ENABLING EVIDENCE BASED EDUCATION ECOSYSTEM

Real-time education ecosystem implementation
Mongolian case
What is the education business?
How does it run?

- Leadership
- Management
- Curriculum
- Teacher
- Environment
- Student
- Cooperation
  - Ministry of Education
  - Education research
  - Teacher development
  - Education Evaluation

The education ecosystem framework includes

- Teacher development
- Leadership
- Management
- Curriculum
- Environment
- Student
- Learning and Teaching
- Education Research

Ministry of Education, Culture and Science

Education Evaluation
Manage Education ecosystem

Strategy
• Evidence based Strategy development
• Planning, budgeting, forecasting
Management
• Human resource /Institutional capacity building/
• Financial
Learning and Teaching /Real-time data analysis/
• Curriculum
• Application and Admission
• Student administration
• Grading
Assessment /Evidence based feedbacks to every school, teacher and student/

Primary education program
Lower secondary education program
Upper secondary education program
### Information systems

#### Educational management
- Curriculum management
- Grading and Advising
- Assessment management
- Timetable management

#### Human capital management
- Core HR
- Workforce compensation
- Learning and Development
- Talent Review

#### Financial management
- Strategy management
- Investment and Construction
- Receivable management

#### Information & Integration management
- Statistics management
- Content management
- Data integration

#### Testing and Learning management
- Course management
- Certificate
- Testing management

#### Social & Collaboration management
- Messenger
- Portal
- Stream

#### Governance, Risk & Compliance
- Cloud control
- Enterprise management
- Access Governance
- Audit Management
- Controls and Compliance
- Risk management
- Fraud management
<table>
<thead>
<tr>
<th><strong>Educational management</strong></th>
<th><strong>Human capital management</strong></th>
<th><strong>Financial management</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum management</td>
<td>Core HR</td>
<td>Strategy management</td>
</tr>
<tr>
<td>Grading and Advising</td>
<td>Time and Labor</td>
<td>Planning, budgeting &amp;</td>
</tr>
<tr>
<td>Assessment management</td>
<td>Absence management</td>
<td>forecasting</td>
</tr>
<tr>
<td>Timetable management</td>
<td>Payroll</td>
<td>Cost management</td>
</tr>
<tr>
<td></td>
<td>Workforce compensation</td>
<td>Investment and</td>
</tr>
<tr>
<td></td>
<td>Benefit management</td>
<td>Construction</td>
</tr>
<tr>
<td></td>
<td>Learning and Development</td>
<td>Maintenance and Repair</td>
</tr>
<tr>
<td></td>
<td>Performance and Succession</td>
<td>Receivable management</td>
</tr>
<tr>
<td></td>
<td>Recruiting and Onboarding</td>
<td>Travel management</td>
</tr>
<tr>
<td></td>
<td>Talent Review</td>
<td>Financial close</td>
</tr>
<tr>
<td></td>
<td>Workforce Planning</td>
<td>Project management</td>
</tr>
<tr>
<td></td>
<td>Workforce Analytics</td>
<td>Procurement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Financial analytics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Information &amp; Integration management</strong></th>
<th><strong>Testing and Learning management</strong></th>
<th><strong>Social &amp; Collaboration management</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics management</td>
<td>Course management</td>
<td>Messenger</td>
</tr>
<tr>
<td>Data integration</td>
<td>Online course</td>
<td>Collaboration</td>
</tr>
<tr>
<td>Data warehouse (OLAP)</td>
<td>Virtual class</td>
<td>Information feeds</td>
</tr>
<tr>
<td>Business intelligence</td>
<td>Certificate</td>
<td>Portal</td>
</tr>
<tr>
<td>Content management</td>
<td>Mobile learning</td>
<td>Sites</td>
</tr>
<tr>
<td>Master Data management</td>
<td>Content</td>
<td>Document Sharing</td>
</tr>
<tr>
<td>Data Quality</td>
<td>Testing management</td>
<td>Stream</td>
</tr>
<tr>
<td>Service integration</td>
<td>Test database</td>
<td>Content management</td>
</tr>
<tr>
<td>Service management</td>
<td>Testing device integration</td>
<td>Mobile chatting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Social analytics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Governance, Risk &amp; Compliance</strong></th>
<th><strong>Cloud control</strong></th>
<th><strong>Enterprise Management</strong></th>
<th><strong>Access Governance</strong></th>
<th><strong>Audit Management</strong></th>
<th><strong>Controls and Compliance</strong></th>
<th><strong>Risk Management</strong></th>
<th><strong>Fraud Management</strong></th>
</tr>
</thead>
</table>
Education Sector Information System Project

• Goal
  Education sector information systems of development, pilot, implementation, sustainability

• Scope
  • Develop 250+ modules

• Time
  3 years (2013/7-2016/12)

• Budget
  State budget, Asian development bank

• Team
  25 people (Manager and architect-1, Business analyst -7, System analyst-4, System developer-10, IT engineer -2, Designer -1)
Project management: Agile

Plan  Development  Deliver

Modules

Daily Review

Feedback

Backlog

Iteration

Release

Deliverable
Development process

- MANAGEMENT ARCHITECTURE
  - Deliverables
    - Project management
    - System architecture

- BUSINESS ANALYSIS
  - Deliverables
    - Strategy analysis
    - Requirement analysis
    - Solution

- SYSTEM ANALYSIS
  - Deliverables
    - Data model
    - UI model

- SYSTEM DEVELOPMENT
  - Deliverables
    - Business component
    - Task Flow
    - User interface
    - Unit, performance testing

- TEST PILOT
  - Deliverables
    - Functional testing
    - Pilot, implementation
A Guide to the business analysis Body of Knowledge

- **Strategy analysis**
  - Current state
  - Future state
  - Change strategy
- **Requirement analysis**
  - Requirement
  - Define Design
- **Solution, evaluation**
  - Simple solution
  - Evaluation
Strategy analysis

- **From top-down**: a strategic goal
- **From bottom-up**: a problem with the current state of a process, function or system
- **From middle management**: Manager needs
- **From external drivers**: Customer demand
Business analysis

- Requirements analysis
- Design Definition

Education program

Knowledge

Skill

Assessment

School
  - School performance
  - Result based management

Teacher
  - Teacher performance

Student, parent
  - Study analysis
Solution evaluation

Prototype
Pilot
Operating

Institution

Department

Course catalog

Courses

Class

Group

Education career

Program

Terms

Sessions

Plan

Degree

Student

Instructor

Guide
Strategy analysis
Requirement analysis

Solution
System analysis

System structure
System analysis

Data model
- Conceptual model
- Logical model
- Physical model
- Meta Data
System analysis

Mockups
  Sketch
  Wireframe
  Prototype & simulation
  Visual design
  Test & assessment
System development

- Entities
- Associations
- View Objects
- View Links
- Application Modules
System development

- Switches
- Navigations
- Methods
- Views
- Managed beans
- Servlets
- Parameters
System development

- Pages
- Forms
- Templates
- Layouts
System development

- Unit test
- Functional test
- Performance test

Application Testing Suite
A powerful, integrated testing solution for ensuring application quality, performance and reliability

- Functional Testing for Web Applications
  Automated functional and regression testing
- Test Manager for Web Applications
  Test process management, requirements and defect tracking
- Load Testing for Web Applications
  Automated load and performance testing

- OneScript
  Reuse functional test scripts for load testing
- ServerStats
  Infrastructure performance monitoring under load
Applications

- Schools: 700+
- Students: 515,000 +
- Teachers: 25,000+
- Record: 70+ millions
- Concurrent user: 10,000+
Data warehouse

- Applications
- Database
- Data warehouse
- Business intelligence
Warehouse design

- Historic Data model (Fact and dimensions)
- Real time data model
Data warehouse

ETL
- Scenario
- Extract, load, transform
Data warehouse

- Business component
- Design in runtime
- Drag and drop reports
Infrastructure

- **Province connectivity**
  Fiber optic cable to every administrative unit

- **School connectivity**
  Fiber optic cable to every school

- **Classroom connectivity**
  Wired network to every classroom

- **Student connectivity**
  Wireless connection to every student, teacher and employee
Infrastructure

- Applications
- Application platform
- Hardware platform
- Enterprise management
- Enterprise security
- Enterprise development
Enterprise Manager Ops Center
Network, Server, Storage device, virtual machine, Operating system management

Enterprise Manager Cloud Control
Database, middleware, application management

Quest Spotlight
Network, server, database control
Network
  Nationwide fiber optic network

Data center
  National level datacenter

Application development
  Enterprise grade applications
  ...

Maintenance
Development
Human resource
Policy
Milestones

System development
- Statistics
- Human resource
- Education

System piloting
- Statistics
- Human resource
- Education

System implementation
- Statistics
- Human resource
- Education

2014-06-23
- Statistic system pilot
- System platform pilot

2014-08-01
- System platform
- Statistics system
- Human resource pilot

2015-05-01
- Human resource
- Education system pilot

2015-08-01
- Education system
- Human resource
Thank you for attention