The Improvement Process, Step 4: Data Analysis and Improvement

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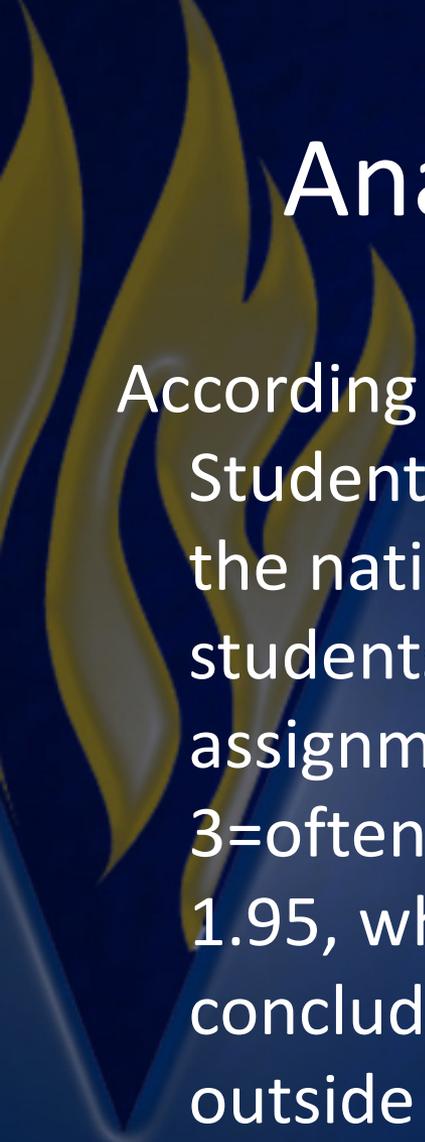
Analyzing Data—A Warm Up

According to VU's 2011 Community College Survey of Student Engagement data, VU students are above the national average when it comes to working with students outside of class to prepare class assignments. On a scale of 1=never; 2=sometimes; 3=often; 4=very often, VU students mean score is 1.95, while the national average is 1.90. We can conclude that faculty are expecting more work outside class, and VU is teaching students to work together.

Do you agree with these conclusions?

Analyzing Data—A Warm Up

The real story:

1. What does a "mean" score really mean?

Frequency scores paint an interesting picture:

33.6% of students taking the survey said they never worked with other students outside class, and 77.3% said they never or sometimes work with others.

2. What does it means to conclude "VU faculty are expecting students to work together."

The Goal of Analysis

- Make sense of data
- Present your analysis so that it:
1. Provides feedback on student learning mastery
2. Answers questions that faculty want to know
3. Describes for an external audience what students are learning, and how the learning and assessment processes are being improved by the department or institution

Some Principles of Data Analysis

- Focus on improving, not looking good
- Mix opinion-based, qualitative data with quantitative data, or various forms of quantitative data, and make the different data "talk to each other"
- Seek data that confirm quality learning, but data that also indicate needed learning improvements
- Disaggregate data into subgroups, where possible, to tailor improvements

Some Principles of Data Analysis

Recognize the data doesn't answer everything

- Data will reflect a limited group in a limited place and time, not a trend

- Data without a benchmark or baseline is a preliminary, limited basis for a judgment

- Data from one class or one course does not tell you everything about a program

- Data gives us a evidence of an hypothesis about learning, not a definitive claim about it

5 Basic Ways to Summarize Data

1. Tallies are straight-forward counts of how many students achieved a specific score or answered or felt a certain way. Tallies might be more expressive than averages.

Example: In evaluations of small classes, it might be more clear to say 2 students chose incorrectly than to say 20% of the students. You might also tally how many students answered each option in a multiple choice question in order to evaluate the quality of the question or the instruction.

5 Basic Ways to Summarize Data

2. Percentages can be a better way to explain achievement than a simple tally of how many students passed

Examples: 45 students passed the exam, but saying 83% of the students passed the drafting final is more likely to reflect expression of a success standard, no matter how large the class is or how many sections of a course.

Also, percentages are better for identifying a trend over a period of years.

5 Basic Ways to Summarize Data

3. Aggregates, which combines tallies of different items, answers, or rubrics categories into an overall or generalized score

Example: You might have 5 questions on a test that check vocabulary and 7 questions that test knowledge of the scientific method or a lab skill. The results of each group might be aggregated to determine general understanding. Mapping a test is key to developing aggregate scores.

5 Basic Ways to Summarize Data

4. Averages, which are numbers that summarize the central tendency of assessment results.

In addition to the *mean,* which is the most typically used sense of "average" achieved by adding the results of all scores and dividing by total number, there are two other averages that might be more meaningful in some cases. Consider also *median* and *mode* averages

5 Basic Ways to Summarize Data

Averages: Median, which is the midpoint score of all scores when they are listed from highest to lowest.

A median of 20 test grades might be more meaningful overall than an average. Consider a case where 18 students earned scores of 82 and two students earned scores of 10. While the average score would be 74.8, the median (82), would better reflect the overall learning, since 90% of the students earned the 82.

5 Basic Ways to Summarize Data

Averages: Mode is the average that can be used with categorical data, such as in the case of multiple choice questions or surveys, where a mean doesn't make sense. The "mode" is the most common answer.

Example: You might want the most common answer for a multiple choice question to consider the quality of a lecture on the issue, or you might want the most common answer to a survey question to understand behavior.

5 Basic Ways to Summarize Data

5. Qualitative Summaries: Use these to organize assessment data from one-minute papers, reflective writings, open-ended survey questions, or focus-group results

3 types of qualitative summaries:

- Quick Read-Throughs
- Grouped Listings
- Thematic Analysis

Quick Read-Throughs

Quick Read-Throughs require little more than reading quickly through all the responses of a one-minute paper (or a random sample of them) to identify what students find difficult.

If you use one-minute papers for qualitative data to complement quantitative results, report what you see in the results.

Results from Quick Read-Throughs

- If students respond in a variety of ways to your question, "What is most important point of lecture," many missing the point, then note the need for a lecture correction; if most of their answers match yours, note success.

- If students give a variety of responses to "What question remains unanswered?" you can note success, but if many have the same question, report the need to clarify in future lectures.

Grouped Listings

Grouped Listings: Reflective writings or open-ended survey questions that give brief responses might fall into categories of answers. After a workshop on assessment that covered rubrics, multiple choice exams, and reflective writing, the question, "What is the most helpful thing you learned" might produce lists of all the different comments about each category. The lists will show which category seemed most important and what aspect of the category was most useful.

Thematic Analysis

A Thematic Analysis is more useful with longer reflective essays or a series of focus-group interviews.

A Thematic Analysis requires a written synthesis of all the responses to develop a holistic description of the all the comments by looking for common themes, patterns, links between responses and events that led to these, and relationships between results

Three Different Patterns of Evidence

Once your data is summarized, consider the patterns of evidence

- Consistency—over time
- Consensus—different populations
- Distinctiveness—different situations or variables or items

Consistency

The consideration of the same practice or performance or individuals or groups over a period of time, or trends

Key Question: "Has this person or group acted, felt, or performed this way in the past or over a period of time?" or

"Has the same practice been valued by different groups of students over a period of years?"

Consistency

**How well can students explain the scientific method?**
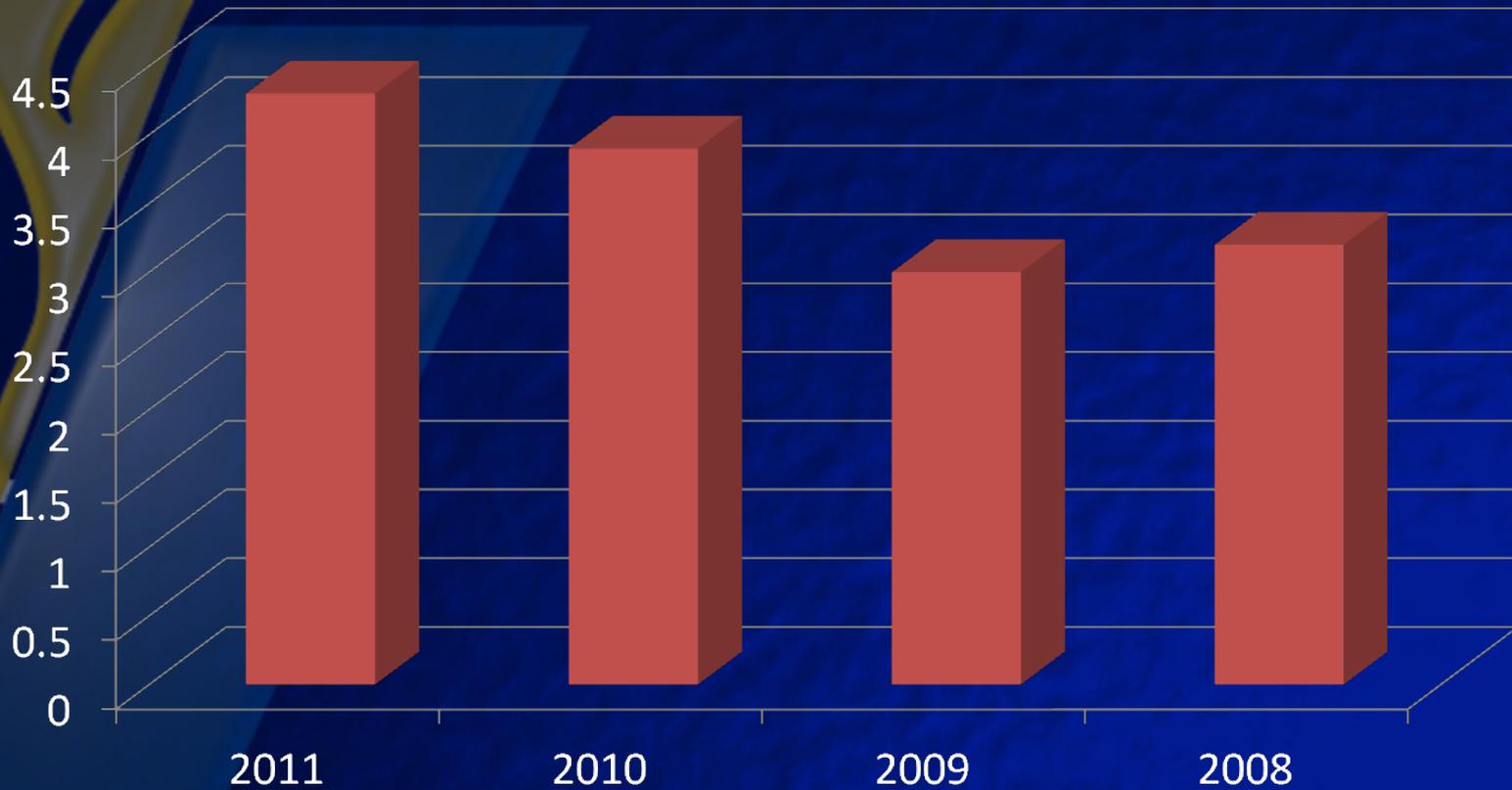
Consensus

Examines the similarities and differences between or among groups/populations of students, considering factors such as discipline, gender, or other demographic data

Key Questions: "What is the general outcome, result, feeling, attitude, or behavior?" and

"What are the differences between or among different groups relative to the outcome, results, feeling, attitude or behavior?"

Consensus

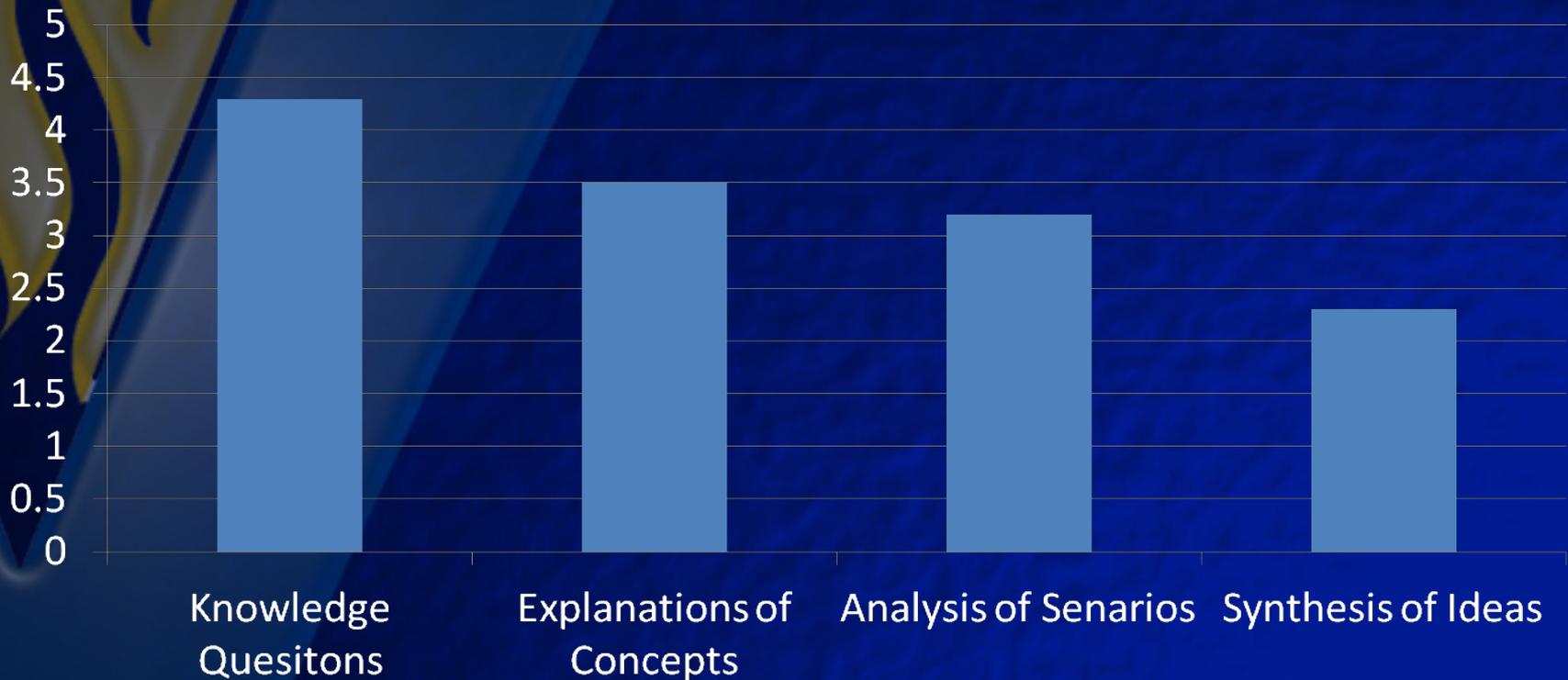How accurately do students use and cite sources in intensive writing classes?
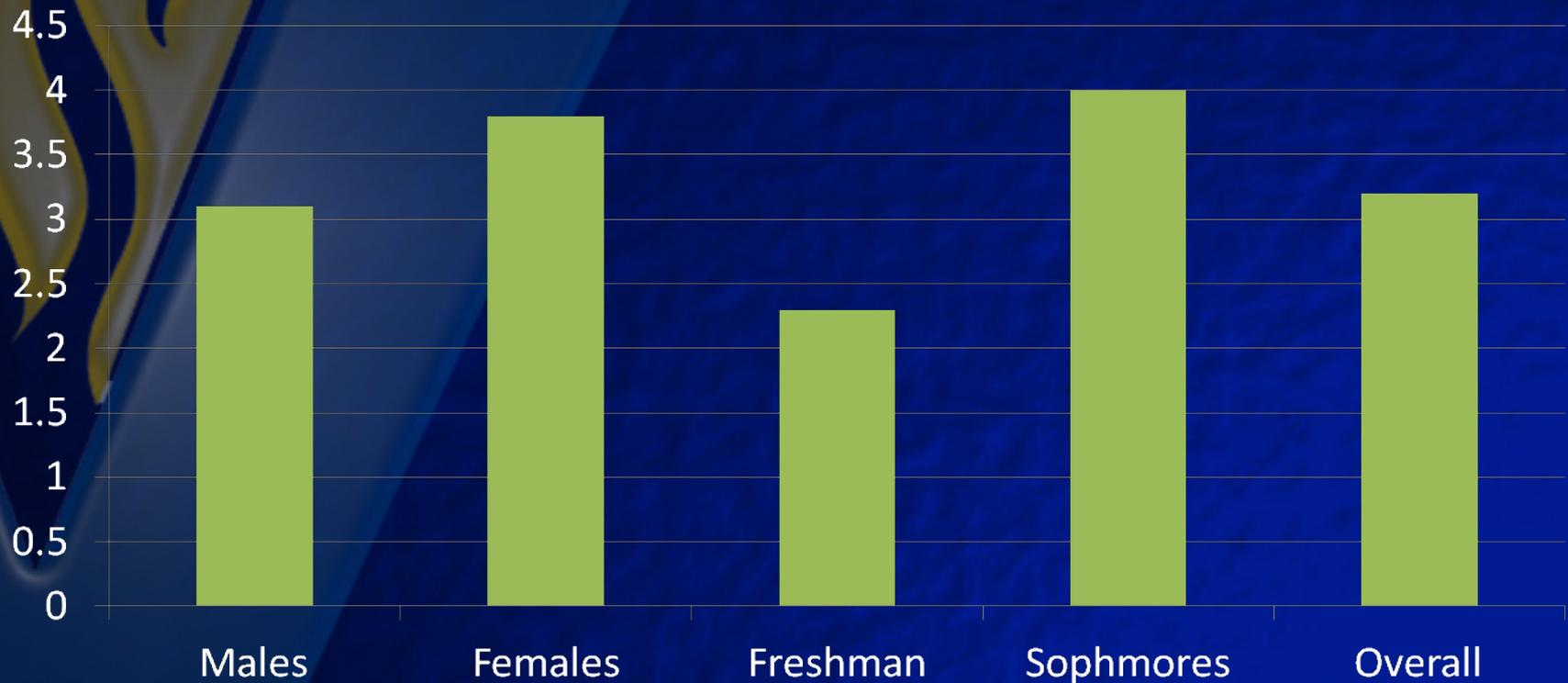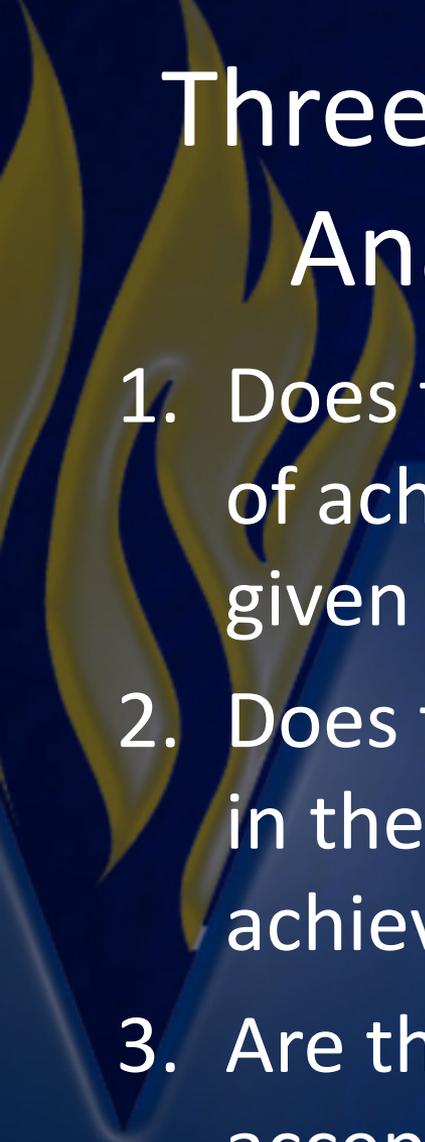
Distinctiveness

Examines individual or cohort perspectives or results across different situations or categories

Key Question: "Does a person or a group respond differently based upon the situation, item, or issue?"

Three Fundamental Questions for Analysis of Assessment Data

1. Does the data represent an acceptable level of achievement/activity/accomplishment given our mission, outcomes, values?

2. Does the data represent an identifiable trend in the level of achievement/actvity/accomplishement?

3. Are the differences in the subpopulations acceptable?

Linda Hatfield, HLC Workshop

Evaluating the Results of Objective Exams

1. Compare your results to your target or success standard. Did the students achieve it or not? If "yes," is there "consensus" or did some groups do significantly different? What does it mean if most majors answered correctly, but not non-majors, or freshman?

2. Consider using various averages to add depth to your analysis in your assessment report. How do the different views affect your understanding of the results?

Evaluating the Results of Objective Exams

3. Consider the meaning of your students meeting your success standard. If your success standard is 80% of students will achieve an 80% on an exam, are there questions that a significant number of students got wrong? Why?

4. What is the cognitive level of the questions on the exam? Did different questions affect the meaning of your results Do questions discriminate best students from poorest?
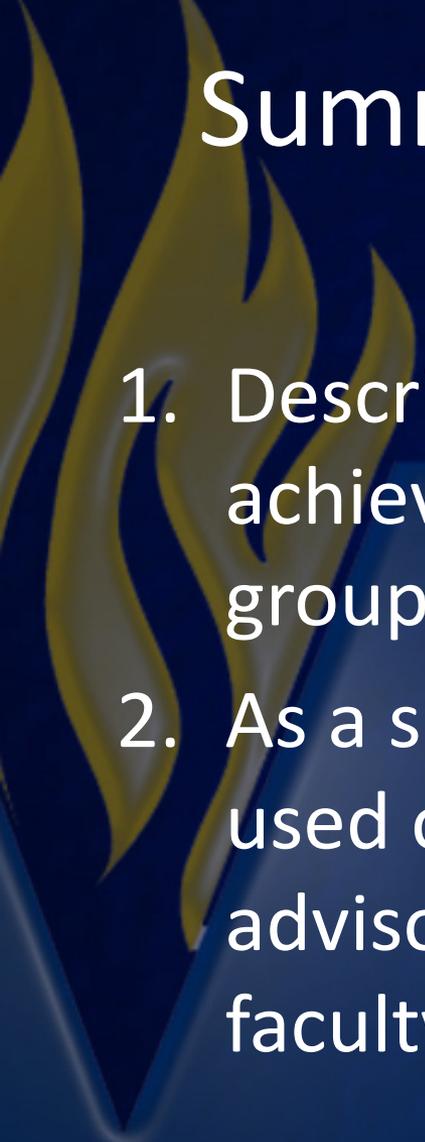
Summarizing and Evaluating the Results of Rubric Data

1. Describe how inter-rater reliability is achieved—through practice, through small groups working together, other means?

2. As a single-member department, was rubric used or reviewed by outsiders, such as advisory committee members or other faculty

# Summarizing and Evaluating the Results of Rubric Data

3. Describe the review process, including how many papers were read and by whom, how scores on shared papers were tallied, etc

4. Identify whether or not groups reading the same papers (such as trios) were used to achieve validity

5. Identify what learning dimensions were most difficult and most easy for students

Summarizing and Evaluating the Results of Rubric Data

6. Identify the holistic scoring data, if determined

7. Whenever helpful, aggregate rubric domain results that track back to a single outcome

Example: "Students will use sources well."

You might aggregate the scores for appropriate selection of sources, accurate summary of sources, and accurate citation of sources.
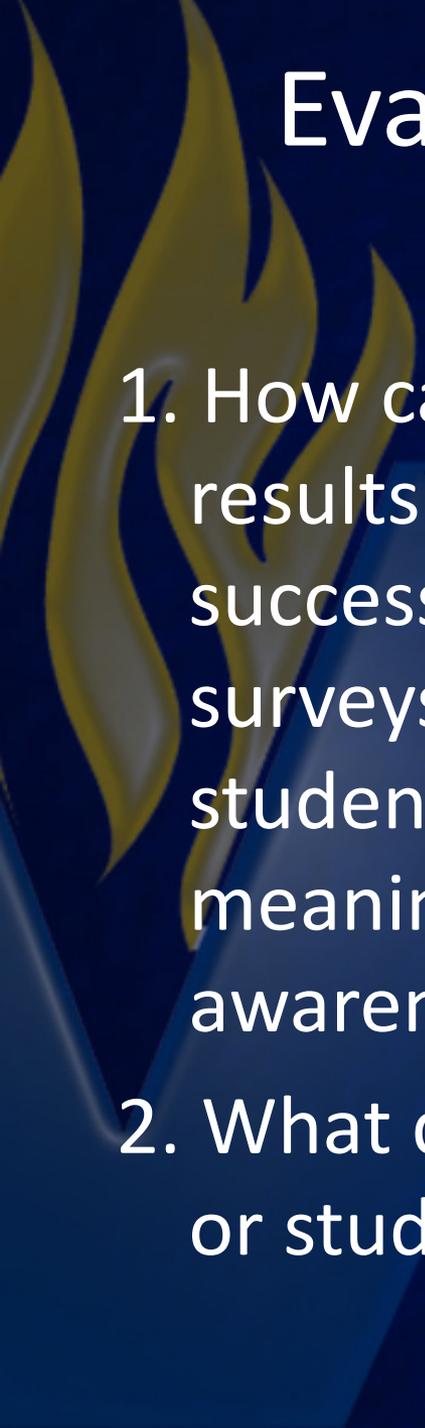
Evaluating the Results of Any Assessments

1. How can you make your results "talk to" other results? Even if your students meet the success standard, what do responses on surveys or reflective writing tell you about the students' depth of understanding, the meaningfulness of the material, or their awareness of how the results?

2. What does a triangulation with CCSSE results or students' developmental history tell you?
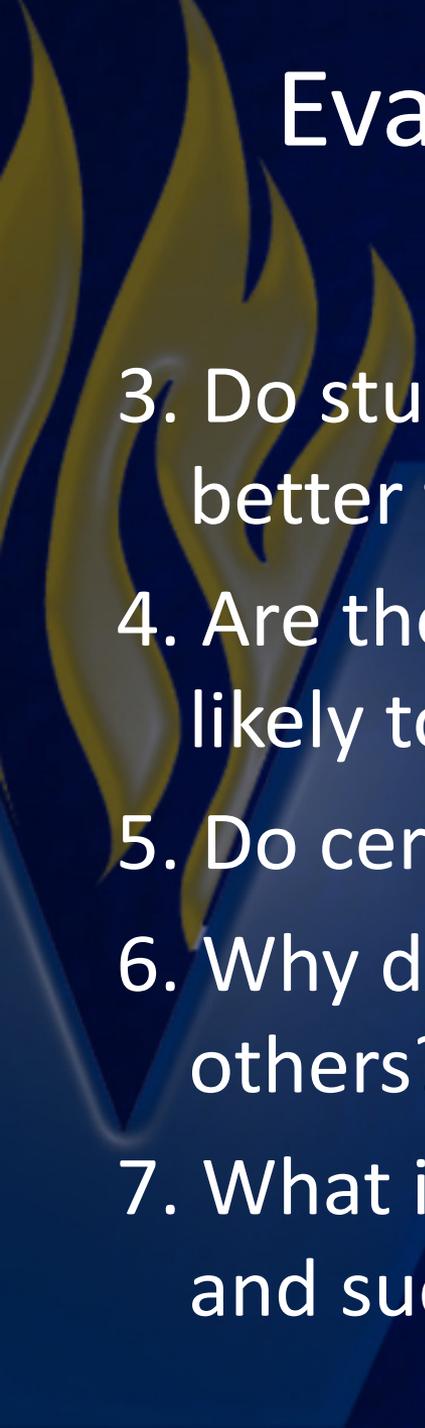
Evaluating the Results of Any Assessments

3. Do students at the end of the program do better than those early in the program?

4. Are the students with high scores on an exam likely to earn high grades for the course?

5. Do certain majors do better than others?

6. Why do students learn some material and not others?

7. What is relation of success on an assessment and success in the program?

Closing the Loop—Improving the Learning

Curriculum and Process Changes, such as:

- Changes in pedagogical practices
- Revision of course content
- Revision of course expectations
- Addition of student support mechanisms
- Revision or enforcement of prerequisites
- Faculty development
- Improved technology
- Be sure improvements follow from results!

Closing the Loop—Improving the Assessment Process

Changes to the Assessment Plan, such as:

- Revision of the learning outcomes statements

- Revision of the measurement tools, such as test questions or rubrics

- Collection of additional data to clarify and distinguish results

- Changes to the data collection procedures, adding reflection, surveys or other tools

- Be sure improvements follow from results!

Presentation of Analysis

- Minimum Expectation: Detailed Narrative Form

- Cover strengths and weakness of learning results and assessment tools and measures

- Optional, but important to consider:

1. Clip in small charts or graphs if possible or on future forms

2. Attach summaries of quantitative or especially qualitative data to clarify the report

Workshop Analysis—Task One

School X in Indiana used the Collegiate Assessment of Academic Proficiency (CAAP) exam to test critical thinking and writing skills. The results showed that 1st year writing skills only slightly above the national average, and critical thinking, slightly below. The General Education Committee concluded that the institution is instructing students well in both areas because the students are achieving results consistent with the national norms for 1st year students. (See handout)

Is the Committee's conclusion justified?

Sources

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