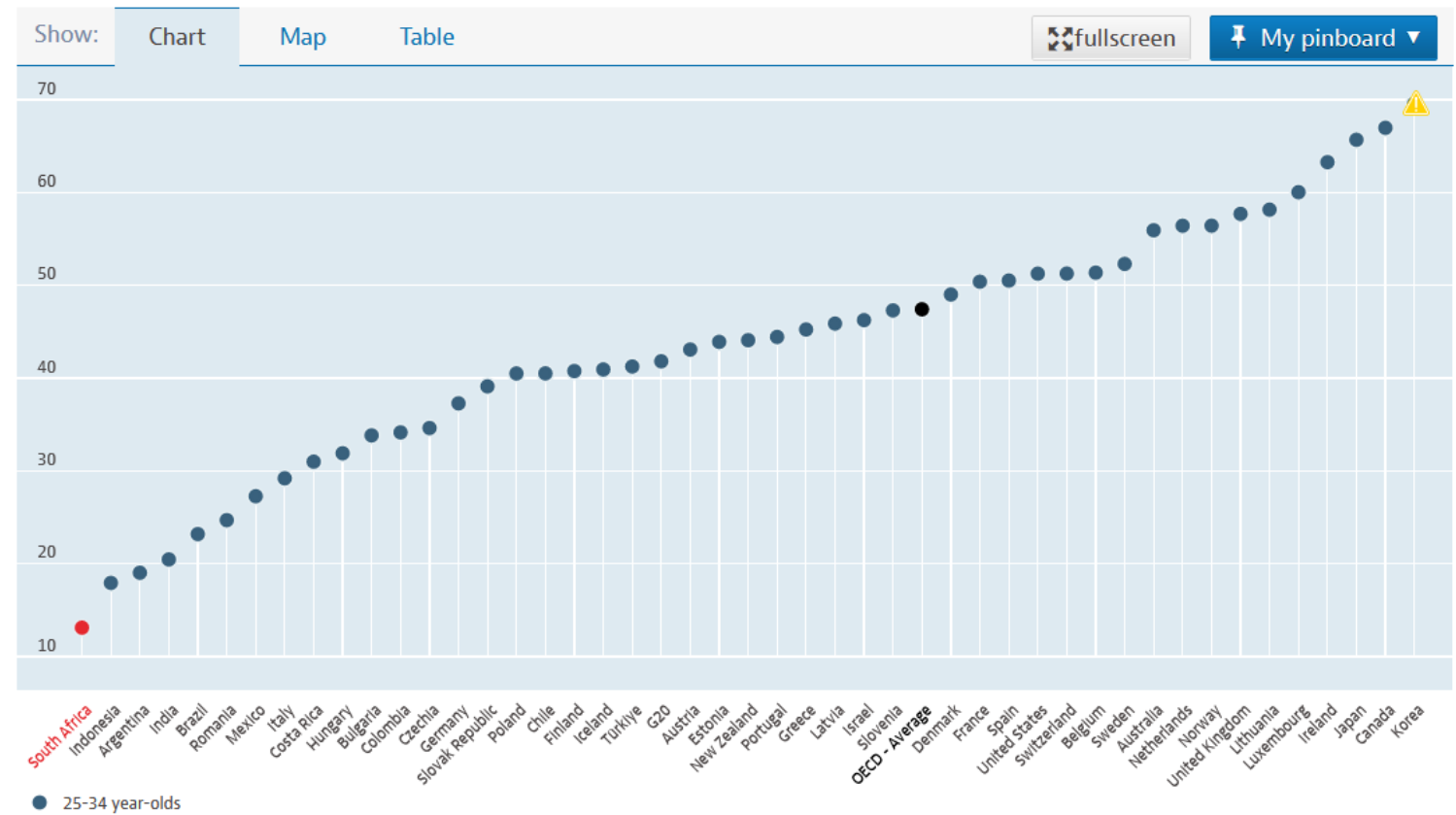# Population with tertiary education25-34-year-olds.

Comparative Performance: South Africa's tertiary education attainment is significantly lower than that of many other countries, highlighting a substantial gap in higher education enrollment and completion. For instance, the top-performing countries such as Canada and Korea have rates around 70%, indicating that these countries have managed to engage a much larger proportion of their young population in higher education.
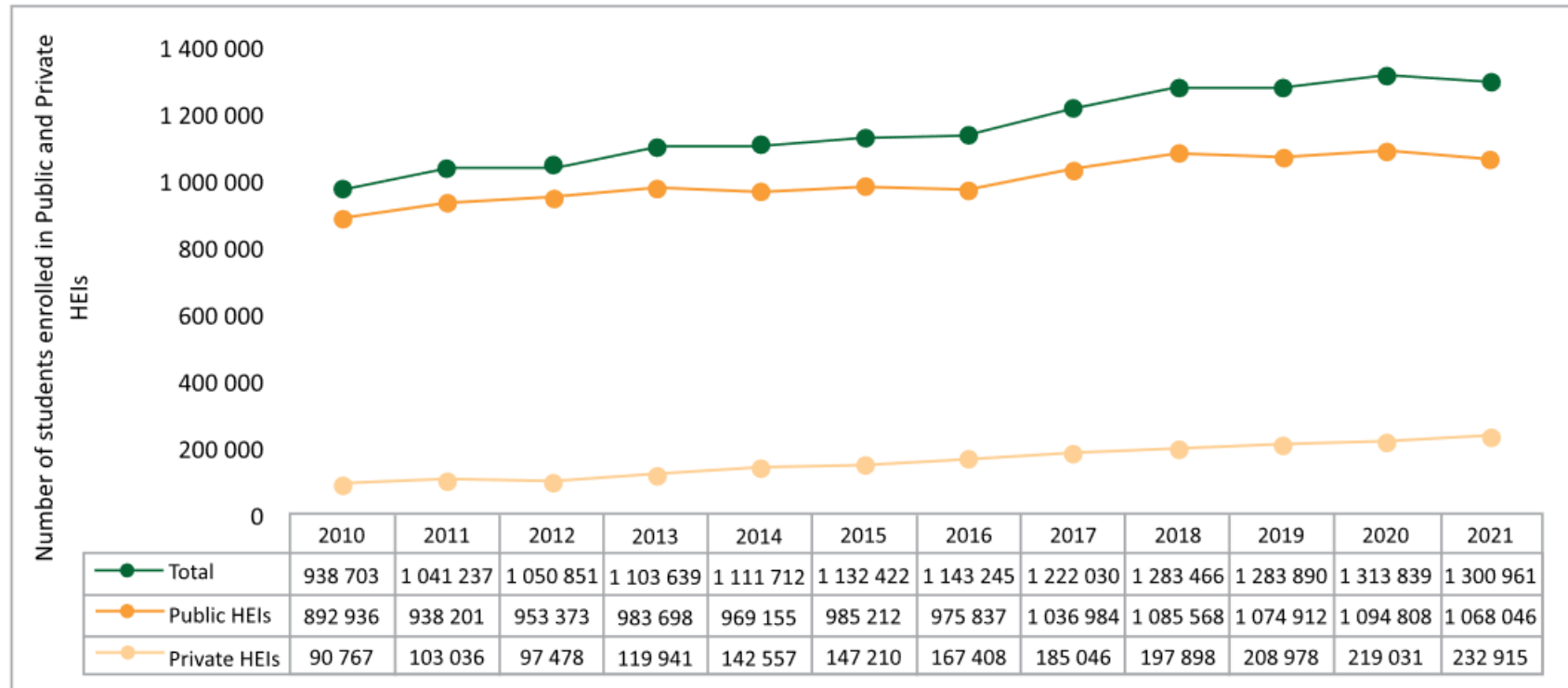
Potential Implications: The low rate of tertiary education attainment in South Africa could have several implications, including reduced competitiveness in the global job market, lower overall levels of economic development, and potential challenges in fostering innovation and technology growth within the country.

Population with tertiary education   25-34 year-olds, % in same age group, 2022 or latest available

Source: Education at a glance: Educational attainment and labour-force status

Show: Chart Map Table   fullscreen My pinboard ▾

25-34 year-olds

Number of students enrolled in public and private HEIs, 2010 – 2021

|	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	938 703	1 041 237	1 050 851	1 103 639	1 111 712	1 132 422	1 143 245	1 222 030	1 283 466	1 283 890	1 313 839	1 300 961
Public HEIs	892 936	938 201	953 373	983 698	969 155	985 212	975 837	1 036 984	1 085 568	1 074 912	1 094 808	1 068 046
Private HEIs	90 767	103 036	97 478	119 941	142 557	147 210	167 408	185 046	197 898	208 978	219 031	232 915

Sources: Statistics on Post-School Education and Training in South Africa, 2020.
2021 HEMIS database, data extracted in November 2022.
Annual reports submitted by private HEIs to the DHET for the 2021 year of reporting.
Note: Enrolment figures for private HEIs for 2010-2015 were unaudited.

Percentage distribution of average undergraduate success rates in public HEIs for contact education programmes by population group, 2009 – 2021
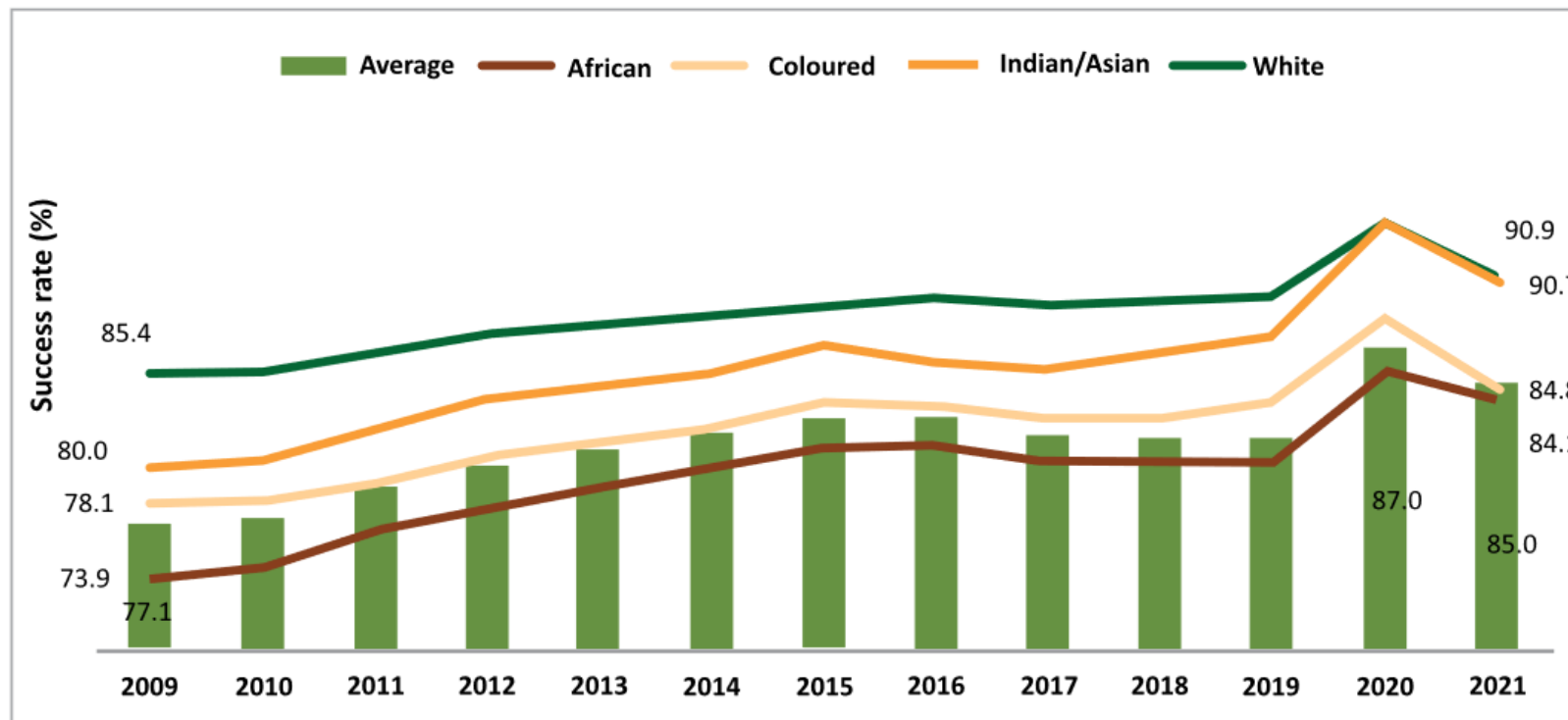
Source: 2021 HEMIS database, data extracted in November 2022.

Note: Success rates are determined as follows: a calculation is made of full-time equivalent (FTE) enrolled student totals for each category of courses. A further FTE calculation, using the same credit values, is made for each category of courses for those students who passed the courses. The success rates are then determined as: FTE passes divided by FTE enrolments. The success rates shown are, therefore, weighted averages for contact and distance courses for each population group.

Average graduation rates in public HEIs by qualification type, 2021
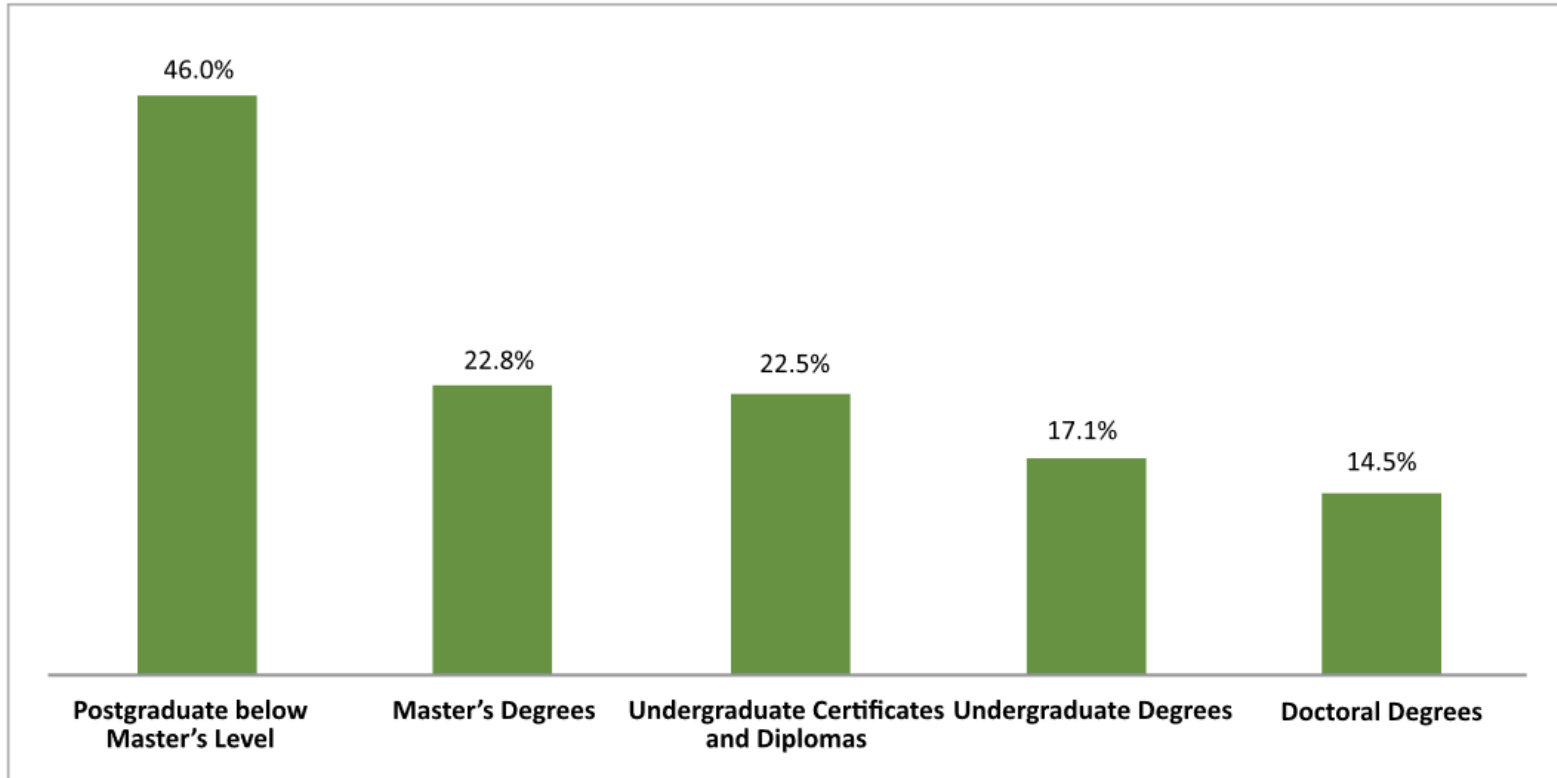
Source: 2021 HEMIS database, data extracted in November 2022.

Note: These graduation rates serve as proxies for throughput rates of cohorts of students. A detailed account of benchmarks related to these graduation rates can be seen in The National Plan for Higher Education (Department of Education: 2001).
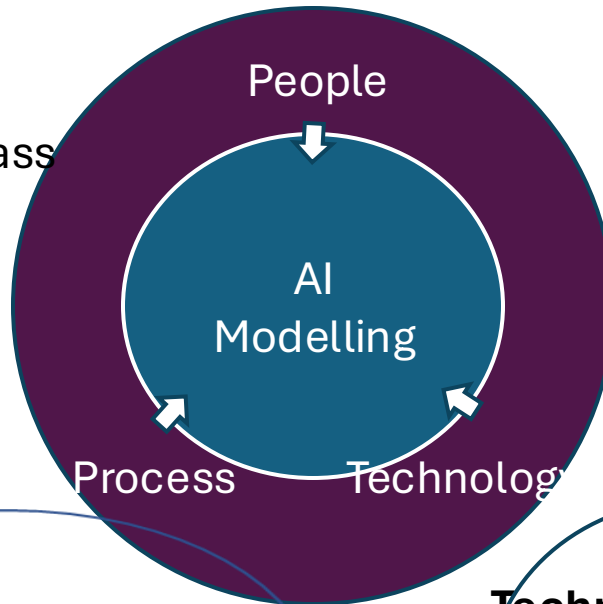
What is a Student Tracking System?

- Student Tracking Systems (STS) are integrated software solutions designed to monitor and enhance the academic journey of students within educational institutions. These systems collect, store, and analyze a wide range of data points related to student performance, behavior, and engagement. The primary goal of STS is to provide actionable insights that can help institutions improve student success rates, optimize resource allocation, and enhance overall educational outcomes.

- The integration of student tracking systems (STS) in higher education has significantly transformed the way educational institutions monitor and support students throughout their academic journey. These systems have evolved from merely storing data to becoming proactive engagement tools, utilizing data analytics, artificial intelligence, and machine learning to predict student performance and suggest timely interventions (Carbonaro, 2005).

GPS

GPRS

GSM

GPRS

INTERNET

GSM

Interacting Contextual Elements: Predictive Modelling for Student Success

UG throughput rate in minimum time for 2020 cohort: 35.4%

Governance

Governance (1)
- Student Success Framework
- Data Governance Framework
- Monitoring & Evaluation Framework
- Student Success Committee

Leading and Lagging Indicators
Course Pass Percentage Reports

People

AI Modelling

Process   Technology

People (5) ***
- Teaching and learning interaction in class
- Tutoring and mentoring
- Advisors arranging interventions
- Divisions offering student support

Process (4)
Capture of course structures in LMS
Capture of Marks
Capture of Interventions

AI Models (3)
Enables faculties to proactively identify the students that will need Support before entering campus. Refined (BQ, LMS, marks etc.)

Technology (2)
- Data Warehouse
- Data Lake
Store/QA the data that feeds the models

IMPROVE –
IMPROVE –
IMPROVE –
IMPROVE –

Monitor progress and make Adjustments to max impact

WITS Data Integration Framework
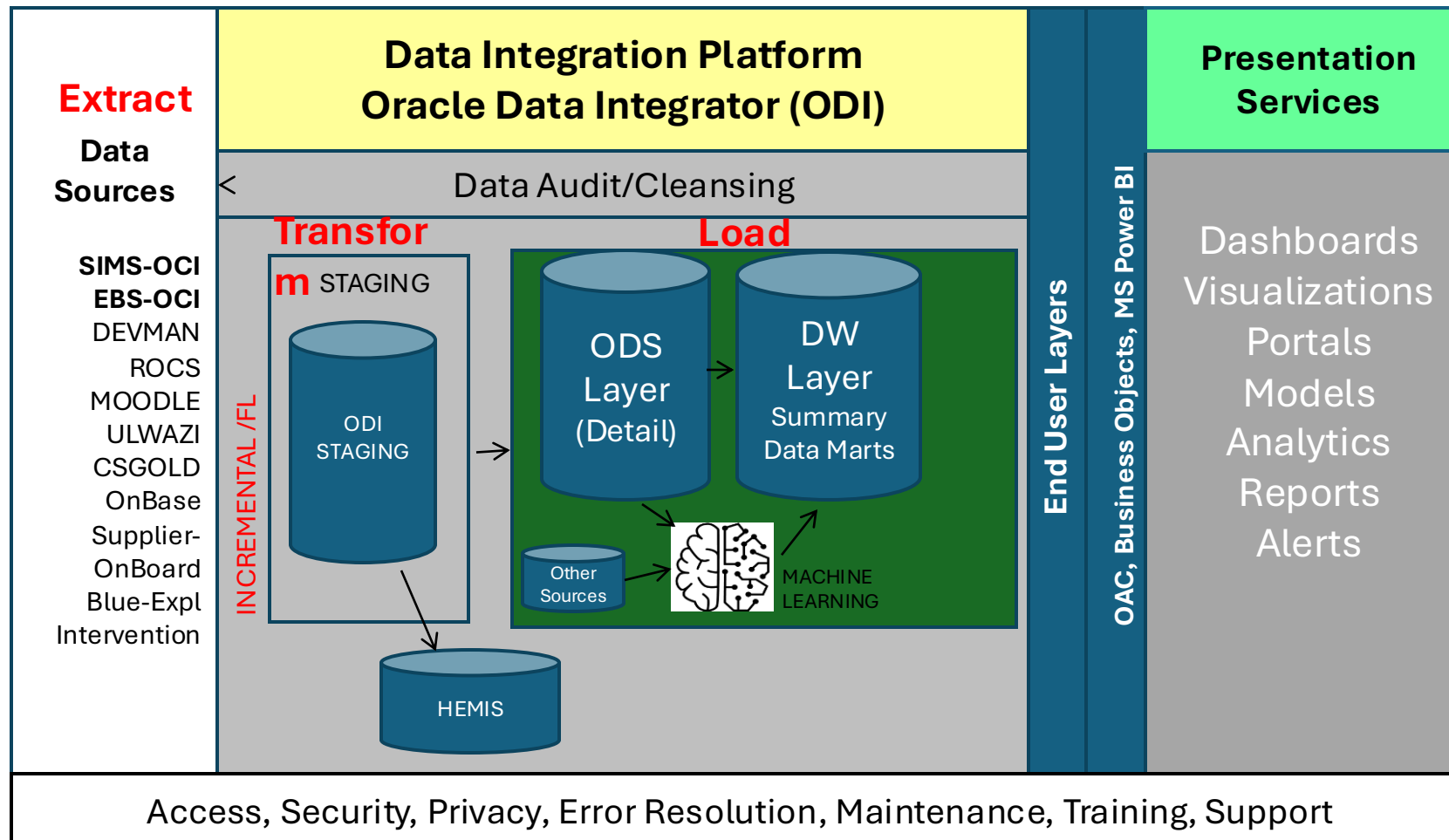
Blue-Expl= Blue Explorance (Lecturer Evaluation), ODS=Operational Data Store, DW= Dimensional Modelling

9

Key Components of STS:
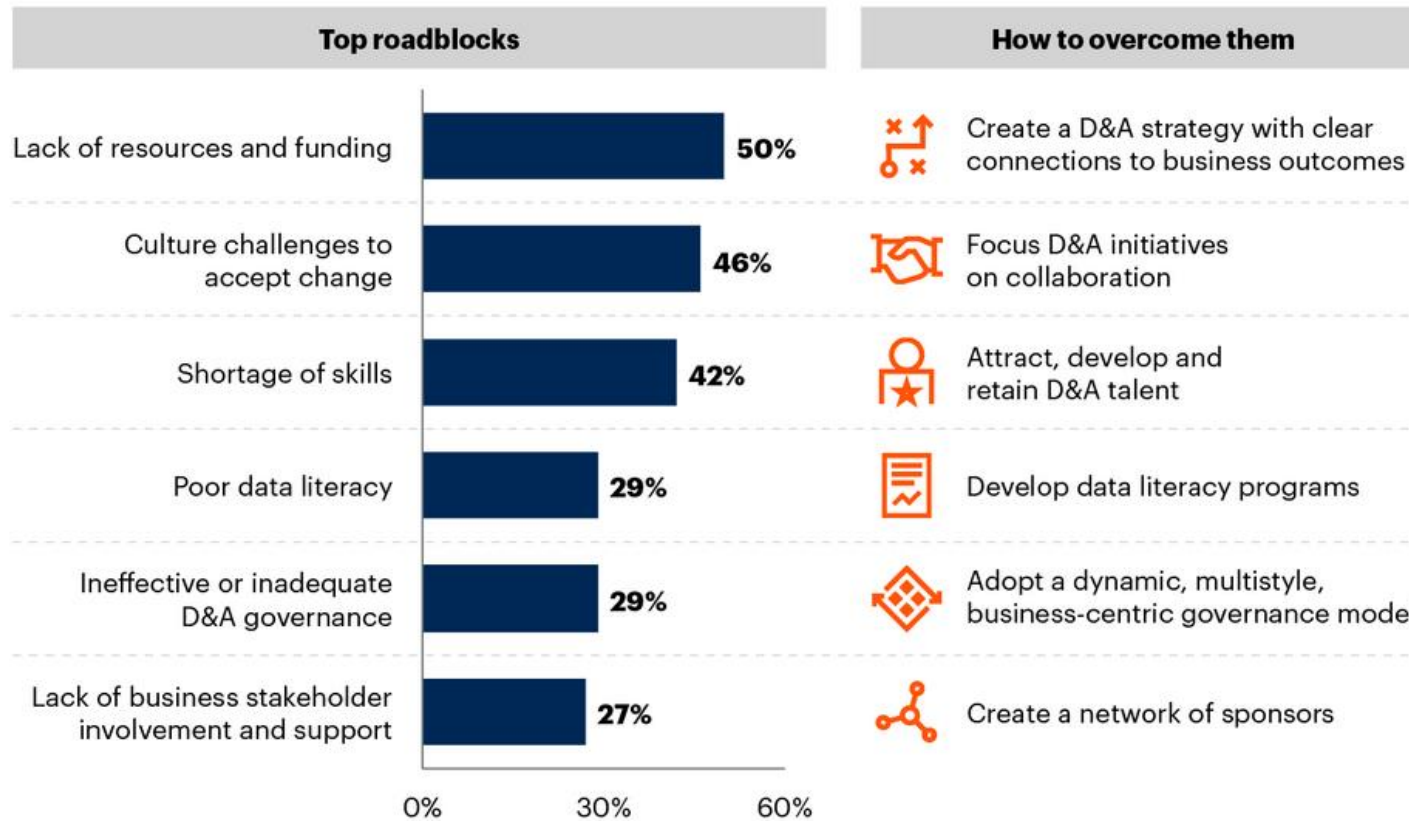
- **Data Collection and Storage:**
- Academic records (grades, attendance, assignments)
- Behavioral data (participation, disciplinary actions)
- Engagement metrics (interaction with learning materials, extracurricular activities)
- **Progress Tracking:**
- Monitoring academic performance over time
- Identifying at-risk students early
- Providing real-time updates on student progress

Key Components of STS:

- **Predictive Analytics:**
- Using historical and current data to predict future performance
- Identifying patterns and trends that may affect student success
- Suggesting timely interventions and support mechanisms
- **Personalized Learning Paths:**(Maaz et al., 2008).
- Tailoring educational experiences to individual student needs
- Recommending courses, resources, and activities based on student profiles
- Enhancing student engagement through customized learning plans

The Top Roadblocks to D&A Success and How to Overcome Them

Top roadblocks		How to overcome them
Lack of resources and funding	50%	Create a D&A strategy with clear connections to business outcomes
Culture challenges to accept change	46%	Focus D&A initiatives on collaboration
Shortage of skills	42%	Attract, develop and retain D&A talent
Poor data literacy	29%	Develop data literacy programs
Ineffective or inadequate D&A governance	29%	Adopt a dynamic, multistyle, business-centric governance model
Lack of business stakeholder involvement and support	27%	Create a network of sponsors

0%   30%   60%

n = 478; all respondents, excluding no challenges

Data and Analytics Capabilities

Technology Input   **Human Input**

Descriptive
What happened?

Diagnostic
Why did it happen?

Predictive
What will happen?

Prescriptive
How can I make it happen?

Decision/
Action
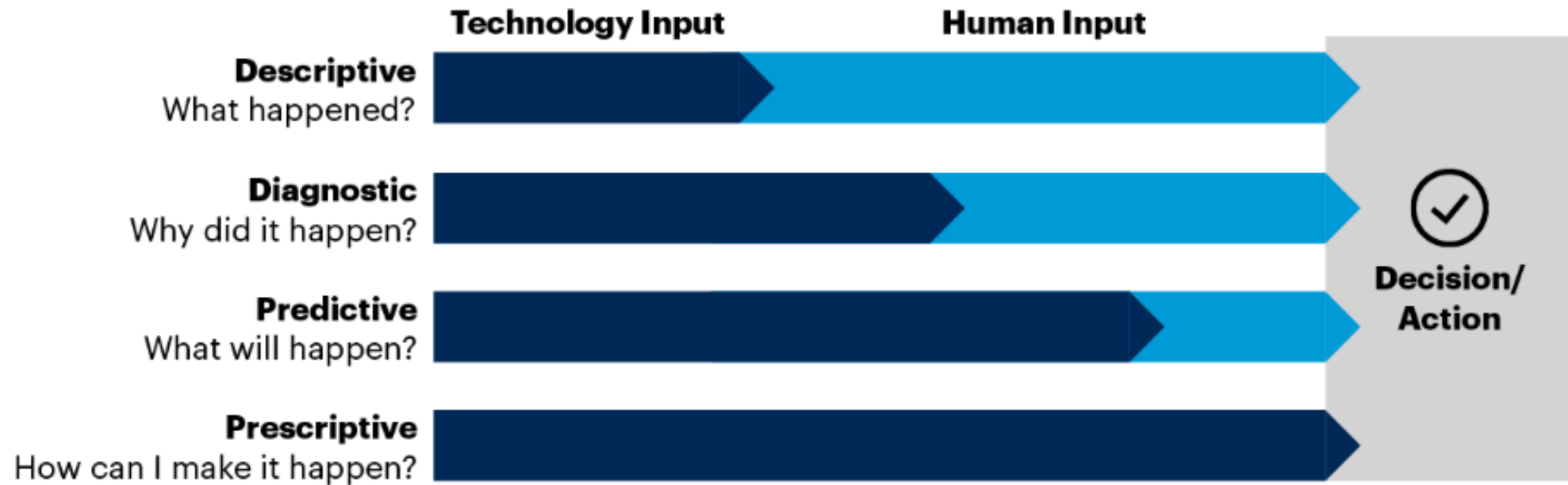
Gartner.

Types of Reporting and Analytics

Which interventions do we suggest to support this student?

Prescriptive Analytics

Which students are likely to fail if they don't receive support?

Predictive Analytics

Value

Diagnostic Analytics

Which courses have the highest failure rates?

Descriptive Analytics

What are our throughput and graduation rates?

Complexity
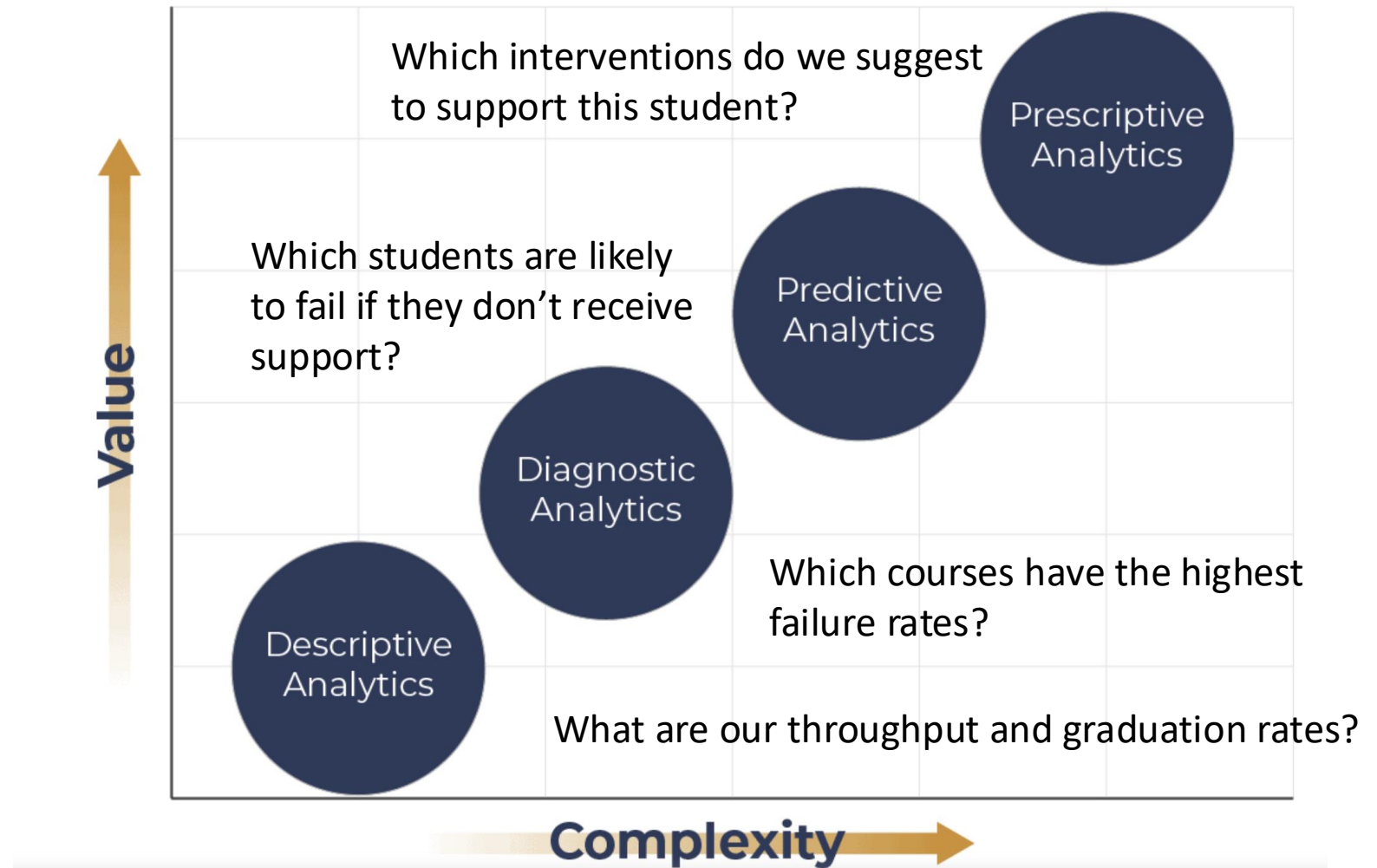
Features and Functions of STS

- **Data Collection and Storage**

- **Comprehensive Data Capture:**
  - Academic records: grades, attendance, assignments
  - Behavioral data: participation, disciplinary actions
  - Engagement metrics: interaction with learning materials, extracurricular activities

- **Centralized Database:** Secure and organized storage of student information

- Easy access for authorized personnel

Features and Functions of STS

- **Progress Tracking**

- **Monitoring Academic Performance:**
  - Tracking grades, test scores, and assignment completions over time
  - Identifying trends in academic performance

- **Early Identification of At-Risk Students:**
  - Highlighting students who may need additional support
  - Providing alerts for timely intervention

Features and Functions of STS

- **Predictive Analytics**

- **Data-Driven Predictions:**
  - Using historical and real-time data to forecast future performance
  - Identifying patterns and trends that may indicate potential issues

- **Intervention Recommendations:**
  - Suggesting targeted support and resources based on predictive models
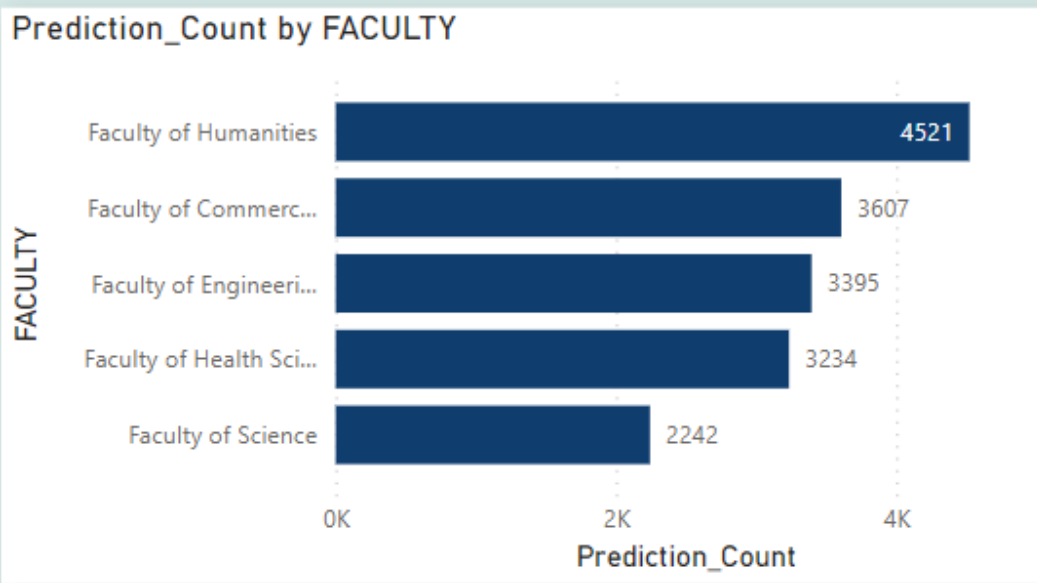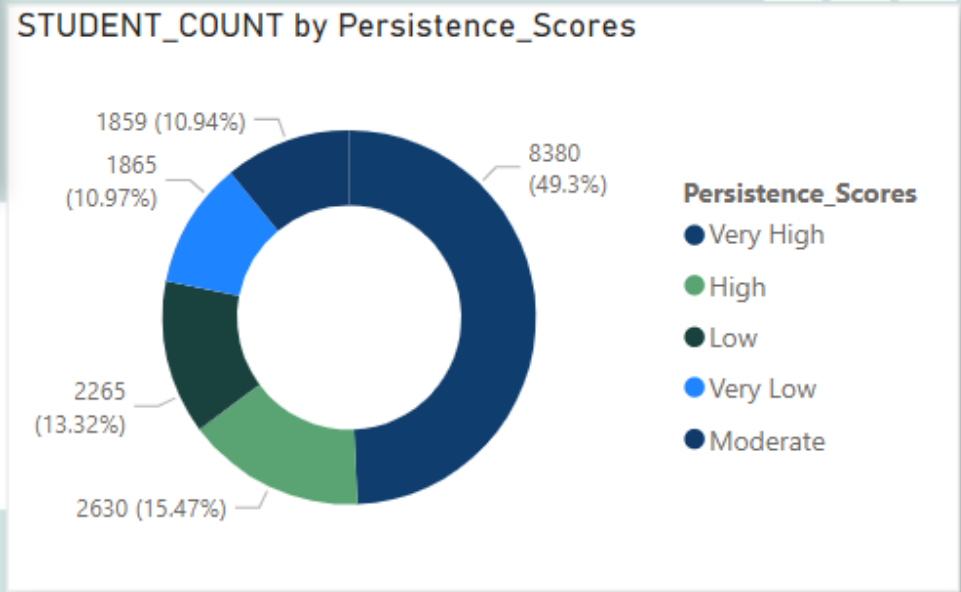 - Helping educators tailor interventions to individual student needs

WITS Student Persistence Dashboard

Persistence is defined as the continual pursuit of a student in a degree program leading toward the completion of the program and therefore being awarded a university degree in the student's field of study.

FACULTY	ALIGNED_PROGRAM_CODE	Persistence_Scores
All ∨	All ∨	All ∨

▷ Send Email

STUDENT_COUNT by Persistence_Scores

1859 (10.94%)
1865 (10.97%)
8380 (49.3%)
2265 (13.32%)
2630 (15.47%)

Persistence_Scores
- ● Very High
- ● High
- ● Low
- ● Very Low
- ● Moderate

Prediction_Count by FACULTY

FACULTY	Prediction_Count
Faculty of Humanities	4521
Faculty of Commerc...	3607
Faculty of Engineeri...	3395
Faculty of Health Sci...	3234
Faculty of Science	2242

0K   2K   4K
Prediction_Count

STUDENT_NUMBER	Persistence_Scores	Probability	Actionable Insights	GENDER_CODE	RACE_PARENT	TOTAL_FIN_AID	END_FEE_BAL	PAYMENTS
	Low	42.42	Consult with an advisor for personalized guidance and support.	F	WHITE	0.0	117 285.00	0.00
	Low	40.15	Consult with an advisor for personalized guidance and support.	F	BLACK	0.0	46 203.90	0.00
	High	72.75	Maintain your positive trajectory towards success.	F	BLACK	1.0	6 815.77	-64 180.00
	Very High	92.00	Maintain your positive trajectory towards success.	F	BLACK	0.0	41 364.00	0.00
	Low	44.91	Consult with an advisor for personalized guidance and support.	F	BLACK	0.0	69 661.78	-58 000.00
	Moderate	56.71	Maintain your positive trajectory towards success.	F	BLACK	0.0	55 730.00	-9 640.00
	Very Low	1.46	Join Academic Support programs.	M	BLACK	0.0	42 595.98	0.00
Total		**1 188 162.15**					**1 324 285 318.59**	**-378 263 706.85**

WITS Student Persistence Dashboard

Send Email

Persistence_Scores
Very High

Probability
91,08

4
Enrolled Courses

STUDENT_N...

Search

UNIT_RISK_MARKS by UNIT_CD and UNIT_RISK_MARKS

AFRL1005A		PSYC2005A	AFRL2003A
4			
94			
PSYC3001A		70	60
75			

LMS_Logins by Year, Month and Day
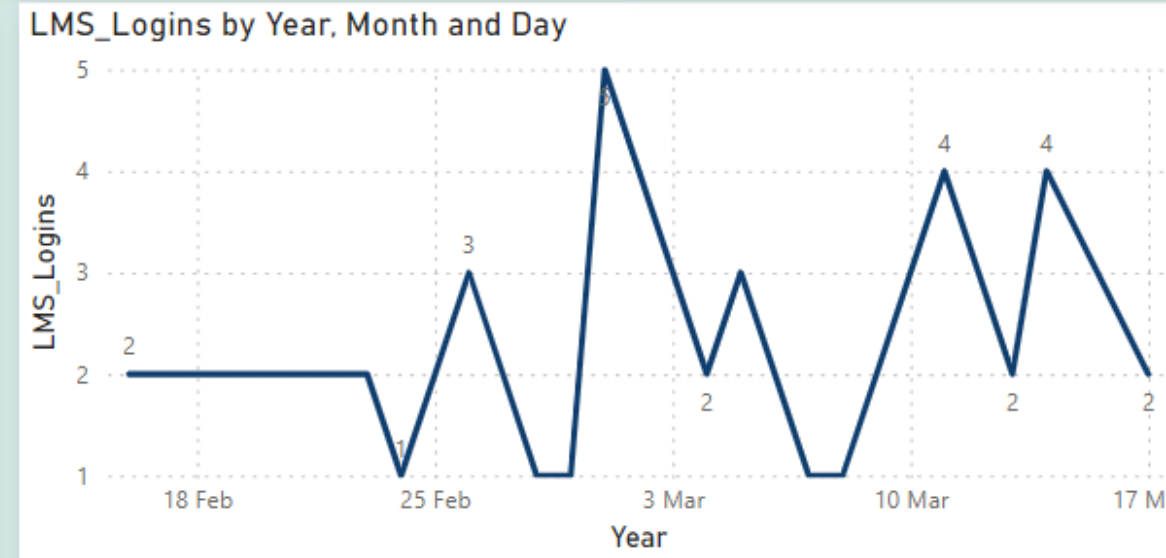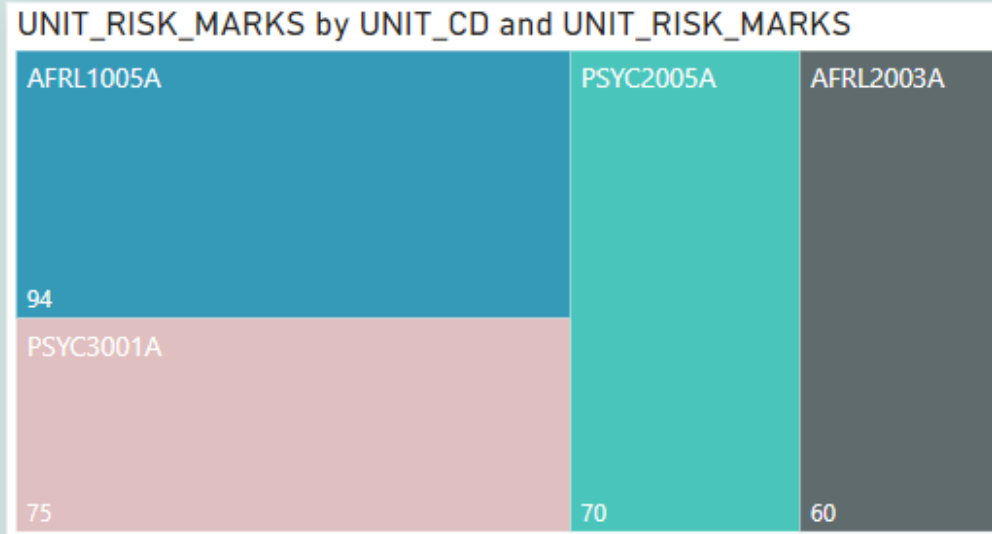
STUDENT_NUMBER	FACULTY	ALIGNED_PROGRAM_CODE	GENDER_CODE	RACE_PARENT	Actionable Insights		COURSES_ENROLLED	PRE
	Faculty of Humanities	ABA00	F	BLACK	Maintain your positive trajectory towards success.		4	
Total							**4**	

Lagging Indicators

Keeping Track of the Past

- Key Performance Indicators (KPIs) for Student Success¶

To enable governance to focus on achieving specific institutional outcomes, the Student Success Committee has adopted the following metrics to enable the monitoring progress towards achieving student success:¶

- Lagging Indicators (output measures):¶

  ¶
  - Indicator 1: Increased completion rate ¶
    - Number and percentage of students from each cohort who complete in N, N+1, N+2 years (where N is the minimum time)¶
      ¶
  - Indicator 2: Decreased time to completion¶
    - Comparative number and percentage of students from each cohort who complete in N years¶

  - Indicator 3: Decreased disparities in completion rate by race and gender¶
    - Percentage completion rates per cohort by race and gender¶

Leading Indicators

LEAVE YOUR PAST BEHIND

- Leading Indicators (predictive measures which anticipate the output measures):

  - Indicator 4: Increased retention
    - Number and percentage of students by cohort who remain registered from semester to semester, year to year

  - Indicator 5: Increased progression
    - Number and percentage of students by cohort who progress from one YOS to the next one

  - Indicator 6: Sufficient Credit Points
    - Number and percentage of students by cohort who have achieved the required number of credits per YOS

  - Indicator 7: Decreased bottlenecks
    - Number of courses with high number or percentage of students who fail

  - Indicator 8: Uptake of advising
    - Number of students identified as at risk by BQ and/or BIS "at-risk" reports who consult an advisor

Impact of STS

- **Improved Retention Rates**
- **Early Identification of At-Risk Students:**
  - STS helps identify students who are struggling early on, allowing for timely intervention.
- **Targeted Support:**
  - Providing personalized resources and support based on individual student needs.
- **Example:**
  - A university implementing STS saw a 15% increase in first-year retention rates after identifying and supporting at-risk students.

Impact of STS

- **Enhanced Graduation Timelines**
- **Personalized Learning Paths:**
  - Tailoring academic plans to ensure students stay on track for graduation.
- **Proactive Advising:**
  - Academic advisors use STS data to provide timely guidance, helping students navigate their academic journeys efficiently.
- **Example:**
  - A college reported a 10% decrease in average time to graduation after using STS to monitor student progress and adjust course loads accordingly.

Challenges and Considerations:

- **Data Privacy and Security:** Ensuring that student data is protected and used ethically is paramount.

- **Equity and Access:** Addressing potential biases and ensuring that all students benefit from STS equally.

- **Implementation and Integration:** Integrating STS with existing institutional systems and processes can be complex and resource-intensive.

Ethical Considerations

Data Privacy

Confidentiality:

- Ensuring that student data is kept secure and confidential.
- Protecting personal and academic information from unauthorized access.

Compliance:

- Adhering to data protection laws and regulations (e.g., POPI).
- Regular audits and compliance checks to maintain data integrity.

Ethical Considerations

Responsible Use of Analytics

Bias and Fairness:

- Ensuring algorithms and predictive models do not perpetuate bias.
- Regularly reviewing and updating models to promote fairness and equity.

Transparency:

- Being transparent about how data is collected, stored, and used.
- Providing clear information to students and stakeholders about the purpose and scope of analytics.

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