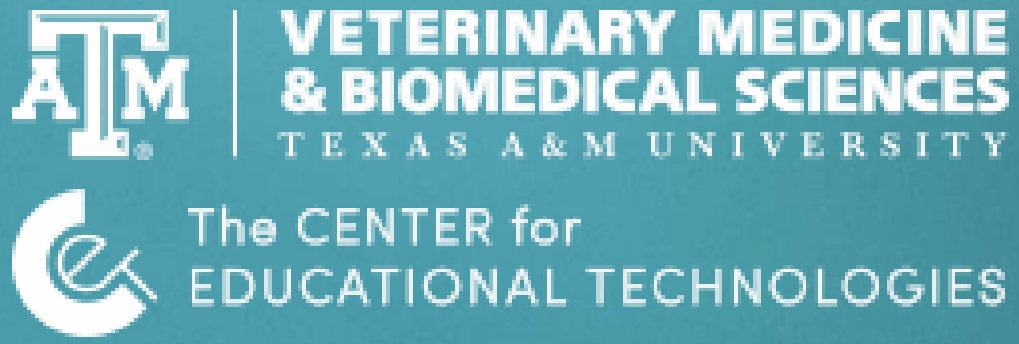
Where Success Begins: Leveraging Learning Analytics to Predict Student Program Success

Dr. Nicola Ritter, M.Ed., Ph.D.
Director, The Center for Educational Technologies

Dr. Molly Gonzales, M.Ed., Ed.D.
Instructional Assistant Professor
The Center for Educational Technologies



Overview

- Initiative Goals
- Research Questions
- Sample
- Methods
- Findings
- Next Steps

What can learning analytics do for a degree program?

- Evidence-based education to support program, faculty, & student needs
  - Evaluate course content
  - Assess students progress
  - Predict students future performance
  - Identify at-risk students in a degree program

- Move from **data-rich and information-poor** TO **data-rich and information-rich**

Goals of the Initiative

1. Build Education Data Warehouse
2. Generate predictive model for Fall 2017 DVM courses
3. Create Analytic Dashboards

Research Questions

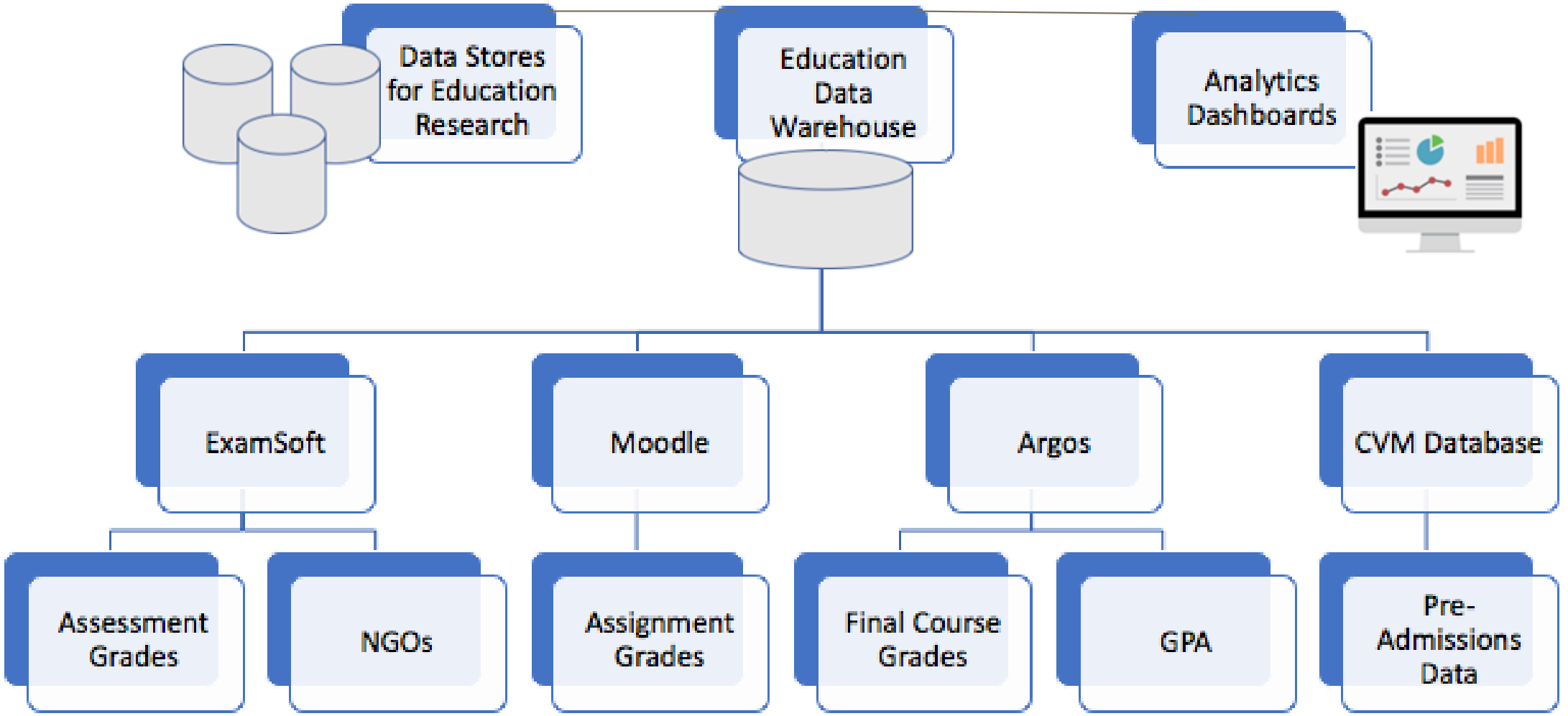
- How is the class performing in a first semester DVM program?
- How is the class performing in a first semester DVM course?
- How are students performing in the Professional & Clinical Skills(PCS) course?
- How are the student performing on the New Graduate Outcomes with the Histology course?
- How well are the instructional activities telling us what we want to know for a student's knowledge and skill acquisition?

Sample: Class of 2021

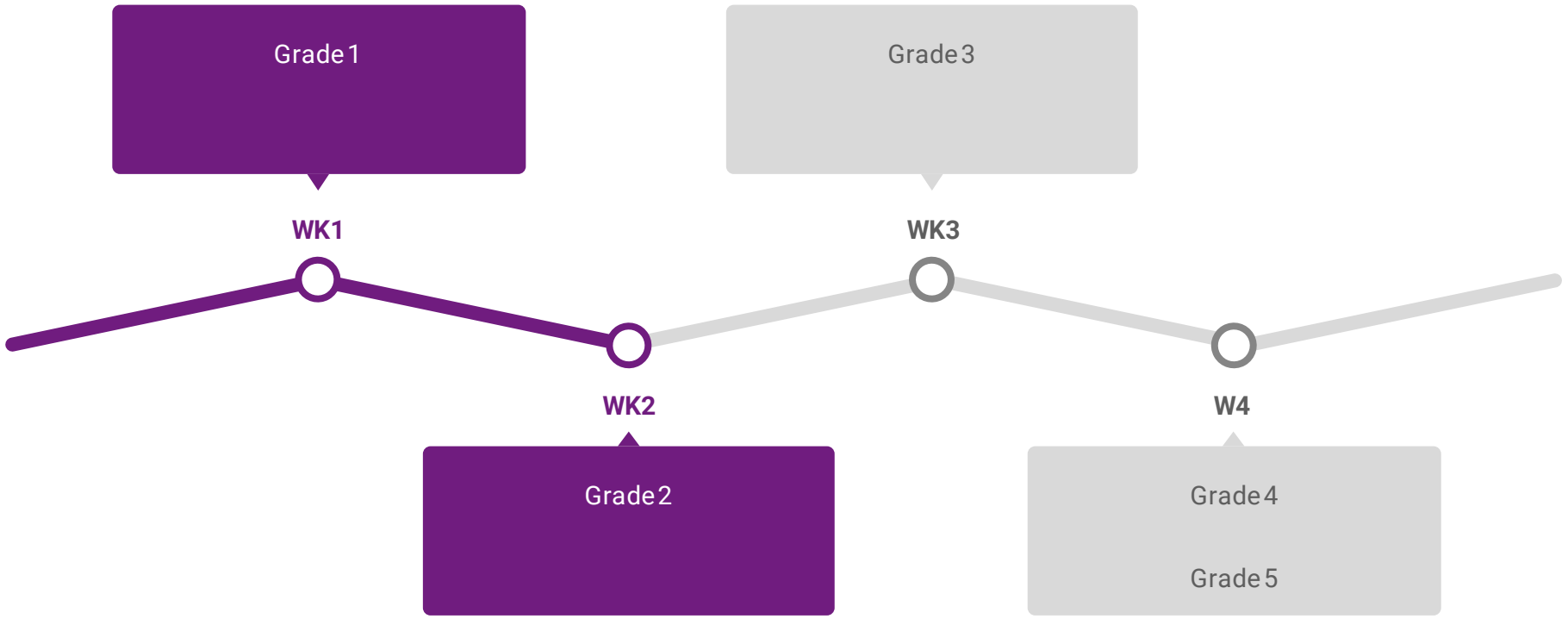
Enrolled Courses in Fall 2017

Course Number	Course Name	Credit Hours	Course Coordinator
VIBS 911	Histology	1	Dana Kneese
VSCS 910	Integrated Animal Care I	3	Stacy Eckman
VTPP 910	Physiology I	6	Randy Stewart
VTPP 914	Professional & Clinical Skills I	3	Alice Blue-McLendon
VIBS 910	Small Animal Anatomy	4	Anton Hoffman
VIBS 936	Veterinarians in Society	2	Tacy Vemulapalli and Michelle Pine
VTPB 910	Veterinary Immunology	2	Roger Smith

Goal #1 Build DVM Education Data Warehouse



Goal #2: Generate predictive models



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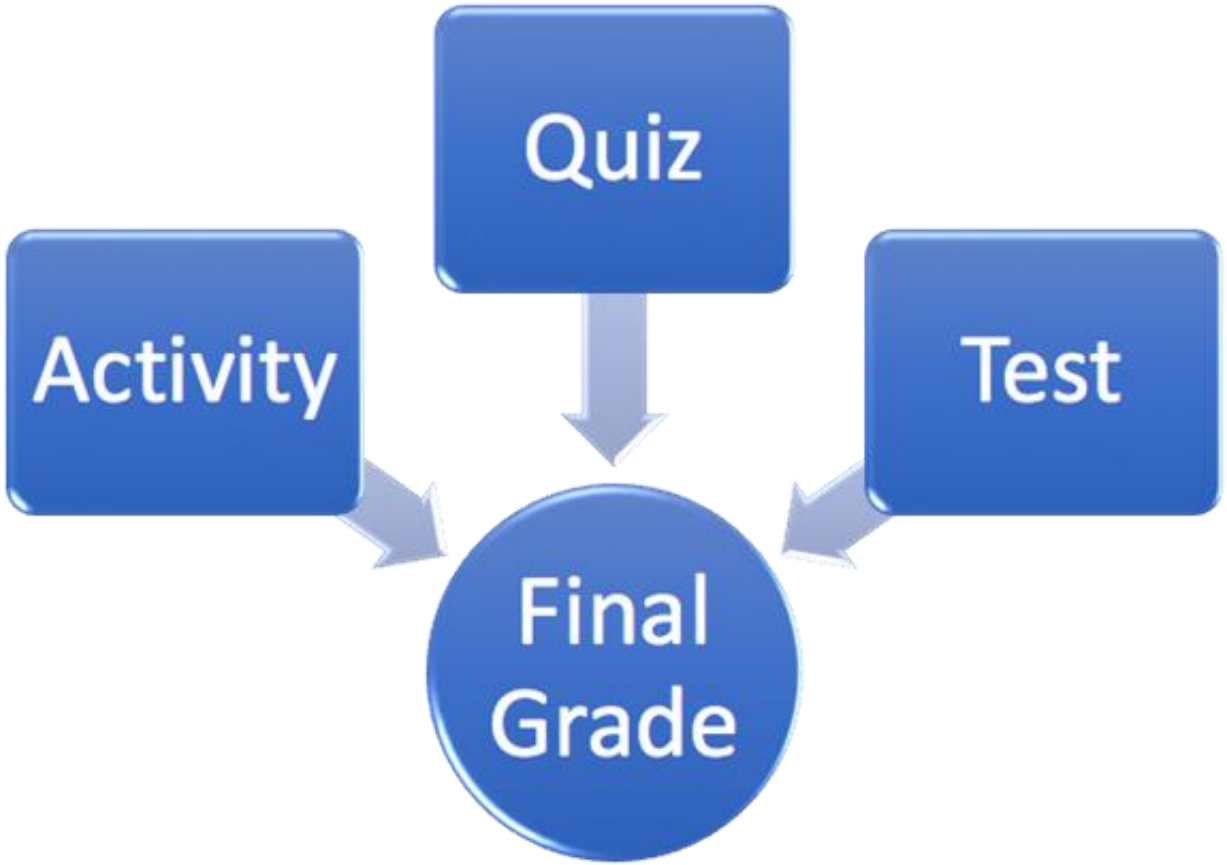


Goal #2: Generate predictive models

Program-level data

What: View of how each class is progressing and how curriculum content is supporting student's mastery of the NGOs.

Stakeholders: CVM, PPO, curriculum committee, accreditation entities

Course-level data

What: View of how each student is progressing in the course and how the course activities and assessments are supporting student's mastery of the NGOs.

Stakeholders: PPO, course coordinators, and course instructor(s)

Student-level data

What: View of how a student is progressing in each course and level of mastery of the NGOs.

Stakeholders: Course coordinators, course instructor(s) and students

Statistics Methods

- Predictive Modeling
  - Research purpose: create multiple models to predict students' course final grade by each week of the course activities
  - Dataset: historical data in Fall 2017
  - Model features: every scored activities (e.g., quizzes, assignments, participation, etc.)

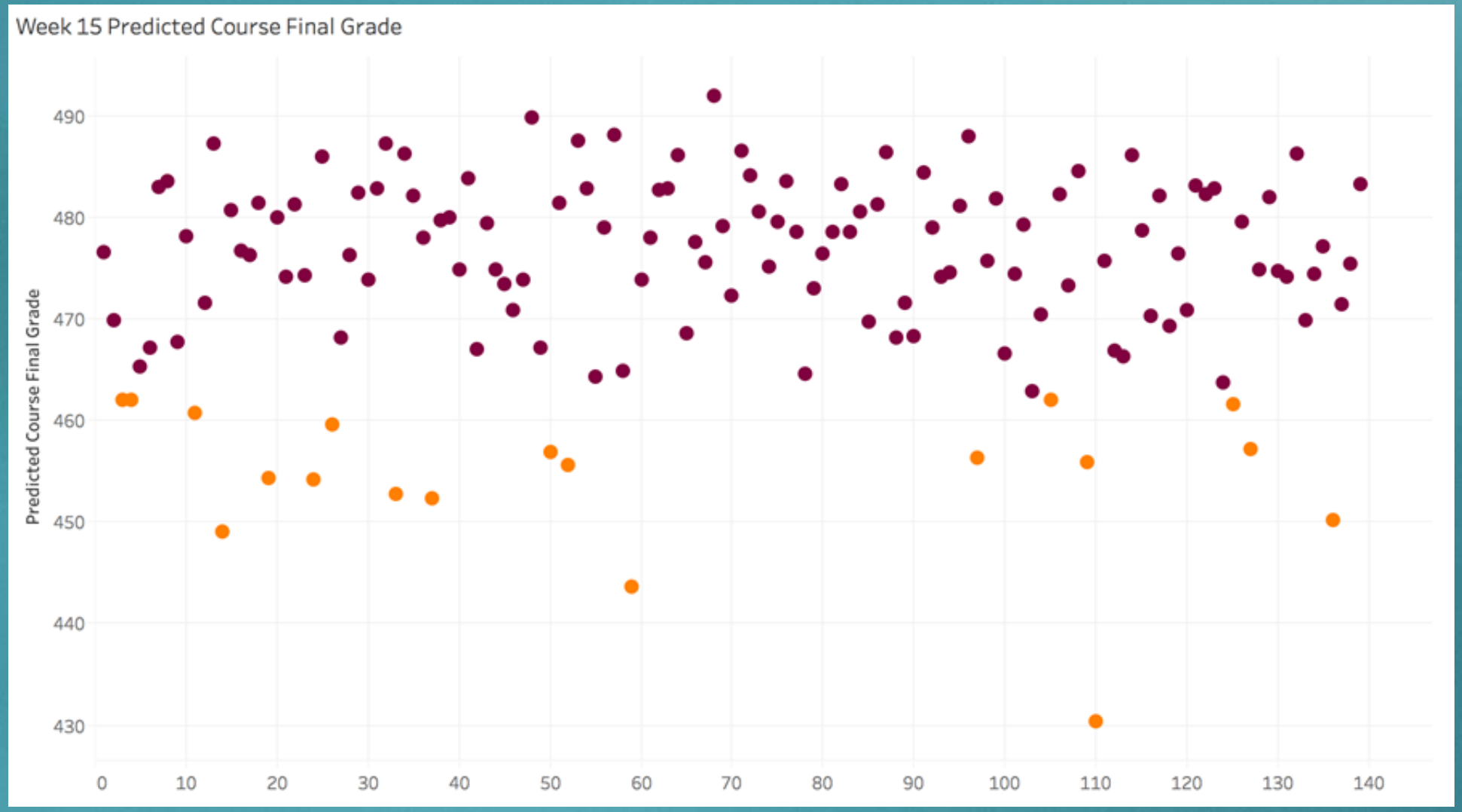
Statistics Methods

- Linear Regression
  - "predicts a continuous numeric output from a linear combination of attributes." (The Handbook of Learning Analytics, p. 64)

$$y_i = \beta_0 + x_{i1}\beta_1 + \cdots + x_{ip}\beta_p + e_i.$$

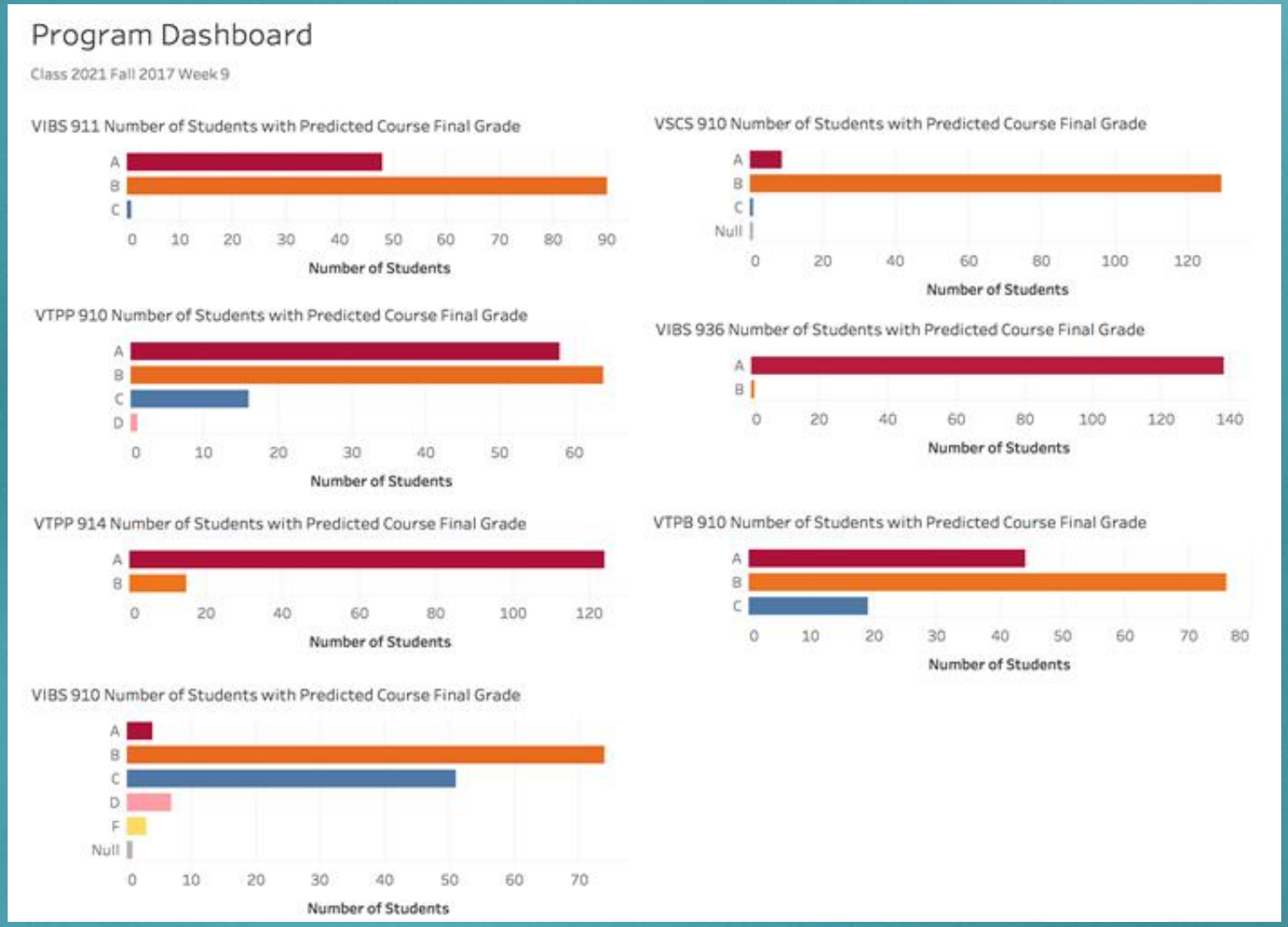
  - Applied relaimpo package in R
    - Relative importance of regressors in the linear model
      - Averaging over orderings of regressors
      - Using both direct effects and effects adjusted for other regressors in the model

Example Predictive Model for Final Course Grade in Professional & Clinical Skills

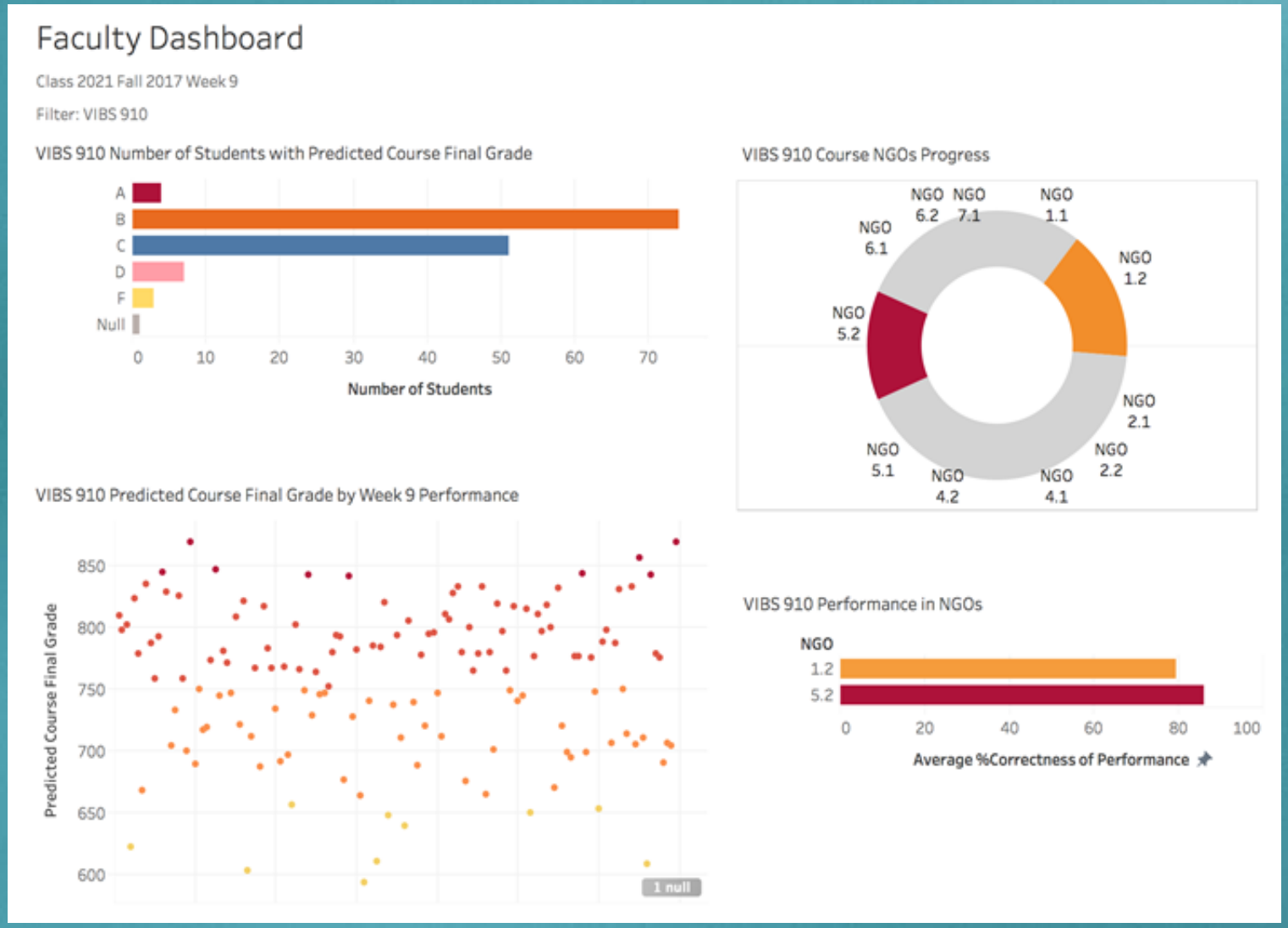


Goal #3: Create Analytic Dashboards

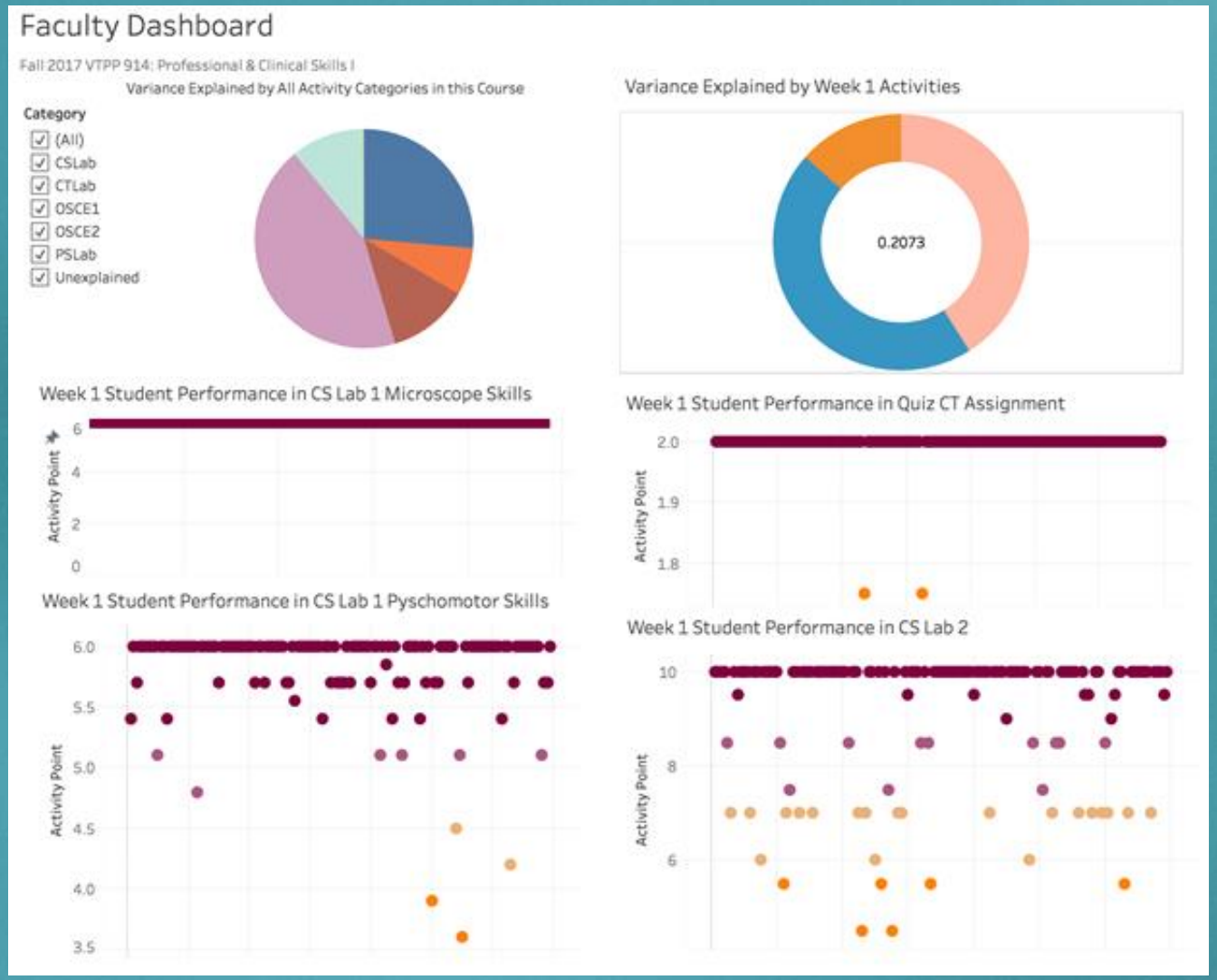
Program-level Dashboard



Course-level Dashboard (Faculty View)



Course-level Dashboard (Content-View)



Next Steps in the Initiative

- Locate other data sources for the program (e.g. MMI results, participation in student organization activities, wellness measures, VEA, track-selection, etc.)
- Refine existing models by adding more data (e.g. pre-admissions) and meta-data (e.g. NGO tags)
- Refine the predictive models by adding the Class of 2022 data set