Welcome to the ALSET webinar!

You will be muted on entry, but you may keep your camera on.

For questions use the Chat panel Q&A at the end of the session (email is possible)

This webinar will be recorded. You can edit your name to stay anonymous.

An Exploratory Tour of ALSET Data Lake: Towards Better Teaching and Research

TAN TECK KIANG, ALSET
ALEX BIOTTEAU, ALSET
Contents

• What is ALSET?
• An Overview of ALSET Data Lake (ADL)
• ADL Data Analytics Example – Field of Study Mismatch, GES 2016
• Demonstration - ADL
• Possible Data Analytics & Research Projects for Better Teaching and Research using ADL
• References
• What is ALSET?
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What is ALSET?

NUS Institute for Applied Learning sciences and Educational Technologies

- Interdisciplinary Institute
- Created in 2016
- Educational Research
Management & staff

Laksh SAMAVEDHAM
Director

Patricia CHEN
Deputy Director &
Research Theme Lead
Psychology of Education

Jessica PAN
Research Theme Lead Economics
of Education

Joshua GOOLEY
Research Theme Lead
Neuroscience of Education

Michele TEH
Assistant Manager

Alex BIOTTEAU
Senior Research Fellow &
Discovery Research Coordinator

Kevin HARTMAN
Translational Research
Coordinator

Teck Kiang TAN
Statistician

Mohamad Rais Bin
Mohamed KAMIS
Research Assistant (Economics)

Clin LAI
Research Assistant (Neuroscience
of Learning)

Boon Zhong BOH
Research Assistant
(Economics)

TEO Qiao Kang
Research Assistant
(Survey)
Interdisciplinarity

Affiliates’ Main Disciplines

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics &amp; Business</td>
<td>16</td>
</tr>
<tr>
<td>Biology &amp; Chemistry</td>
<td>11</td>
</tr>
<tr>
<td>Psychology</td>
<td>11</td>
</tr>
<tr>
<td>Computer Science</td>
<td>10</td>
</tr>
<tr>
<td>Medicine &amp; related</td>
<td>9</td>
</tr>
<tr>
<td>Information System &amp; Analytics</td>
<td>7</td>
</tr>
<tr>
<td>Engineering</td>
<td>5</td>
</tr>
<tr>
<td>Others</td>
<td>4</td>
</tr>
<tr>
<td>Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>Education, Sociology &amp; Policy</td>
<td>3</td>
</tr>
<tr>
<td>English &amp; Language studies</td>
<td>3</td>
</tr>
</tbody>
</table>
Resources for Faculty

DATA
Data Lake

FUNDING
Seed grants, information on extramural grants

COMMUNICATION
Seminar, newsletter, Internet

SUPPORT
LACE & IRB applications, statistician

CONTACTS
Collaboration, institutions
• What is ALSET?
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Components of the ALSET Data Lake

- Mobility data
- Learning Systems
- Campus surveys
- Campus IT
- Facilities
- Registrar
- Admissions
- Housing

Researcher collected data
Main tables of educational data
70 Tables in ADL (May 2020)

AVAILABLE DATA
- Registrar Data
- LMS transaction logs
- Job Placement & Salary Data (GES)
- Co-curricular Activities
- Module Bidding
- Orientation Survey
- Student Feedback
- Student Housing

FORTHCOMING/POTENTIAL DATA
- Email Header Metadata
- Graduate admissions
- Researcher collected data
- Next generation LMS logs
- Facilities usage
- Library resources
- Internships
Main surveys

- Graduate Employment Survey 2015+
  - Survey Question
  - Survey Data

- Orientation Camp Survey 2017
  - Survey Question
  - Survey Data

- Freshman Entry Survey 2018
  - Orientation Question
  - Survey Data

- Student Feedback Survey
  - Feedback for Module
  - Feedback for Instructors
Examples: GES & OCS

### Graduate Employment Survey

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Background</td>
</tr>
<tr>
<td>B</td>
<td>Employment Activity Status</td>
</tr>
<tr>
<td>C</td>
<td>Employment Particulars</td>
</tr>
<tr>
<td>D</td>
<td>Job Application</td>
</tr>
<tr>
<td>E</td>
<td>Future Studies</td>
</tr>
<tr>
<td>F</td>
<td>NUS Experience</td>
</tr>
<tr>
<td>G</td>
<td>Demographic</td>
</tr>
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</table>

### Orientation Camp Survey

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Faculty</td>
</tr>
<tr>
<td>B</td>
<td>Satisfaction</td>
</tr>
<tr>
<td>C</td>
<td>Motivation</td>
</tr>
<tr>
<td>D</td>
<td>About OC</td>
</tr>
<tr>
<td>E</td>
<td>Social Networking</td>
</tr>
<tr>
<td>F</td>
<td>Opinion About OC</td>
</tr>
<tr>
<td>G</td>
<td>About OC (con’d)</td>
</tr>
<tr>
<td>H</td>
<td>Respondent’s Background</td>
</tr>
<tr>
<td>I</td>
<td>About Survey and Contact</td>
</tr>
</tbody>
</table>

2015 and 2016 for 2017
## Tokenised Student Tables

### Personal Data
- **Data Items**
  - Student Token
  - Gender
  - Year of Birth
  - Marital Status
  - Country
  - Residency
  - Job Title
  - ...

### Program Enrolment
- **Data Items**
  - Student Token
  - Program
  - Faculty
  - Department
  - Term (e.g. 1910)
  - Start Data
  - End Date
  - Partner University
  - Program Category
  - ...

### Module Enrolment
- **Data Items**
  - Student Token
  - Module
  - Course
  - Final Grade
  - Final Mark
  - Grading Basis
  - Grade Points per Unit
  - Module Credit
  - Earned Credit
  - Class Group
  - ...

### Term and Grade History
- **Data Items**
  - Student Token
  - Term
  - Term GPA
  - Cumulative GPS
  - Institution
  - Academic Career
  - Career Number

### External Test Score
- **Data Items**
  - Student Token
  - Test Date
  - Test Description
  - Test Component
  - Test Score
  - Test ID

### Term and Grade History
- **Data Items**
  - Student Token
  - Term
  - Term GPA
  - Cumulative GPS
  - Institution
  - Academic Career
  - Career Number

---

From 2005
## Co-Curricular Activity Table

### Profile
- Student Token
- Country
- City
- State
- Classification
- Community
- Portal

### Events
- Student Token
- Event ID
- Event Description
- Event Category
- Event Description
- Event Title
- Event Location

### Positions
- Student Token
- Position Name
- Position Start Date
- Position End Date

### Involvement
- Student Token
- Community ID
- Community Name
- Start Date
- End Date

![Image](image-url)
LMS Audit Log

<table>
<thead>
<tr>
<th>Data Items</th>
<th>Action</th>
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<tbody>
<tr>
<td>Student Token</td>
<td>Start Assessment button</td>
</tr>
<tr>
<td>Session ID</td>
<td>Submit Assessment button</td>
</tr>
<tr>
<td>IP Address</td>
<td>View Unread Announcements</td>
</tr>
<tr>
<td>Day (e.g. 2019-10-16)</td>
<td>View Download Files page</td>
</tr>
<tr>
<td>Date Time</td>
<td>View Modules</td>
</tr>
<tr>
<td>Action</td>
<td>View class groups</td>
</tr>
<tr>
<td></td>
<td>View Media from Multimedia</td>
</tr>
<tr>
<td></td>
<td>Search Module</td>
</tr>
<tr>
<td></td>
<td>Module Overview</td>
</tr>
<tr>
<td></td>
<td>File download</td>
</tr>
<tr>
<td></td>
<td>Saving Assessment Answer</td>
</tr>
<tr>
<td></td>
<td>Etc.</td>
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</table>

<table>
<thead>
<tr>
<th>Action</th>
<th>Data Items</th>
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</thead>
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<td>token1</td>
<td>Login</td>
</tr>
<tr>
<td>token1</td>
<td>Load</td>
</tr>
<tr>
<td>token1</td>
<td>Explore Assessment Integration</td>
</tr>
<tr>
<td>token1</td>
<td>Load</td>
</tr>
<tr>
<td>token1</td>
<td>Login</td>
</tr>
<tr>
<td>token1</td>
<td>Load</td>
</tr>
<tr>
<td>token1</td>
<td>Load</td>
</tr>
<tr>
<td>token1</td>
<td>Explore Assessment Integration</td>
</tr>
<tr>
<td>token1</td>
<td>Load</td>
</tr>
<tr>
<td>token1</td>
<td>Module Overview</td>
</tr>
</tbody>
</table>
Coming & Developing

- LumiNUS audit logs
- IMMS (Continuous Assessment grades)
- Graduate admissions (GDA2)
- Alumni
- Library search logs
- Class attendance system
- Internship offerings and placements
- ...

Kevin HARTMAN
Translational Research Coordinator
ALSET Data Lake

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### Questionnaire

**Graduate Employment Survey 2016**

#### Data Structure

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Short Description</th>
<th>Long Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>Faculty_1st Major</td>
<td>Faculty (1st Major)</td>
</tr>
<tr>
<td>Q2</td>
<td>Faculty_2nd Major</td>
<td>Faculty (2nd Major, if applicable)</td>
</tr>
<tr>
<td>Q3</td>
<td>Honours Class_1st Major</td>
<td>Breakdown of class of honours for 1st major</td>
</tr>
<tr>
<td>Q4</td>
<td>Honours Class_2nd Major</td>
<td>Breakdown of the class of honours for 2nd major</td>
</tr>
<tr>
<td>Q5</td>
<td>Conferred Degree_1st Major</td>
<td>Breakdown of conferred degree for 1st major</td>
</tr>
<tr>
<td>Q6</td>
<td>Conferred Degree_2nd Major</td>
<td>Breakdown of conferred degree for 2nd major</td>
</tr>
<tr>
<td>Q7</td>
<td>Conferred Date</td>
<td>Conferred Date</td>
</tr>
<tr>
<td>Q8</td>
<td>1st Choice of Study</td>
<td>1st Choice of Study</td>
</tr>
<tr>
<td>Q9</td>
<td>1st Choice of Study as Current Course, Recoded</td>
<td>Was your current course your first choice of study? (Recoded 3 = Current course was my first choice of study for medicine and music students and BLANK for others)</td>
</tr>
<tr>
<td>Q10</td>
<td>Country of Residence</td>
<td>Country of Residence</td>
</tr>
</tbody>
</table>

#### First Ten Observations

**First Choice of Study and Field of Study Mismatch**

<table>
<thead>
<tr>
<th>Q08</th>
<th>Q035</th>
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</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>Yes, I am employed in a job related to my course of study</td>
</tr>
<tr>
<td>Computing (Computer Science)</td>
<td>Yes, I am employed in a job related to my course of study</td>
</tr>
<tr>
<td>Science</td>
<td>Non Applicable based on skip pattern</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>Yes, I am employed in a job related to my course of study</td>
</tr>
<tr>
<td>Arts &amp; Soc Sci</td>
<td>No, I am employed in a job not related to my course of study</td>
</tr>
<tr>
<td>Environmental Eng</td>
<td>Yes, I am employed in a job partially related to my course of study</td>
</tr>
<tr>
<td>Business Admin (Accountancy)</td>
<td>Yes, I am employed in a job related to my course of study</td>
</tr>
<tr>
<td>Science</td>
<td>Yes, I am employed in a job partially related to my course of study</td>
</tr>
<tr>
<td>Computer Eng</td>
<td>Non Applicable based on skip pattern</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>Yes, I am employed in a job related to my course of study</td>
</tr>
</tbody>
</table>
What is Field of Study (FOS) Mismatch?

- **Field of Study**
  - Law
  - Accountancy

- **Occupation**
  - Lawyer / Solicitor
  - Accountant
  - Financial Adviser
  - Social Worker

Is the nature of your present job related to your course of study of NUS?

(1) yes, I am employed in a job related to my course of study
(2) Yes, I am employed in a job partially related to my course of study
(3) No, I am employed in a job not related to my course of study

(1) Match
(2) Partial
(3) Mismatch
Field of Study Mismatch

Field of Study After Working

Income Earning and Field of Study

[Some information masked for confidentiality reason]
**Mismatch Affect Income Earning?**

**FOS Match earned higher income.**

**Income earned differ by FOS**

**Mismatch Affect Income Earning?**

**Gender Effect**

### GES 2016 OLS Regression Model

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>8.022 (0.014)**</td>
<td>7.996 (0.014)**</td>
</tr>
<tr>
<td>Mismatch (Ref: Match)</td>
<td>-0.179 (0.014)**</td>
<td>-0.178 (0.014)**</td>
</tr>
<tr>
<td>Partial</td>
<td>-0.045 (0.012)**</td>
<td>-0.046 (0.012)**</td>
</tr>
<tr>
<td>Dentistry (Ref: FASS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M Discipline</td>
<td></td>
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<tr>
<td>Business</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computing</td>
<td></td>
<td></td>
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<tr>
<td>Design and Env</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.083 (0.010)**</td>
<td></td>
</tr>
</tbody>
</table>

| R2               | 0.194          | 0.206          |
| Num. obs.        | 4569           | 4569           |
| RMSE             | 0.323          | 0.321          |

***p < 0.01, **p < 0.05, *p < 0.1
### Mixed-Effect Model - Mismatch Affect Income Earning?

#### GES 2016 Miced-Effect Regression Model

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>8.101 (0.087)***</td>
<td>8.101 (0.081)***</td>
<td>8.118 (0.068)***</td>
<td>8.141 (0.055)***</td>
</tr>
<tr>
<td>Mismatch (Ref: Match)</td>
<td>-0.179 (0.014)***</td>
<td>-0.181 (0.014)***</td>
<td>-0.212 (0.069)***</td>
<td></td>
</tr>
<tr>
<td>Partial</td>
<td>-0.046 (0.012)***</td>
<td>-0.048 (0.012)***</td>
<td>-0.087 (0.028)***</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.083 (0.010)***</td>
<td>0.029 (0.057)***</td>
<td>0.021 (0.065)***</td>
<td></td>
</tr>
</tbody>
</table>

#### (1) 43.1% of Variation in Income is from Faculty

#### (2) Male Earned Higher After Control for FOS Mismatch

#### (3) Specifying Gender Random

Gender Effect Disappears

#### (4) Specifying FOS Random

FOS Effect Disappears

[Some information masked for confidentiality reason]

---

### Log Likelihood

- Model 1: -1431.388
- Model 2: -1323.790
- Model 3: -1321.189
- Model 4: -1309.341

### Number of observations

- Model 1: 4569
- Model 2: 4569
- Model 3: 4569
- Model 4: 4569

### Number of groups: Faculty

- Model 1: 11
- Model 2: 11
- Model 3: 11
- Model 4: 11

### Intraclass Correlation Coefficient

- Model 1: 0.082
- Model 2: 0.070
- Model 3: 0.048
- Model 4: 0.032

### ICC: 0.431

---

***p < 0.01, **p < 0.05, *p < 0.1
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Login

National University of Singapore

Sign in with your organizational account

Username

Password

Sign in

Please sign in with your NUSNET ID, eg:
- nusstf\userid
- nusstu\userid
- nusext\userid

Change Password

Forgot Password

Help On 2FA
https://jhub.nus.edu.sg/hub/login
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Possible Data Analytics: Teaching and Research using ADL

• ADL as A Sampling Frame

• Study Directly from ADL
  1. Research Study Based on ADL (Second Year Economic)
  2. Understanding Student Progress (Longitudinal Data Analysis)
  3. Propensity Score Analysis (Matching Students for Course Comparison)
  4. Classification of Student Learning Pattern (Sequence Analysis)

• Integrating Assessment / Survey into ADL
  1. Sleep Habit Study
  2. Cognitive Diagnostic Model / Item Response Theory (Assessment and Cognitive Diagnostic)
ADL as a Sampling Frame

Targeted Population: 200 Students

Students Took Second Year Economics Subjects

Random Sampling

Sample: 200 Students

Preliminary Analysis from ADL

Survey / Assessment

Back to ADL for Further Analysis

No. of Students

By Module

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Income 2015</th>
<th>Income 2016</th>
<th>Increase</th>
<th>Growth</th>
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<tbody>
<tr>
<td>03</td>
<td>Foundations for Econometrics</td>
<td></td>
<td>340</td>
<td>340</td>
<td>12%</td>
</tr>
<tr>
<td>73</td>
<td>Global Economic Dimensions of Singapore</td>
<td>89</td>
<td>89</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Quantitative Methods for Economic Analysis</td>
<td>328</td>
<td>328</td>
<td>11%</td>
<td></td>
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<tr>
<td>02</td>
<td>Macroeconomic Analysis I</td>
<td>257</td>
<td>257</td>
<td>8%</td>
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<tr>
<td>01</td>
<td>Microeconomic Analysis I</td>
<td>209</td>
<td>209</td>
<td>7%</td>
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<tr>
<td>74</td>
<td>Economy of Modern China I</td>
<td></td>
<td>94</td>
<td>94</td>
<td>-3%</td>
</tr>
</tbody>
</table>

By Faculty

[Some information masked for confidentiality reason]
Unconditional Growth Model

\[ Y_{ij} = \beta_{0j} + \beta_{1j} t_{ij} + r_{ij} \]

\[ \beta_{0j} = \gamma_{00} + u_{0j} \]
\[ \beta_{1j} = \gamma_{10} + u_{1j} \]
\[ r_{ij} \sim N(0, \sigma^2) \]

\[ Y_{ij} = 30.42 + 0.17 t_{ij} + r_{ij} \]  
Increase in grade over time but small

\[ r(u_{0j}, u_{1j}) \tau_{01} = -0.71 \]  
Initial grade and growth grade are negatively related

\[ \text{The Intraclass Correlation} = 0.3547 \]

Variation in Grade
35.47% is between student
64.54% is over time.
ADL as a Source of Carrying Out Experimental Design

Fisher’s Randomized Experiment

 Attend Language Classes

Did not Attend Language Classes

Propensity Score Analysis

- Gender
- Country
- ... CCA

Matching

Performance Score

Attended

Not Attended

It is designed to answer specific questions about a particular treatment strategy.
Classification of Student Learning Pattern & Sequence

On-Line Access Pattern

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
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<tbody>
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<td>Wifi 3</td>
<td>Wifi 4</td>
<td>Wifi 5</td>
<td>Wifi 6</td>
<td>Wifi 7</td>
<td>Wifi 8</td>
<td>Wifi 9</td>
<td>Wifi 10</td>
</tr>
</tbody>
</table>

...!

<p>| | | | | | | | | | |</p>
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<td>Wifi 6</td>
<td>Wifi 7</td>
<td>Wifi 8</td>
<td>Wifi 9</td>
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</tbody>
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Learning Pattern

<p>| | | | | | | | | | |</p>
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</thead>
<tbody>
<tr>
<td>IVLE 1</td>
<td>IVLE 2</td>
<td>IVLE 3</td>
<td>IVLE 4</td>
<td>IVLE 5</td>
<td>IVLE 6</td>
<td>IVLE 7</td>
<td>IVLE 8</td>
<td>IVLE 9</td>
<td>IVLE 10</td>
</tr>
</tbody>
</table>

Sequence Analysis

Optimal Matching

\[
\begin{bmatrix}
0 \\
d(2,1) \\
d(3,1) \\
\vdots \\
d(n,1)
\end{bmatrix}
\begin{bmatrix}
0 \\
d(3,2) \\
\vdots \\
d(n,2)
\end{bmatrix}
\begin{bmatrix}
0 \\
\vdots \\
0
\end{bmatrix}
\]

A Matrix Shows How Similar Are The Sequences of These Students.

Classification

Factors Influencing Learning

Multinomial Regression

\[
\ln \left( \frac{\pi_{ij}}{\pi_{im}} \right) = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \cdots + \beta_k x_{i_k}
\]

Explanation (from ADL)

Sequence to Form Learning Grouping

Learning Pattern Affecting Academic Outcomes

e.g. Cluster Analysis
Sleep Habit Survey 2019
PI Joshua J. Gooley

What's Your Sleep Habit?

OR

Early Bird

Night Owl

From Survey to ADL

Sleep Habit Survey

ADL

IVLE

ADL Wifi

ADL
From Assessment Using Cognitive Diagnostic Model to Understand Student Skills

Link to ADL for Further Analysis

Assessment
200 Students + 20 Items

<table>
<thead>
<tr>
<th>Student</th>
<th>Item 1</th>
<th>Item 2</th>
<th>...</th>
<th>Item 19</th>
<th>Item 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>...</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
<td>...</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>199</td>
<td>1</td>
<td>1</td>
<td>...</td>
<td>0</td>
<td>0</td>
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<td>1</td>
<td>1</td>
<td>...</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

Number of Skills Mastered

Skills Mastered Pattern

Skills | Probability
-------|------------
$\alpha_1$ | 0.58
$\alpha_2$ | 0.79
$\alpha_3$ | 0.72
$\alpha_4$ | 0.69
$\alpha_5$ | 0.60
$\alpha_6$ | 0.79
$\alpha_7$ | 0.81
$\alpha_8$ | 0.82

Relationship of Skills

<table>
<thead>
<tr>
<th></th>
<th>$\alpha_1$</th>
<th>$\alpha_2$</th>
<th>$\alpha_3$</th>
<th>$\alpha_4$</th>
<th>$\alpha_5$</th>
<th>$\alpha_6$</th>
<th>$\alpha_7$</th>
<th>$\alpha_8$</th>
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</thead>
<tbody>
<tr>
<td>$\alpha_1$</td>
<td>1</td>
<td>0.35</td>
<td>0.44</td>
<td>0.69</td>
<td>0.64</td>
<td>0.52</td>
<td>0.14</td>
<td>0.42</td>
</tr>
<tr>
<td>$\alpha_2$</td>
<td>0.35</td>
<td>1</td>
<td>0.42</td>
<td>0.32</td>
<td>0.19</td>
<td>0.50</td>
<td>0.92</td>
<td>0.69</td>
</tr>
<tr>
<td>$\alpha_3$</td>
<td>0.44</td>
<td>0.42</td>
<td>1</td>
<td>0.37</td>
<td>0.60</td>
<td>0.38</td>
<td>0.40</td>
<td>0.39</td>
</tr>
<tr>
<td>$\alpha_4$</td>
<td>0.69</td>
<td>0.32</td>
<td>0.37</td>
<td>1</td>
<td>0.55</td>
<td>0.61</td>
<td>0.34</td>
<td>0.32</td>
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<tr>
<td>$\alpha_5$</td>
<td>0.64</td>
<td>0.19</td>
<td>0.60</td>
<td>0.55</td>
<td>1</td>
<td>0.51</td>
<td>0.18</td>
<td>0.33</td>
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<tr>
<td>$\alpha_6$</td>
<td>0.52</td>
<td>0.50</td>
<td>0.38</td>
<td>0.61</td>
<td>0.51</td>
<td>1</td>
<td>0.57</td>
<td>0.43</td>
</tr>
<tr>
<td>$\alpha_7$</td>
<td>0.14</td>
<td>0.92</td>
<td>0.40</td>
<td>0.34</td>
<td>0.18</td>
<td>0.57</td>
<td>1</td>
<td>0.63</td>
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<tr>
<td>$\alpha_8$</td>
<td>0.42</td>
<td>0.69</td>
<td>0.39</td>
<td>0.32</td>
<td>0.33</td>
<td>0.43</td>
<td>0.63</td>
<td>1</td>
</tr>
</tbody>
</table>

Guessing and Non-Slipping

Individual Diagnostic Report

Student 1
Math Score: 65

Q1 Q2 Q3 ... Q18 Q19 Q20
1 1 0 ... 1 0 1

Subtract Numerator
Find Common Denominator
Separate Whole No from Fraction

0 0.5 0.86
0 0.5 0.19
0 0.5 0.59

Skills

Skills Mastered Pattern

> T_Att_Pdf

Att_Pattern Freq
1 1 1 1 1 1 1 1 1 154
2 1 1 0 1 1 1 1 1 18
3 0 1 1 1 1 1 1 17
4 1 1 1 1 0 1 1 1 17
5 0 1 0 0 0 1 1 1 16
6 1 1 1 1 1 0 1 1 15
7 0 0 0 1 0 0 0 1 14
8 0 1 0 0 0 0 1 1 13
9 0 1 1 0 0 0 1 1 13
10 1 0 1 0 0 0 1 1 13
ALSET Data Lake

• What is ALSET?
• An Overview of ALSET Data Lake (ADL)
• ADL Data Analytics Example – Field of Study Mismatch, GES 2016
• Demonstration - ADL
• Possible Data Analytics & Research Projects for Better Teaching and Research using ADL

• References
References

1. Package RODBC – 11 May 2020
2. Introduction to R (Version 2, 8 June 2020)
3. ADL Data Management using R (1 June 2020)
Thank you
and do keep in touch with us

Slides: http://nus.edu.sg/alset/2020/07/10/adl-webinar/

ALSET Website: http://www.nus.edu.sg/alset

Alex: alsab@nus.edu.sg
Kevin: alskrh@nus.edu.sg
Teck Kiang: alsttk@nus.edu.sg