****

**PROJECT SNAPSHOT**

**Understanding Transfer Student Experience and Outcomes through Business Intelligence Analytics**

**Type:** Seamless Transfer

**Project Number:** 2021-34 orS2134

**Project Lead:**Lakehead University

**Project Summary**

This project leveraged existing transfer student data sets developed through previous ONCAT projects to enhance the understanding of transfer student experiences and outcomes through the development of enhanced transfer student business intelligence visualizations. Through this project, Lakehead University constructed data models that improved the understanding of its transfer student experience and outcomes to support transfer student success and new transfer pathway opportunities. These datasets will also support decision-making related to strategic enrolment management and academic and non-academic supports for transfer students with the aim of improving transfer student outcomes. This work may also identify opportunities that can be leveraged by other Ontario post-secondary institutions to improve the experience and outcomes of transfer students across the province.

### Project Rationale

Lakehead’s commitment to equity and access to post-secondary education cannot be overstated. Since its inception, Lakehead has served a complex student body with complex needs by nurturing the potential of every student, as evidenced by the University’s strong graduation rates and related graduate employment outcomes. Lakehead’s ongoing commitment to equity and access is reflected in its 2018-2023 Strategic Plan and 2019-2024 Academic Plan, which both include commitments to improving student mobility through expanded transfer agreements/programs, college partnerships and transitional programming.

As university education becomes increasingly relevant in the future economy and the development of a highly skilled workforce, Lakehead remains committed to access and equity for students who face barriers to accessing post-secondary education, including transfer students. Within this context, Lakehead has been implementing strategic enrolment management throughout the university, developing a business visualization platform using Tableau that is accessible to members of the University community to access data and analysis focused on variables of student success, including:

* Historic enrolment
* Experiential learning
* Student demographics
* Retention and graduation rates
* Student engagement
* Graduate outcomes

While many of these data sets include subsets of data such as enrolment status, immigration status, and gender, Lakehead had not yet been in a position to consistently segment transfer students in these visualizations. Building on Lakehead’s work to date to expand its analytics capabilities, the findings of previous ONCAT projects, the learning of enhancements in bridging/transitioning, and targeted supports, this project allowed Lakehead to advance its capabilities in better understanding transfer student experiences with the goal of informing development of strategies to better prepare transfer students for success at Lakehead.

### Main Collaborators

* Project Sponsor: Dr. Heather Murchison, Vice-Provost (Institutional Planning & Analysis) ONCAT Liaison: Dr. Michel Beaulieu, Associate Vice-Provost (Special Projects)
* Project Manager: Andrea Warywoda, Sr. Analyst (Business Intelligence) Technical Expert: Elizabeth Stafford, Associate Vice-Provost (IPA) Technical Expert: Sarah Prouty, Research Analyst (Surveys)
* Research Analyst: Helen Otterman, Research Analyst (Business Intelligence) Project Support: Gillian Lavoie, Administrative Assistant

### Results

Phase 1: Initiation

Completed recruitment, onboarding & orientation and an internal Project Kick-Off meeting. Initial knowledge sharing and engagement of key internal stakeholders was completed throughout the project.

Phase 2: Data Collection

Completed literature review & environmental scan identifying common themes and variables to inform analysis. The team reviewed various business intelligence dashboards from post-secondary institutions and other sectors in Canada, the US and other jurisdictions to inform the project work. A longitudinal dataset of transfer students has been developed.

Phase 3&4:BI Development & Rolling Release of Visualizations

Development & roll out of data visualizations with focus on analyses related to transfer students enrolled at Lakehead in the following areas: historical enrolment, demographic characteristics, student experience, retention and graduation. The team also developed a Drop-Fail-Withdrawal analysis to better understand courses where transfer students may experience barriers to completion and to inform pedagogical and instructional strategies. The project team conducted an environmental scan of Ontario post-secondary institutions and research literature leveraging machine learning and predictive analysis to study student success and drop outs. The project team developed internal capacity and knowledge related to machine learning and predictive analysis by attending workshops gaining hands-on experiences with machine learning tools such as Tableau, Weka, KNIME, and Scikit Learn. The team completed some testing to inform ongoing training and testing of machine learning classification algorithms using Weka analyzing transfer student completion and reasons for dropout.

Phase 5: Project Close-Out & Monitoring

The project team regularly captured lessons learned and monitored the project schedule through regular project meetings and status updates. This approach worked well and aligned with the project goals and deliverables.

### Challenges

The team encountered insignificant to negligible challenges throughout the project duration. The project stayed on schedule, had no cost overruns and the scope was maintained. The project team established strong review and approval processes for the development of visualizations that worked very well.

### Student Outcomes

Lakehead University’s “Understanding Transfer Student Experience & Outcomes through Business Intelligence Analytics” has the following student-focused outcomes:

Data collected through the environmental scan may lead to future research questions, new interventions and strategies to support transfer student success at Lakehead.

With business intelligence datasets and analysis available to Deans and university administrators, better data-driven decisions can be made to support new pathways, interventions and supports, and pedagogical and instructional strategies to improve the transfer student experience and success at Lakehead.

Lessons learned from this project will inform future transfer-related project which will be focused on transfer student outcomes and success at Lakehead.

### Institutional Outcomes

Lakehead University’s “Understanding Transfer Student Experience & Outcomes through Business Intelligence Analytics” has the following institutional outcomes:

* Results from the environmental scan may inform future University policy development, interventions and supports that are specific to transfer students;
* Efficiencies in data cleaning of transfer student characteristics will help enable the University to respond to transfer student data needs moving forward;
* Visualizations available to Deans and academic support units reinforced a culture of data-driven decision making at Lakehead. As a result of this project, the project team has seen improved engagement and trust in the institutional data, which has increased engagement related to transfer student success and pathways.
* Having built some understanding and capacity in machine learning, the project team will continue research in this area, using machine learning tools to inform which students would benefit from early interventions and supports.

Findings from this project have been presented to the University’s Strategic Enrolment Management Steering Committee and are informing ongoing discussions related to building an understanding of the unique challenges faced by transfer students.

### Sector or System Implications

Through this project work, Lakehead University has developed business intelligence visualizations and analysis to inform planning and strategic enrolment management activities at the university through a transfer student lens. Key findings of this analysis present opportunities for sector-level knowledge exchange and system level initiatives tailored to transfer students. Specifically, Lakehead is now in a position to share:

* Its approach and learnings with peer institutions who may be developing similar data sets and analyses related to transfer student populations
* Key findings with government decision makers regarding some of the unique challenges facing transfer students

### Tips

While this project did not develop specific pathways, other institutions looking to develop of business intelligence dashboards and broader engagement of their internal community may benefit from the following recommendations:

* Leverage existing committees and structures to build engagement and buy-in for the project work. At Lakehead University this included the Data Quality Committee, Deans Council, Strategic Enrolment Management Executive and Steering Committees, Pathways & Transfer Committee as well as Enrolment Services and Provost Office.
* Active sponsorship and championing from the Provost and Vice-Provost (Institutional Planning & Analysis) helped gain buy-in from Faculty Deans supporting a data-driven culture at Lakehead.
* Schedule time in the project schedule to allow for the project team to familiarize themselves with various tools and gain hands-on experience to build confidence and familiarity.
* Incorporate project management practices at all stages of the project to maintain the project timeline and budget, specifically when working with constituents outside the core project team.

### Tools and Resources

The Lakehead University team developed the following tools and resources to support the project work:

Part 1) Environmental Scan

* An annotated bibliography based in Excel was developed including the author, title, year, summary of abstract, key research questions, data sources, research results, thematic elements and other notes which can be shared with others.

Part 2) Longitudinal Transfer Student Inventory across all years

* Using Tableau Prep, the Lakehead team used the Postsecondary Financial Information System – University Statistical Enrolment Report (PFIS-USER) and the ONCAT DataPilot template as a starting point, augmenting the dataset with the additional columns. For example, block vs. pathway transfer, transfer institution category, credits attempted vs. credits completed ratios, and access and inclusion characteristics. This approach can be shared with others.

Part 3) Business Intelligence Visualizations Development (Rolling Release)

* Visualizations were developed in Tableau and then uploaded to a cloud-based environment for users to view and interact with the data. Each visualization contains an Overview tab that includes details about the data source(s), information about the different views and analyses, criteria and inclusions, as well as any limitations within the dataset. Each workbook also includes a date stamp of when it was last updated. To date, this approach has been well received by users in their use of the data. While the specific data sets cannot be shared outside the University, the approach and structure of this work can be shared with others.

Part 4) Understanding Predictive Data Modelling & Machine Learning

* The work to date has been organic in nature, and very much a living document shared among the project team. The team has benefited from video tutorials and webinars where they have used sample datasets to get hands-on experiences with machine learning tools. This library of resources could be shared with others.

