COLORADO TECHNICAL UNIVERSITY

# BRINGING INTENTIONAL INSTRUCTION INTO THE ADAPTIVE LEARNING ENVIRONMENT

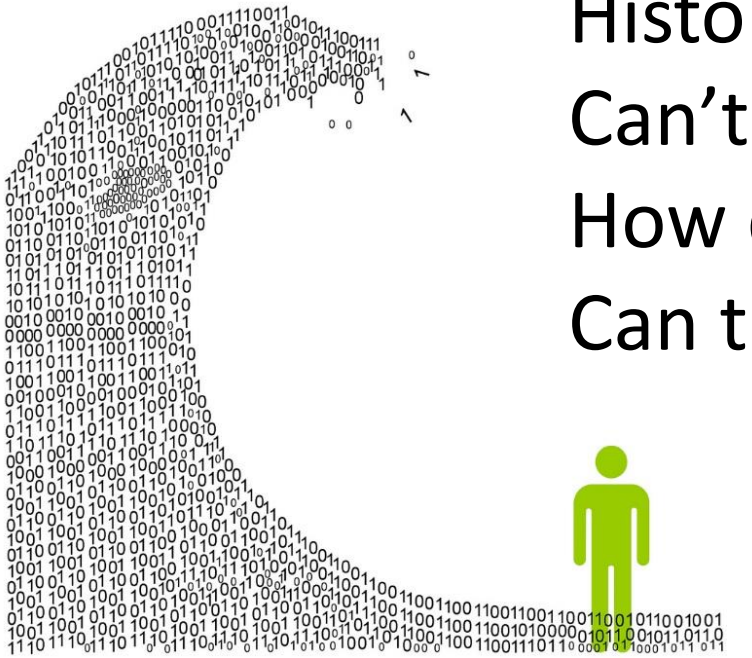
OLC INNOVATE CONFERENCE

APRIL 19, 2018

# Overview

- Data, data everywhere
- What's the problem?
- Faculty buy in
- What data is available?
- Caution: Data Ahead
- What can we learn from data?
- Data and interventions: What's the connection
- Curriculum vs. instructional interventions
- Let's examine some data!

# Data Overload



History of data collection

Can’t see the forest for the trees

How do we determine the importance of the data?

Can this be applied to adaptive learning?

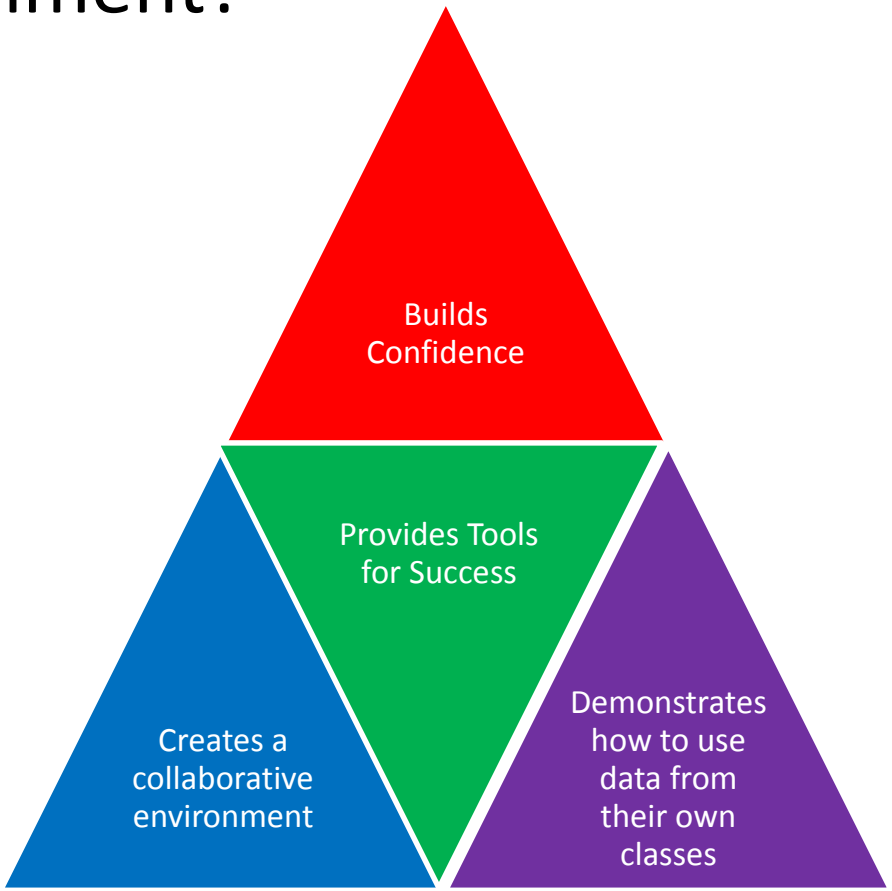
# Issues faced by Adaptive Learning Faculty

- Improving pass rates
- Providing the proper resources
- Engaging with students
- Motivating students
- Increasing the engagement in the later assignments
- Working with snails vs. hares, how to work with different groups of students

# Faculty Buy-In

- What can an institution do to help faculty embrace the adaptive learning environment?

❖ Training



# Faculty Buy-In

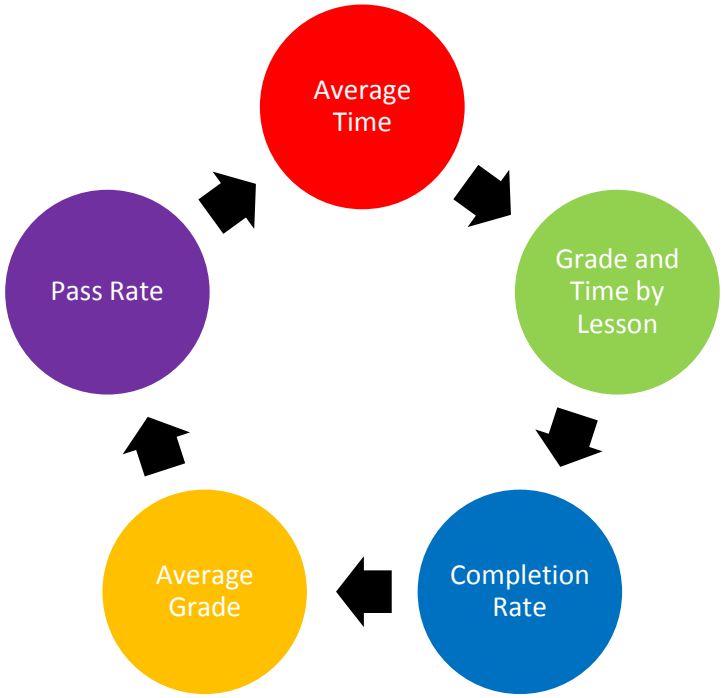
- What can an institution do to help faculty embrace the adaptive learning environment?

  - ❖Provide data showing the increase in retention and passing rate in adaptive learning versus non-adaptive learning
  - ❖Provide support to faculty to help create the best learning environment

# Data Available to Instructor

Some of the data available to faculty for their class in adaptive learning environment:

- Pass rate per class
- Completion rate per class
- Average grade per class
- Average grade per lesson or unit
- Average time spent by lesson
- Percent of times a particular question is answered correctly



# Data available to Institution

- Grade distribution by faculty
- Pass and completion rate trends
- Data for faculty across different classes
- Information regarding each lesson
- Statistics about each type of question
- Statistics about each question

# Caution: Data Ahead

- Keep in mind that you should not take data at face value, it must be combined with other information to get the big picture.
- One session of data is not enough to make an analysis, rather look at trends.
- What is the frame of reference? Is the data being compared to a goal, session over session or some other metric?
- Examine the sample size
- What is the standard deviation?

# What can we learn from data?

- Completion and Passing Rate Trends:
  - ❖Administrators can look for any decreasing or increasing trends and investigate the cause
  - ❖Care must be taken to see if there are any confounding variables that may have caused the trend
  - ❖A complete analysis of the data is needed to determine the cause of any trend

# What can we learn from data?

- Average Time Per Lesson:
  - ❖This is data that instructors can check as well as the institution and they can be a primary source for the information.
  - ❖If a lesson consistently has a longer average time than other lessons, an analysis of the lesson is warranted.
    - ❖Do additional resources need to be provided to students?
    - ❖Are there particular questions that are contributing to the length of time?
    - ❖Is this the mean or the median?
  - ❖ If a lesson has a lower average than similar lessons, it also needs to be analyzed.
    - ❖Are individual questions the major contributor to the low average?

# What can we learn from data?

- Re-taker Rate
  - ❖Does re-taker rate increase or decrease historically occur during the same session each year?
  - ❖An analysis should be performed to determine which faculty perform the best with this population.
  - ❖Should the re-takers be grouped together in sections or spread out uniformly throughout all sections?

# What can we learn from data?

- Grade distribution by faculty trends
  - ❖Are faculty paired with the course(s) where they are most successful?
  - ❖Are certain faculty's classes consistently among the top pass rate and average grades?
    - ❖What can we learn from these faculty and how can we use that information to help other faculty?
  - ❖Are certain faculty's classes consistently below the average in pass rate and/or average grade?
    - ❖What resources and support can we provide to these instructors?

# Determining the best faculty/course match

- Use a matrix to determine the best course and faculty match
  - Choose the most important criteria
    - Passing rate
    - Average course grade
    - Course observations
    - Retention rate
  - Determine which faculty perform best in a particular course
  - Determine which course that a particular faculty performs best

# Initiatives to Use

| Instructional | Curricular |
|---|---|
| Additional training for faculty | Replace/reword specific question |
| Mentoring instructors | Inform faculty which topics need additional explanations |
| Provide extra resources to use in the classroom | Rearrange faculty courses |
| Collaboration | Regroup re-takers |
| Additional Outreach | Look at scope and sequence of pre-requisite classes |

# FACULTY MATRIX

| Math xyz | Term | Completion rate | Pass Rate | Retention Rate | Classroom Observation | Preference | | Sum of rates | |
|---|---|---|---|---|---|---|---|---|---|
| Jane Doe | Q1 - 2016 | 0.8 | 0.909 | 0.88 | 0.87 | | | | |
| | Q2 - 2016 | 0.83333 | 0.9375 | 0.8889 | 0.92 | | | | |
| | Q3 - 2016 | 0.536585366 | 0.733333333 | 0.731707317 | 0.9 | | | | |
| | Q4 - 2016 | 0.769230769 | 0.888888889 | 0.865384615 | 0.85 | | | | |
| | Q1 - 2017 | 0.9 | 0.9375 | 0.96 | 0.88 | | | | |
| | | | | | | | | | |
| | | 0.767829227 | 0.881244444 | 0.865198386 | 0.884 | | | 3.398272058 | |
| | | | | | | | | | |
| John Doe | Q1 - 2016 | 0.728813559 | 0.811320755 | 0.898305085 | 0.79 | | | | |
| | Q2 - 2016 | 0.854166667 | 0.911111111 | 0.9375 | 0.87 | | | | |
| | Q3 - 2016 | 0.791666667 | 0.926829268 | 0.854166667 | 0.82 | | | | |
| | Q4 - 2016 | 0.8113 | 0.8958 | 0.9057 | 0.9 | | | | |
| | Q1 - 2017 | 0.8983 | 0.9464 | 0.9492 | 0.89 | | | | |
| | | | | | | | | | |
| | | 0.816849379 | 0.898292227 | 0.90897435 | 0.854 | | | 3.478115956 | |
| | | | | | | | | | |

Data did not come from an actual course

# Sample data 1 – Math XYZ

| Session | Population | Pass Rate | Completion rate | Pass rate times completion rate | Average grade for nonpassing students | Average grade for passing students | Retaker rate |
|---|---|---|---|---|---|---|---|
| Spring 2017 | 109 | 70.1% | 90.1% | 63.2% | 32.4% | 79.2% | 15.1% |
| Summer 2017 | 65 | 61.3% | 78.6% | 48.2% | 25.1% | 67.1% | 27.1% |
| Fall 2017 | 134 | 73.3% | 88.9% | 65.2% | 39.4% | 78.4% | 9.1% |
| Winter 2017 | 110 | 64.4% | 86.4% | 55.6% | 44.1% | 81.2% | 17.3% |

## What can we learn from this set of data?

Data did not come from an actual course

# Sample data 1

- The summer rates are lower, but the population is smaller and the retaker rate is higher. Can not be sure those rates are statistically significant.
- The average grade for nonpassing students in the summer session is lower than the other sessions. Could be due to higher rate of students who quit participating during the class.

# Sample data 2 – English ABC

| Unit | Average time per unit (HRS) | Average grade per unit | Percent of students that did not complete this uniy | Number of lessons per unit | Total number of questions per unit |
|---|---|---|---|---|---|
| 1 | 5.06 | 90.78% | 8.9% | 9 | 89 |
| 2 | 6.08 | 89.34% | 9.7% | 10 | 94 |
| 3 | 11.25 | 78.45% | 14.1% | 11 | 123 |
| 4 | 7.85 | 87.45% | 12.1% | 9 | 82 |
| 5 | 5.98 | 80.34% | 13.9% | 8 | 78 |

Data did not come from an actual course

# Sample Data 2

- Big change in unit 3
  - Is the drop in performance due to the larger number of questions in the unit?
    - The average amount of time per question ranges from 3. 4 minutes in unit 1 to over 4.5 minutes in units 3 and 4.
  - The percent of students completing each unit is significantly lower in Unit 3.
  - The growing incompletion rate in units 4 and 5 indicate that additional outreach may be needed.

# Your turn!

- Use the data in the handout to determine what interventions you think are needed in each of these classes.
- Divide into groups and discuss your decisions.
- We will convene afterwards and hear what ideas each group has.

# Questions?

# Contact Information


- Ginger Walker
- gwalker@coloradotech.edu
- 931-302-5223


WWW.COLORADOTECH.EDU