

# Data Analytics in Higher Education

Institutional Research Committee  
(IRC) - Wisconsin Technical Colleges

Fall 2023 Convening



# Models for Utilization of Data

History and Potential Futures



Why
Metric
Struggle

Corporate  
Selling and Control Cost  
Granularity  
Point in Time Data

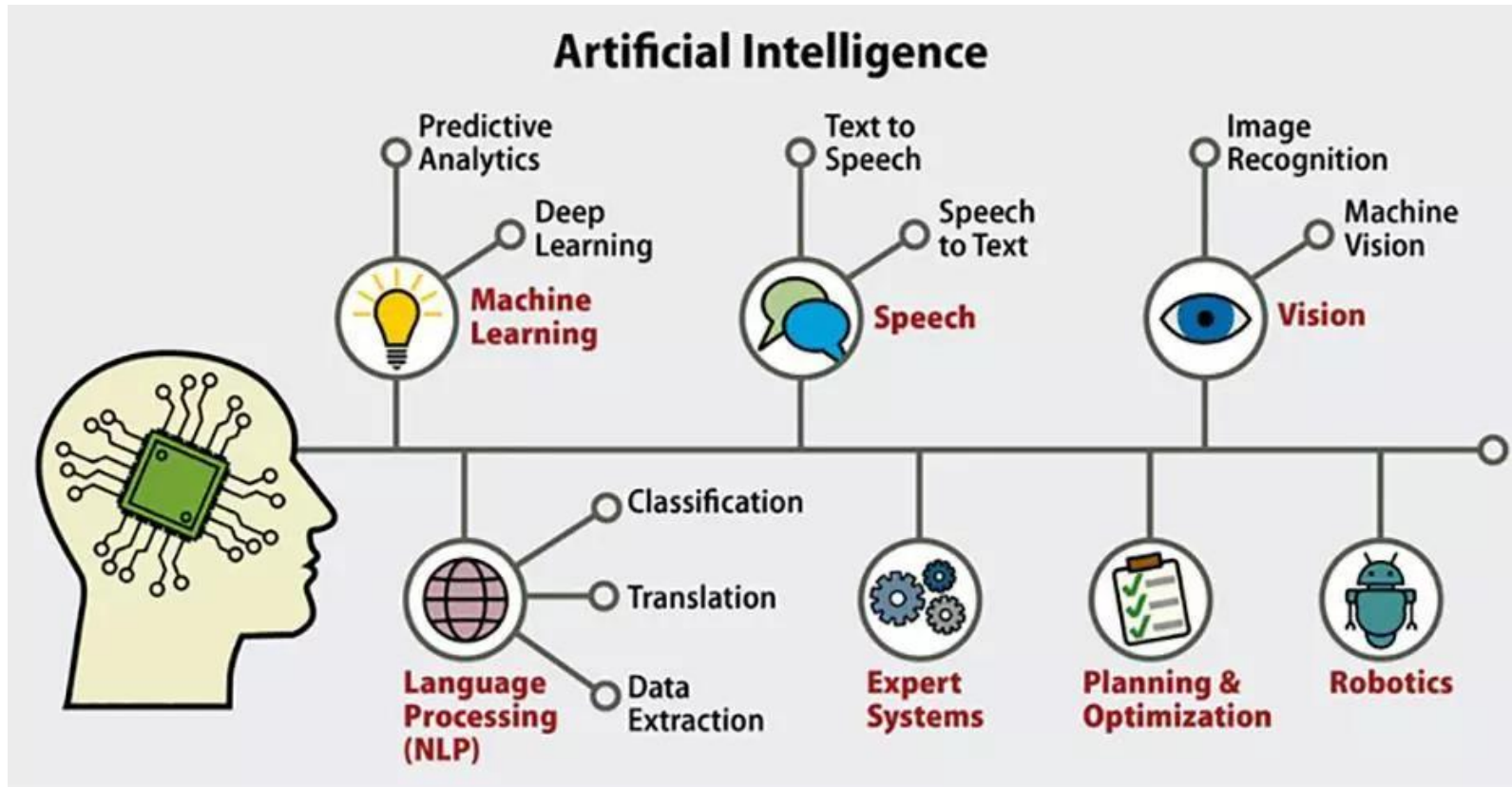
Non-Profit  
Fundraising and Impact  
Outcomes  
Qualitative Data

Government  
Planning and Forecast  
Trends  
Constants

Academic  
Knowledge Itself  
P-Value  
Replicability

# The Age of AI

## Predictive Analytics and Higher Education – Risks and Benefits



### ❖ Problems it might solve

- Generate correlations faster, with more data points
- Translating insights into code, presentations, and documents
- Streamlining ETLs and Plug interoperability and functionality holes left by vendors

### ❖ Problems it won't solve:

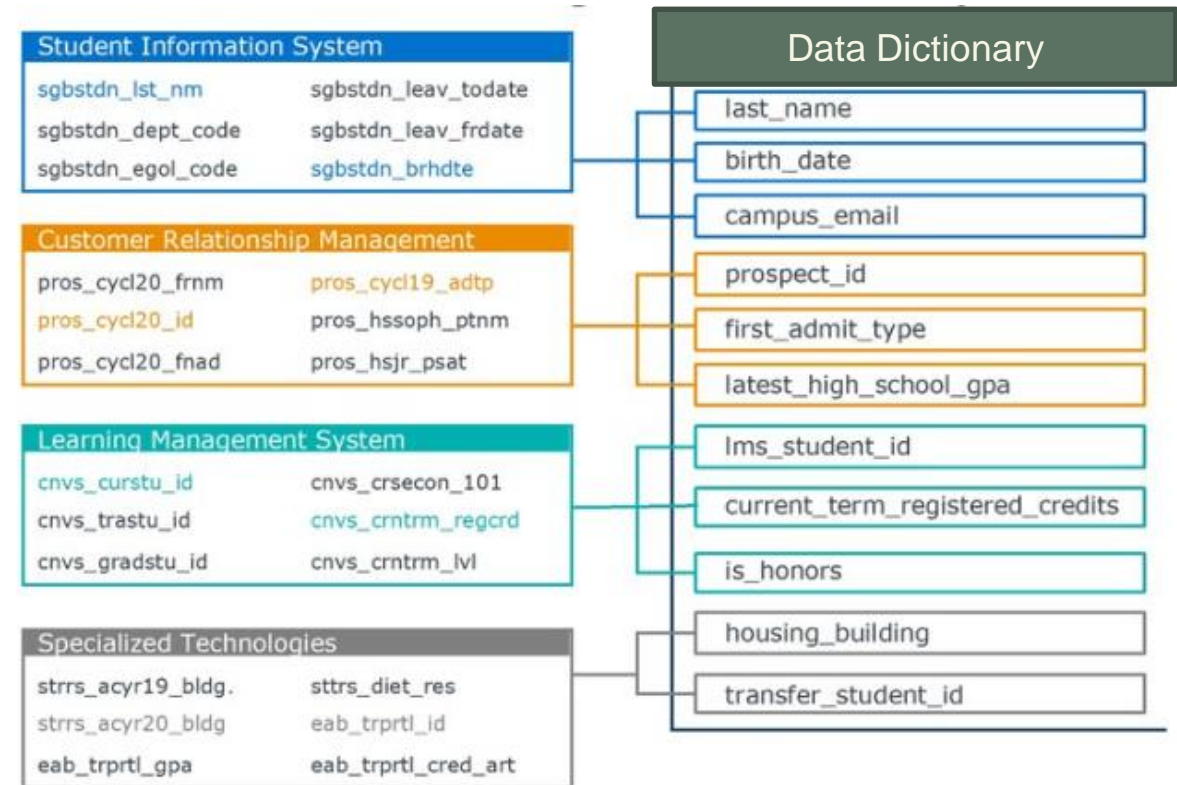
- Understanding the specific business processes that create the data
- Constructing the Question with stakeholders
- Explaining Answer to stakeholders

# Documentation

## Data Dictionaries and Data Governance Working Groups

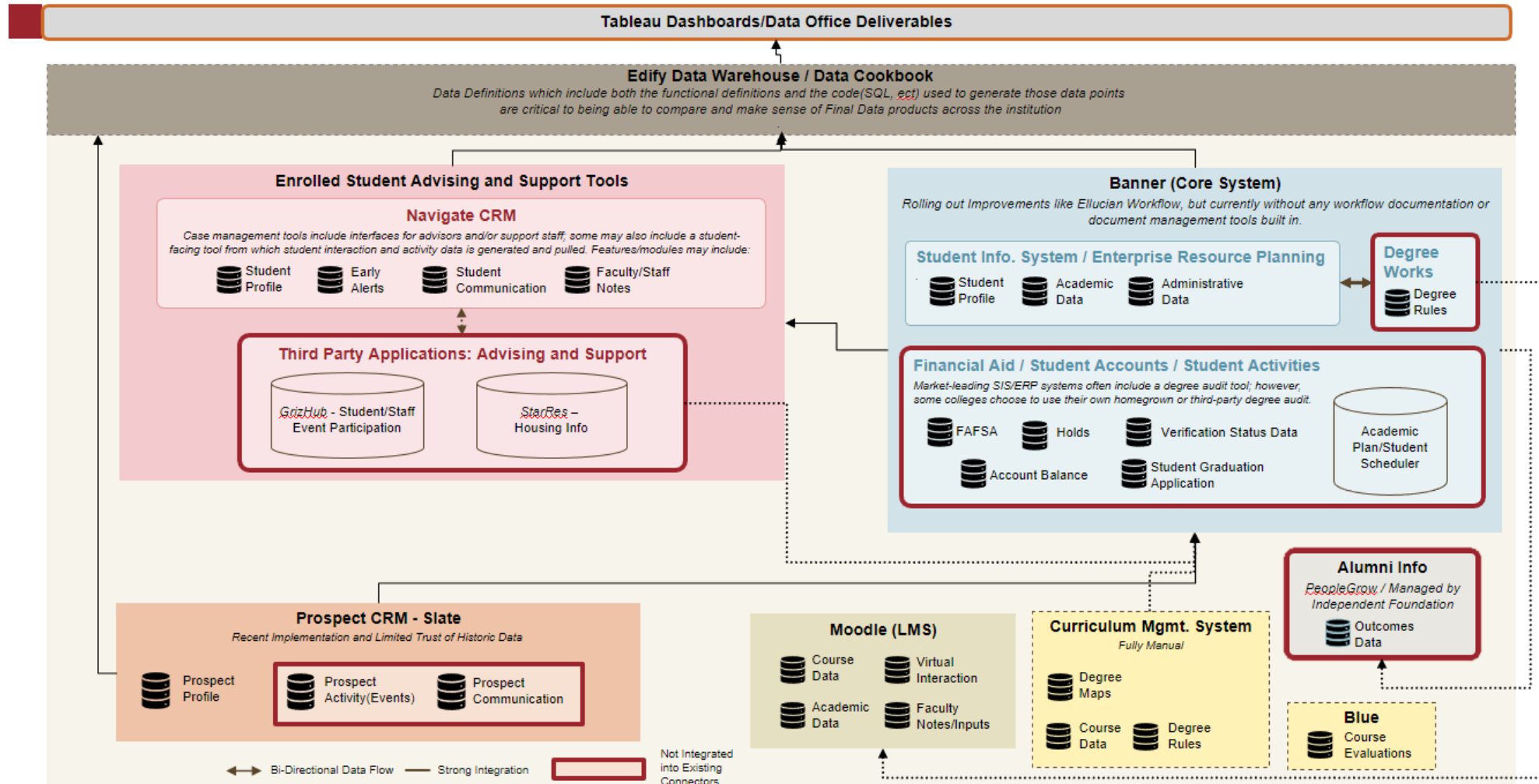


- ❖ Develop a key data dictionary to better understand and **trust** the data.
  - Accessible business process and technical data definitions
  - Current technology stack review with recommendations of documentation tools.
  - Review historic data requests to prioritize fields for documentation
  - Focus groups of Key Data Request Stakeholders to determine current state
  - Business Process documentation exercises
- ❖ Identify and socialize data stewards through this process to prepare for future data governance structures.



# A Typical Tech Stack

## Demonstrating The Complexity to Stakeholders





# A Customer Service Perspective

## Defining your Services



❖ IR Professionals need to be able to provide reporting support for various levels of stakeholders across a continuum of complexity, on any topic where data is available. Includes custom visualizations in your native visualization tools, ranging from:

Graduation analysis example:

	Low Detail Complexity	High Detail Complexity
C-Level Stakeholders <ul style="list-style-type: none"><li>• Cabinet</li><li>• President</li><li>• Board Level</li></ul>	Demographic equity review with narrative (1 page)	5-year review with 30/60/90 day intervention recommendations (15 page)
Leadership Stakeholders: <ul style="list-style-type: none"><li>• Director</li><li>• Associate Director</li></ul>	Custom visualization with trending narrative and extrapolations (Single Graphic)	3-year review with logistic regression and statistical analysis of predictive variables (10 page)

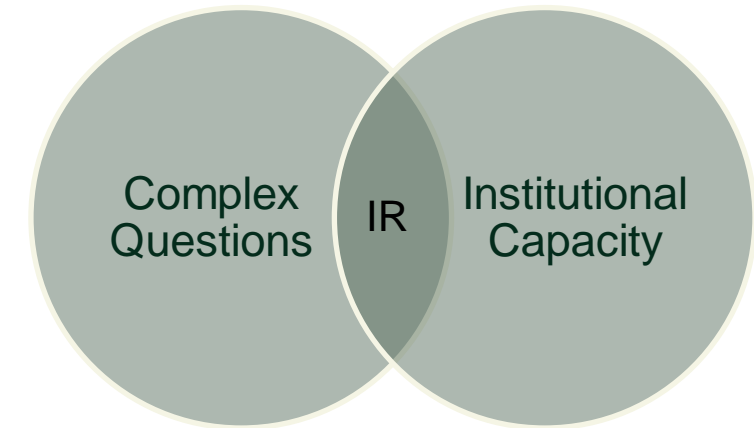


# A Customer Service Perspective

Messaging around “Who you are”



Data Resources	Currently Available	Most Commonly Requests
PowerBI/Tableau Dashboards	~ 350	<ul style="list-style-type: none"><li>- Census dashboard</li><li>- Registration tracking per term</li><li>- Admissions and tuition information</li></ul>
Vendor Dashboards	20	<ul style="list-style-type: none"><li>- Financial aid information / Tuition waiver application status</li><li>- Housing and admissions information by student</li><li>- Email/Phone numbers and advisors for prospective and current students</li></ul>
Ad Hoc Requests	~ 100 - 200 created per year	<ul style="list-style-type: none"><li>- Lists of students for outreach/analysis/accreditation/program development</li><li>- Top level statistics for Executive Review</li></ul>
Required Reporting	15 Reports	CSRDE, IPEDS Degrees Conferred, OCHE Census Counts



# A Customer Service Perspective

## Three Critical (Free) Tools



### ❖ Data Request Form



- Allows tracking of data requests Year over Year
- Enables prioritization within departments and with high level stakeholders
- Cuts down on email and voicemail correspondence

### ❖ Office Hours



- Enables better utilization and training of existing resources
- Enables access without sacrificing too much work time
- Helps identify data champions in other offices to empower with in-depth offline training

### ❖ Current Projects List



- Allows business use case to be displayed next to high level projects
- Reduces data requests and broadens distribution lists for existing projects



# AIMS Consulting: Case Studies

Bill and Melinda Gates Foundation Grant – Data for Student Equity Project



## Financial Challenges still Impede Native American Students' Success

- At the University of Montana, Native student still struggled with affording college, despite the institution's focus on initiatives and innovative offices that support them.
- Across multiple forums with students and staff, we heard that students main pain point was understanding all the existing programs that were available, and that specifically the Tuition Waiver program was extremely impactful and under-utilized.
- Lack of Student understanding of Tuition Waivers was compounded by staff's lack of access to Financial Aid information outside of SQL Queries and protected SIS screens.

## Centralizing Data in a Data Warehouse, UM used Actionable Dashboards to enable Proactive Outreach

*Freeing the data allowed existing programs to reach their full potential in inflecting Student Success Metrics*

1



**Centralize.** First we centralized data across Admissions/Housing/SIS systems to allow seamless navigation within student sub-populations.

2



**Develop** We developed over 50 variables based on their actionability that were not previously available, including: "Students Who Have not Applied for Tuition Waiver" and "Admitted Students Selected for Verification"

3



**Outreach** Partnered with Student Success, Admissions, or Career Services offices to provide Training, Office Hours, and documentation including FAQ and an itemized list of Next Steps for each Variable



SCAN ME

# AIMS Consulting: Case Studies

## High Level Executive Summaries



### ❖ 1<sup>st</sup> Page Narratives

Source: [Retention and Graduation - No Major Detail: Retention and Graduation Rates - Tableau Server \(mus.edu\)](#) & [CSRDE Retention: CSRDE Cohort Retention - Tableau Server \(mus.edu\)](#)

#### High Level Narrative

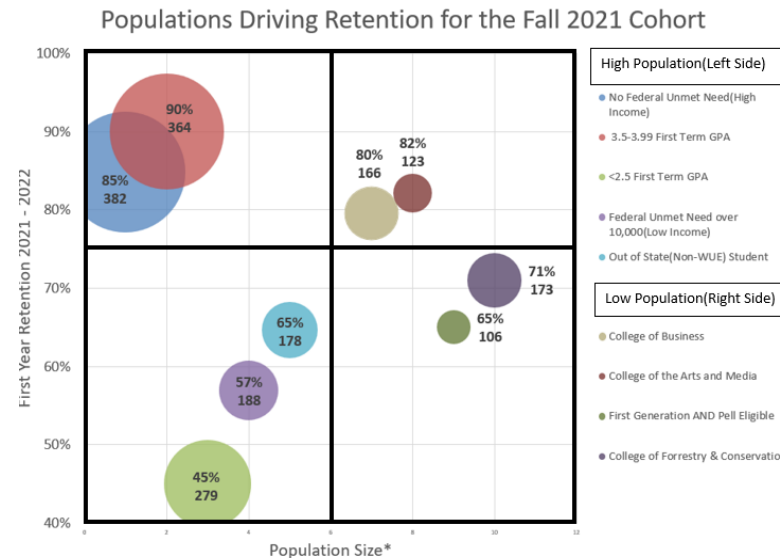
While overall retention did shrink from the high of 75.5%, the Fall 2020 cohort was the smallest in 5 years, and it is our recommendation that this data point be weighed significantly lower in trending estimates and goal setting.

First-Time Full-Time Bachelor's Degree Seeking 1 <sup>st</sup> Year Retention	Fall 2022 Cohort	Fall 2021 Cohort	Fall 2020 Cohort	Fall 2019 Cohort	Fall 2018 Cohort
1 <sup>st</sup> Year Retention	74.0%	74.0%	75.5%	74.4%	71.4%
Entering Cohort	1283	1203	938	1065	1100
% Change in Cohort Size from Previous Year	6%	28%	-12%	-3%	-10%

#### Main Takeaways and Recommendations

- na still retained 182 additional students entering Fall 2022 compared to Fall 2021 and the previous cohort. This was due to the large increase in cohort size in Fall 2021. UM would have needed an additional 18 students, for a total of 908 instead of 890, to have reached the same retention percentage of 75.5 from Fall 2021. It is our position after analysis of the data that this Fall 2020 Cohort was an outlier, and a better comparison group demographically is the Fall 2019 cohort; UM would have only needed 5 students to reach the Fall 2020 cohort 1<sup>st</sup> year Retention mark of 74.4.
- Analysis focused around the hypothesis that there are 3 reasons students do not retain: Academic Preparedness, Financial Need, Engagement.
  - Academic Preparedness – was best assessed at UM with students 1<sup>st</sup> Term GPA. It not only had the descriptive differences across GPA bands to account for the additional needed students, it also was the only variable that consistently remained a High-powered Predictor in the Logistic Regressions of each Cohort.
  - Financial Need – was best assessed by Federal Unmet Need, which provided a more nuanced look than Pell Eligible of EFC to the growing population of students with High Levels of Financial need that retain at low levels.
  - Engagement – While there were not a robust set of engagement variables available at the time of this report, Residency was the variable with the largest change in the last 3 years, with an increasing population of low retention students who may need additional engagement to feel connected at UM.

### ❖ Sub-Population Breakouts



Area	Action
Large Populations & Higher Retention Rates	Ensure this Group Continues to Drive Retention Increases
Large Populations & Lower Retention Rates	Pursue Structural Changes to Alleviate Barriers
Low Populations & Higher Retention Rates	Look to Drive Up Population
Low Populations & Lower Retention Rates	Investigate Population Trends & Look to Provide Customized Support to these Populations

### ❖ Future Study Mappings

#### First Time Full Time Bachelors Degree Seeking Retention for the last 4-Year

Specialty Cohort: TRIO	4-Year Ave % of Population	Fall 2021 – Fall 2022 8.22.2022
Overall Total		
TRIO Total		
TRIO - Financial		
NonTRIO - Financial		
TRIO – First Generation		
NonTRIO – First Generation		
TRIO – Person with Disability		
NonTRIO – Person with Disability		
TRIO – Finance&First Generation		
NonTRIO – Finance&First Generation		
TRIO – Finance&Person with Disability		
NonTRIO – Finance&Person with Disability		
TRIO – First Generation&Person with Disability		
NonTRIO – First Generation&Person with Disability		

\*Trio not included b/c of multiple eligibility requirements, see additional varia

# AIMS Consulting: Case Studies

## Executive Leadership Dashboard Design



❖ Focus on Gaps between Offices

❖ Marketing and Risk Oriented

❖ Fundraising Enabler

### Student Lifecycle Success Funnel - (College Transparency Act Compliant)

**Choose Your Filter**

**Programs**  
Choose One

**Degree Levels**  
Choose One

Race	Ethnicity	Period	Campus
All	All	All	All

Gender	Age	Cohort	Tribe	Reservation
All	All	All	All	All

**Admissions Funnel**

100%  
45%  
33%  
93%

Admit...  
Enroll...  
Census

**Student Success Funnel**

100%  
75%  
86%  
90%

1st Year...  
2nd Year...  
3rd Year...

**Graduation Funnel**

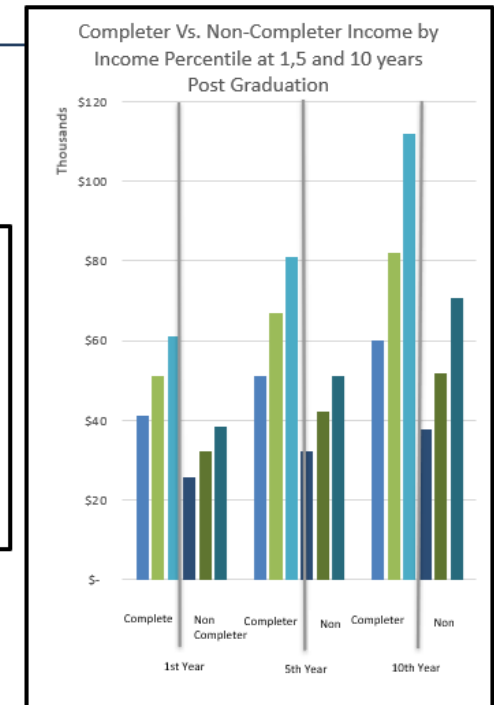
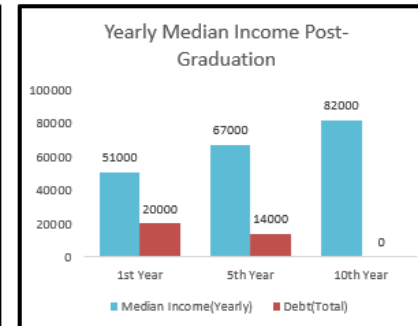
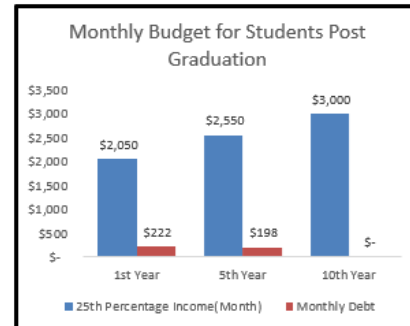
100%  
90%  
80%  
70%  
60%  
50%  
40%  
30%  
20%  
10%  
0%

4th Year...  
5th Year...  
6th Year...

Stopped Out  
Transferred Out  
Graduated  
Continuing

Student Base at Funnel Stage	Yield% Per Step	Cumulative Stop Out All Categories	Cumulative Graduated Total	Cumulative Transferred Out Total	Cumulative Stopped Out Total
Application					
Admitted	45%				
Enrolled/Deposited	33%				
Census	93%				
1st Year Persistence	75%	150		100	50
2nd Year Persistence	86%	200		125	75
3rd Year Persistence	90%	265	35	130	100
4th Year Continuing/Graduation	92%	741	400	240	101
5th Year Continuing/Graduation	84%	830	475	245	110
6th Year Graduation/Graduation	84%	920	550	250	120

Percent of Students who took out Loan: **49%**      Default Rate at 12 Years: **18%**



Income and Debt Post Graduation	25th Percentage Income (Month)	Monthly Debt	Median Income (Yearly)	Debt (Total)
1st Year	\$ 2,050	\$ 222	\$ 51,000	\$ 20,000
5th Year	\$ 2,550	\$ 198	\$ 67,000	\$ 14,000
10th Year	\$ 3,000	\$ -	\$ 82,000	\$ -

Income Post Graduation	College Completers			NonCompleters		
	25th Percentile	Median	75th Percentile	25th Percentile	Median	75th Percentile
1st Year	\$ 41,000	\$ 51,000	\$ 61,000	\$ 25,830	\$ 32,130	\$ 38,430
5th Year	\$ 51,000	\$ 67,000	\$ 81,000	\$ 32,130	\$ 42,210	\$ 51,030
10th Year	\$ 60,000	\$ 82,000	\$ 112,000	\$ 37,800	\$ 51,660	\$ 70,560

# AIMS Consulting: Case Studies

## Student Facing Visualizations



### ❖ Explanation Text

### ❖ White Space Utilization

### ❖ Comparison Focused

(1) Start by Selecting Program, Debt, and Location

(2) Select Up to 3 Programs

Biology, Accounting, Pharmacy

*Try: Start with your Major, then your minor, or other major you are considering*

(3) Enter your Estimated Debt

Debt

\$22,000.00

*Try: Check with Financial Education if you are not sure, or enter the University's average of*

(4) Select up to 3 Locations

Locations

Glacier MT, Missoula MT, Los Angeles CA

*Try: Start with your hometown and Missoula MT*

(5) Next Select the Demographics below that you identify with

Tribe Select Any

Race Select Any

Ethnicity Select Any

Gender Select Any

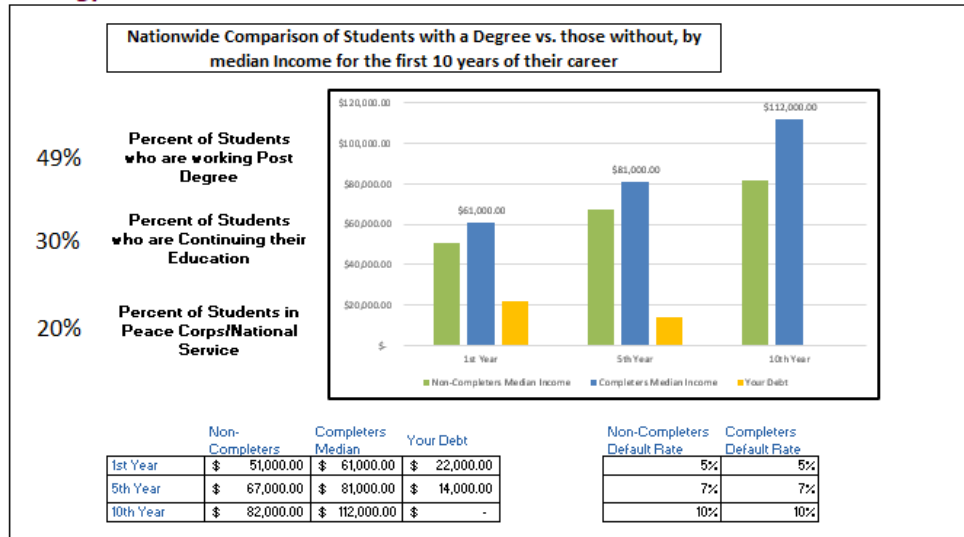
Age Select Any

*Refer to the Below Definitions to help understand the Graphs to*

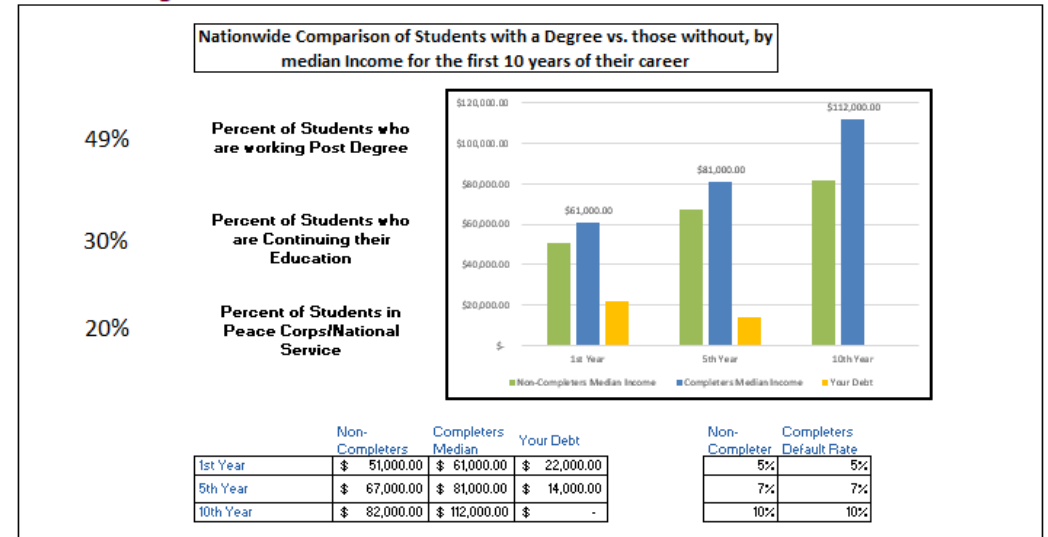
**Definitions**

Median Income	Better than Average, less effected by outliers
Default Rate	% of students who cannot pay their loans, normally measured at 10 years. This process is very damaging to your financial

### Biology



### Accounting



# Your Consultant



## Matthew Dreitlein

- 10+ Years in Technology Integration, Data Architecture, and Data-Driven Storytelling in Higher Education
- Learn more at [www.aimsconsults.com](http://www.aimsconsults.com)
- MBA with a specialty in ERP Implementations
- Experience in SQL/R/Python/Excel/Access/VBA/Perl/C++, Business Process Mapping
- 5 Years in working at education technology vendors, implementing technology for Student Success
- Authored custom retention visualizations as Director of Institutional Research at Keuka College in Upstate NY.