To: Mark Richards, Provost

George Sandison, Faculty Senate Chair

From: Dan Ratner, Associate Professor of Bioengineering, (co-chair)
Helen B. Garrett, University Registrar and Chief Officer of Enrollment Information
Services, (co-chair)

RE: Enrollment Data and Analysis Workgroup Recommendations

Executive Summary

In support of the larger effort to implement a University of Washington strategic enrollment management plan, our group was charged with evaluating the current state of data and visualization tools for undergraduate enrollment management and to provide recommendations for data & analysis infrastructure to inform strategic enrollment decisions. The following report and appendices include a detailed summary of existing and needed tools, including an assessment of resources, timelines, and significance of the tools recommended for development. The following summary briefly outlines the key recommendations, focused on immediate and actionable items to support UW's enrollment needs. Additional details, including the complete set of recommendations from the committee, can be found in Appendix B, attached to this report.

For the purposes of facilitating discussion, supporting understanding of our data needs, and aligning our recommendations with the enrollment process, we have defined the enrollment management pathway by the following stages: **(1) Application, (2) Admissions & Enrollment, and (3) Tracking**. This pathway follows the normative flow of students into the University of Washington and their major, with the initial collection of their applications, followed by admissions and subsequent enrollment in the university, and tracking into majors. Grouping the committee's recommendations by stage made it easier to arrive at consensus, and ensured that data and visualization tools are implemented to support the entire enrollment management process.

Top recommendations by stage:

Application:

Applicant/admit pool demographics and visualization—Develop a visualization tool to describe and build a narrative around the freshman application pool, with granular data on residency, area of interest, demographics, and academic

preparation. This tool has been identified as an immediate priority for development.

Admissions & Enrollment:

Admissions modeling and predictive enrollment tool—Develop a granular yield-modeling tool to support forecasting for admissions to build an incoming freshman cohort based on the priorities established by UW faculty and leadership. The tool needs to include information about intended major, academic preparation, and additional relevant applicant characteristics (residency, etc…) to enable the admissions selection process and support a balanced incoming class that is prepared for success.

Cost per major analysis tools—Tuition and revenue are inextricably tied to admissions decision, however the conversation requires a better understanding of the cost to educate students based on major. While this recommendation falls outside the immediate scope of the committee, the relationship to enrollment planning and larger institution-wide conversations compelled us to keep it in the report.

Tracking:

UW major placement tool (MyMajor Hub)—Student placement into major was identified as the single largest gap in knowledge for student tracking, as application to major is **not** currently captured centrally. Not knowing when a student applies to a major, or how many times they attempt to get into a major, exposes the University's blind spot to the student experience. Placement into major has consistently been identified by our students as one of their top concerns. Tracking should extend through graduation, to enable post-graduation statistics on the student experience from application until graduation. Additionally, this tool should be capable of tracking transfer students as well as students with multiple majors, minors, and/or options. This tool was identified as an immediate and actionable recommendation for implementation.

Granular tools for tracking specific populations—Tracking first generation, URM, conditional admits, running start, students by residency, undeclared students, and other specific populations, requires additional tracking tools to follow students through their UW experience. This recommendation was identified by OMAD and other student serving groups (including UAA, departments, and the Retention Task Force) as a critical tool to support student success in an evolving enrollment landscape.

Academic unit internal activity and visualization—Create a shared data set with standards to report student major activity, including applicants, admits, denials,

demographics. This tool will support better institutional understanding of the student experience.

Key recommendations for immediate impact:

In the context of supporting data-informed strategic enrollment management, the workgroup identified three of the aforementioned recommendations as critical for immediate development and implementation.

- **MyMajor Hub --** Addresses the immediate shortcomings in our current system, which is unable to track student intention (e.g. which majors student apply to, how many times, if they are accepted/denied, etc.). Students have identified placement into increasingly capacity constrained majors as a significant detractor of their educational experience, and access to majors has a direct negative impact on student success.
- **Admissions modeling and predictive enrollment tool --** Supports more sophisticated enrollment practices that can address additional selection criteria, including area of academic interest, while facilitating improved predictions of yield, the ability to support new enrollment policies, and building a comprehensive and holistic incoming freshman cohort.
- **Determination of cost per major --** Capacity in majors and the UW's overall carrying capacity for undergraduates is partly defined by constraints in the differential costs to support students in their respective majors. While degree costs fall under the larger umbrella of university finance, they play an important role in enrollment decision making, and need to be part of the strategic enrollment management conversation.

Organization of report

This report is organized by the original charge letter to the workgroup (*italics*). The Committee's response is provided following each charge, and in some cases, additional details are available in the enclosed appendices.

Conclusions

The Data and Visualization/Analysis workgroup is committed to supporting strategic enrollment management practices that prioritize equity, access, and student success. While our workgroup is part of a larger conversation on enrollment goals, co-curricular development, and communications, we feel that the following recommendations represent critical resources that are needed to support data-informed decision making. Practices in enrollment management need to respond to the changing landscape in higher education and be able to support University policy makers, including both faculty leadership and administration. Therefore, whatever our enrollment goals may be in the years ahead, a data-informed approach will require usable tools that can analyze, predict, model, and evaluate results. To make this possible, we strongly urge the University to act now to implement these recommendations to support ongoing enrollment discussions and impending policy changes.

Charge Letter (*Italicized)* and Work Group Responses:

Charge:

With this letter we ask that you to serve on the Data and Analytics Work Group. This group will work on identifying and specifying the development of admissions, enrollment, and student outcome- related data and analytics. These data, analytics, and visualizations will allow for data-informed enrollment planning, management, and assessment. The scope of this group's work includes making recommendations in the following areas:

A. Evaluate the current state of data and analytics for undergraduate enrollment management.

Work in this area includes:

> *1. Develop an inventory of the data and visualizations that are currently available*
>
> *regarding enrollment management. This inventory should also include the location and/or access points for these data and visualizations.*

Response:

Data and Visualizations Available	Location/Access Points
Enterprise Data Warehouse	http://itconnect.uw.edu/work/data/use-data/connect-to-data/query-data/
UW-Seattle, Undergraduate Admissions Client Relationship Management (CRM)	https://crm.recruit.uw.edu/seattle (Paul Seegert, director Undergraduate Admissions)
Student Database	https://www.washington.edu/admin/adminsystems/sdb2/
EDW Admissions Dataset: UWSDBDataStore[1]	https://studentdata.washington.edu/system-access-forms/#SDBEDW
Electronic Academic Advising System (EARS)	http://www.washington.edu/students/ears/
UW Profiles Enrollment Summary	http://itconnect.uw.edu/work/data/use-data/uw-profiles/
Business Intelligence (BI) Portal	https://biportal.uw.edu/

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[1] University's admission data is available in the UWSDBDataStore, which is one of the many databases in EDW. Anybody with access to the EDW can access and query these data, however, historical records are not included, as it only shows the current state of the admissions records.

Charge:

> *2. Identify any issues associated with access to these data. Access should include the perspective of central, college/school, and departmental administration.*

Response:

- The Work Group assessed that there are five main gaps in the availability of admissions and enrollment management data to the full campus:
    1. We have data on what a student indicated as their preferred major on their admissions' applications, into what majors they successfully gain admission, and from which major(s) they graduate. We are missing all of the activity in between, in terms of preferred or intended majors, which majors they applied to, how many times they applied, and if they were rejected.
    2. We need to identify data points that are not currently gathered during the admissions process that may be useful for strategic enrollment management.
    3. Data from academic units such as the number of applicants, admits, denials, and students who have been dropped from the major after being admitted, and the students who have switched to different majors.
    4. Some units have noted that it can be difficult to navigate access to Seattle undergraduate admissions' data for entities outside of UW's Undergraduate Admissions' Office. While data are available in EDW, there are limited reports that match admissions data with current student behavior.
    5. No way to access course and program planning from student-generated data in MyPlan.
- The Work Groups' assessment of the issues related to access to data is that the main data repository for this data is not complete, widely accessible or easy to use. This data repository is the UW's Enterprise Data Warehouse (http://itconnect.uw.edu/work/data/about/).
- Individual reporting FTE in the various units who know how to use the EDW and to draw down information into their own data repositories are at an advantage when it comes to having access to data. The challenge is that not all units have reporting FTE or perhaps the ability to create strong secondary data repositories for use by unit faculty, staff, deans, and chairs.
- There is a wide variety of data existing in databases within the various units, but there is no standard format for presenting the data or guidelines to establish what data is collected, how it is presented, and to whom this data is available.
- There is no longer an active data governance committee in place to determine what the policies and procedures are around who has access to which data or not. Data is provided according to roles that were established by the Data

Management Committee in 2008. These roles often provide either too little, too much, or not the correct access which individuals are seeking. There is a new Data Governance structure on the horizon, and the Work Group looks forward to this having an impact by providing new UW policies designed to provide easier access to data for more individuals throughout the University community.

- There is not a clear inventory in place of the data that is available or if there is an inventory, it is not widely known that this exists. For individuals tasked with reporting, not knowing what it available and how to gain access is a huge mystery and a barrier to having the data they need.
- Thoughtful and strategic staffing is an issue across the University, and the domain of data analysis is not immune from questions of appropriate and strategic staffing and resource deployment. Since the Office of Planning & Budgeting was reorganized a little over one year ago, the Institutional Data & Analysis team was organized and staffed to maintain its responsibility for institutionally mandated reporting and institutional analyses for University leadership. It is not currently operating with sufficient capacity to support individual departmental level reporting or analysis, apart from *ad hoc* requests related to its areas of expertise (e.g., student activity; tuition and financial aid resource allocation). Depending on a units' resources, they may or may not have their own data analysts, which calls into question whether analysts are using like definitions, methodologies, and outputs. We recommend leveraging and building upon the data capabilities and partnerships with Enrollment Management and UW Information Technology.

A significant amount of data are available in the EDW today. As EDW is broadly accepted as an effective tool for making data available to the UW community the workgroup recommends leveraging its success by including additional relevant data elements in support of enrollment policy decision making.

Current State:
1. University's admission data is available in the UWSDBDataStore, which is one of the many databases in EDW. Anybody with access to the EDW can access and query these data. However, there are two major issues that make it hard or impossible to use it (we believe that these two issues can be resolved by our recommendations below):
    a. UWSDBDataStore has only the current admission data. These data cannot be used for any meaningful historical trending (because there is no history) nor for defining any predictive modeling.
    b. UWSDBDataStore is hard to use. Using UWSDBDataStore is painful and complex. The use of structures (tables) and relationships (joins) to reproduce institutional business process requires a skilled database resource and/or analyst to get information out of the system.
2. EDW does not have any departmental admission data

3. BI Portal/UW Profiles do not have any reports/visualization that would help administrators and/or advisors answer basic admission questions
4. EIIA does not have any admissions related (nor academic) analytical cubes

Recommendation:

Expose snapshots of UW's admission data in EDW for campus use

The EDW is the only system on campus that takes regular snapshots of the SDB system, including admission data. This process has continued for the past twelve years. However, this data is not exposed anywhere in EDW. Exposing this data in EDW would give anybody with access to EDW access to twelve years of data to do historical trend analysis, build predictive models, analize admission data using student attributes at any point-in-time. According to comments from some committee members, exposing this data in EDW would enable users to *"be able to use [past] data to model [future] outcomes -- that we outline many places in our recommendations where we currently are unable to build the models we might like due to lack of [convenient] access to data."*

Build analytical cubes to allow ad hoc analysis

Analysts should spend more time on investigating data to answer institutional questions rather than learning t-SQL syntax. Analytical cube(s) are built to answer business domain questions in an *ad hoc* fashion by allowing the analyst to drag and drop data fields in pivots. Cubes are built with predefined business logic and can contain large data sets going back years. Interacting with these large datasets is instantaneous. The end user will be able to slice the data by residency status, gender, URM, first-gen and other attributes.

Expand BI Portal and UW Profiles with additional dashboards/reports specific to admission within units.

University's leadership, senior leadership, administrators and advisors do not have any admission information available in either of these portals. These reports/visualizations can easily help users to answer questions related to Major Tracking and Cost (*"We need to know the cost to educate a student in different units"*). These tools would provide consistent reporting of demographic information.

Charge:

B. With the current state defined, determine data and analytics needs in the following areas:

    1. Comprehensive admit-to-enroll yield data.

Response:

- Prior yield patterns by category are utilized to predict future yield. We have clear admit-to-yield data from the prior year's admitted student behavior. There is interest in having a more granular level of post-mortem analysis that can be shared with policy makers and leadership across the institution to inform decisions for upcoming admissions cycles.

Charge:

2. Granular admit-to-enroll yield data. Examples include:

▪ Applicant area of academic interest (for example, admit-to-yield for non- domestic, resident students that indicated English as their intended major)

▪ Applicant admission pathway (for example, admit-to-yield for resident students directly admitted and not-directly admitted to the College of Engineering)

Response:

- Undergraduate Admissions needs an in-house data analytics team that develops reporting tools and models to support Enrollment Management decisions after the Holistic Review process is complete. Decisions are made within a period of one to two weeks and this support needs to be in-house, nimble, and responsive.
- If Undergraduate Admissions is to use academic area of interest as a determining factor of who is admitted into academic programs and/or as pre-majors, we need a more robust mechanism and reporting tool to support this activity.
- We need further granular data on those who "melted" and did not attend after indicating their intentions to enroll. This is especially key for URM and first-generation students.
- The Work Group identified granular data that entities beyond Undergraduate Admissions would like to have available on our admits each year:
  - Residency: Country, county state
  - Major on application
  - Demographic information: gender, race, ethnicity, 1st generation
  - Academic credentials or preparation: what have they taken and how have they performed and is this predictive to yield?
  - The application holistic review assessments
- Because of the new direct to X admissions' processes, there is an interest in more granular data for these admits/enrollees:
  - Residency by groups: Resident, non-resident, international, adding in county, country, state, high school
  - Academic area of interest/major

- ○ What is the yield on those admitted to a Direct to X program and the yield on those who applied, but were not admitted Direct to X?
  - ○ Academic preparation
  - ○ The academic profile of the applicants to the Direct to X programs: GPA, test scores, holistic review assessments
  - ○ Prior engagement with the UW (e.g. summer camps, bridge programs)
- ● Entities outside of Undergraduate Admissions would like:
  - ○ Historic data on what major students applied to, compared to who enrolled in what majors
  - ○ We need to enhance the current survey presented to all students at the point of their decisions to accept our offers or not and to make this survey data available to entities outside of Undergraduate Admissions
  - ○ Information on the tuition revenue and cost of enrollment into the various academic units

Charge:

3. Student persistence related to direct-to-unit admission policies.

Response:

- ● Data demonstrating how students admitted through Direct to X are faring and use this to model and make decisions on future Direct to X and internal admissions' processes.
  - ○ What students admitted Direct to X are leaving for other majors?
  - ○ Why are Direct to X students leaving for other majors?
  - ○ How are specific populations, such as URM, faring in the Direct to X admissions' program?
  - ○ What do we know about students who are not succeeding academically in Direct to X programs?

Charge:

4. Identifying and addressing the reporting needs of academic units to support unit-specific enrollment goals. These needs should include trends in unit enrollments.

Response:

- ● A tool or reporting process is needed for Undergraduate Admissions and internal academic units to anticipate and understand capacity in programs as a result of degrees being earned, courses offered, teaching faculty numbers, classroom space, and students leaving academic units.
- ● It appear that academic units are tracking data on students applying to,

enrolling in, and exiting from their programs. This data is in a wide variety of databases and is not standardized in formatting to allow for a central repository upon which to obtain this data for institution-wide use at the UW.

- In order to facilitate this, all academic units would need to contribute standardize data points to a central repository that can be utilized to track enrollment activities in and out of these units:
  - Applications to majors
  - Denials
  - Admissions
  - Intended major
  - Times applied to major
  - Transfers out
  - Students dropped from their desired majors

Charge:

5. Student academic trajectory. For example, what is the academic trajectory of a student admitted to the UW, but not directly to the College of Engineering? The level of granularity of interest includes:

▪ What degree programs are they interested in, and how does that interest change over time?

▪ What degree programs does a student apply to and when? Are they successful in admission to a given program?

Response:

- What major does a student indicate on their application, where are they admitted, and what is their path to earning their ultimate degree?
- We need data on individual student trajectories toward landing in a major from which they earn a degree. Having this data will allow other units to provide them with back-up plans and to market their programs to students trying to get into capacity constrained majors.
- We are missing data on why students are not choosing non-capacity constrained majors. Provisioning this data could help non-capacity constrained majors with reaching out to students and attracting them to consider their programs.
- We need a tool to track "Intended Major" by student to provide a mechanism of communication by advisers and programs for these students.
  - Could the field in MyUW for intended major be used for this purpose, or does this require a new tool, such as MyMajor Hub?
- What is the impact on students transferring in with advanced credit

(Running Start/AP/IB) and how is this impacting their progress toward admissions to a major and ultimately to earning their degree?

Charge:

C. Develop a prioritized list of data and visualization needs. Work in this area includes:

1. Given the areas identified in part B, identify what data and/or visualizations already exist to address these area needs, and also identify areas where data/analytics development is required.

Response:

Refer to Appendix B, reflecting our prioritized recommendations.

Charge:

2. Develop a prioritized list of development work. For each item on the list, identify any potential barriers to its implementation, resources required for implementation, and an estimated timeline for implementation.

Response:

Refer to Appendix B, reflecting our prioritized recommendations.

Charge:

3. Make any recommendations regarding access to data and/or visualizations that would improve the availability of this information to parties charged with evaluating enrollment management policies and outcomes.

Response:

Refer to Appendix B, reflecting our prioritized recommendations.

Charge:

Many other institutions have launched significant initiatives in the area of academic data visualization, including the University of Michigan and Indiana University. We ask that you contact a few peer institutions to learn about best practices that may be included in your recommendations.

Response:

<u>Peer Responses</u>:

See Appendix C which provides survey responses from peers interviewed from :

- Drexel University
- The University of Texas at Austin
- University of California, Berkeley
- University of Illinois at Urbana/Champaign
- University of Minnesota Twin Cities
- Vanderbilt University

Themes that stood out from the survey:

1) Everyone we surveyed enrolls via some mechanism that takes student academic interest into account (direct-to-college, direct-to-major).

2) Access to data is contentious. The data guardians recognize that this data is sensitive, even requiring confidentiality in one case.

3) The reporting tool of choice was Tableau.

4) A highlight quote was:

> "We can occasionally out-smart ourselves. We develop sophisticated analytic tools that should in theory make us better able to predict enrollment, only to find that simple projections that ignore the noise of the life choices of 18-year olds are often more reliable."

Individuals were approached to provide feedback from the University of Michigan and Indiana University, but they chose not to participate. We did have an extensive conversation with the University Registrar at the University of Michigan, regarding their academic data visualizations utilized for enrollment management and he was not familiar with this reference. He indicated that an enrollment committee, consisting of academic deans, admissions leadership, and the registrar meets throughout the year to determine the number of spots available to offer for admissions in each unit, based on the number of graduating students and never surpassing a freshman class of 6700. Individuals in the academic units are trained to perform holistic review along with the admissions office, and together they make decisions on admission to the majors and the University, for undeclared students or those who were not directly admitted to their major of choice.

The survey results demonstrated that these institutions have data focused positions, often within Enrollment Management, dedicated to managing data designed to strategically manage enrollment. Slate and Tableau were popular tools utilized for

modeling and reporting and the majority admit their students directly into the major.

Helen Garrett attended an Advanced Analytics meeting at the University of Pittsburgh in October that was a convening of Enrollment Management professionals from over forty different universities. The conversation did not center on how to use data to manage the high interest and demand for STEM majors, but instead on how to find more and stronger applicants, how to increase the number of URM students, and how to raise the four, five, and six year graduation rates. When Helen approached the enrollment leaders to ask what they were doing about managing too many students desiring capacity constrained programs, the response was nearly unanimous that these institutions had since moved to admissions that considers area of academic interest to manage this challenge.

Appendices

A.   Data and Analytics Work Group Membership

B.   Final Recommendations

C.   Peer Institution Survey feedback

Appendix A

Data and Analytics Work Group Membership

Data and Analytics Work Group Member	Title	Unit
Dan Ratner (co-chair)	Associate Professor; Member, Faculty Council on Academic Standards; Chair, Subcommittee on Admissions and Graduation	Bioengineering
Helen B. Garrett (co-chair)	University Registrar and Chief Officer of Enrollment Information Services	Enrollment Management
Dori Bloom	Senior Computer Specialist	College of Arts and Sciences
Anja Canfield-Budde	Associate Vice President for Information Management	UW Information Technology
Melody Gilbert	Director of Institutional Research	College of Education
Dan Grossman	Professor, Member, Senate Committee on Planning and Budgeting	Computer Science and Engineering
Erin Guthrie	Director of Institutional Data and Analysis	Office of Planning and Budgeting
Suzanne Hawley	Divisional Dean for Natural Sciences	College of Arts and Sciences
Michaelann Jundt	Associate Dean	Undergraduate Academic Affairs
Paul Seegert	Director of Admissions	Enrollment Management

<u>Ex Officio</u>

Megan Davis	Associate Director of Financial Aid	Enrollment Management
Marcus Hirsch	Technology Project Manager	Academic and Student Affairs
Emily Leggio	Senior Associate Director	Enrollment Management
Neal MacCannell	Director of Departmental Computing	Enrollment Management

<u>Additional Contributors</u>

Anne Althauser	Institutional Data and Research Analyst	Office of Planning and Budgeting
Robin Neal	Director, EOP	Minority Affairs & Diversity
Matt Portwood	Technology Product Manager	EIIA, UW-Information Technology
Bartosz Pietrzak	Senior Technology Manager	EIIA, UW-Information Technology
Dan Feetham	Director of Advising	Undergraduate Academic Affairs

Appendix B

Workgroup Recommendations by Stage

We have defined the enrollment management pathway by the following stages: **(1) Application, (2) Admissions & Enrollment, and (3) Tracking**. The following recommendations are arranged by stage. Each recommendation will include:
- Title
- Description
- Potential barriers to implementation
- Resources required for implementation
- Justification/consequences for failure to implement

*Recommendations are **not** sorted according to priority or ranking. Please see executive summary for list of top recommendations from the workgroup.* Top recommendations are highlighted in green.

Recommendations for Application Stage:

Process to Obtain Additional Granular Data on Students
> *Description*
>> Granular data not currently available, such as languages spoken at home, Health Professions' interest.
> *Potential barriers to implementation*
>> Adding these items to existing admissions applications
> *Resources required for implementation*
>> Partnership with Undergraduate Admissions to add these questions to admissions' application. Provost and Faculty Governance support to do so.
> *Justification/consequences for failure to implement*
>> Unable to track these key pieces of information not yet asked of applicants that can have an impact on their progress toward graduation.

Freshman Applicant/Admit Pool Demographics Visualization
> *Description*
>> Visualizations on the freshman applicant pool. Granular data on admits and those who enroll: Residency status (country and state), major on application, demographic info, academic credentials or preparation
> *Potential barriers to implementation*
>> Timing and confidentiality of this data would need to be addressed. This does not exist as a data set available outside of Undergraduate Admissions and some of it may not be captured with the admissions' application
> *Resources required for implementation*
>> FTE with a data scientist in Enrollment Management

Justification/consequences for failure to implement

There is interest in knowing more about the demographics of those who have applied, and in particular who were denied and/or did not accept the admissions offer. There is a belief that by knowing more about the applicants, we can use this to both choose the class and understand those who were not admitted and/or who did not accept our offer

Recommendations for Admissions and Enrollment Stage:

Initial Applicant/Admit Analytics Tools

Description

1) A method by which to more scientifically predict summer melt for freshman admits who have confirmed their intentions to enroll for autumn quarter and to obtain enhanced data (i.e. demographics) on this population 2) Statistics on students that do not accept admissions offers. Focusing on areas of interest, demographic factors, and possible reasons for going elsewhere. 3) Qualitative data: why students choose not to attend UW; this information may be collected by admissions, but is not available on BI Tools

Potential barriers to implementation

Not having FTE in Enrollment Management to assist with the data gathering and compiling of known data from prior year melt activity and from First Year Program data collected. Challenges tracking these students as they do not end up attending UW and staying in our systems. Providing access to these on BI Tools

Resources required for implementation

Data Analysis FTE in Enrollment Management. New FTE to build reports using EDW and BI tools. Some data already exists at the National Student Clearinghouse. Do a better job of consistently organizing this information into an interpretable form and disseminating it to interested parties. Some data already exists from the NSC.

Justification/consequences for failure to implement

Having this data will assist Admissions and the University with enhanced information to anticipate melt and to focus on messages to populations most likely to be in the melt group. Not fully understanding why students do not attend UW

Undergraduate Admissions Modeling and Predictive Tool

Description

Granular yield modeling data and visualizations, and "selection tools" to be used by Undergraduate Admissions to translate the desired models into decisions. Creating an enrollment forecasting tool that looks at the current student body enrollment, resident vs. non-resident, etc..

Potential barriers to implementation

Resources required for Undergraduate Admissions to develop this model and visualization tools. Imbedded data analytics/data scientist resources in Enrollment Management.

Resources required for implementation

Development required, and on-going maintenance.

Justification/consequences for failure to implement

Nuanced direct-to X admission cannot be carried out, and enrollment goals cannot be met without these data/visualizations and tools. This needs to have flexibility to be able to use this to determine freshmen and transfer admissions and to utilize all of the factors related to these two groups to make the ultimate admission decisions.It is short sighted to determine freshman admit numbers without looking at the full composition of the student body.

Cost per Major Analytics

Description

Data on cost to educate student depending on their major in a particular academic unit. Impact on tuition revenue based on admission and enrollment data

Potential barriers to implementation

This does not exist as a data set at this time. It can be retrieved with a report being written. Would this be data that OPB and academic units are willing to make globally available?

Resources required for implementation

Office of Planning and Budgeting FTE staff resources and ability to prioritize and deliver data

Justification/consequences for failure to implement

Cost per student differs across units. This impacts resource, revenue and investment decisions. Those should be based on actual data. The issue of tuition revenue is on enrollment planners' minds and is a data point that is of value for planning.

Challenging "Known Data Stories" with Analytics

Description

Capturing known trends (i.e. 50% of Econ majors are Intl students) in a graphical interface so that these trends and themes are obvious to all

Potential barriers to implementation

Finding these "known" truths and finding a way to present that these are accurate and true visually will take some intense data scientist analysic coupled with expert storytellers

Resources required for implementation

Hiring Enrollment Management data scientist FTE to gather, track, and visualize these truths

Justification/consequences for failure to implement

We hear experts speaking in truthful and credible circles about reporting themes and truths. We need to make sure this is not folklore, but measurable and a visibly and accessible truth.

Analytic Tools for Tracking Specific Populations

Description

Access to enrollment patterns for specific populations such as URM, First Generation, Undeclared - Pre-Majors, Conditional Admits

Potential barriers to implementation

Access to databases in units tracking this information.

Resources required for implementation

Conversation with units capturing this information and creating a mechanism to make this data available globally within the UW.

Justification/consequences for failure to implement

It is vital that these populations to be tracked on access to major, progress toward graduation, and accessing enrollment patterns

Interface between Need for Access to Data Analytics and new University Data Goverance

Description

Once new University Data Governance model is implemented, partner with them to discuss access issues and advocate for need for visualizations for initial and internal admissions activity

Potential barriers to implementation

If a process cannot be agreed upon for uniform data records' access granting, training, and provisioning, this will be a barrier

Resources required for implementation

Provost support and endorsement of the new Data Governance mdoel

Justification/consequences for failure to implement

There is a need for standardized access requesting, granting, and training so that there is uniform access to enrollment data. The data is there; it is just a matter of creating access and visualizations to make it more uniformly available.

Global UW Database Inventory

Description

University global database and report inventory and repository

Potential barriers to implementation

Time to gather a repository of all possible visualizations and databases that exist

Resources required for implementation

Provost support and endorsement. UW-IT FTE dedicated to its creation.

Justification/consequences for failure to implement

Individuals only know what data they have access to by what they have been granted or exposed to. With a transparent inventory of all databases and sources, and an established and standardized mechanism for requesting access,

provisioning access, providing training, the issue of fairness and equity to data will be addressed.

Census Day Post-Mortem Analysis

Description

Perform Census Day post-mortem on autumn quarter first time enrollment

Potential barriers to implementation

FTE with a data scientist in Enrollment Management

Resources required for implementation

FTE with a data scientist in Enrollment Management

Justification/consequences for failure to implement

Being able to know at a more granular level which students converted from admit to enroll could assist with marketing and recruitment activities, as well as assist with decision making in March. Create a process to model future admission decisions based on the analysis of the data on who enrolled.

Advanced Credit Data Visualization

Description

Data on students bringing advanced credits (AP/IB/Running Start) at the point of enrollment

Potential barriers to implementation

This does not exist as a data set at this time. It can be retrieved with a report being written.

Resources required for implementation

FTE with a data scientist in Enrollment Management

Justification/consequences for failure to implement

This data can have an impact on course selection and especially on the College of Arts and Sciences

Recommendations for Tracking Stage:

UW Academic Unit Internal Admission Activity Visualization Tool

Description

Visualization tool providing data on applicants, admits, denials, demographics for students applying to internal UW academic units. Academic Unit shared data set with standards on data reported on student major activity

Potential barriers to implementation

Academic units may not want to share this information or feel that they do not have capacity to provide this. Data shared would need to be done so in a standardized format and this could be challenging to require and procure from each individual academic unit.

Resources required for implementation

Provost support for the creation of this data visualization, FTE in Enrollment Management to collect, organize, and provide access to this data tool.

Justification/consequences for failure to implement

There is a lack of transparency for student and enrollment planners as to the numbers of students admitted and denied to internal academic units and the absence of a database upon which to track and use this information. There is a need for a data repository with standardized and granular information on the activity related to internal admissions by UW students. Academic units want to be able to know where students are in terms of current and intended major. Students are asking to have different pathways available to them to be able to move along more than one pathway to meet their graduation goals

MyMajor Hub Tool

Description

Creation of a "MyMajor Hub" application and tracking tool that allows current UW students, both as pre-majors and those admitted into a major to provide signal their intended major. This MyMajor Hub would also provide the place from which students would find the application for UW academic units requiring an internal application. This "MyMajor Hub" would provide a mechanism for reporting on student major activity and provide a mechanism for communicating with students information on their major in the Student Database, as well as those they had indicated as intended major. This tool would also provide a mechanism for approved majors changes, alleviating the need for the student to take a paper form to their previous and future advisers to be delivered to the Office of the University Registrar for processing. Mechanism to track on students who are admitted to a major and then are required to leave that program

Potential barriers to implementation

There is not a current mechanism in place to track this data or to provide internal UW students with a way to indicate their intended majors

Resources required for implementation

Workflow based tool designed to capture student's pre-admission/post-enrollment major intentions and action related to applying to programs and being admitted or denied. (i.e. Common Application tool for internal admissions)

Justification/consequences for failure to implement

Failure to track on student intentions will mean we will continue to operate in the dark in terms of not knowing how many attempts students are making for a desired major, what majors students are "parking in" while they await admission, and the continued absence of a means to report on student's behavior between UW and internal department admission. This will also provide a process for students to find the application for admission to internal UW academic units and once admitted a built in workflow to "automate" the major change. Knowing students' intended major provides a data point and an opportunity to market

information on intended majors to students. Being able to track students who have not succeeded in a major and may be major shopping or in a major they did not initially choose will allow for academic support of these students at a level that may be currently missing. Academic units want to be able to know where students are in terms of current and intended major. Students are asking to have different pathways available to them to be able to move along more than one pathway to meet their graduation goals.

Internal Academic Unit Admissions Modeling Tool

Description

Incoming/outgoing intended major modeling tool for enrollment planning. "2D grid" of what student had as major(s) choice at matriculation and what in which major(s) they earned a degree.

Potential barriers to implementation

Definitional challenges with pre-major status and double majors/degrees. Want to be able to drill down into any entry in the grid to consider student demographics.

Resources required for implementation

Data should already exist, so just challenge of creating a useful output format and visualization (even a table of data may suffice however)

Justification/consequences for failure to implement

Essential for successful enrollment targets in a direct-to-X world as we expect and want natural flows among majors provided we can model them. The goal is not to lock students in but rather to create a freshman cohort better aligned to capacity and student demand. Intention is to have access to granular data to impact enrollment planning and decisions.

Academic Unit Capacity Analytics Tool

Description

Method of measuring capacity within majors

Potential barriers to implementation

Difficult to define and calculation will need to be from scratch/ground up

Resources required for implementation

All units/majors' participation and input in how they define and measure capacity currently

Justification/consequences for failure to implement

Centrally, we will have a hard time planning for admissions if future capacity of majors is unknown

Direct to X Data

Description

Direct to X Data: How are students performing in their Direct to X major? Are they staying in this major? How are specific groups (i.e. URM) performing?

Potential barriers to implementation

This does not exist as a data set at this time. It can be retrieved with a report being written.

Resources required for implementation

FTE with a data scientist in Enrollment Management

Justification/consequences for failure to implement

While it is early on DTC and DTM is yet to come, it will be a data point that will be of high interest for enrollment planners. Certain units, such as OMAD, does monitor this now, but it is done through ad hoc or specific report writing and individual student tracking.

Student Success Initiative Data

Description

Accessing data from units focusing on access and student success, such as the STEM Dawgs program in Chemistry

Potential barriers to implementation

Finding a foolproof mechanism to identify these data sets within academic and student support units

Resources required for implementation

Creating a place to store this data as retrieved

Justification/consequences for failure to implement

Helpful to know what data is being tracked on students associated with the various access and student success initiatives. Provides further mechanisms to reach these students.

Appendix C

Data and Analytics Work Group Peer Survey Results -- Autumn 2018

What institution do you represent?

- Drexel University
- The University of Texas at Austin
- University of California, Berkeley
- University of Illinois at Urbana/Champaign
- University of Minnesota Twin Cities
- Vanderbilt University

We would like to understand who in your organization sets enrollment goals for incoming freshmen and transfer students (i.e. target enrollment numbers, residency blend, intended majors/areas of interest, etc...). Please list all positions by title and department/unit that are responsible for determining enrollment goals for entering freshmen and transfers.

- President: Sets total enrollment goal. Provost: Provides individual college/school enrollment goals. Senior Vice Provost: Finalizes goals from President and Provost and provides to Executive Director of Admissions. Executive Director of Admissions: Works with enrollment analytics to recommend admitted class offer goals to yield desired enrollment. Individual Deans/Associate Deans: Works with Provost if recommended numbers are not aligned with their needs.

- Provost and Vice Provost, in consultation with collegiate Deans and Executive Director of Admissions

- We take a bottom up enrollment targets approach. Admissions negotiates with the colleges to set targets by residency and majors and then tries our best to match their preferences to the expectations of the Provost Office, which are typically budget focused. I am willing to share our enrollment target memo with you if you would like. Provost, CFO, Vice Provost for Undergrad Ed, Associate Provost for Enrollment Management, Admissions Director, Colleges Associate Deans for Admissions, Department Chairs

- Chancellor, Executive Vice Chancellor & Provost, Vice Chancellor, Undergraduate Education Vice Chancellor, Student Affairs Vice President for Institutional Research & Academic Planning (IRAP), Office of the President In coordination with the individuals above, the following positions assist executive leadership in establishing enrollment targets: Undergraduate Deans of the University Schools and Colleges Associate Vice Chancellor, Financial Planning & Analysis Director of Admissions/Assistant Vice Chancellor, Admissions and Enrollment Associate Director, Undergraduate Admissions Institutional Research Analysts, Office of Planning & Analysis

- Vice Provost of Enrollment, Provost

- SVP Enrollment Management & Student Success VP and Dean of Admissions, Associate VP Enrollment Analytics, Executive VP, Treasurer, and COO and Executive VP and Provost Deans of each college

If enrollment management goals are supported by additional staff who contribute analytics and visualization tools to help determine enrollment goals, please list the title of these support positions and which unit they report to.

- Enrollment Analytics reports to Enrollment Management and is led by an Associate Vice Provost and has a systems analyst and two data analysts.

- Data Analyst, Office of Admissions; Director of Analytics and Data Analyst, Office of Undergraduate Education

- Director of Admissions Operations, Director of Enrollment Management Analytics

- Analysts in the Office of Planning & Analysis contribute the analytics and visualization tools for this effort.

- Senior Associate Director & 2- Associate Director of Institutional Research, 3 Research Analyst, all in the Institutional Research unit.

- The Enrollment Analytics team, which reports directly to Enrollment Management & Student Success, provides analytical support to determine enrollment goals.

What student information system do you use?

Value	Count
Ellucian/Banner	2
PeopleSoft/Oracle Campus Solutions	1
Homegrown	1
PeopleSoft	1
Changing to Slate, feeding into PeopleSoft	1

What third party software is used for initial or internal enrollment management activities?

- Slate

- SalesForce, Slate, Tableau

- Tableau, Slate, Home grown web apps

- In addition to our data warehouse, we leverage open source technologies such as Python and Javascript to for our modeling calculations and scenario planning tools. The Office of Undergraduate Admissions uses Slate for all admissions-management work, including queries and reports that aid in enrollment management and the actual

selection and coding of admit status for applicants. The Associate Director in Undergraduate Admissions who leads data analysis efforts and assists the Director with enrollment management uses a mix of SAS, and Excel (in addition to Slate).

- None - all custom built

- Slate, Banner, R, Shiny, Hyperion, and soon, OBIEE

Within your organization, where/who does Enrollment Management report to?

- The Provost

- Undergraduate Education (Vice Provost)

- Provost

- Enrollment management as a distinct department does not exist at our institution. The functions related to enrollment management report to the Vice Chancellor - Undergraduate Education, the Vice Chancellor - Student Affairs (i.e., Office of Undergraduate Admissions), and the Vice Chancellor - Finance (i.e., Office of Planning & Analysis).

- EM reports directly to the Provost

- President's Office

To the best of your knowledge, what method is used to determine your institution's annual freshman enrollment goals/numbers (including total enrollment, residency blend, intended major, etc...)?

- I am not sure I completely understand what is meant by method. We predict enrollment considering historical yield data, though the prior year yield rate is generally the most accurate. We are legislatively mandated to cap out of state enrollment at 10%, and of the remaining 90%, 75% are admitted based on the automatic admit law. Within each individual college/school, there is not much variation from year to year other than to adjust for modified yield rates.

- Collegiate space availability, academic metrics, total enrollment

- University/College budget requirements, seat capacity in high demand programs, residency blend, intended major

- We determine the total number of freshmen, in part, based on a traditional term-to-term continuation rate model to predict retention based on entering freshmen and transfer cohorts. We further take into account the residency blend, as well as the goal of maintaining a 2:1 freshman to transfer ratio for our incoming California residents.

- I am not in those meetings. That is a joint process worked on between the Provost, Vice Provost for EM, and sometimes the Academic Deans.

- Our institution has undertaken a radical shift to its enrollment strategy, which has led to some financial challenges in recent years. After each cycle, we have modified the overall enrollment goal according to the enrollment attained the previous year. We apply similar thinking to the college- and program-level targets, but if we know that a particular program is positioned to grow or contract, we adjust those targets in collaboration with the deans. That said, we have enrolled our two largest freshman classes the previous two cycles, and there is some desire to set an overall target at a lower level than our current enrollment to boost the academic quality of the class.

Does your institution use Direct to College/Major/Program admissions? If so, which colleges/majors/programs?

- We admit students directly to the majors within their college/school, except for Business to which students are admitted only to the School of Business. We have enrollment targets for each college/school, and for Engineering, Education, and Geosciences, we have targets by major. Also, we have individual targets for auto-admit students, non-auto admit state Residents, Non-Residents, and Foreign.

- Yes, all 7 undergraduate colleges (Science and Engineering; Food, Agricultural and Natural Resources; School of Management; Liberal Arts; Design; Education and Human Development; Biological Sciences) Within the College of Design, we admit to major as well

- Yes, majors

- First-time freshmen admitted to the Colleges of Chemistry and Engineering are admitted directly to a major. All other freshmen are admitted to a college. They must declare a major by no later than the end of their sophomore year. Transfer applicants to all but the College of Letters and Science (L&S) are admitted to a major. In L&S students are evaluated based on preparation for a major but are admitted to a Division (large department that comprises groups of like majors). These students must declare a major by the end of their first term on campus.

- Yes to college, only to major in one of the 4 colleges. The vast majority are not admitted to major.

- Yes, nearly all of our admissions decisions are direct to the major designated by the student. The only exception is that some students are denied to their first-choice major and are admitted instead to our first-year exploratory studies program. After successfully completing that program, students may transition to their original major.

What role does faculty governance play in freshmen/transfer admissions, as well as internal/departmental/college admissions?

- Faculty governance plays a minimal role. There is technically a committee to handle this, but it mainly just informational.

- None

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- Admissions Subcommittee of Academic Senate reviews admissions issues biannually (or more often if needed).

- Our Academic Senate has decision rights over campus admissions policies, via the Admissions, Enrollment, and Preparatory Education (AEPE) committee. AEPE further works closely with our Office of Undergraduate Admissions to implement admissions policies.

- I cannot answer this.

- For prospective freshmen, we collaborate with the deans and associate deans to identify characteristics of students who will be successful in their colleges/programs. Prior to the release of admissions decisions, we meet with each college to discuss students who are close to the criteria set by the college to make final decisions. The academic units are much more involved in transfer admissions, particularly with credit articulation to our programs and to determine admissibility.

Do you have a mechanism to track student major intentions (e.g. application to major; accept/deny decision)? If so, what is that mechanism?

- Students apply to first choice majors on their admission application.

- Tableau

- Application to major and accept/deny decisions

- We capture an intended major when students submit an application for undergraduate admission and track persistence to major declaration and degree. We currently have no structured way of tracking data regarding the acceptance/denial of admission into various major programs.

- We just watch major for people applying to our school of education via SPSS files and BI reports.

- We allow students to designate their first-choice major on their application, and a majority of students do so. We ask students if they are interested in being considered to alternative programs should they not be admitted to their first choice. If students indicate they are willing to be considered for alternative programs and if they do not meet the minimum qualifications for their first-choice program, we may deny them admission to their first-choice major and consider them for an alternative. We use a combination of standard admissions codes (accept/deny/etc.) with decision-reason codes that divulge whether a particular student has been admitted to an alternative program.

How accessible are your visualization/reporting data/tools for enrollment activity at the university and departmental admissions level? Does everyone have access? How is this access controlled?

- They have historically been hard to access. We have begun to roll out new visualizations through tableau to college/school representatives as of this last month. Access is controlled by our Enrollment Analytics team, and users have to sign a confidentiality agreement.

- Accessible to collegiate associate deans and their designates. Access is controlled by the Office of Admissions in consultation with the Vice Provost.

- Limited to Admissions and Provost staff only, but we are exploring sharing this data with the colleges

- Only specific people have access to our enrollment visualizations and tools. We deploy our tools on secure web pages requiring CAS authentication and using Grouper to manage authorization.

- Access is controlled by the Vice Provost of Enrollment Management. Tools are highly visible to various offices, and only summaries given to other offices.

- Final data at the aggregate- and department-level are published by the Office of Planning and Institutional Research to a Tableau server that is available to the community with a log-in request. I believe that any faculty or staff can request access to this information. During the admissions cycle, point-in-time admissions information (current numbers of applications, offers of admission, and deposits, for example) is available to faculty and staff who have access to Hyperion. I believe the bar for access is low. We keep tight control, however, of admissions and financial aid projections while the cycle is ongoing to prevent misinterpretation of the data. We provide admissions projections on an ad hoc basis to deans and faculty, but I can only think of a few such requests in the middle of the cycle in the four years I've been at X Senior leadership of the University and of the division of Enrollment Management & Student Success has access to admissions and financial aid projections.

What data/visualization/tool, if any, do you wish were available to support your institution's strategic enrollment management goals?

- Tableau

- Tableau has really solved a number of our concerns, we are just now beginning to use Slate, so we haven't realized the full potential there.

- Various tableau tables

- It would be helpful if certain data (such as admissions pipeline data) were available. We have access to most of the tools we currently need to build visualizations and tools in support of enrollment management.

- Home grown tool, Oracle Business Intelligence, starting to use Tableau

- None.

Do you have any other comments or observations that you feel were not addressed in the questions above.

- We can occasionally out-smart ourselves. We develop sophisticated analytic tools that should in theory make us better able to predict enrollment, only to find that simple projections that ignore the noise of the life choices of 18-year olds are often more reliable.

- No

- We recently transitioned from a top-down, current-services budget model to RCM, and our methods for setting enrollment targets haven't necessarily evolved to this change at the present time. We still set an overall enrollment and budget goal as central administration and fill in the blanks for each college and program. Deans certainly have say in how many students we intend to enroll, and most of our programs are willing to enroll as many students that wish to come. Over time, I anticipate that the deans will drive the process of setting enrollment targets more than they currently are, but at our maturity level of RCM, we are not quite there yet.