To realise the potential of learning analytics to impact on student retention and success, mega open distance learning (ODL) institutions face a number of challenges, paradoxes and opportunities (Prinsloo et al, 2012)
Introduction

• Analytics and the insights they deliver are changing competitive dynamics daily by delivering greater acuity and focus.

• The high level of interest and hype surrounding analytics, Big Data and business intelligence (BI) is leading to a proliferation of market projections and forecasts, each providing a different perspective of these markets.

• The Advanced and Predictive Analytics (APA) software market is projected from grow from $2.2B in 2013 to $3.4B in 2018, attaining a 9.9% growth in the forecast period.

• The growing number of on-line interactions between learners and on-line learning systems leaves a trail of data that can be analyzed at a number of levels of granularity and for several purposes.
Outline of Presentation

• Improved student Teaching, Learning and institutional/social engagement (student life/sense of belonging) efforts through technology.

• The project implementation will also impact the current learning tools, teaching and learning processes including the roles and responsibilities of students, e-tutors, and academics etc.

• Pre-empt points of intervention and decision making to invest in learning tools like MOOCS and OeR

“I never teach my students. I only provide the conditions in which they can learn.”

- Albert Einstein
# Economics 101

## How the Leaders Rank

### Sub-Saharan Africa GDP growth forecasts

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP per person, $'000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angola</td>
<td>11.1</td>
</tr>
<tr>
<td>Côte d'Ivoire</td>
<td>8.7</td>
</tr>
<tr>
<td>Ghana</td>
<td>6.6</td>
</tr>
<tr>
<td>Rwanda</td>
<td>5.6</td>
</tr>
<tr>
<td>Zambia</td>
<td>4.0</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1.0</td>
</tr>
<tr>
<td>Kenya</td>
<td>0.5</td>
</tr>
<tr>
<td>Uganda</td>
<td>0.4</td>
</tr>
<tr>
<td>Togo</td>
<td>0.5</td>
</tr>
<tr>
<td>South Africa</td>
<td>8.7</td>
</tr>
<tr>
<td>Gabon</td>
<td>11.1</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Source: IMF

### Selected countries, 2012, % increase on previous year

<table>
<thead>
<tr>
<th>Country</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angola</td>
<td>5.4%</td>
</tr>
<tr>
<td>Côte d'Ivoire</td>
<td>1.1%</td>
</tr>
<tr>
<td>Ghana</td>
<td>1.8%</td>
</tr>
<tr>
<td>Rwanda</td>
<td>0.6%</td>
</tr>
<tr>
<td>Zambia</td>
<td>1.4%</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1.0%</td>
</tr>
<tr>
<td>Kenya</td>
<td>1.0%</td>
</tr>
<tr>
<td>Uganda</td>
<td>0.5%</td>
</tr>
<tr>
<td>Togo</td>
<td>0.4%</td>
</tr>
<tr>
<td>South Africa</td>
<td>0.5%</td>
</tr>
<tr>
<td>Gabon</td>
<td>8.7%</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

Source: IMF
We respond to

• White Paper
• National Development Plan
• United Nations Global Compact
UNISA Student distribution

Unisa Student Distribution by Magisterial District
Tertiary Education Participation Rates

Note that the OECD figure represents an approximate average across developed countries within the OECD and excludes OECD developing countries such as Mexico.

Source: World Bank, Ernst & Young analysis. MENA – Middle East & North Africa; OECD – Organisation for Economic Co-operation & Development
Purpose of Analytics

Figure 2
How analytics impacts business strategy

Business strategy

Fuel innovation (42%)

Drive profitability (29%)

Increase operational effectiveness (29%)

Source: Leadership Excellence in Analytic Practices (LEAP) study, 2014
Perspectives on analysis and the value add in predictive success and throughput

• Analytics can assist transform education from a standard one-size-fits-all delivery system into a responsive and flexible framework, crafted to meet the students' academic needs and interests.

• Enhance student experience in open distance education (ODL)

• Pre-empt the learner environment to increase engagement
Internal Requirements for information on students

• Biometric
• Psychometric
• Psychosocial
• Socio-economic
• Habits and Behaviours
• [ethics and confidentiality need to be applied, PoPI, PAIA]
Challenges faced by different Constructs

- Accessibility
- Economic
- Logistics
Internal Drivers

• ICT
  – Robust system, processes
  – Internal control mechanisms (self learning and AI)

• Skills Development and sourcing
  – Develop and design pedagogies and didactics for the digital age

• Scalability and Agility
  – Stable systems over large economies of scale

• Visionaries
  – To connect the dots on the horizon-Thought leaders
‘Unpacking’ the Client

• Learning style (locus of control)
• Motivation
• Will to complete [need to succeed]

Moving away from books?

Do you like books or reading?
Data, Information and Intelligence

- Characteristics
- Trends
- Behaviour
The digital DNA

- Break – up to 1 and 0
- Collate and aggregate
- Connect the dots
- Big data are now being used to personalize every experience users have on commercial websites, and education systems, companies, and publishers see tremendous potential in the use of similar data mining techniques to improve learning outcomes.
Figure 5

Big data architecture

<table>
<thead>
<tr>
<th>Vertical apps</th>
<th>Decision support</th>
<th>Reporting and visualization</th>
<th>Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced visualization</td>
<td>Structured dashboarding</td>
<td>Charting and graphing</td>
<td>Request-response and queuing</td>
</tr>
<tr>
<td>Sentiment analysis</td>
<td>Business intelligence</td>
<td>Predictive modeling</td>
<td>EAI and event-based updating</td>
</tr>
<tr>
<td>Stream processing</td>
<td>Web crawl processing</td>
<td>Forecasting and simulation</td>
<td>ETL and ELT</td>
</tr>
<tr>
<td>Loosely structured</td>
<td>Key-value database</td>
<td>In-memory processing</td>
<td>Database coupling</td>
</tr>
<tr>
<td>Highly structured</td>
<td>Object-oriented database</td>
<td>Parallel and distributed processing</td>
<td>SQL processing</td>
</tr>
<tr>
<td>More structured</td>
<td>Relational database</td>
<td>SQL processing</td>
<td></td>
</tr>
<tr>
<td>Less structured</td>
<td>Parallel database</td>
<td>Parallel and distributed processing</td>
<td></td>
</tr>
</tbody>
</table>

Notes: EAI is enterprise application integration. SQL is structured query language. ETL is extract, transform, and load. ELT is extract, load, and transform.
Source: A.T. Kearney analysis
Analytics

- Big data analysis
- Requirement analysis to meet personal expectation
- Requirement to meet group expectation
- Requirement to meet organizational expectation
Skills for Learner Analytics

• Data scientists
• Team approach
Quality Teaching and learning

• Enhance student experience at a distance
• Quality and alternate assessments
• Intelligent interventional design (MOOC, OeR)
Cost of Education

• Dwindling state funds
• Increased competition lead to plateau student numbers
• Reduced enrolments and throughput places strain on the organization
• Cost benefit of intervention design and development
Connectivity

• Connect via
  • social media
  • LMS
  • Mobile technologies

• Networks established to harness data and information (guided by legislation and policies)
• Artificial intelligence to monitor controls within the network
Delivery

• Delivery is a function of the context
  – Distance education in SA still very dependent on postal services
• Change management essential at college, support and student level
• Just in Time delivery methodologies
Way Forward

• **Systems evolution**
  – central warehousing is imperative
  – overview approach to systems architecture
  – deployment of an ‘information control centre’
  – movement away from traditional development thinking – concept, specification, development, user-test, reiterate, and deploy
  – movement away from traditional systems integration – moving data efficiently

• **Analytic Process (velocity, agility, complexity)**
  – Expand on ‘control room’ design (virtual??) – different methods of packaging/dissemination
  – Maintain agility with increasing volumes, complexity - automation
  – Maintain velocity of real-time data - too much noise and not enough signal
  – Think about velocity from a research or analytic point of view - traditional methods mentioned above
Thank you