.

Statistics Canada (2011). *Youth in Transition Survey*. Retrieved April 4, 2018 from:
http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=4435

Statistics Canada (2017). *Postsecondary Student Information System*. Retrieved April 4, 2018 from:
http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5017

Student Achievement Measure (2013a). *What is SAM?* Retrieved April 4, 2018 from:
http://www.studentachievementmeasure.org/about

University of Alberta (2018). *Academic Calendar 2018-2019: Letter of Permission.* Retrieved April 13, 2018 from: http://calendar.ualberta.ca/content.php?catoid=28&navoid=6988#letter-of-permission

U.S. Department of Education (2013, February 13). *Education Department releases college scorecard to help students choose best college for them*. Retrieved April 4, 2018 from:
https://www.ed.gov/news/press-releases/education-department-releases-college-scorecard-help-students-choose-best-college-them

Van Stolk, C., Tiessen, J., Clift, J., Ruth Levitt (2007). Student retention in higher education courses: International comparison. Cambridge, UK: RAND Corporation.

Appendix A - Key Questions for Faculty Representatives

1. Are you aware of any existing metrics (graduation rate, time to completion, retention rate are most common) that measure student success at the University of Alberta? Do these include transfer students / differentiate by direct entry / transfer?

2. What gaps do you perceive in the existing metrics? What would help you better understand the success of transfer students?

3. Are there particular data elements that we should include in a case study for UAlberta that would make the study particularly helpful to your unit within the institution?

4. Can you speak to the transfer student experience at the University of Alberta?

Appendix B - Data Structure

The base data provided by the institution was transformed into a number of database tables that could be utilized specifically for student success type analysis:
- term_tbl: a list of all terms included in this study
- student_term: this table houses enrolment records for each student in each term they were enrolled.
- student_program: this table houses records for each student at the time of admission. This table also houses bio-demographic information, where provided, including gender, indigenous status, and national status.
- student_progression_term: this tale brings together information from term_table, student_term, and student_program. It ensures that reporting on student status from the time of entry until 10 years in the future is conceptually possible (though limited by length of the dataset)

These tables, and the transformations required to build them, are further described in the sections that follow.

Base_Data_UofA_Admit_Term

This table contains "File 1 - Admit Term" as provided by the University of Alberta. It contains records from a single point in time - as of the Admission Term, or if the Admission Term was before the start of the study period, the first year of the study period. In addition to admission related records, in contains other static records from the student's career: demographic information, last school attended, transfer credits awarded, graduation date, and total credits passed from the student's start of studies to graduation.

Column	Data Type	Description	Source and Notes

institution_id	integer	Institution ID	Institutions.institution_id
institution_code	text	Institution short code	Institutions.institution_code
Cohort_Year	text	UAlberta reporting year for each cohort	Base data
anon_id	text	Student Anonymous ID	Originally "Student ID" in Base Data
Gender	text	Gender	Base data
National_Status	text	National Status	Base data
Aboriginal_Flag	text	Indigenous indicator (Y/N)	Base data
Aboriginal_Group	text	Detailed indicator of indigenous status	Base data
Admit_Type	text	Admit Type	Base Data
Admit_Term	text	Admit Term	Base Data
Original_Last_School	text	Last School Attended	Base Data
Original_Last_School_Province	text	Last School Attended Province / State	Base Data
Original_Last_School_Country	text	Last School Attended Country	Base Data
Credit_Transfer	integer	Transfer credits awarded at the time of admission	Base Data
Graduation_Date	text	Date of first graduation	Base Data
Totals_Credit_Passed_From_Start_to_Graduation	text	Credits passed from start of studies to graduation.	Base Data

Base_Data_UofA_Annual

This table contains "File 2 - Annual" as provided by the University of Alberta. It contains records from each UAlberta reporting year (an annualized summary of student enrolment) for each student.

Column	Data Type	Description	Source and Notes
institution_id	integer	Institution ID	Institutions.institution_id

institution_code	text	Institution short code	Institutions.institution_code
anon_id	text	Student Anonymous ID	Originally "Student ID" in Base Data
UA_Reporting_Year	text	UAlberta reporting year	Base Data
Academic_Load	text	Full-time or part-time	Base Data
Program_Faculty	text	Faculty or program name	Base Data
Courses_Dropped	integer	Number of courses dropped within the reporting year	Base Data
Credits_Passed_GPA	float	Credits passed (that count for GPA) within the reporting year	Base Data
Total_Credits_Passed	float	Total credits passed (credits for GPA plus credits not for GPA) within the reporting year	Base Data
Credits_Taken_for_GPA	float	Credits enrolled (that count for GPA) within the reporting year	Base Data
Credits_Taken_for_Progress	text	Credits enrolled (that count for progress, including those for GPA) within the reporting year	Base Data
GPA	text	Calculated grade point average within the reporting year	Base Data
Term_Indicator	text	Calculated indicator of which UAlberta terms are included in the reporting year for each student	Base Data

Term_Tbl

The term table takes recoded terms from the dataset provided by the University of Alberta and adds start and end dates to each.

Column	Data Type	Description	Source and Notes
institution_id	integer	Institution ID	Created for the study
ua_reporting_year	text	For UAlberta, this field is populated with an annualized year	
term	text	Term code	Annualized UAlberta reporting year (without hyphen)
institution_code	text	Institution Code (UofA)	Created for the study
term_start_date	text	Start date of the term	Annualized start date of September 1.
term_end_date	text	End date of the term	Annualized end date of August 30.

Student_Program

The Student_Program table is one of the main intermediate tables for the institutions. It contains all student records for every institution in the study, separated by institution_id. Many variables within this table are recoded for consistency with other institutions.

Column	Data Type	Description	Source and Notes
institution_id	integer	Institution ID	Institutions.institution_id
institution_code	text	Institution short code	Institutions.institution_code
anon_id	text	Student Anonymous ID	As provided by the institution.
admit_type	text	Basis of admission	As provided by the institution.
admit_term	text	Admit term, recoded	Admit term, recoded to match Term_tbl.term
program	text	Program, if provided. Faculty otherwise.	Institutional
plan_type	text	Coded manually as "Degree".	Institutional
graduated	text	Graduation flag (Y or N)	Created based on graduated date

graduated_term	text	Graduated term, if available	Created, based on graduated date
graduated_date	text	Graduated date, if available	Institutional
transfer_credits	text	Transfer credits at time of admission	Institutional
national_status	text	National Status	Recoded to D (Domestic), I (International), or U (Unknown)
indigenous	text	Indigenous status. This is based on the Aboriginal flag provided.	Recoded to Y or N.
gender	text	Gender	Recoded to F, M, O, or U.
age	text	Age, if provided.	Institutional
last_school	text	Last School Attended	Institutional
last_school_city	text	Last School Attended City	Institutional
last_school_state	text	Last School Attended Province or State	Institutional
last_school_type	text	Last School Attended Type, if provided	Institutional
program_length	text	Length of program	Created. This was proxied as 4 years.
last_school_country	text	Last School Attended Country	Institutional
admit_term_start_date	text	Start date of admit term	Term_tbl.term_start_date
admit_term_end_date	text	End date of admit term	Term_tbl.term_end_date
grad_term_start_date	text	Start date of grad term	Term_tbl.term_start_date
grad_term_end_date	text	End date of grad term	Term_tbl.term_end_date

admit_time_category	text	Determines whether a student is within the study period	Created. If student started on or after the first term reported by the institution, and and the student's first enrollment term is within the study period, then Standard. If the student was admitted prior to the study period, identify as such. If the student student's first enrollment term is before their admission term, identify this.
inst_first_term_in_dataset	text	Determines first term reported by the institution.	Min(term) for each institution.
ua_reporting_year	text	University of Alberta reporting year	Term_tbl.ua_reporting_year
stud_first_term_in_dataset	text	Student's first term in the dataset	Min(term) for each student.
stud_first_term_start_date	text	Start date of the first term for the student in the dataset	Term_tbl.term_start_date
stud_first_term_end_date	text	End date of the first term for the student in the dataset	Term_tbl.term_end_date
stud_last_term_in_dataset	text	Student's last term in the dataset	Max(term) for each student.
stud_last_term_start_date	text	Start date of the last term for the student in the dataset	Term_tbl.term_start_date
stud_last_term_end_date	text	End date of the last term for the student in the dataset	Term_tbl.term_end_date

Student_Term

At UAlberta the student_term table houses enrolment records for each student in each term they were enrolled, including information on annual performance (GPAs), progress (credits and withdrawals) and flags related to each student (first and last term in dataset, and how many total terms they have registered for).

Column	Data Type	Description	Source and Notes
institution_id	integer	Institution ID	Institutions.institution_id
institution_code	text	Institution short code	Institutions.institution_code
anon_id	text	Student Anonymous ID	As provided by the institution.
term	text	Term code	Institutional (recoded if needed)
term_gpa	text	Grade Point Average for the Term	Base Data
cumulative_gpa	text	Cumulative GPA as of the end of that Term	Base Data
term_academic_standing_code	text	Academic Standing Code for each term	Base Data
term_academic_standing_desc	text	Academic Standing Description for each term	Base Data
term_credits_enrolled	text	Credits enrolled for the Term	Institutional
term_credits_passed	text	Credits passed for the Term	Institutional
cumulative_earned_credits	text	Cumulative earned credits (as of that Term)	Calculated based on credits per term.
academic_load	text	Full or part-time status that term	Institutional
term_withdrawals	text	Number or credits of withdrawals that term	Institutional
ua_reporting_year	text	Annual year for the UAlberta	Institutional
ua_term_indicator	text	Term indicator for the UAlberta	Institutional
registered	text	Registered flag, for each term	Institutional
unique_key	text	Combination of institution_id and	Calculated

		anon_id	
term_start_date	text	Start date of term	Term_tbl.term_start_date
term_end_date	text	End date of term	Term_tbl.term_end_date
Student_Registered_Term_Count	text	Number of terms the student has registered in	Calculated
inst_first_term_in_dataset	text	Determines first term reported by the institution.	Earliest term for each institution.
ua_reporting_year	text	University of Alberta reporting year	Term_tbl.ua_reporting_year
stud_first_term_in_dataset	text	Student's first term in the dataset	Earliest term for each student.
stud_first_term_start_date	text	Start date of the first term for the student in the dataset	Term_tbl.term_start_date
stud_first_term_end_date	text	End date of the first term for the student in the dataset	Term_tbl.term_end_date
stud_last_term_in_dataset	text	Student's last term in the dataset	Max(term) for each student.
stud_last_term_start_date	text	Start date of the last term for the student in the dataset	Term_tbl.term_start_date
stud_last_term_end_date	text	End date of the last term for the student in the dataset	Term_tbl.term_end_date

Student_Progression_Term

At UAlberta the student_progression_term table takes the information in student_program for each student's admit term, and builds it out over time. First, it joins to each possible term where the term is greater than or equal to the admit term, and less than or equal to the admit term + 10 years. Then, a left join is performed against the student_term table. This ensures that for each admit cohort, all future terms are visible, regardless of whether the student registered in classes or not. This, in turn, allows for the calculation of the "Status" field.

Column	Data Type	Description	Source and Notes
institution_id	integer	Institution ID	Student_Program
institution_code	text	Institution short code	Student_Program
anon_id	text	Student Anonymous ID	Student_Program
admit_type	text	Basis of admission, as provided by the institution.	Student_Program
admit_term	text	Admit term, recoded	Student_Program
program	text	Program, if provided. Faculty otherwise.	Student_Program
plan_type	text	Plan Type, if provided. Otherwise coded manually as "Degree".	Student_Program
graduated	text	Graduation flag (Y or N)	Student_Program
graduated_term	text	Graduated term, if available	Student_Program
graduated_date	text	Graduated date, if available	Student_Program
transfer_credits	text	Transfer credits at time of admission	Student_Program
national_status	text	National Status	Student_Program
indigenous	text	Indigenous status, if provided.	Student_Program
gender	text	Gender	Student_Program
age	text	Age, if provided.	Student_Program
last_school	text	Last School Attended	Student_Program
last_school_city	text	Last School Attended City	Student_Program
last_school_state	text	Last School Attended Province or State	Student_Program
last_school_type	text	Last School Attended Type, if provided	Student_Program
program_length	text	Length of program	Student_Program

last_school_country	text	Last School Attended Country	Student_Program
admit_term_start_date	text	Start date of admit term	Term_tbl
admit_term_end_date	text	End date of admit term	Term_tbl
grad_term_start_date	text	Start date of grad term	Term_tbl
grad_term_end_date	text	End date of grad term	Term_tbl
ua_reporting_year	text	University of Alberta reporting year	Term_tbl
ua_term_indicator	text	University of Alberta Term indicator	Term_tbl
term	text	Term code	Student_Term
term_start_date	text	Start date of term	Student_Term
term_end_date	text	End date of term	Student_Term
term_gpa	text	Grade Point Average for the Term	Student_Term
cumulative_gpa	text	Cumulative GPA as of the end of that Term	Student_Term
term_academic_standing_code	text	Academic Standing Code for each term	Student_Term
term_academic_standing_desc	text	Academic Standing Description for each term	Student_Term
term_credits_enrolled	text	Credits enrolled for the Term	Student_Term
term_credits_passed	text	Credits passed for the Term	Student_Term
cumulative_earned_credits	text	Cumulative earned credits (as of that Term)	Student_Term
academic_load	text	Full or part-time status that term	Student_Term
term_withdrawals	text	Number or credits of withdrawals that term	Student_Term
registered	text	Registered flag, for each term	Student_Term

unique_key	text	Combination of institution_id and anon_id	Student_Term
Student_Registered_Term_Count	text	Number of terms the student has registered in	Student_Term
Status		Status, for measuring persistence. Student is either Registered, Graduated, or Left	Calculated
admit_time_category	text	Determines if the student's admit term is prior to the student's first term in the dataset	Student_Program
inst_first_term_in_dataset	text	Student's first enrolled term code in the dataset	Student_Term
term_name			Term_tbl
inst_first_term_in_dataset	text	Determines first term reported by the institution.	Earliest term for each institution.
stud_first_term_in_dataset	text	Student's first term in the dataset	Earliest term for each student.
stud_first_term_start_date	text	Start date of the first term for the student in the dataset	Term_tbl.term_start_date
stud_first_term_end_date	text	End date of the first term for the student in the dataset	Term_tbl.term_end_date
stud_last_term_in_dataset	text	Student's last term in the dataset	Max(term) for each student.
stud_last_term_start_date	text	Start date of the last term for the student in the dataset	Term_tbl.term_start_date
stud_last_term_end_date	text	End date of the last term for the student in the dataset	Term_tbl.term_end_date