



Understanding types of evidence

Office of Assessment, Trinity College
February 2018

How do we know which type of evidence is most likely to tell the story of learning in our program?

How can we leverage the research traditions of our discipline for use in assessment of learning?

Do we have to use numbers to explain student learning?

Why are you asking us to prioritize "direct" evidence over "indirect" evidence?

How should we judge our findings?
Against whose standards?

Foreword by
Trudy W. Banta

Assessing Student Learning

a common sense guide

Linda
Suskie

second edition

ASSESSMENT CLEAR AND SIMPLE

**A Practical Guide for
Institutions, Departments,
and General Education**

SECOND EDITION

BARBARA E. WALVOORD

Which type(s) of evidence are most likely to tell the story of learning in your program?



```

78 var curCookie = name + "=" + escape(val
79 ((expires) ? "; expires=" + expires
80 ((path) ? "; path=" + path : "") +
81 ((domain) ? "; domain=" + domain :
82 ((secure) ? "; secure=" : "");
83 window.document.cookie = curCookie;
84 }
85
86 function showhide(obj_id, img)
87 {
88     var obj = getObjectHandle(window, obj
89
90     if (obj)
91     {
92         obj.className =

```

America. Over the last several years, funding for general has been decreasing among public schools. This money can be spent teaching students academically applicable skills. However, in a study by Amy Graziano, 237 secondary students used keyboard training and innovative math software for fractions tests than students only using the math software. The students' involvement with music and their academic



Determination of the Atomic Weight of Magnesium

CHEM 101

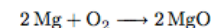
John SMITH

February 4, 2013

Date Performed: January 1, 2012
Partners: James Smith
Mary Smith
Instructor: Professor Smith

1 Objective

To determine the atomic weight of magnesium via its reaction with oxygen and to study the stoichiometry of the reaction (as defined in 1.1):



1.1 Definitions

Stoichiometry The relationship between the relative quantities of substances taking part in a reaction or forming a compound, typically a ratio of whole integers.

Atomic mass The mass of an atom of a chemical element expressed in atomic





The story of student learning



Direct	Indirect
Quantitative	Qualitative
Locally-developed	Published (national)
Embedded	Added-on
Formative assessment	Summative assessment
Traditional	Performance (alternative)
Objective	Subjective
Longitudinal	Cross-sectional
Program assessment (learning context)	Student learning outcomes

Direct	Indirect
Rubric-scored writing sample	Course grade
Rubric-scored performance task	Course evaluations
Employer evaluation	Satisfaction measures (Kirkpatrick)
Select psychometrically-validated tests	Awards, recognitions
Knowledge tests	Post-bac. placement rates
Portfolio artifacts, reflections	
Alumni survey?	Student survey?

Caution about using GPA, grades, satisfaction as measures of learning

Quantitative

Structured, pre-determined values

Test scores, rubric ratings, many
survey questions

Operations include:
Measures of central tendency, frequency
distributions, regression models,
correlations, ANOVA, etc.

Qualitative

Flexible, naturalistic, exploratory.
Humanistic? But also still
structured and systematic

Focus groups, structured interviews,
document analysis

Methods include: phenomenology,
case studies

Locally-developed

Developed at the institution

Targets a localized topic or question

Usually free

Can take a long time to develop a good instrument

Harder to validate and establish reliability

No national norms for comparison

Published (national)

Developed by external organization, institution, or consortium

Tests generalized constructs; less detailed?

May have to get permission first

Can be expensive

Rigorously tested. Validated with high degrees of reliability.

National and institutional norms usually available

Greater perceived legitimacy?

Embedded

Happens within the learning experience

“Double duty”: May measure learning within course *and* a major

Locally designed

Grades or feedback provided

Added-on

Additional work outside class [See general education presentation for SACS](#)

Can provide informational supplemental to that which is collected in class

Contributes to assessment fatigue

Which approach is easier to implement?

Which approach is more likely to achieve buy-in from students?

Formative assessment

Enriches learning in real time

Most effective for assessment-as-feedback

Internally focused

Summative assessment

Occurs at the end of a learning experience

Most effective for assessment-as-compliance

Internally *and* externally focused

May need to drill-down to understand results

A natural relationship between formative and summative assessment!

Traditional	Performance (authentic)
<p data-bbox="123 425 923 539">Multiple-choice tests, essays, oral exams</p> <p data-bbox="96 604 923 718">Focus is on evaluation not learning feedback</p> <p data-bbox="285 782 923 896">Administered in controlled settings</p>	<p data-bbox="1000 425 1696 539">Demonstrate a skill, often in response to a real-world task</p> <p data-bbox="1000 604 1812 718">Task or prompt is accompanied by a scoring guide (rubric)</p> <p data-bbox="1000 782 1831 896">Messy performance task may have many “correct” answers</p> <p data-bbox="1000 961 1561 1011">Portfolios (See AAEEBL)</p>

Objective	Subjective
Single correct answer	Many possible answers; answers of varying quality
No professional judgment needed	Scoring/feedback require expertise
Feedback is limited	Feedback may be rich
Easier, faster to evaluate (QLRA example)	Time-consuming to evaluate (See CAT example)
	Better at evaluating higher-order skills and competencies
	Facilitates deeper, engaged learning
	Harder to achieve reliability, over time and across multiple graders

Longitudinal (time-series)

Estimate differences in learning or competency over time

Only possible with a stable sample

Cross-sectional

Look at differences between two samples at a moment in time

Can be used when you have two different samples, or when the sample changes over time

Not mutually-exclusive!

Program assessment (learning context)

Student learning outcomes

Number of enrolled students

Metacognitive gains

Rate of attrition from program

Mastered competencies and skills

Satisfaction with specific courses

Table 2.3. The Kirkpatrick's Four Levels of Learning Experience Outcomes



1. Reaction	Student satisfaction with the learning experience.
2. Learning	What students have learned as a result of the learning experience.
3. Transfer	Students' use of what they have learned in later pursuits: further study, on the job, community service, and so on.
4. Results (Behaviors)	How what students have learned is helping them achieve their goals and our goals for them. These goals may include persistence through graduation, obtaining and advancing through positions for which they've prepared, admission to appropriate programs of advanced study, and achievement of other life goals that they've identified for themselves

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About course evaluations ([link](#))

Student Course Evaluation Form

PART 1: EVALUATION OF COURSE AND INSTRUCTION

 first  previous  next  save

Trinity College -- Student Evaluation Form

The purposes of this survey include the following: 1) to provide your instructor with feedback about the quality of the course; 2) to inform promotion decisions; 3) to assist student's selection of courses; and 4) to help you assess how this course has helped you progress with the learning objectives of the Duke curriculum. Please respond to each item with the indicated code.

Please make use of the comment boxes provided as faculty find your comments particularly valuable. All of your responses will be kept confidential and will be reported in aggregate form only. If you have questions concerning any of the items in this survey please contact the Office of Assessment, Trinity College (assessment@duke.edu). If you are having technical problems with this survey please contact the Help Desk at 684-2200.

Overall Appraisal

Give an overall rating for the quality of this course. (e.g., content, structure, approach, educational value).

☐ Very Poor ☐ Poor ☐ Adequate ☐ Good ☐ Excellent

Give an overall rating for the quality of instruction. (e.g., presentation, knowledge, fairness, responsiveness).

☐ Very Poor ☐ Poor ☐ Adequate ☐ Good ☐ Excellent

Overall, how much did you learn in this course?

☐ Very Little ☐ A Little ☐ Moderate Amount ☐ Quite a Bit ☐ A Great Deal

How would you characterize the workload in this course?

☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy

Would you recommend this course to other students?

☐ No
☐ Yes

About course evaluations ([link](#))

Know

Gaining factual knowledge.

☐ Not at All ☐ A Little ☐ Moderately ☐ Highly ☐ Very Highly

Understand

Understanding fundamental concepts and principles.

☐ Not at All ☐ A Little ☐ Moderately ☐ Highly ☐ Very Highly

Apply

Learning to apply knowledge, concepts, principles, or theories to a specific situation or problem.

☐ Not at All ☐ A Little ☐ Moderately ☐ Highly ☐ Very Highly

Analyze

Learning to analyze ideas, arguments, and points of view.

☐ Not at All ☐ A Little ☐ Moderately ☐ Highly ☐ Very Highly

Synthesize

Learning to synthesize and integrate knowledge.

☐ Not at All ☐ A Little ☐ Moderately ☐ Highly ☐ Very Highly

Learning to conduct inquiry through methods of the field

☐ Not at All ☐ A Little ☐ Moderately ☐ Highly ☐ Very Highly

Evaluate

Learning to evaluate the merits of ideas and competing claims.

☐ Not at All ☐ A Little ☐ Moderately ☐ Highly ☐ Very Highly

My ability to effectively communicate ideas orally.

☐ Not at All ☐ A Little ☐ Moderately ☐ Highly ☐ Very Highly

My ability to effectively communicate ideas in writing.

Bubble form

1. Based on our **customer service**, how likely are you to recommend Acme to a friend or colleague?

0 1 2 3 4 5 6 7 8 9 10

Not Likely ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very Likely

2. Please rate the Support Staff at Acme in the following areas:
Click on the number of stars to rate each item - 5 stars is best!

Rating

Promptness ★★★★★

Courtesy ★★★★★

Expertise ★★★★★

Enthusiasm ★★★★★

3. Based on our **software**, how likely are you to recommend Acme to a friend or colleague?

0 1 2 3 4 5 6 7 8 9 10

Not likely ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very likely

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Art portfolio



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Lab report

Virtual Lab Report

Student: Gary Wilson : mcmfangw
Instructor: Kelly Gilgenbach
Section: BIO1301
Unknown Session: Testing

Identification Information

Assigned Unknown: Streptococcus pyogenes
Identified Unknown: Buttiauxella agrestis
Gram Reaction & Morphology: Gram Positive Cocci
Auto-Inoculation Used: Yes

Test Detail (Chronological Order):

1 Gram Reaction {+} Eliminated {71} Remaining {53} Recorded 1 time(s)

Observations: none

No errors recorded

2 Growth on 7.5% NaCl {+} Eliminated {6} Remaining {47} Recorded 1 time(s)

Observations: none

Result recorded but transfer not complete. Result a guess?

Swab selected for incompatible medium

3 Mannitol fermentation {+} Expected {-} Eliminated {20} Remaining {27} Recorded 1 time(s)

Direct

Quantitative

Locally-developed

Embedded

Formative assessment

Traditional

Objective

Longitudinal

Program assessment (learning context)

Indirect

Qualitative

Published (national)

Added-on

Summative assessment

Performance (alternative)

Subjective

Cross-sectional

Student learning outcomes

Computer program

```
78     var curCookie = name + "=" + escape(value) +  
79         ((expires) ? "; expires=" + expires.toGMTString() : "") +  
80         ((path) ? "; path=" + path : "") +  
81         ((domain) ? "; domain=" + domain : "") +  
82         ((secure) ? "; secure" : "");  
83     window.document.cookie = curCookie;  
84 }  
85  
86 function showhide(obj_id, img)  
87 {  
88     var obj = getObjectHandle(window, obj_id);  
89  
90     if (obj)  
91     {  
        obj.className = "hidden";  
    }  
}
```

Direct	Indirect
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Research paper

**“Open Educational Mobile Application Development and Implementation for Teaching
English based course.”**

1.0 Introduction

The chief aim of any educational institute is to enable students to meet with their preplanned goals. In doing so they need to communicate in a language that is widely used i.e. English. In order to achieve institutional goals, teachers have to play a very vital role. Generally in formal system of education the process of getting education takes place between teachers and learners. In this process language functions as a medium of transmitting knowledge from one person to another. Thus, the language, that teacher practices in the classroom should be error free and should meet with linguistic competence. In order to achieve the above said technology can

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Open-ended survey

* 1. What does a healthy lifestyle look like to you (For example, "I want to cook healthy home cooked food 4x/week and work out for an hour 3x/week")?

* 2. In the last 7 days, how many days did you cook a meal at home (For example, "I cooked 3x last week")?

* 3. In the last 2 questions, you told me the difference between how much you WANT to cook at home vs. how much you DO cook at home; to help me understand the difference can you tell me in detail how you FEEL when it is time to cook a meal (For example, "I feel exhausted from work/kids and I don't have the energy to cook")?

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The story of student learning



	Introductory Course	Research Methods	Advanced Content Course A	Laboratory / Practicum Course	Advanced Content Course B	Advanced Content Course C	Advanced Content Course D	Capstone Course
Content								
SLO 1: Disciplinary knowledge base (models and theories)	Introduced		Reinforced		Reinforced	Reinforced	Reinforced	Mastery / Assessed
SLO 2: Disciplinary methods		Introduced		Reinforced		Reinforced		Mastery / Assessed
SLO 3: Disciplinary applications	Introduced		Reinforced		Reinforced		Reinforced	Mastery / Assessed
Critical Thinking								
SLO 4: Analysis and use of evidence		Introduced		Reinforced	Reinforced		Reinforced	Mastery / Assessed
SLO 5: Evaluation, selection, and use of sources of information	Introduced	Reinforced		Reinforced		Reinforced		Mastery / Assessed
Communication								
SLO 6: Written communication skills	Introduced	Reinforced		Reinforced		Reinforced		Mastery / Assessed
SLO 7: Oral communication skills		Introduced	Reinforced		Reinforced	Mastery / Assessed		
Integrity / Values								
SLO 8: Disciplinary ethical standards		Introduced		Reinforced	Reinforced			Mastery / Assessed
SLO 9: Academic integrity	Introduced	Reinforced	Reinforced	Reinforced		Reinforced		Mastery / Assessed
Project Management								
SLO 10: Interpersonal and team skills			Introduced		Reinforced		Reinforced	Mastery / Assessed
SLO 11: Self-regulation and metacognitive skills	Introduced			Reinforced	Reinforced	Reinforced		Mastery / Assessed

Computer Science students will

- **solve** problems using computational methods.
- **write** computer programs.
- **analyze** problems mathematically where such analysis is appropriate.
- have foundational **knowledge** and **understand** basic principles of software and hardware systems.
- **know** new techniques and concepts, where these new areas are related to computer science.
- **collaborate** effectively, to work together, to value different points of view, and to interact with others productively.
- **evaluate** trade offs in problems and systems and to communicate this reasoning effectively.
- **understand** the ethical and societal dimensions of computer science and technology.

Compsci	101	201	230	250	310	330	Elec. 1	Elec. 2
<u>evaluate</u> trade offs in problems and systems and to communicate this reasoning effectively.		E		D		M		
<u>understand</u> the ethical and societal dimensions of computer science and technology.				E	D		M	
have foundational <u>knowledge</u> and <u>understand</u> basic principles of software and hardware systems.	E			D				M
<u>collaborate</u> effectively, to work together, to value different points of view, and to interact with others productively.	E				D		M	

E = Emerging, D = Developing, M = Mastering

DIRECT measures for SLO number 1

If you utilized multiple *direct* measures to measure this SLO, please separate them into multiple rows. The table can accommodate as many rows as you need.

Clarification of the difference between Direct and Indirect measures (i.e., sources of evidence) is located [here](#).

We selected the following direct measure(s) to collect evidence of students learning...	We set the following target for each of our direct measures. These targets are what we expect to see from the direct measure described at left...	When evidence was collected via this direct measure, we found the following...	Did we meet this target for this measure? (Yes / No)
Capstone paper	We expect 90% of capstone students to score "mastery" (or high level) on rubric item.	Still happening...	Unknown???
<i>Enter text...</i>	<i>Enter text...</i>	<i>Enter text...</i>	<i>Enter text...</i>

[Your assessment portfolio]

[Direct and indirect evidence](#)

What are the influential research traditions in your discipline?

[Contrasted with the principles of action research]

How should we judge our findings?

Against whose standards?

<i>Local standards</i>	<i>Are students meeting our own standards?</i>
External standards	Are students meeting standards set by someone else?
<i>Internal peer benchmark</i>	<i>How do our students compare to peers within our course, program, division, or college?</i>
External peer benchmark	How do our students compare to peers at other colleges?
Best practices benchmark	How do students compare to the best of their peers?
<i>Value-added benchmark</i>	<i>Are our students improving over time?</i>
Historical trends benchmark	Is our program improving?

The take-aways:

Student Learning Outcomes and curriculum maps should guide the selection of appropriate measures.

There's no silver bullet. We balance and blend multiple measures to tell the story of student learning.

The teaching and research traditions of your field also can inform the ways you study student learning. Be authentic to your discipline.

You have the autonomy to determine standards of judgment.