Data-Driven Decision Making

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Data Analysis and Program Evaluation

Reasons for data analyses (Bernhardt, 2004)

- Provide students with feedback – student proficiency
- Gain a common understanding of quality performance
- Measure program success
- Understand the impact
- Monitor students
- Discover causes of issues
- Meet district, state and federal requirements

Data Analysis and Program Evaluation

Four overarching reasons for us

- Improve classroom instruction
- Guide curriculum and re-evaluate assessment
- Promote reflection and accountability
- Provide assurances that identical course material is equitably covered by different teachers

Data Analysis and Program Evaluation

Question: How do I begin looking at my course?
Answer: Use the data you have to develop an understanding of your work

Conduct an assessment of your data – this is today's focus

What are steps I can take to get some immediate feedback from testing data.

- Item analysis
  - How do the students' perform on the assessment?
- Equity across course sections
  - How closely does student performance on common assessments align between different teachers?
- Assessment quality
  - What am I testing?

Item Analysis

General purpose (Runte, 2014)

- Find flaws in the test so that you can adjust before returning to students.
- Find questions with two right answers, or that were too hard, etc., that you may want to drop from the exam.
- More diagnostic information on students
- Curriculum feedback

Item Analysis

Classroom level (Runte, 2014)

- Potential to identify questions students all guessed
- Find content areas to reteach
- Ability to use basic descriptive statistics to compare individual achievement with classroom performance. Example: Notre Dame assessment model
- Build future tests, revise test items, build question bank

Individual level

- Isolate specific errors a student has made and individualize instruction

Item Analysis

- Can also be used on free response assessments by conducting an analysis on the rubric used to grade the essay/short answer etc.
- Use Kyocera print out that addresses each question.
- Greater clarity on how the items are being perceived by students by grouping them according to the objective
- Can be expanded by looking at comparison with other descriptive statistics on the test
- Compare items within the same objective
- As the professional use personal judgment in addressing results

Why might an item have a 100% correct or 0% correct?

Why would a question have a 50/50 split between two answers?

What has occurred when each potential answer has the same number of answers?

Item Analysis

- Notre Dame Statistical Analysis Tool
  - Google Sheets or Excel file
    - Don’t type in the yellow boxes!
    - Mean and median analysis
      - Look for outliers
    - Standard deviation analysis
      - Look for score spread
    - Upper and lower quartile analysis
      - Look for appropriately challenging questions

Equity Across Course Sections

- Notre Dame Statistical Analysis Tool – Example in packet/online
  - Look for large differences (greater than 5 points) in mean/ median, standard deviation, upper and lower quartile scores
  - Address lows and highs with teachers
    - Were LPs taught in order?
    - Did you do any assessments that other teacher didn't do?
    - Were there any objectives that you felt like you didn't cover as completely as you could have?
    - Are there any particular challenges that you have that could explain these differences (like students below grade level in math and reading all grouped in same hour together)?
    - Were you absent/in middle of coaching season?
    - How did you review for assessments?

Assessment Review

Assessment Review – What is being tested?

Example: Science placement test in packet

1. Take curriculum objectives/study guide
2. Link questions to the objectives
3. Review item allocation with course goals
4. Address whether objectives that are not represented should be removed, replaced, or kept
5. Address whether a test could be failed based on one single objective
6. Correlate course objective with item (Has the objective been addressed in class? Was the content part of an activity at home with feedback provided?)

Overarching question: Do the items on the test indicate student mastery based on standards?

Methods of Evaluation

Points of Discussion

1. 14 questions out of 62 concerned subatomic particles
2. 7 questions out of 62 concerned the periodic table
3. 4 questions concerned identification of laboratory equipment
4. Questions types being used to test into pre-AP Biology neither reflected actual course questions nor covered material needed in the course
5. Multiple items on the study guide were not assessed on the test

Methods of Evaluation

Some outcomes of addressing the assessment and reflecting on the content

1. Completely redesigned test based on specific objectives related to testing out of Methods of Science
2. Reallocated items based on course objectives
3. Redesigned questions to reflect needs of a pre-AP Biology course
4. Effective assessment for success in pre-AP Biology