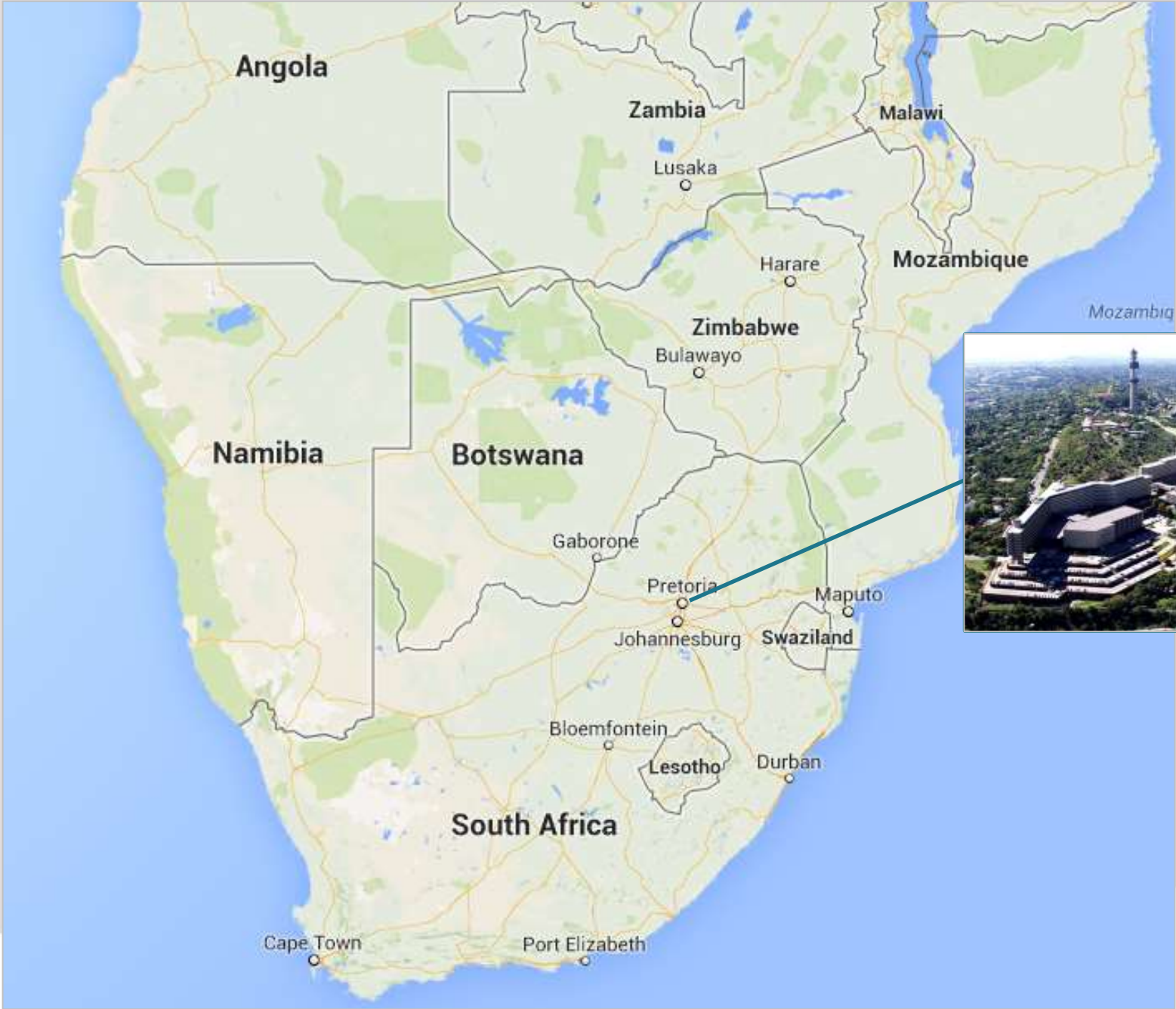


Analytics in Higher Education: Placing Unisa within the changing landscape of evidence- based decision making

***Glen Barnes, University of South Africa
(with contributions by Dr Liz Archer)***

HEIR 2015 - Edinburgh



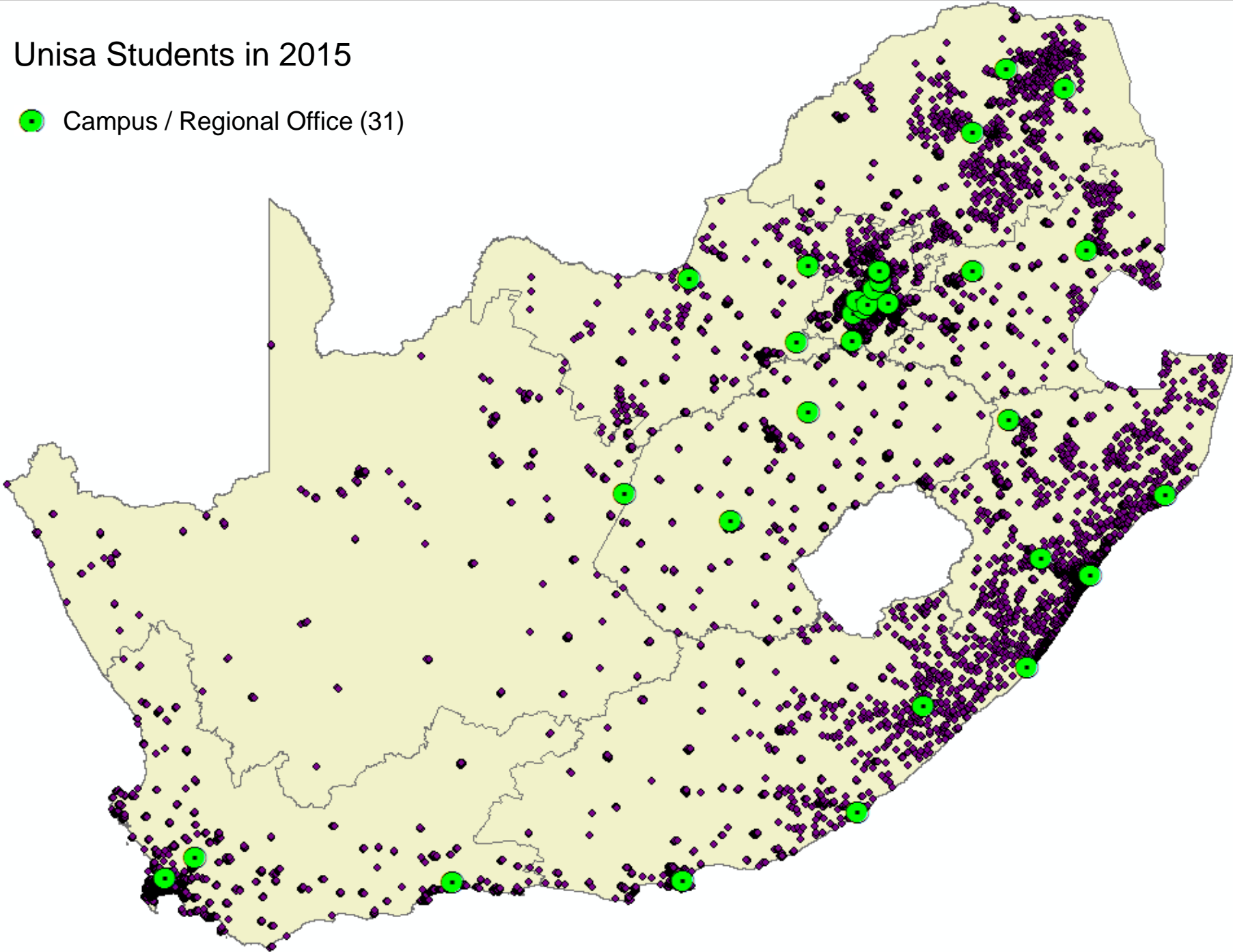




- +140 years old, 387000 formal students, majority SA, 5% international, mainly from two of the nine provinces
- 1000 qualifications, 3400 modules, **>25000 enrolments**
- 4800 establishment staff (HC), 35% academic, 3000 tutors

Unisa Students in 2015

● Campus / Regional Office (31)



Context

- Instrumental case study:
 - Insight into the institutional processes, challenges and opportunities for provisioning and using evidence in decision making.
- Participants:
 - Executive leadership
 - Senior leadership
 - Middle leadership
 - Analysts and researchers

Analytics research in HE

- Jaqueline Bichsel, 2012
 - Survey of a number of institutions with membership of EDUCAUSE and AIR
 - 339 distinct respondents
 - Looked at:
 - Priority of analytics
 - **Targets and benefits**
 - Perceived benefits
 - Concerns on the growing use
 - **What is in place**



Targets and benefits of analytics

(Bichsel, 2012)

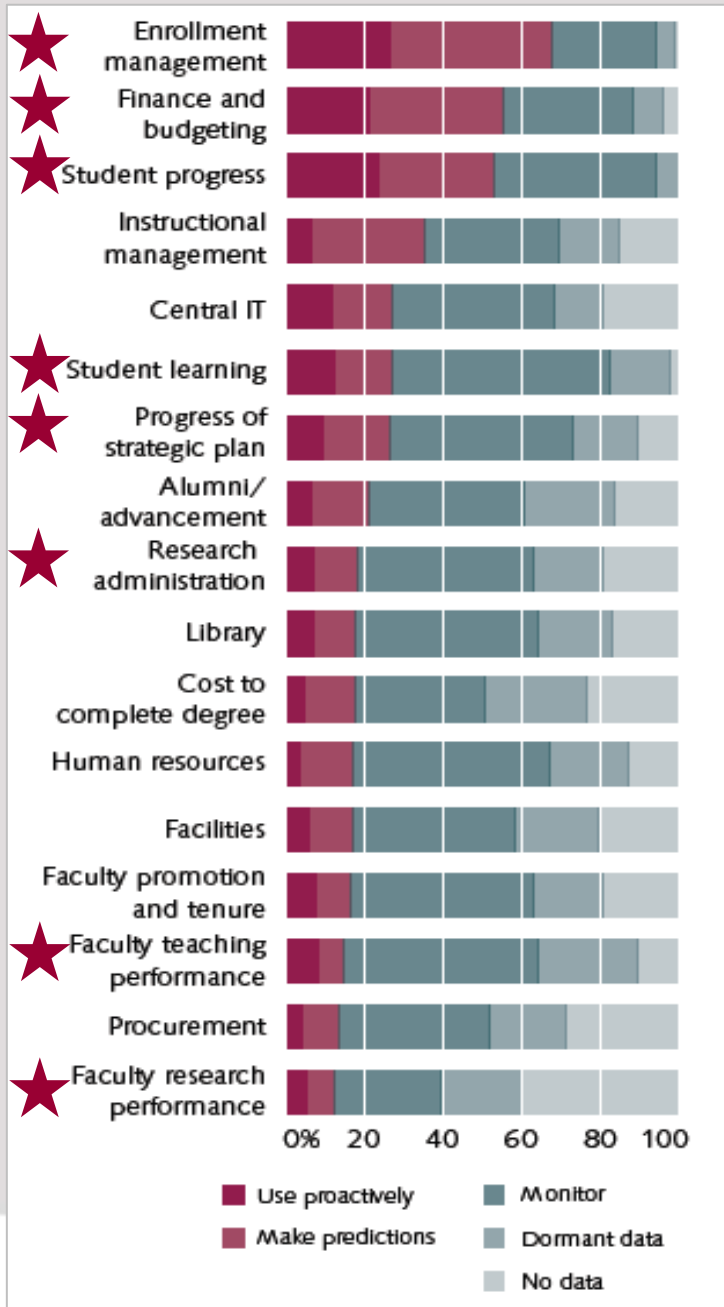
Survey respondents were asked how they use data in various functional areas.

Only three areas (enrolment management, finance and budgeting and student progress) have the use of analytics at the highest levels (proactive and predictive capabilities).

Interesting to note that student learning, and progress of strategy are midway on the list.

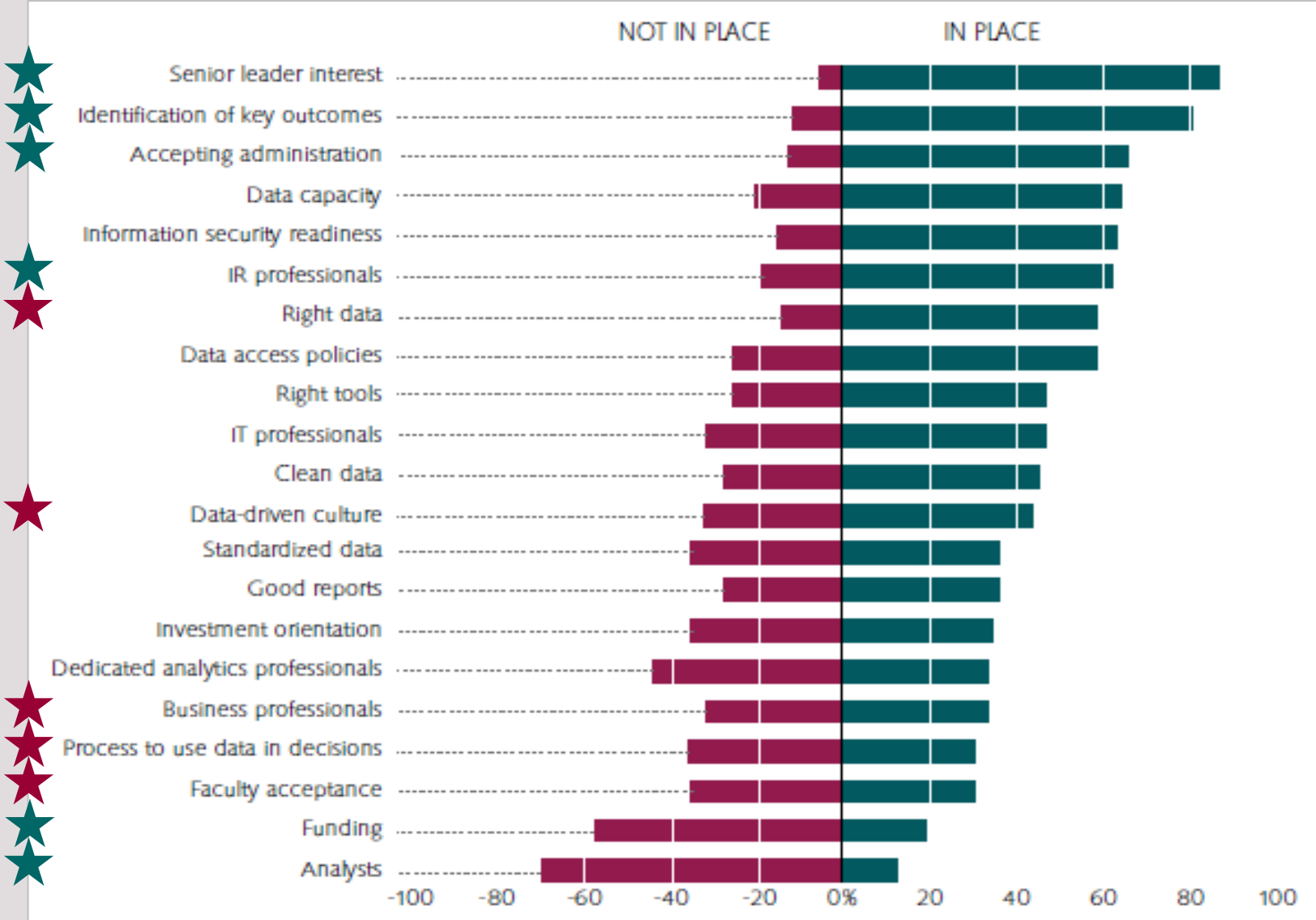
Research administration, faculty teaching performance, faculty research performance are way low on the results, considering these underpin the core business of HE.

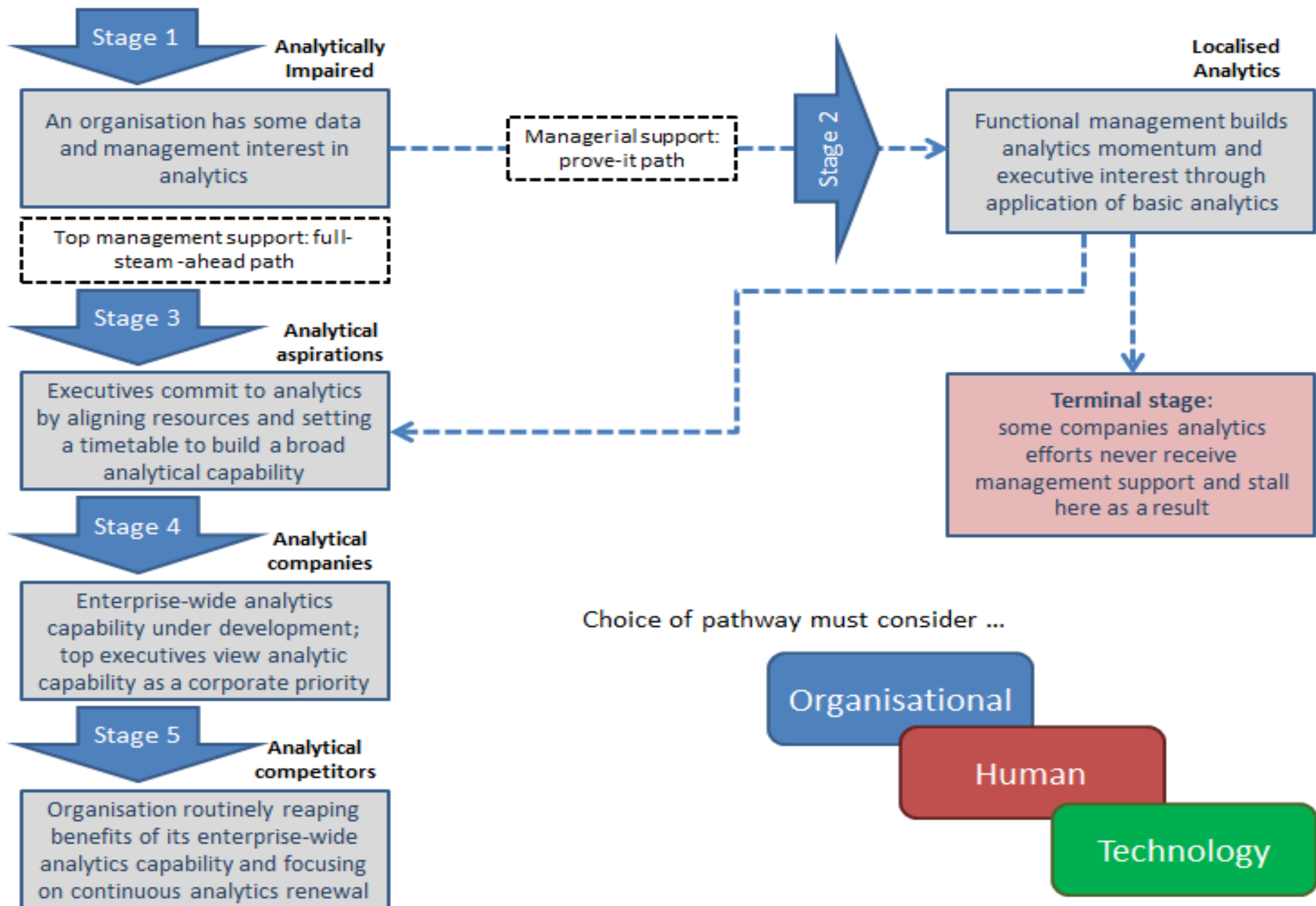
Also interesting are the areas with NO DATA.



What is in place for analytics

(Bichsel, 2012)





The analytic maturity curve

Subotzky (2008)

Actionable intelligence

How can we make things happen/improve?

Prediction

*What will happen and why?
What is the likely outcome and impact?*

Evaluation

What was the impact of an initiative? Was the intended outcome achieved?

Explanation

*Why did it happen/not happen?
What factors contribute to outcomes?*

Progress monitoring

*Was the goal/target reached?
Were any critical levels reached?*

Analysis / interpretation

*What does the change signify?
What trends are apparent?*

Real-time reporting

*What is happening?
What is changing?*

Historical reporting

*What happened?
What changed?*

Time / Technology

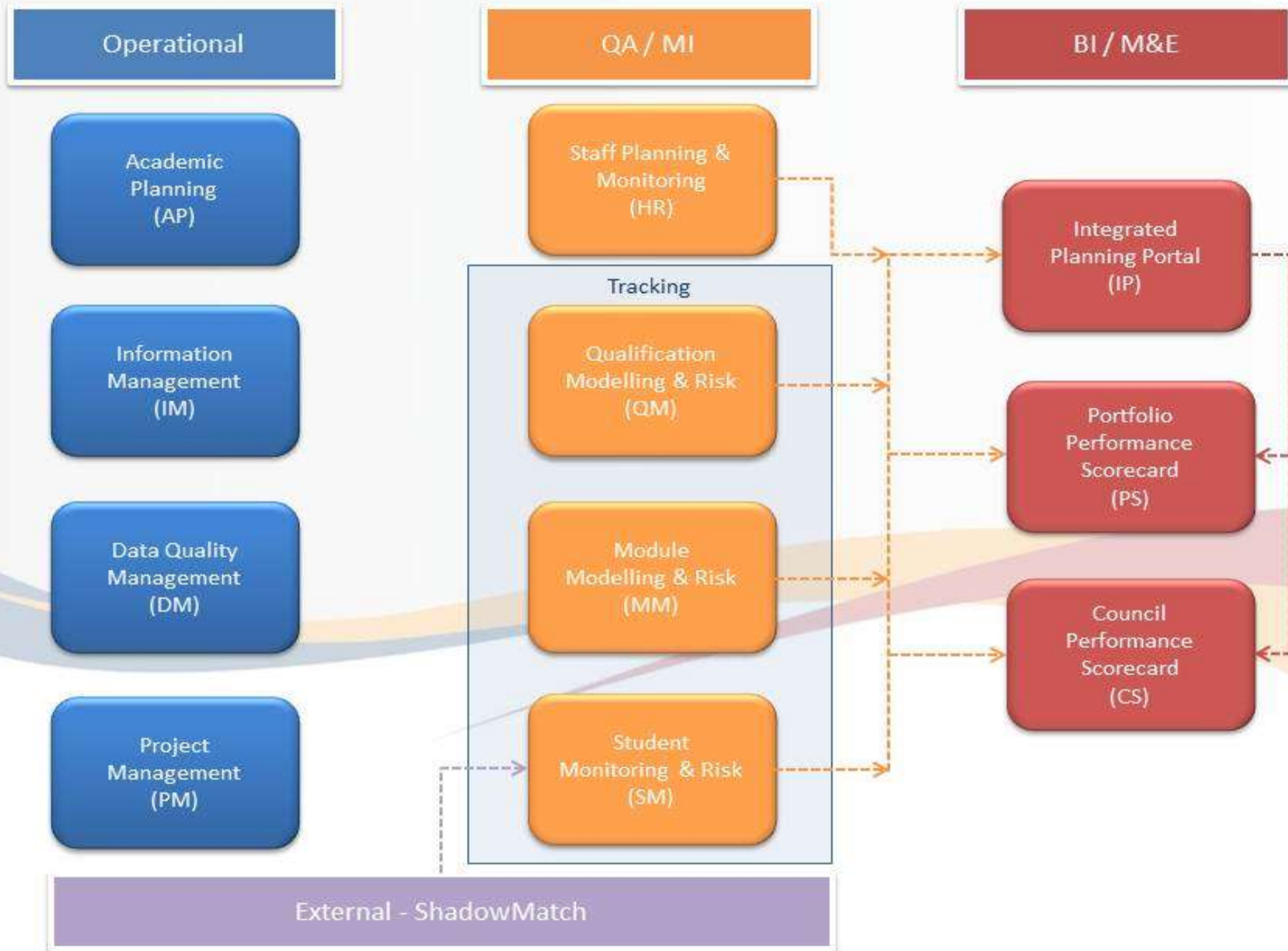
BI Analytic Maturity

Since 2008 ...

- Development in a number of analytic areas
 - Descriptive capability
 - Predictive capability
 - Data integration and broadening of the scope
 - Move towards learning analytics
- Move towards institutional performance
 - Quality assurance metrics
 - Monitoring and evaluation
 - Scorecards
 - Benchmarking, target setting & monitoring

How do these efforts rate in reality – how do they compare with Bichsel

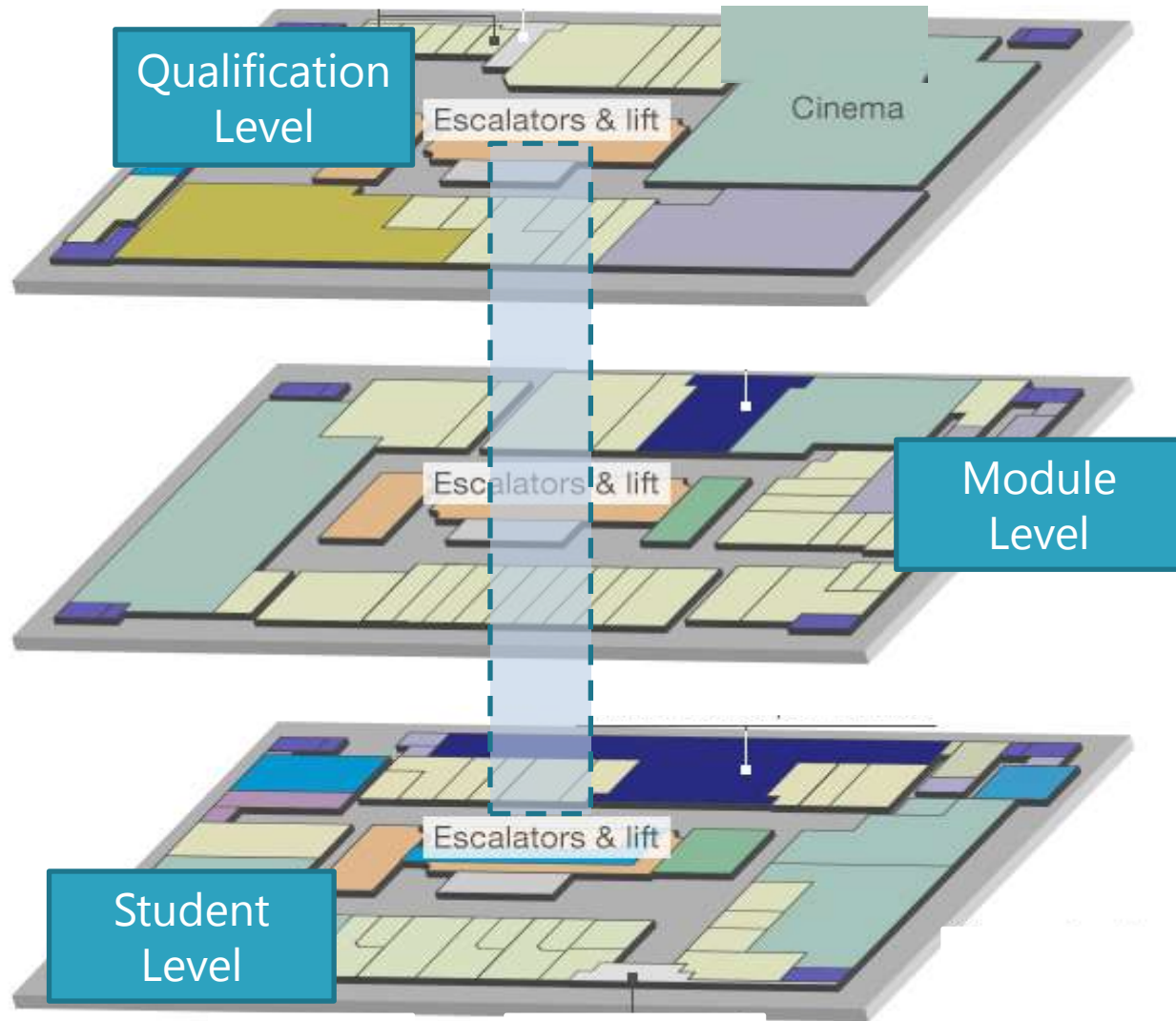




Development areas ...

- Dimension:
 - Qualification view
 - Module / Course view
 - Student view
- Drill-down and drill-through:
 - Organisational structure
 - Filtering (slice & dice)
- Each area:
 - Detail data lists, structured user interactive reports, aggregated dashboards

Classical design approach





Graphic Reports

- ✔ **Registration Dashboard**
 Actual registration counts over time by week or day, accumulated or not, by year.

- ✔ **Flow Planning Summary**
 Actual and planned enrolments, dropouts and graduates aggregated at higher levels.

- ✔ **Actual Profile Report**
 Actual Biographical, Geographical and Registration data per qualification over time.

- ✔ **Planned Profile Report**
 Planned Biographical, Geographical and Registration data per qualification over time.

- ! **Progress Infographics**
 Actual data vs planned targets per qualification over time summarised as simple infographics.

- ✘ **Module Fraction Summary**
 Actual and planned module enrolments and FTEs aggregated to higher levels based on the module fractions.

- ✘ **Module Fraction Dashboard**
 Academic and Registration profiles based on the module fractions of qualifications.

- ✘ **Actual Graduate Pivot Report**
 User-selected variables and filtered parameters reporting graduate data in a pivot table format.



Tabular Reports

- ✔ **Qual Structure (AIMS) Data**
 A summary table showing all the elements recorded on the AIMS system and enrichment by DIA.

- ✔ **Progress Against Targets**
 Detailed report on inflow and outflow data relative to the set targets.

- ✔ **Qual Attrition Analysis**
 Detailed report the various points of attrition (applied, enrolled, registered, cancelled) per qualification.

- ✔ **Quality Assurance Metrics**
 View all aspects of qualification information and drill-through to levels of detail.

- ! **Aggregated Quality Assurance Metrics**
 View aggregated qualification information for selected qualifications as a group.

- ✘ **Finance Module Funding Grid**
 Formatted report of the enrolment pattern of funded credits and levels for setting module Fees.

- ✘ **Finance Fraction Funding Grid**
 Formatted report of the enrolment pattern of funded credits and levels for setting module Fees from module fractions.

- ✘ **Actual Enrolment Pivot Report**
 User-selected variables and filtered parameters reporting qualification enrolment data in a pivot table format.



Data Management

- ✔ **Inflow & Outflow Modelling**
 Manage the process of inflow and outflow modelling at qualification level for enrolment management.

- ✔ **Risk Ranking Management**
 Manage the risk ranking factors and report ordered risk lists per qualification.

- ✔ **Prediction Management**
 Management area to set 4 year predictions for all aspects of the qualification.

- ✘ **Admin Console**
 Administrative area to manage the various underlying tables to update and import data.

- ✘ **Alternate Qualification Management**
 Manage the replacement/change/grouping of quals for planning and predictions.

Note:

Actual data as at 29 Aug 2015.

Qual Masterlist as at 10 Aug 2015.

Enrolment Plan updated 15 Aug 2015.

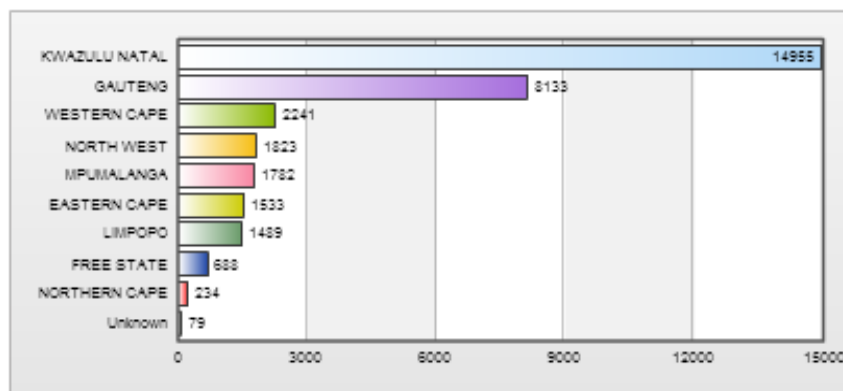
Module Fractions last updated 15 Aug 2015.

Province

2015 Cohort by ' Province '

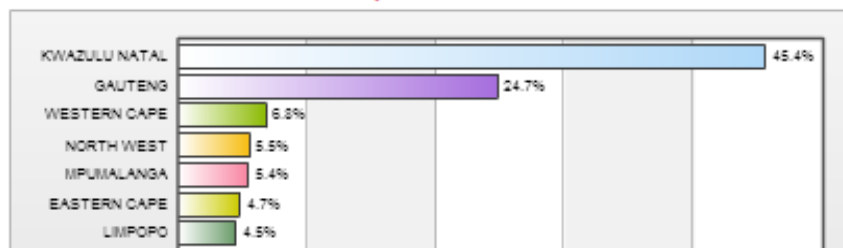
Ord	Province	Cnt	(%)
1	KWAZULU NATAL	14 955	45,4%
2	GAUTENG	8 133	24,7%
3	WESTERN CAPE	2 241	6,8%
4	NORTH WEST	1 823	5,5%
5	MPUMALANGA	1 782	5,4%
6	EASTERN CAPE	1 533	4,7%
7	LIMPOPO	1 489	4,5%
8	FREE STATE	688	2,1%
9	NORTHERN CAPE	234	0,7%
10	Unknown	79	0,2%
TOTAL		32 957	

2015 Cohort by ' Province ' as Counts

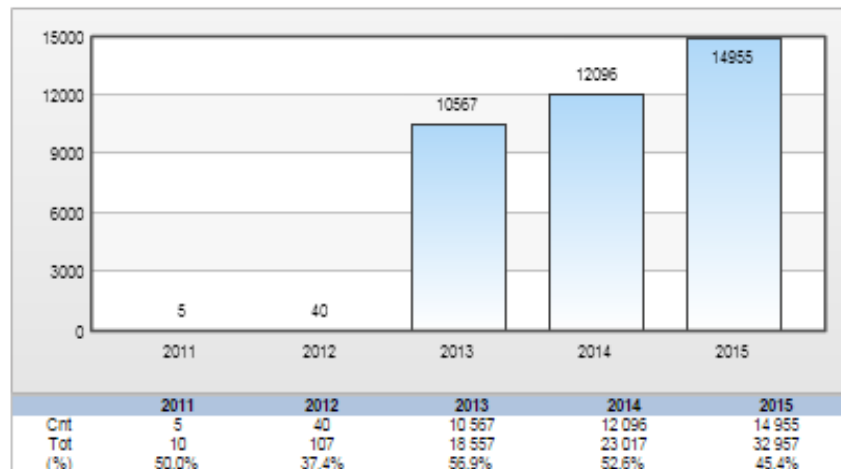


(Qual_College_Code=9) (Qual_Category_Code=41) ((Qualification_Code=98615) OR (Qualification_Code IN(97942)))
(Registration_Status_Code IN(AP, CA, RG, TP, TN))

2015 Cohort by ' Province ' as % of Total

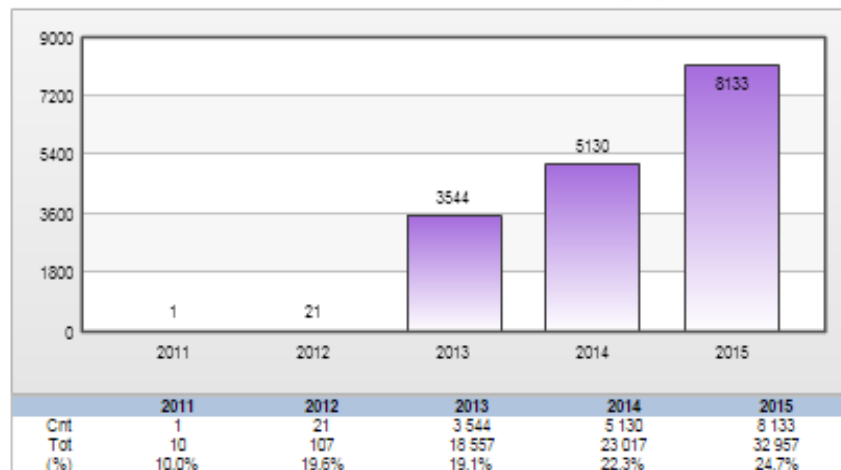


Cohort Enrolments for Province = ' KWAZULU NATAL ' (Cnt)



(Qual_College_Code=9) (Qual_Category_Code=41) ((Qualification_Code=98615) OR (Qualification_Code IN(97942)))
(Registration_Status_Code IN(AP, CA, RG, TP, TN)) (Province=KWAZULU NATAL)

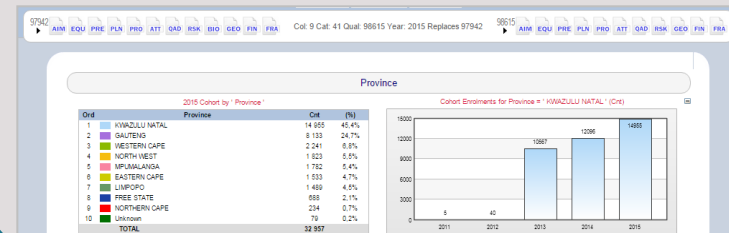
Cohort Enrolments for Province = ' GAUTENG ' (Cnt)



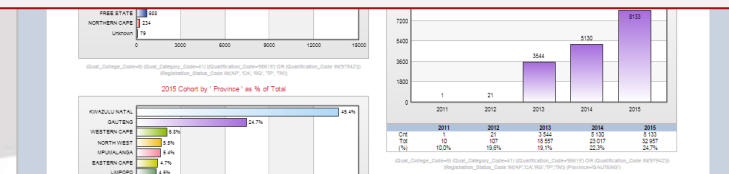
(Qual_College_Code=9) (Qual_Category_Code=41) ((Qualification_Code=98615) OR (Qualification_Code IN(97942)))
(Registration_Status_Code IN(AP, CA, RG, TP, TN)) (Province=GAUTENG)

Evidence on offer ...

Dimension	Areas	Reports	Items
Qualification	14	112	2078
Module / Course	14	198	1730
Student	6	147	1535
Total		457	5343



Information on demand ...



Case Study: User Involvement

- Test the user:
 - Uptake
 - Engagement
 - Understanding
 - Implementation
- Decision stage:
 - Prior during preparation
 - During the process

Relate these back to Bichsel...

Case Study: Enrolment management

- Picture this ...
 - College planning workshop
 - VP: Institutional development, ED Academic Planning, ED College, Deans, Deputy Deans, HOSs, HODs, ED DSPQA, DIA, Quality Consultants, Analysts
 - Purpose – setting enrolment targets for each qualification for 2016 cohort, discussion on practicality / feasibility
 - Initial discussions and engagement put proposals & draft targets on the table

* until now no management of student numbers or targets

Case Study: Higher Cert. ABET (98615)



Qual Code	New Qualification Name	Strategy	2010	2011	2012	2013	2014	2015	2016
98615	HIGHER CERTIFICATE IN ADULT BASIC EDUCATION AND	Growth strategy	2709	3721	5735	11318	10644	9307	13084
98999	MASTER OF EDUCATION in Open and Distance Learning	Sustainable strategy				13	12	19	15
99001	DIPLOMA in Adult Basic Education and Training	Declining strategy	4460	4608	3314	2206	1725	1316	1006
0264X	ADVANCED CERTIFICATE IN EDUCATION (FOUNDATION	Phased out	106	13	4	1			0
0328X	ADVANCED CERTIFICATE IN EDUCATION: TOURISM EDU	Phased out	37						
0376X	ENDORSEMENT: SPECIALISATION IN INCLUSIVE EDUCA	Phased out	14	25	21				0
2032X	DIPLOMA IN EDUCATION (SECONDARY PHASE)	Phased out	1						
9501X	HONOURS BACHELOR OF EDUCATION - WITH SPECIALIS	Sustainable strategy	365	403	355	349	203	155	362
05312	Honours Bachelor of Education	Declining strategy	503	479	394	458	296	244	151

Case Study: Key questions ...

Management question	Viewpoint
What is the pool of interest?	Attrition view (ATT)
What is the potential uptake?	(ATT)
What are the inflows: intake and first-time intake?	Inflow/outflow planning (PLN)
What are the outflows: dropouts and graduates?	(PLN)
How do previous versions contribute to enrolments and graduates?	Equivalent view (EQU)
How many provisional enrolments to achieve the statutory target and what is the workload?	(PLN)
What is the race, gender, matric score, age distribution?	Cohort biographical (BIO)
What is the spatial spread of these students?	Cohort geographical (GEO)
What are the barriers to graduation?	Risk management (RSK)
What modules are taken & how many are “at risk”?	Academic structure (AIM)
Where do these students go on completion?	

Case Study: User Results

- Executive & senior management
 - Significant interest in the analytics
 - Fair knowledge at the higher level
- Middle management
 - Inadequate business knowledge
 - Poor engagement with the data
- Analysts & researchers
 - Required to explain and integrate the data
 - Relied upon to express the business in the data

* Similar to the results of Bichsel ...

Case Study: Analytic Results

- Adequate provision of data / analytics
 - Sufficient dashboard design and drill-down / drill-through
 - Adequate predictive & descriptive analytics
 - Adequate timely / real-time information provided
 - **Little questioning the integrity of the data**
- Inadequate preparation using all available data
 - Despite availability of the data little integrated preparation
 - **More detailed engagement in real-time**
- Difficulty in engaging with all the data / analytics
 - Too much noise - not enough message
 - Difficulty in interpreting some of the data / analytics
 - **Disjuncture between decision makers and college operations**
- The role of the 'data scientist' / analyst
 - Much **reliance on the analyst** to contextualise the analytics
 - Need to 'package' some of the analytics differently

Going forward ...

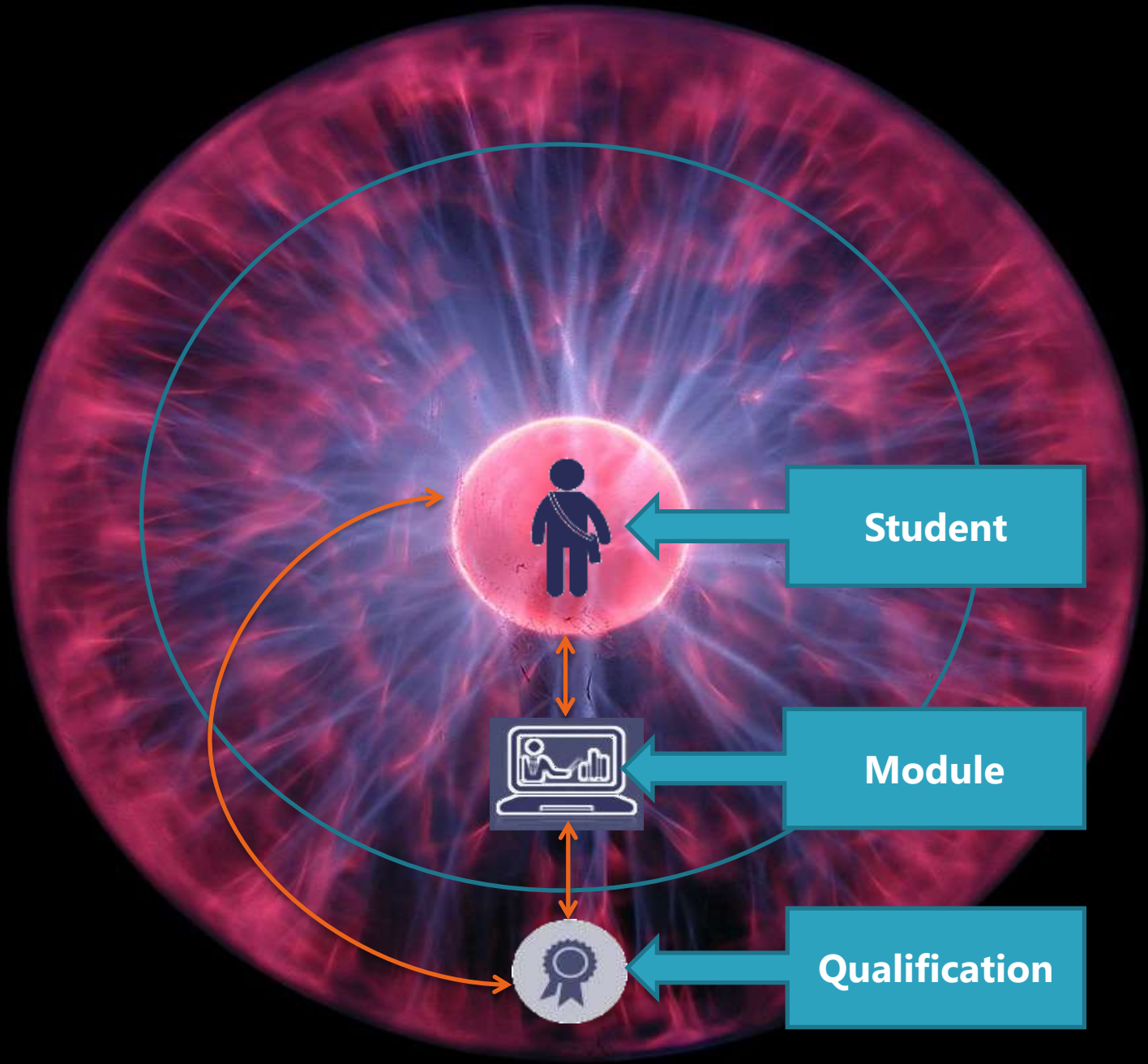
- Re-think the interaction with the audience
 - Identify ‘super users’ or ‘key users’ or ‘champions’
- Think differently about ‘packaging’
 - Simplify without compromising complexity
- Research on dashboard design
 - Importance of memorability
 - Learn from other environments

The Data Sphere

- Dashboard design
 - The use of 'itineraries'
 - Identify 'connected nodes'
 - Contained within a data sphere
- User interaction
 - Process of engagement
 - Visualisation facilities
 - Training

BI is more about process and people than tools and data ...

Data Sphere



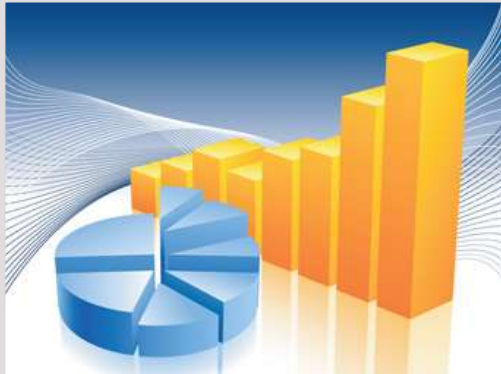
People and process

- User interaction
 - Process of engagement
 - Visualisation facilities
 - Training

BI is more about process and people than tools and data ...



The future Senate / Mancom chambers ...



Thank you ...

Conclusions...

- Sufficient data
 - Accurate, reliable and in real time
- Development and design
 - Comprehensive, detailed, longitudinal
 - Too much, too complex, needs interpretation
- Inadequate user engagement
 - During preparation and process phases
- Varied decision-maker interest/involvement
 - High at executive level
 - Low at operational level