The Airman Learning Record and AMC's Learning Services Ecosystem

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Presented on 29 August 2018

Agenda

- Motivation and Principles
- Airman Learning Record (ALR) Concept
- AMC Learning Ecosystem
- Examples
- Implications

Motivation: Operational Performance

“The speed, connectivity, and non-linear nature of the environment in which warfighters must operate fundamentally changes how one must think about objectives and the threats we face.”*

- Nimble, effective learning systems translate into ready airmen -- current environment is frequently anything but
- Training decisions need to be linked to data and mission relevance and tirelessly improved
- Need to move learning measurement from who, what & where to how and why

*Lt Gen (Retired) Allardice and Mr. Topic (2017). Battlefield Geometry in our Digital Age: From Flash to Bang in 22 Milliseconds. *PRISM* Vol 7, No. 2; National Defense University.

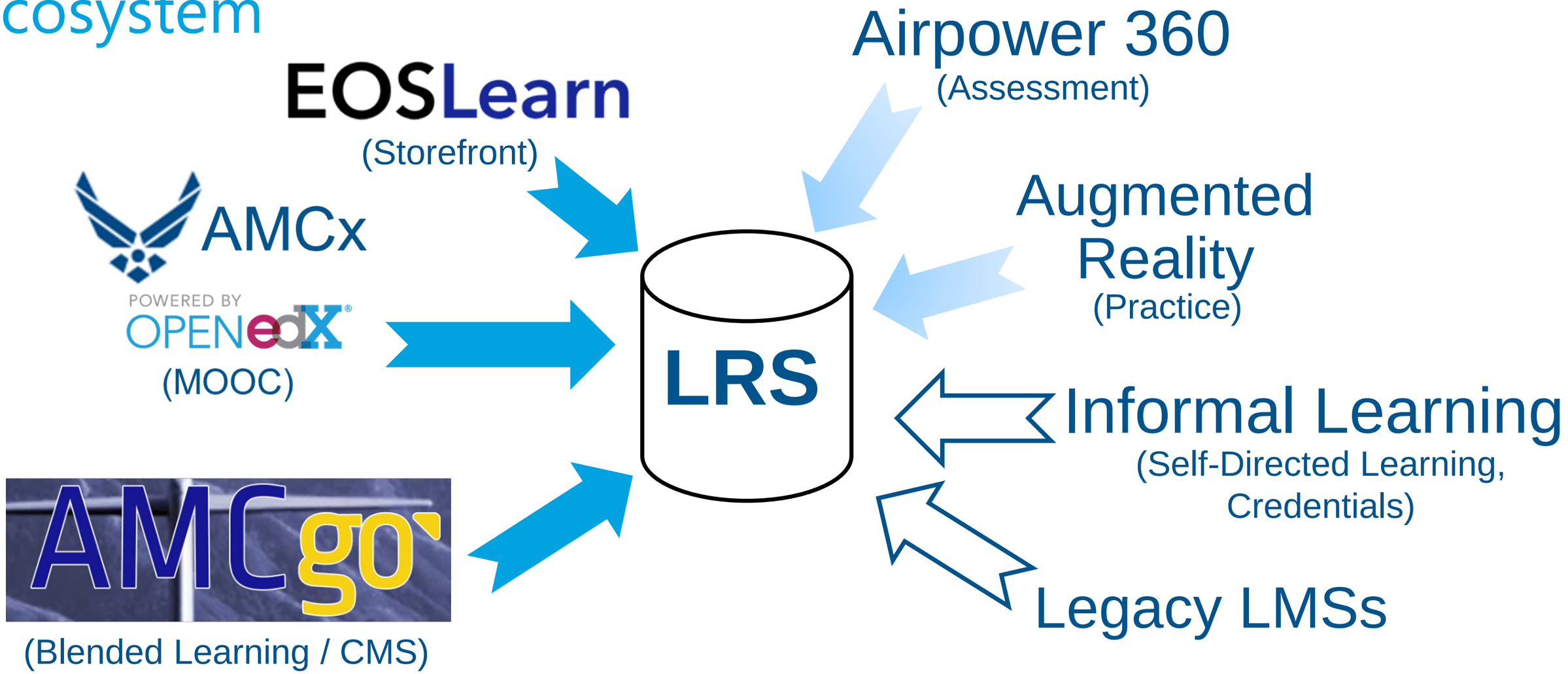
Principles

- Air Force learning environment necessitates analytics tools that are:
  - Cloud Native; mobile first
  - Extensible across use cases without expensive customization
  - Scalable to hundreds of thousands of users
  - Capable of integrating complex, massive data across domains (biosensor, affective, etc.)
  - Non-proprietary
  - Standards-based
  - Interoperable with legacy systems

Airman Learning Record Concept

- Capture learning data from all learning experiences (wherever you can) with total flexibility to capture data at the right level of fidelity/detail
- Instrument and ‘sensorize’ all learning experiences
- Use standards to communicate in a structured way through an open API
- Store them all in an Airman Learning Record Store
- Perform dynamic analytics on that data
- Develop insights and feedback loops to:
  - The learner
  - Learning content owners, producers, designers, & instructors to continuously improve
  - The owners and stewards of learning programs to prioritize investments

Learning Services Ecosystem

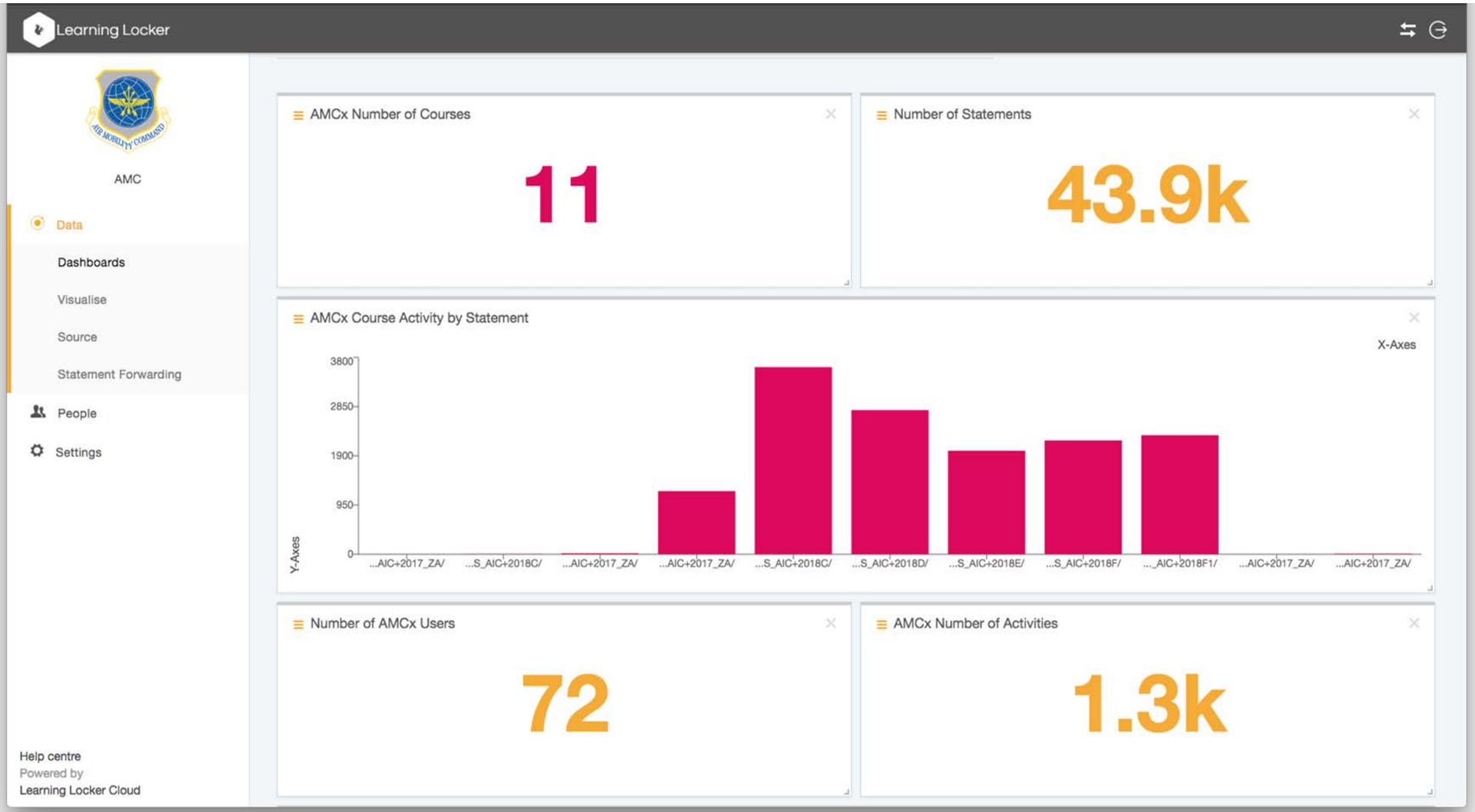


amazon web services

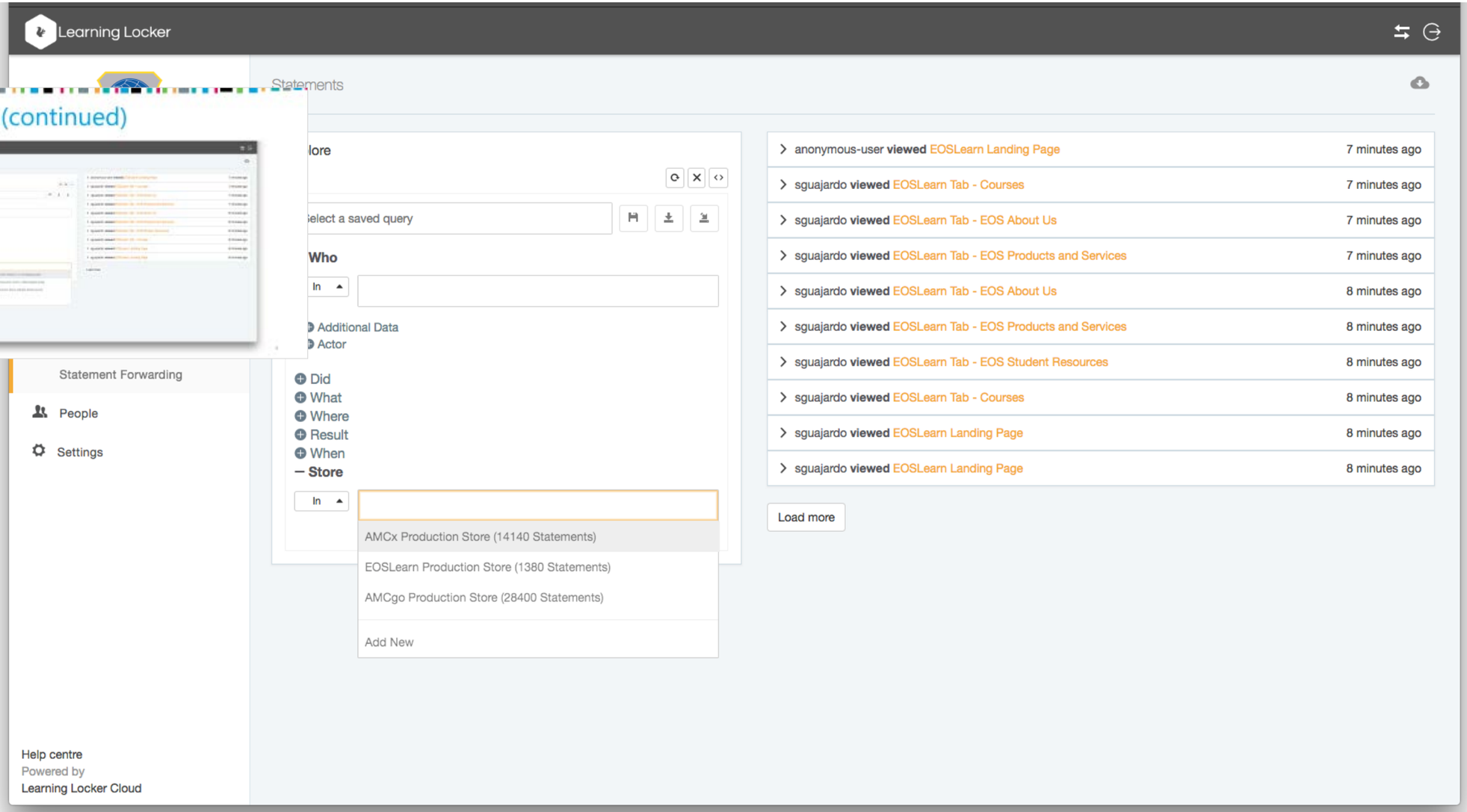
Technology Toolkit

- AWS
- edX
- Learning Locker
- Drupal
- Lime Survey
- Others as needed…

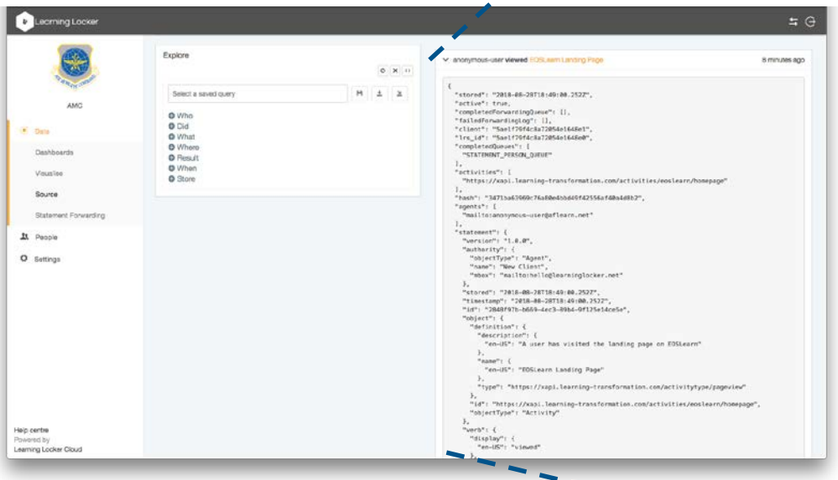
Inside the LRS



Inside the LRS (continued)



Inside the LRS



anonymous-user **viewed** EOSLearn Landing Page — 8 minutes ago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  "completedForwardingQueue": [],
  "failedForwardingLog": [],
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  "lrs_id": "5ae1f79f4c8a72054e1648e0",
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  ],
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    "https://xapi.learning-transformation.com/activities/eoslearn/homepage"
  ],
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        },
        "name": {
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    },
    "verb": {
      "display": {
        "en-US": "viewed"
      },
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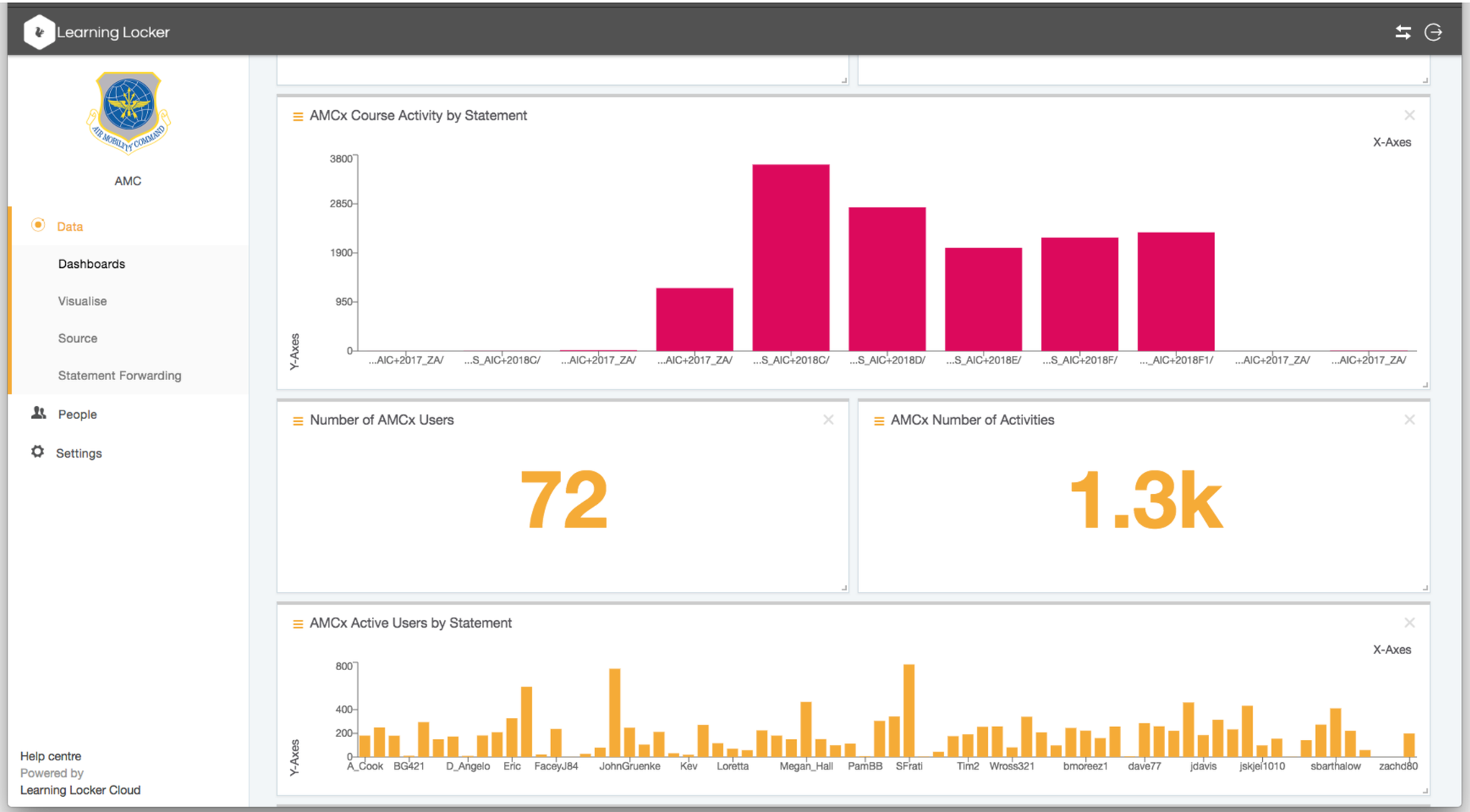
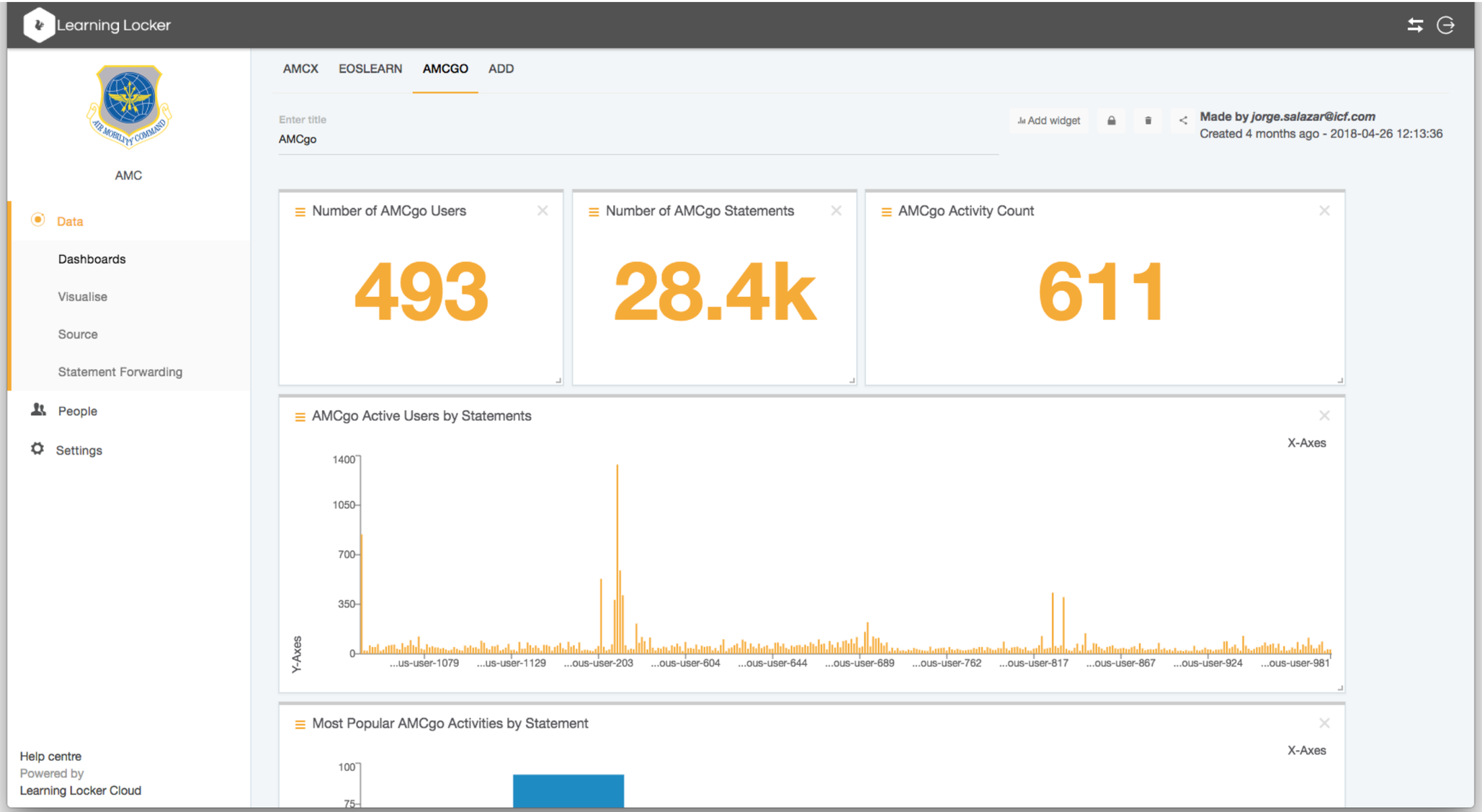
Inside the LRS

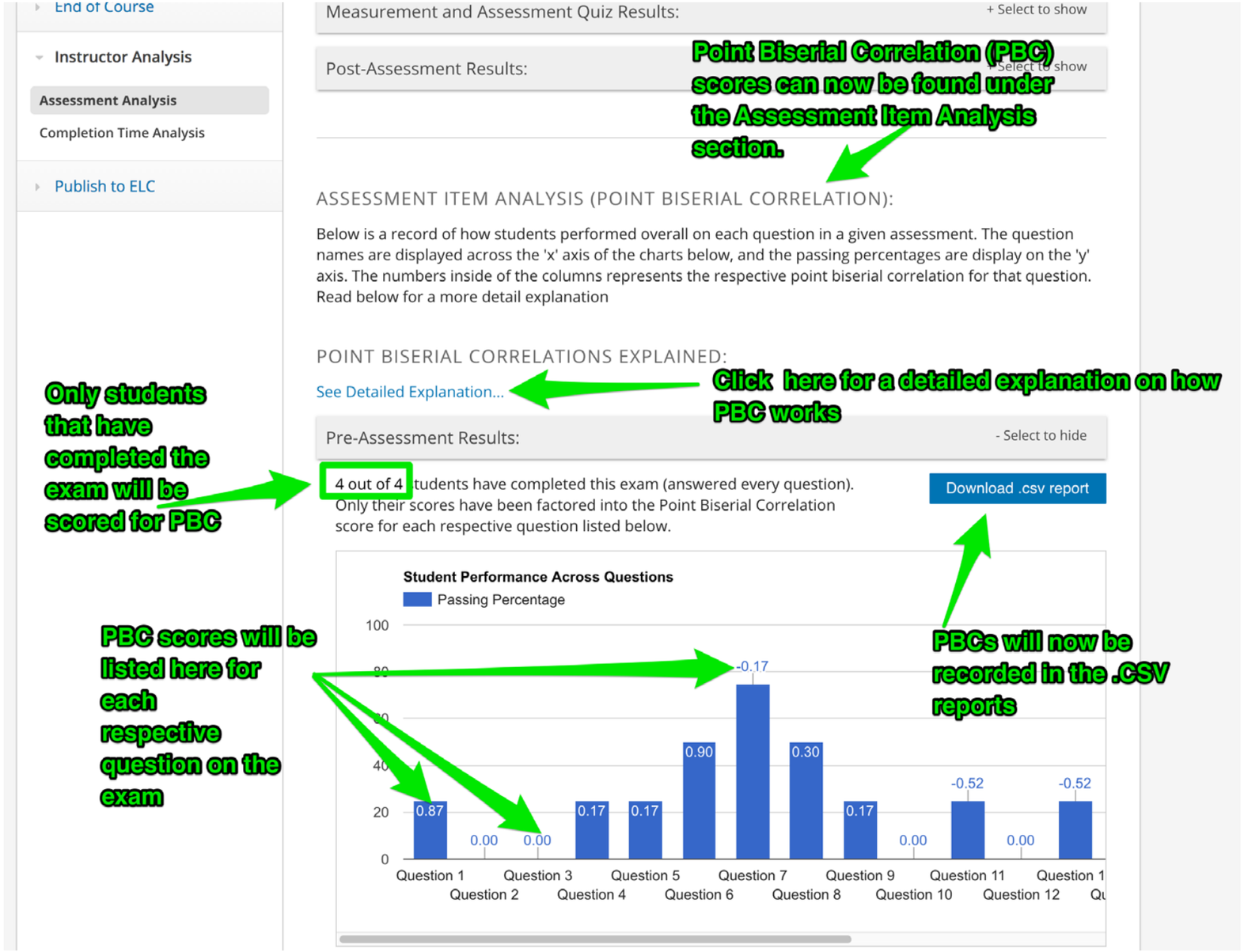


Inside the LRS



Feedback Use Case: Test Item Analysis

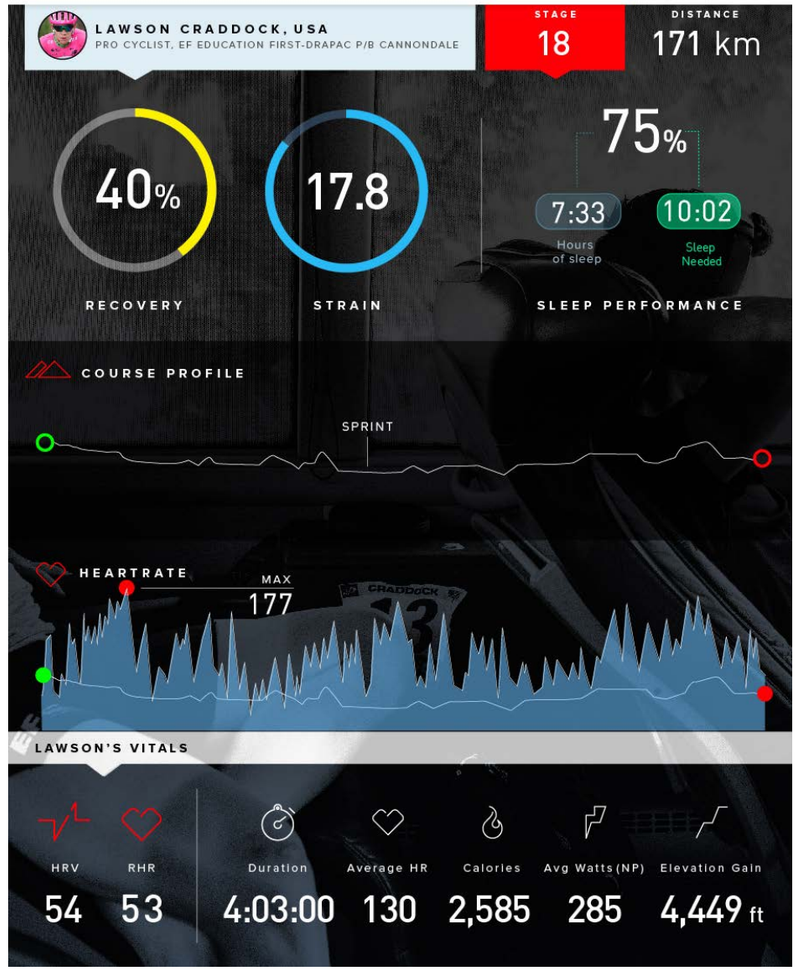
- Point Bi-serial Correlation (PBC) relates observed item responses to a total test score (+1 to -1)
- A high coefficient means students selecting the correct response achieved higher total scores (coefficient closer to 1)
- A point bi-serial rating of .21 or less indicates that the test item should be revised

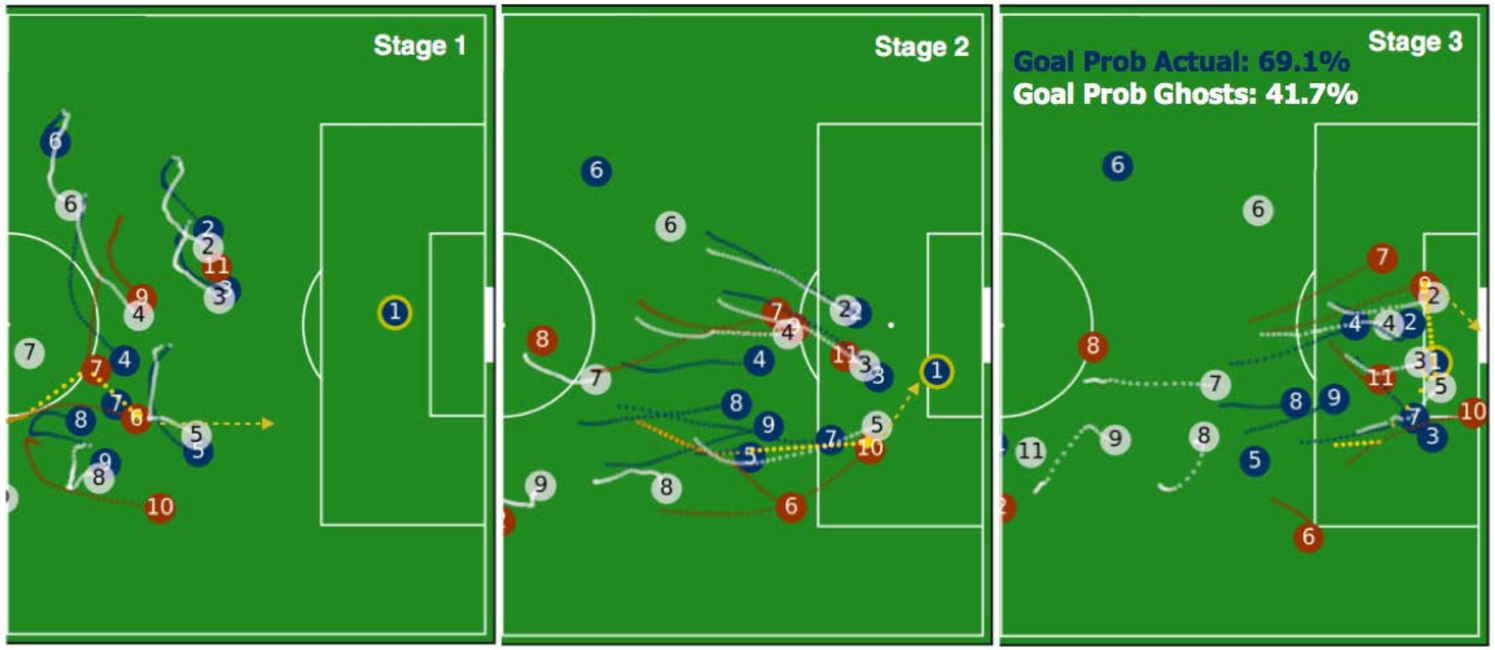


Potential Applications and Extensions

- **Targeted interventions based on observed or predicted learning gaps/decay**
- **Machine Learning to develop expected performance for early warning system**
- **Data-driven Learner “Personas”**
- **Big data analysis of sensorized data, e.g., Aircrew Training**

“Whoop”



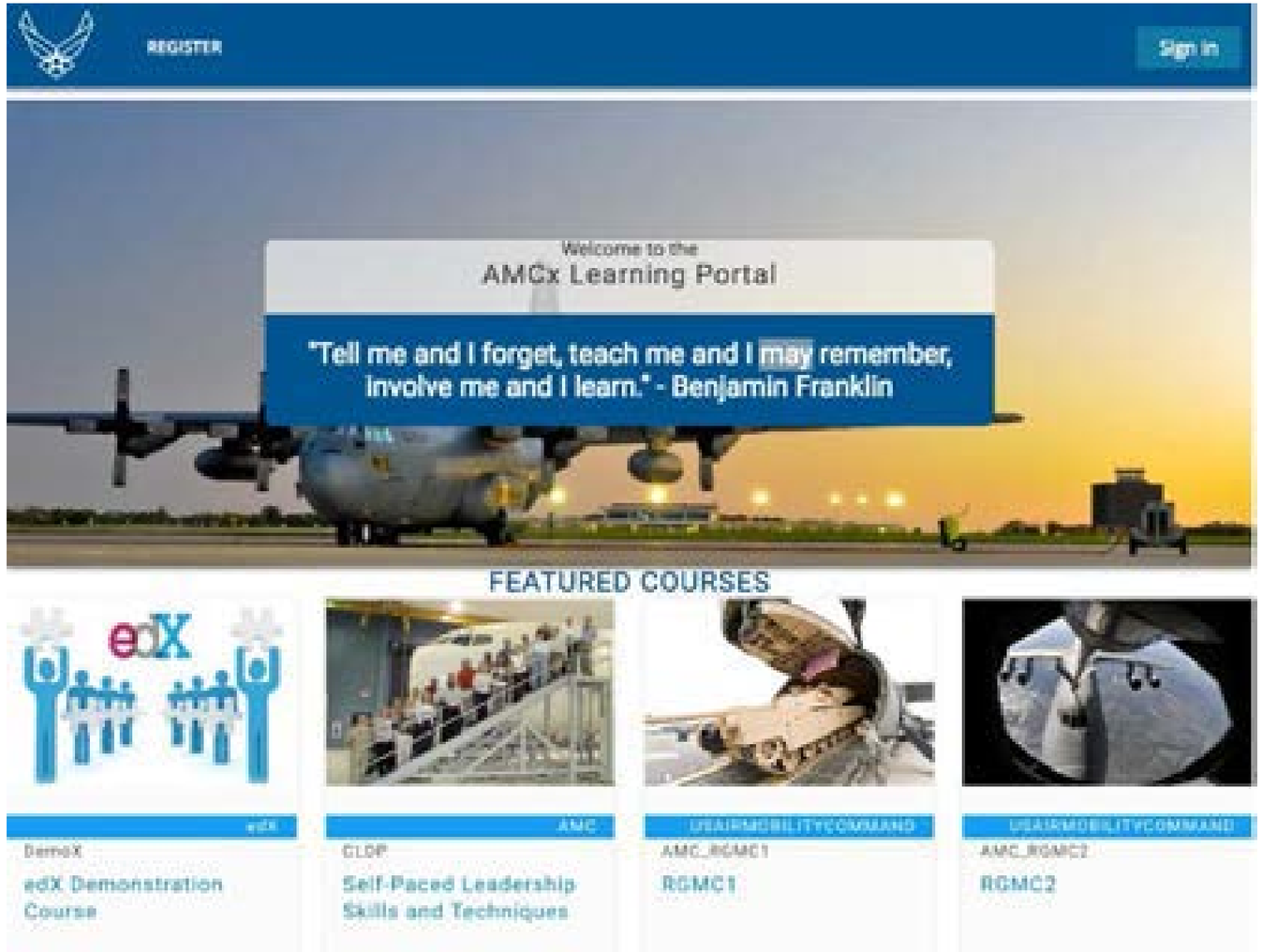


Disney Sports Analytics

Questions?

AMCx

- Massive Online Open Course (MOOC) platform built on the open-source edX platform developed by MIT and Harvard.
- This platform supports self-paced online learning, instructor-led learning, and blended learning.
- Allows an instructor or curator to add courses from any source to the AMCx platform. This includes courses hosted outside of AMCx from sources like Treehouse, Youtube, and Udemy, among others.



AMCgo

- Designed to enhance ILT, primarily in a classroom setting but also has features to allow for access of learning resources any time
- AMCgo hosts the suite of Rapid Global Mobility Courses (RGMC) including two online courses and one classroom course.
- You can go there right now on your phone and learn about AMC's mission:

https://amcgo.learning-transformation.com/

AR Prototype Statements: Launched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Statement successfully sent to the LRS!
{
  "actor": {
    "objectType": "Agent",
    "name": "dummy_user",
    "mbox": "mailto:dummy_user@icf.com"
  },
  "verb": {
    "id": "https://xapi.learning-transformation.com/verbs/launched",
    "display": {
      "en-US": "launched"
    }
  },
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    "id": "https://xapi.learning-transformation.com/activities/AMC/TO/AR-Tool",
    "definition": {
      "type": "https://xapi.learning-transformation.com/activities/AMC/TO/AR-Tool",
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      "description": {
        "en-US": "Optional description about this activity goes here."
      }
    }
  },
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}
```

AR Prototype Statements: Viewed


```
Statement successfully sent to the LRS!
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AR Prototype Statements: Accessed

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      },
      "description": {
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      }
    }
  },
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  "version": "1.0.1"
}
```

AR Prototype Statements: Spent (10 minutes in it)


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Statement successfully sent to the LRS!
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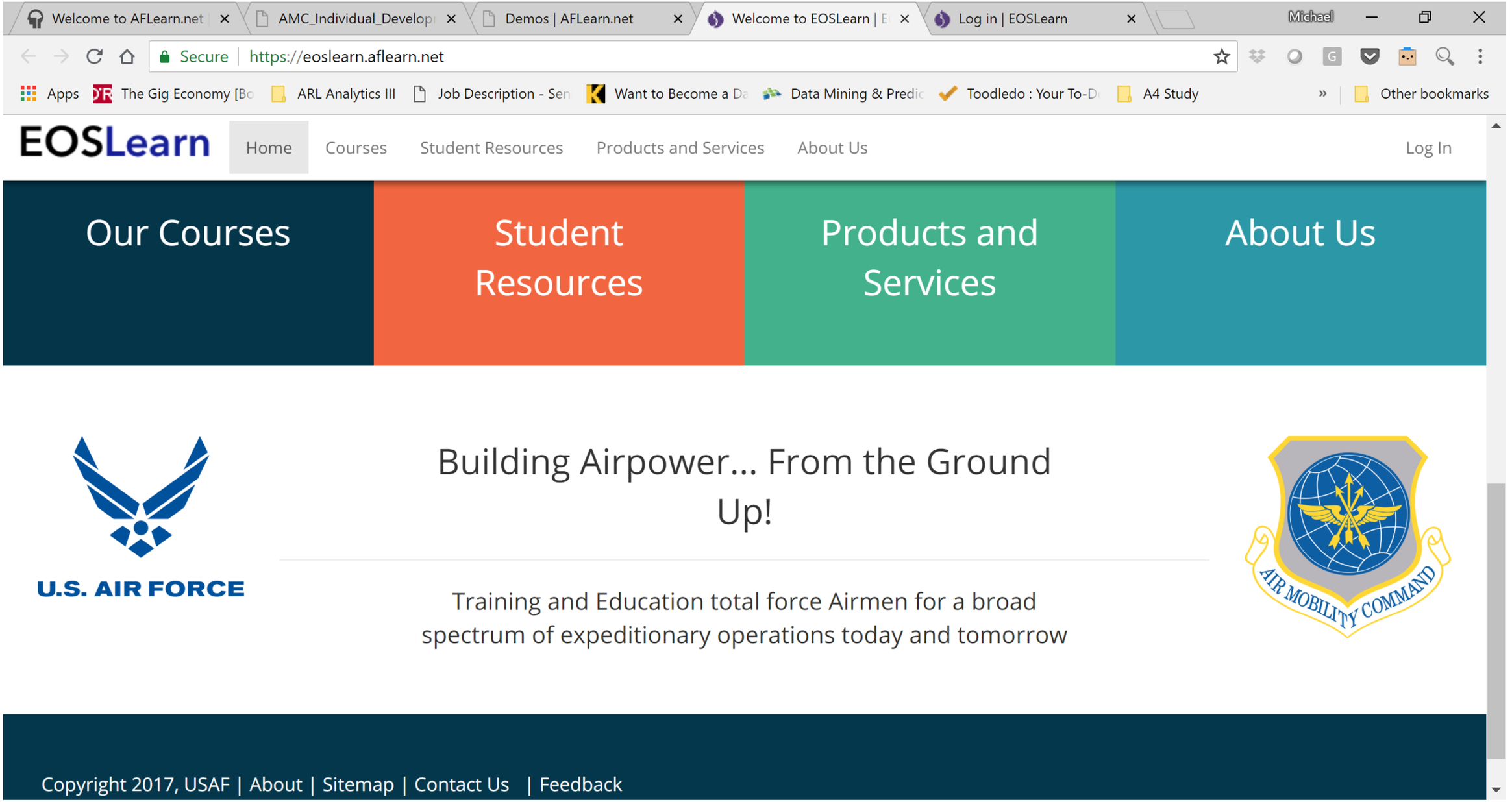
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Products and Services
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Training and Education total force Airmen for a broad spectrum of expeditionary operations today and tomorrow
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AIRPOWER 360 AND AIRMAN DEVELOPMENT PLANS

AP360 is a best practice process and automated tool that furthers the learner-centered strategy at the core of the C of L

- Developed on the foundation of the Airman Competency model, including AF Institutional Competencies
- Provides targeted feedback (Individual Feedback Report) on strengths and developmental needs on individual 360 results; to know where to focus, Airmen need to know where they stand and then how to improve—can be combined with coaching
- Airman Development Plans (ADPs) (Individual Development Plans) provide a structured path for self-development to fill performance gaps
- Enhances expertise & engagement of Airmen learners

React App | Doing good data science | Michael
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CLEAR | Analytics | Authoring Tool

Course Name: EST Marksmanship Novice Training Course (FULL)

Course Date: 05/06/2017

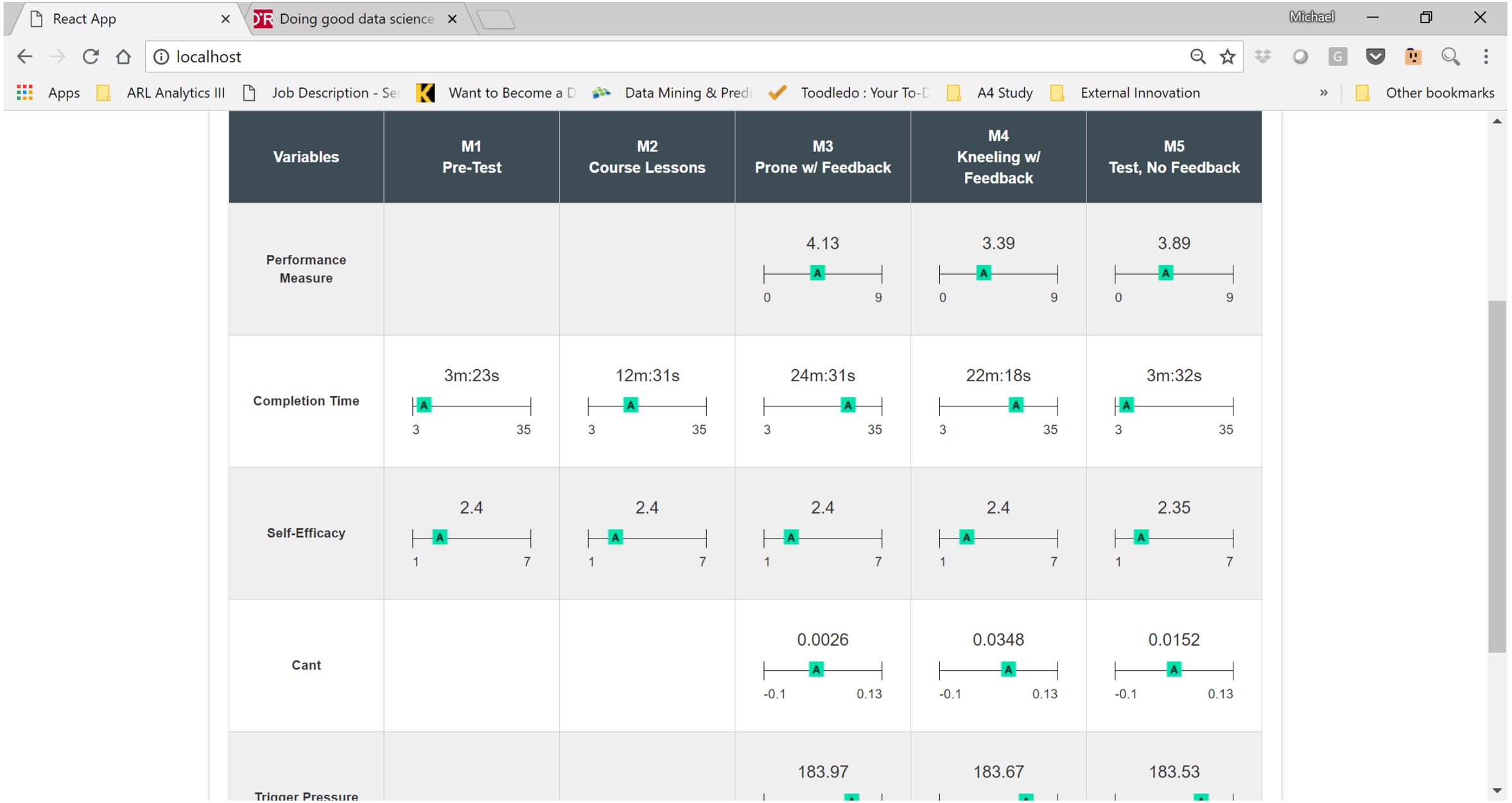
LEARNER GROUPS

Learner Group: Class View

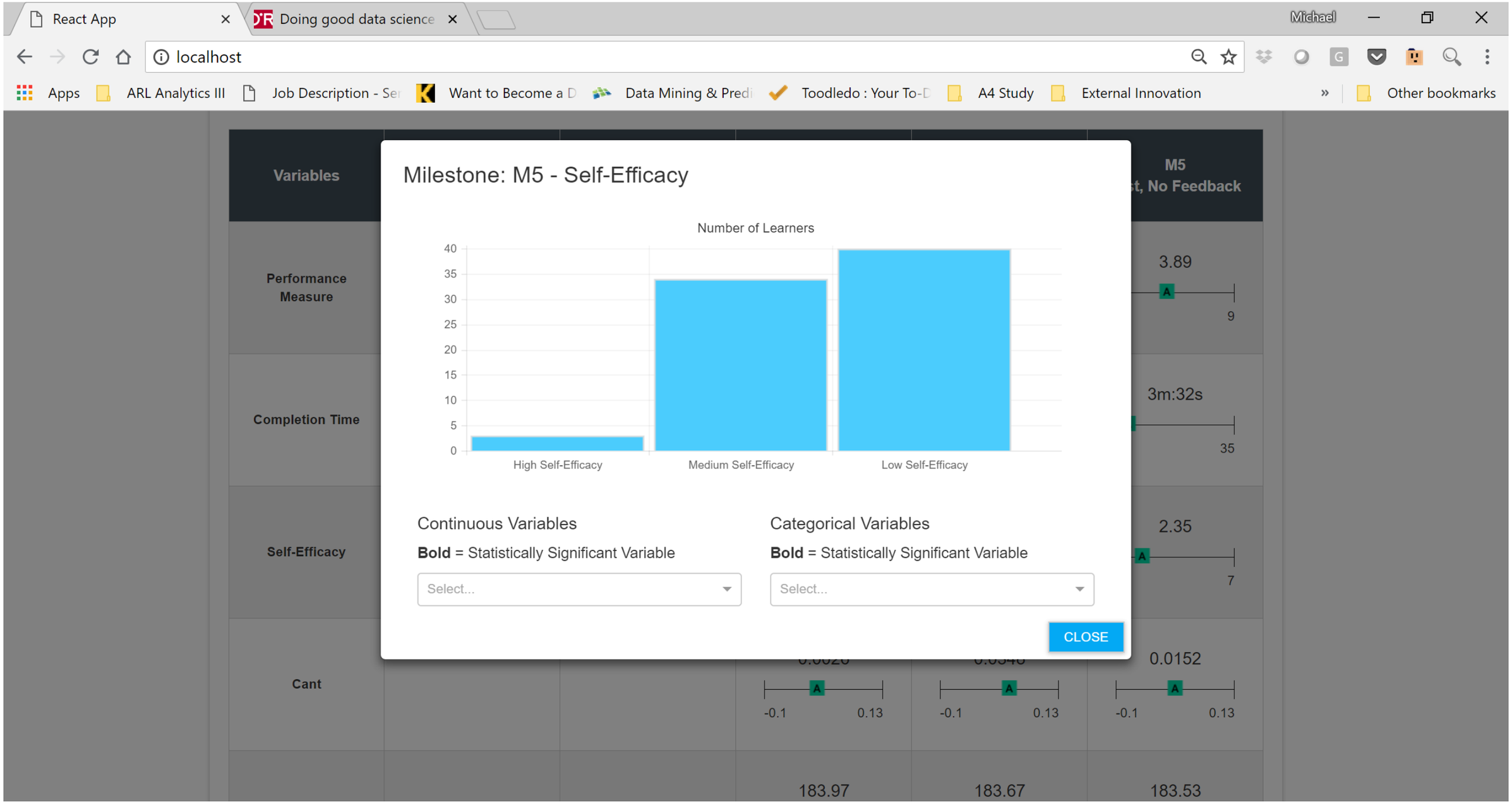
E Expected A Actual

Course Milestones

Variables	M1 Pre-Test	M2 Course Lessons	M3 Prone w/ Feedback	M4 Kneeling w/ Feedback	M5 Test, No Feedback
Performance Measure			4.13 (A: 0–9)	3.39 (A: 0–9)	3.89 (A: 0–9)
Completion Time	3m:23s (A: 3–35)	12m:31s (A: 3–35)	24m:31s (A: 3–35)	22m:18s (A: 3–35)	3m:32s (A: 3–35)



Variables	M1 Pre-Test	M2 Course Lessons	M3 Prone w/ Feedback	M4 Kneeling w/ Feedback	M5 Test, No Feedback
Performance Measure			4.13 A 0 9	3.39 A 0 9	3.89 A 0 9
Completion Time	3m:23s A 3 35	12m:31s A 3 35	24m:31s A 3 35	22m:18s A 3 35	3m:32s A 3 35
Self-Efficacy	2.4 A 1 7	2.4 A 1 7	2.4 A 1 7	2.4 A 1 7	2.35 A 1 7
Cant			0.0026 A -0.1 0.13	0.0348 A -0.1 0.13	0.0152 A -0.1 0.13
Trigger Pressure			183.97	183.67	183.53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0.0152
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Milestone: M5 - Self-Efficacy
Number of Learners
40
35
30
25
20
15
10
5
0
High Self-Efficacy
Medium Self-Efficacy
Low Self-Efficacy
Continuous Variables
Bold = Statistically Significant Variable
Select...
Categorical Variables
Bold = Statistically Significant Variable
Select...
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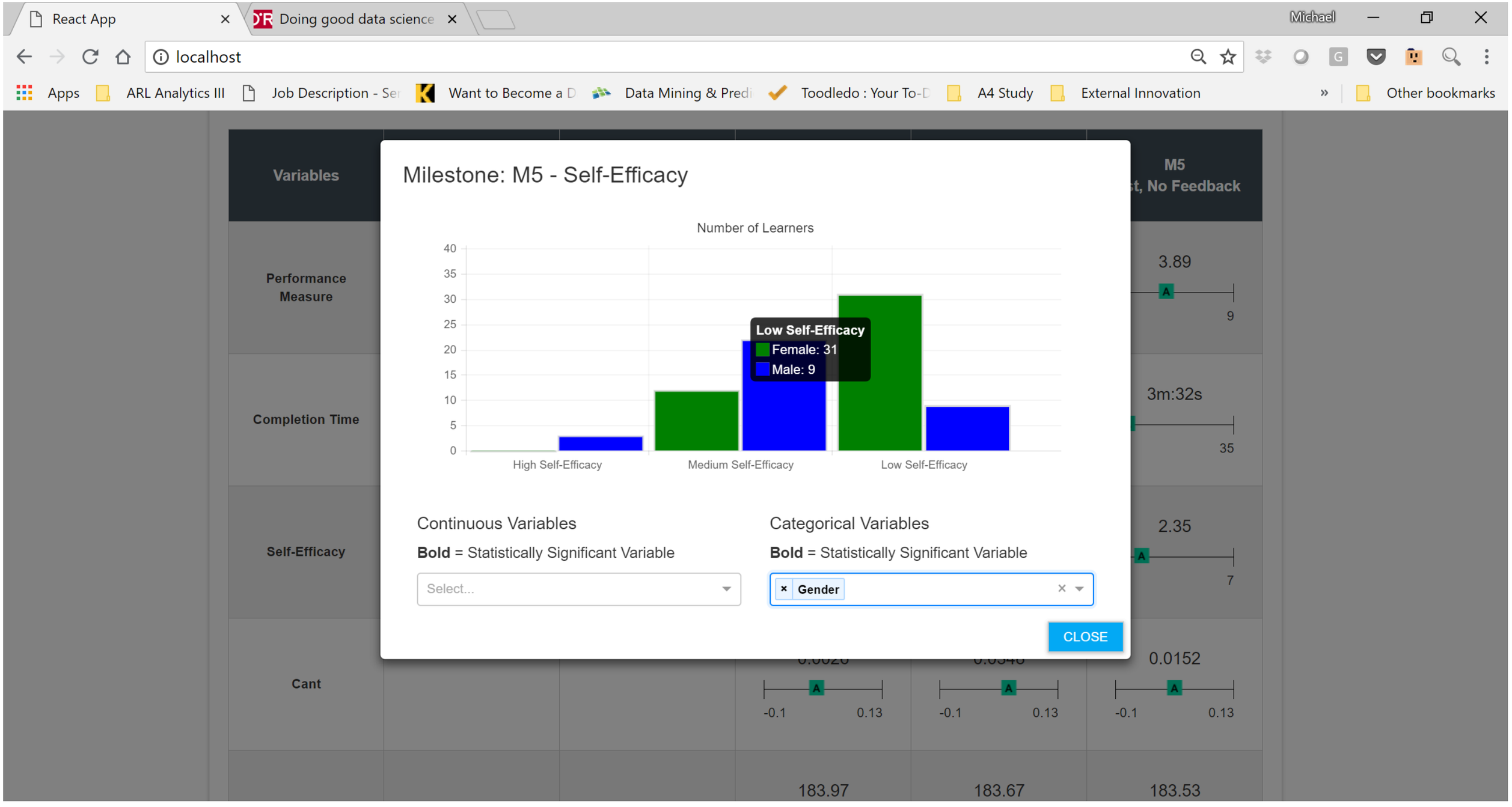
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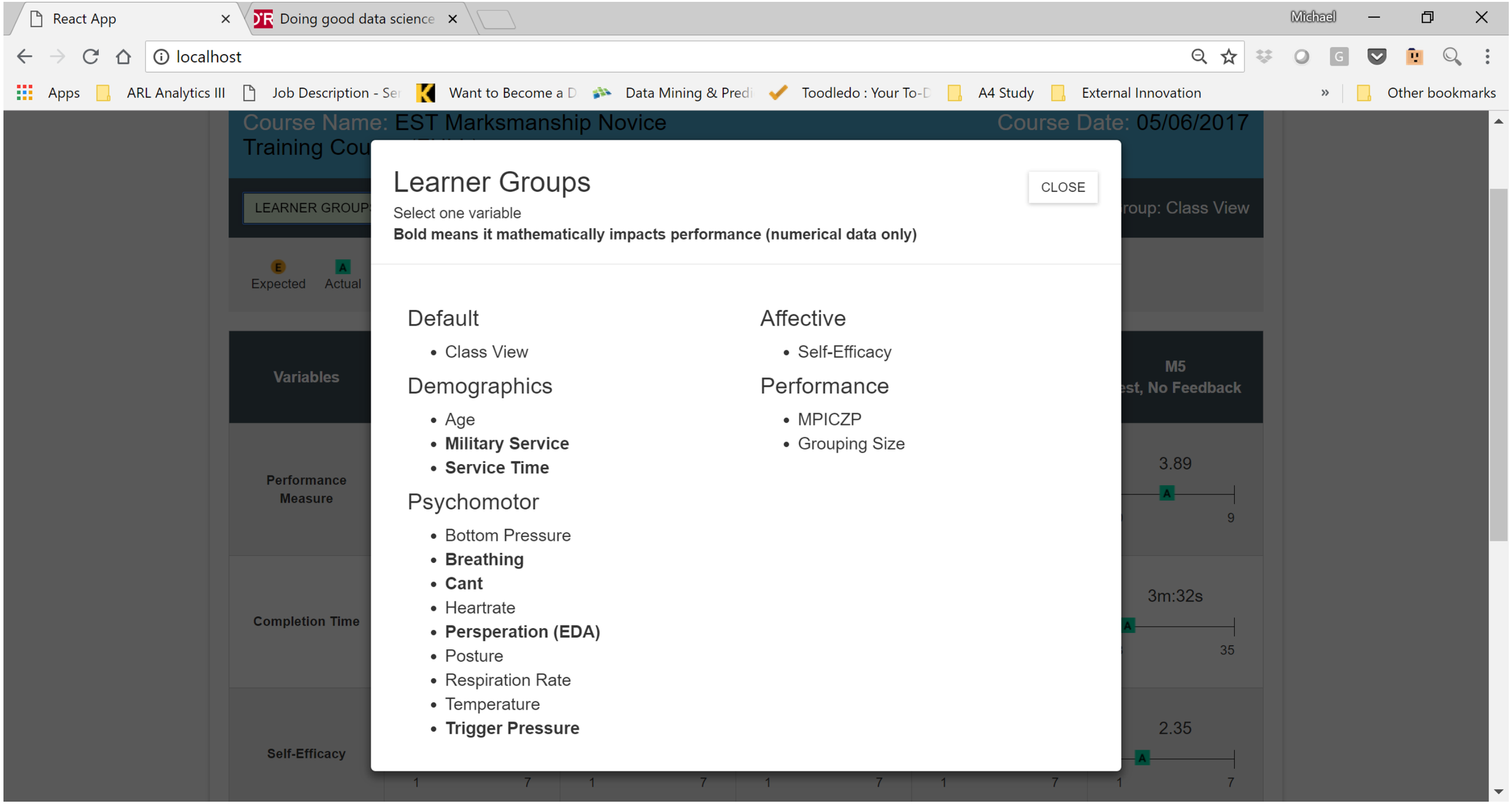
Self-Efficacy
2.35
A
7
Cant
0.0152
A
-0.1
0.13
183.97
183.67
183.53
Milestone: M5 - Self-Efficacy
Number of Learners
40
35
30
25
20
15
10
5
0
Low Self-Efficacy
Female: 31
Male: 9
High Self-Efficacy
Medium Self-Efficacy
Low Self-Efficacy
Continuous Variables
Bold = Statistically Significant Variable
Select...
Categorical Variables
Bold = Statistically Significant Variable
Gender
CLOSE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External Innovation
Other bookmarks
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Course Date: 05/06/2017
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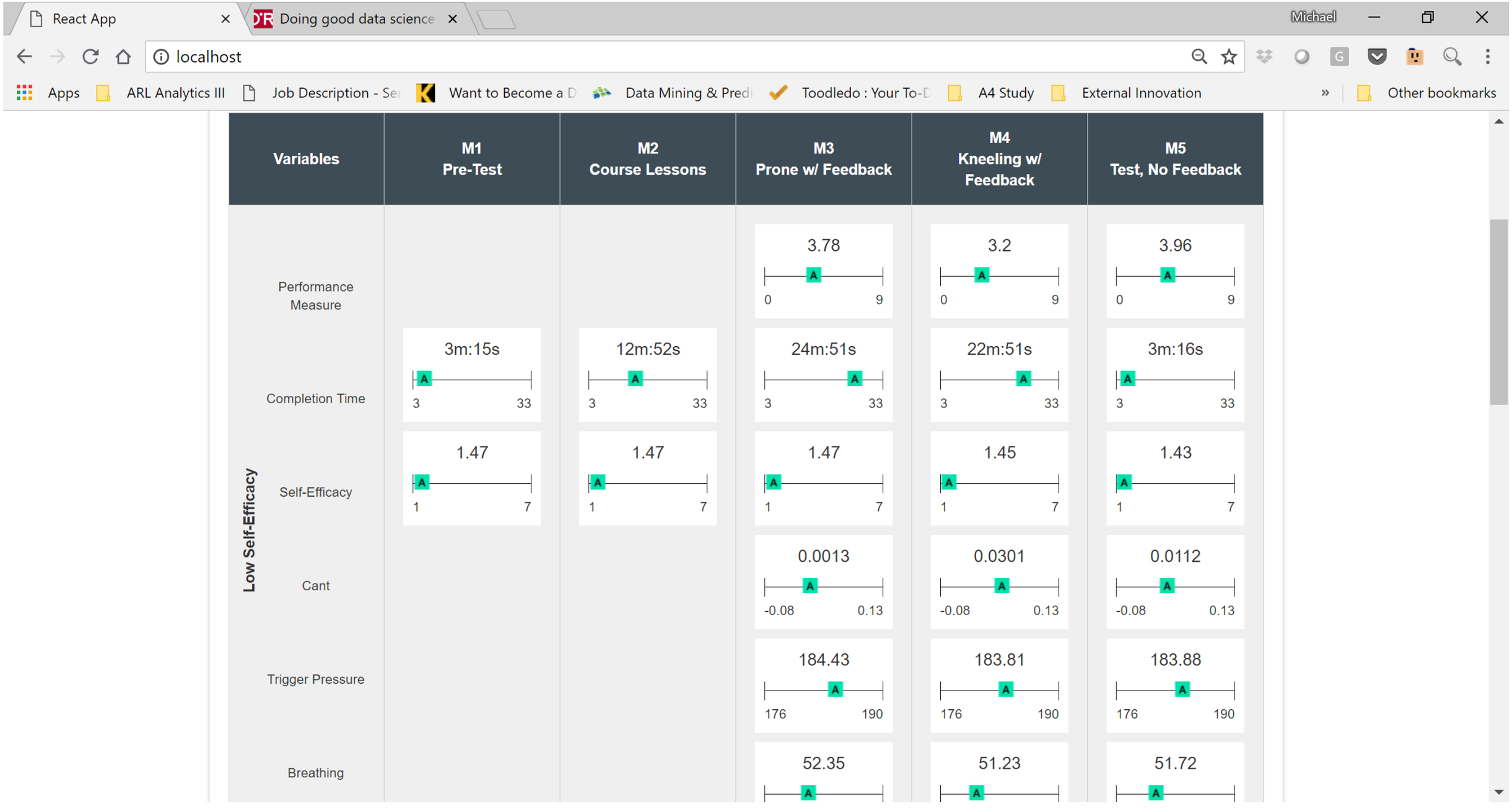
Learner Groups
CLOSE
Select one variable
Bold means it mathematically impacts performance (numerical data only)
Default
Class View
Demographics
Age
Military Service
Service Time
Psychomotor
Bottom Pressure
Breathing
Cant
Heartrate
Persperation (EDA)
Posture
Respiration Rate
Temperature
Trigger Pressure
Affective
Self-Efficacy
Performance
MPICZP
Grouping Size



Variables	M1 Pre-Test	M2 Course Lessons	M3 Prone w/ Feedback	M4 Kneeling w/ Feedback	M5 Test, No Feedback
Low Self-Efficacy					
Performance Measure			3.78 (A: 0–9)	3.2 (A: 0–9)	3.96 (A: 0–9)
Completion Time	3m:15s (A: 3–33)	12m:52s (A: 3–33)	24m:51s (A: 3–33)	22m:51s (A: 3–33)	3m:16s (A: 3–33)
Self-Efficacy	1.47 (A: 1–7)	1.47 (A: 1–7)	1.47 (A: 1–7)	1.45 (A: 1–7)	1.43 (A: 1–7)
Cant			0.0013 (A: -0.08–0.13)	0.0301 (A: -0.08–0.13)	0.0112 (A: -0.08–0.13)
Trigger Pressure			184.43 (A: 176–190)	183.81 (A: 176–190)	183.88 (A: 176–190)
Breathing			52.35	51.23	51.72