



# **Using Assessment of Learning to Improve Undergraduate Education**

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# Can we use assessment to improve undergraduate education?

- **Assessment and Accountability** are different approaches with different goals, processes, and stakeholders
- **Accountability with Collegiate Learning Assessment (CLA)**: unclear what it tells us about student learning
- **Undergraduate Student Learning Initiative (USLI)** at Berkeley: assess majors' achievement of learning goals to improve undergraduate program
- **Examples** of assessment:  
Economics, Chemistry, French, Civil Engineering
- **Other information** for assessment and accountability
- **Lessons** (so far)



# Assessment

- Assessment: a process of evaluation of majors' achievement of explicitly-stated learning goals, which is linked to improving the department's undergraduate program (on-going basis)
- Strengths
  - Goal: improve student learning on a continuous basis, and communicate learning goals and how skills and knowledge are acquired.
  - Discipline-specific content that demonstrates general capabilities.
  - Faculty-driven and owned by departments; used for academic review of departments.
  - Provides valuable information for faculty, students, and public.



## Assessment, cont

- Weaknesses
  - Does not produce one campus-wide measurement for prospective students and their parents, voters, and the government.
  - Cannot be compared across colleges
  - Does not measure “value-added” by the college
  - Usually does not include broader measurements of personal development and social responsibility, or of achievements and contributions over the student’s lifetime



# Accountability

- Accountability: measurement of student performance that summarizes the instructional impact or achievement.
- Strengths
  - Goal: provide the public with a transparent standardized metric of the college's contribution to student learning.
  - Measurement of general education skills at the campus level.
  - “Value-added” measure can be compared across colleges.



# Accountability, cont

- Weaknesses
  - Unclear what is being measured
  - Student performance cannot be linked to the undergraduate curriculum
  - Metric does not provide useful feedback to departments or students on performance of majors in achieving learning goals



# Assessment vs Accountability

- **Goal:**  
organizational improvement
  - **Approach:**  
department assessment
  - **Stakeholders:**  
Faculty, students
- **Goal:**  
organizational accountability
  - **Approach:**  
standardized test
  - **Stakeholders:**  
Public, government



# Accountability: What is CLA?

- Online 90 min test includes problems that require students to analyze complex material and provide written responses (not multiple choice answers).
  - Human graders use scoring guides to grade the students' answers online.
  - Test given to voluntary samples of 100 freshmen and 100 seniors
- CLA calculates a measure of the institution's contribution to student learning (value added)



# Accountability:

## How is value-added calculated?

CLA scores adjusted by school's average SAT scores, and difference between adjusted scores for Freshmen and Seniors is Value-added Score.

- **Institution's value-added estimate:**

**Difference between the mean of freshmen scores relative to the expected CLA score for freshmen (i.e., residual freshmen score) and of senior score relative to the expected CLA score for seniors (i.e., residual senior score).**

- Three scores (residual freshmen score, residual senior score, and value-added estimate) are converted to percentile ranks and performance levels are assigned. These are used to compare value-added across institutions.



# Accountability:

## What does CLA measure?

### Problems with metric

- Different groups of students compared: drop outs and transfers not included; testing of freshmen as seniors is optional
- Schools with low SAT scores and high drop-out rates do better.
- “Content neutral”, yet performance varies by major
- CLA outcome measures do not diagnose the factors that lead to the observed results.
- Questions have been raised about the reliability and validity of the CLA measurements and whether it is psychometrically sound.



# Assessment:

## How does USLI at Berkeley work?

- Importance of context-discipline in assessing student performance
  - Disciplinary context provides richer measurement of student performance than general context, and indicates students' readiness for post-graduate activities.
- Each department developed learning goals for majors and mapped goals to curriculum
  - Learning goals posted online
  - Learning goals stated on syllabi by instructors



## USLI at Berkeley, cont

- Departments developing pilot assessment projects of specific assignments in courses
  - Direct assessment requires a sample of advanced students' work to evaluate achievement of specific goals.
  - Work can include exam question, lab report, problem set, research paper, or design project, depending on major.
- Used by departments to evaluate and improve undergraduate program
  - Assessment of *overall skills and knowledge that the majors have achieved*, and not for specific courses.



## USLI at Berkeley, cont

- On-going process owned by departments
  - Used in academic review of departments
  - Integrated into external reviews (college-wide, professional schools), so each department has only one assessment process.
- Assessment process is resource neutral while improving quality
  - Improves efficiency, effectiveness, and transparency
  - Demonstrates relevance and performance



## Examples of Assessment: Economics

- Economics has 17 learning goals across 6 areas: Critical Thinking (4), Quantitative Reasoning (4), Problem-solving Skills (2), Specialized Knowledge (1), Communication Skills (3), Lifelong Learning Skills (2)



# Learning Goals: Economics

## Critical Thinking Skills

- Apply economic analysis to evaluate everyday problems.
- Apply economic analysis to evaluate specific policy proposals.
- Compare two or more arguments that have different conclusions to a specific issue or problem.
- Understand the role of assumptions in arguments.

## Quantitative Reasoning Skills

- Understand how to use empirical evidence to evaluate an economic argument.
- Interpret statistical results.
- Conduct appropriate statistical analysis of data.

## Communication Skills

- Communicate effectively in written, spoken, and graphical form about specific economic issues.
- Formulate a well-organized written argument supported by evidence.



# Examples of Assessment: Economics

- On-going process of mapping learning goals to courses: Instructors listing primary learning goals on syllabi each semester.
- Pilot course to teach written communication skills
- Pilot for direct assessment of learning goals:  
Three assignments from large senior courses will be selected to represent student proficiency in a specific learning goal. The instructor will record the grades on this assignment along with the grade required to indicate proficiency.



# Examples of Assessment: Chemistry

- Undergraduate learning in chemistry is a cumulative, spiral process as majors advance through the program.
  - Junior- and senior-level courses build on the fundamentals learned in the first two years.
  - Research-level lab project represents majors' cumulative learning
- Pilot assessment: evaluate a student lab report from upper-division laboratory course (or from research project in a Professor's laboratory)
  - Pilot capstone: goal of capstone experience for all majors, with the current pilot on research-level exercises in upper-division laboratory courses.
  - ePortfolio: exploring developing portfolios of student work including freshman- to senior-level copies of exams, laboratory reports, and research reports (being done at UC Irvine)



# Examples of Assessment: French

- Assessment pilot to evaluate if specific goals are learned.
  - Designation of one or two upper division courses each semester as:
    - “writing intensive ” classes (with specific emphasis put on grammar and composition skills)
    - “research oriented ” classes (with specific emphasis on crafting research topics and acquiring bibliographical skills)
- These “research” and “writing”-emphasis designations are not permanently attached to particular courses but will rotate to courses throughout the curriculum. Over time all upper division courses will be included in the assessment process.



# Examples of Assessment: Civil Engineering

- Link to ABET evaluation
  - Maintaining ABET accreditation requires a continual assessment of student learning and documentation on how that assessment was used to improve the curriculum.
- CEE Assessment Pilot:
  - Assess selected upper division courses on a rotating basis (five courses each year) to evaluate how student learning objectives identified by the instructors are achieved through homework assignments, laboratory experiences, projects, and examinations.
  - This schedule will cover the whole of the upper division curriculum over the six year cycle of accreditation.
  - The goal of this pilot process is to find an alternative to the ABET process that is less burdensome to faculty and staff and is more effective in linking assessment to curriculum improvements.



# Other Information for Assessment and Accountability

- Voluntary System of Accountability (VSA): “What information would be most helpful to prospective students and their parents in deciding which university best fits their educational wants and needs?”
  - Cost of attendance, chances of getting into college, campus safety, and social life of primary importance.
  - Information on student learning outcomes was not listed as important.
- UC Campuses Developed VSA Profiles (without CLA)
  - Additional information on Student Research and Academic Excellence and other key areas reflecting student experience
  - <http://metrics.vcbf.berkeley.edu/Berkeley%20Template.pdf>



# Lessons Learned (so far)

- Primary goal of assessment process: to evaluate and improve the undergraduate program over time.
  - Assessment should be discipline-specific (ie, by major), faculty-driven (ie, developed and implemented by faculty), and owned by departments (ie, not by campus administration).
  - Assessment process should be major input in the department's academic review.



## Lessons Learned, cont.

- Assessment of student performance should be embedded in the current curriculum.
  - Uses existing resources.
  - Uses sampling to minimize resources required and to effectively evaluate *overall skills and knowledge that the majors have achieved* in all their courses.
  - Allows continual feedback that is used to improve the majors' program.
- Each department should have only one assessment process.
  - Integrate all evaluation activities (eg external reviews).



# Conclusion

- Assessment of learning goals for majors by departments is a valuable process for understanding student learning and for strengthening undergraduate curriculum at the program level.
- How process is implemented is important for achieving goal:  
efficient, effective, transparent way to improve undergraduate education.

*Thank you!*