Assessing Student Learning in Large Classrooms

Custom Research Brief

Research Associate
Elizabeth Kerr

Research Manager
Nalika Vasudevan
LEGAL CAVEAT

The Advisory Board Company has made efforts to verify the accuracy of the information it provides to members. This report relies on data obtained from many sources, however, and The Advisory Board Company cannot guarantee the accuracy of the information provided or any analysis based thereon. In addition, The Advisory Board Company is not in the business of giving legal, medical, accounting, or other professional advice, and its reports should not be construed as professional advice. In particular, members should not rely on any legal commentary in this report as a basis for action, or assume that any tactics described herein would be permitted by applicable law or appropriate for a given member’s situation. Members are advised to consult with appropriate professionals concerning legal, medical, tax, or accounting issues, before implementing any of these tactics. Neither The Advisory Board Company nor its officers, directors, trustees, employees and agents shall be liable for any claims, liabilities, or expenses relating to (a) any errors or omissions in this report, whether caused by The Advisory Board Company or any of its employees or agents, or sources or other third parties, or (b) any recommendation or graded ranking by The Advisory Board Company, or (c) failure of member and its employees and agents to abide by the terms set forth herein.

The Advisory Board is a registered trademark of The Advisory Board Company in the United States and other countries. Members are not permitted to use this trademark, or any other Advisory Board trademark, product name, service name, trade name and logo, without the prior written consent of The Advisory Board Company. All other trademarks, product names, service names, trade names, and logos used within these pages are the property of their respective holders. Use of other company trademarks, product names, service names, trade names and logos or images of the same does not necessarily constitute (a) an endorsement by such company of The Advisory Board Company and its products and services, or (b) an endorsement of the company or its products or services by The Advisory Board Company. The Advisory Board Company is not affiliated with any such company.

IMPORTANT: Please read the following.

The Advisory Board Company has prepared this report for the exclusive use of its members. Each member acknowledges and agrees that this report and the information contained herein (collectively, the “Report”) are confidential and proprietary to The Advisory Board Company. By accepting delivery of this Report, each member agrees to abide by the terms as stated herein, including the following:

1. The Advisory Board Company owns all right, title and interest in and to this Report. Except as stated herein, no right, license, permission or interest of any kind in this Report is intended to be given, transferred to or acquired by a member. Each member is authorized to use this Report only to the extent expressly authorized herein.

2. Each member shall not sell, license or republish this Report. Each member shall not disseminate or permit the use of, and shall take reasonable precautions to prevent such dissemination or use of, this Report by (a) any of its employees and agents (except as stated below), or (b) any third party.

3. Each member may make this Report available solely to those of its employees and agents who (a) are registered for the workshop or membership program at which this Report is a part, (b) require access to this Report in order to learn from the information described herein, and (c) agree not to disclose this Report to other employees or agents or any third party. Each member shall use, and shall ensure that its employees and agents use, this Report for its intended use only. Each member may make a limited number of copies, solely as adequate for use by its employees and agents in accordance with the terms herein.

4. Each member shall not remove from this Report any confidential markings, copyright notices and other similar indicia herein.

5. Each member is responsible for any breach of its obligations as stated herein by any of its employees or agents.

6. If a member is unwilling to abide by any of the foregoing obligations, then such member shall promptly return this Report and all copies thereof to The Advisory Board Company.
# Table of Contents

I. Research Methodology ............................................................................................................. 4  
   Project Challenge .................................................................................................................... 4  
   Project Sources ....................................................................................................................... 4  
   Research Parameters .............................................................................................................. 5  

II. Executive Overview ............................................................................................................. 6  
   Key Observations .................................................................................................................... 6  

III. Overview ............................................................................................................................. 7  
   Class Sizes and Structure ...................................................................................................... 7  

IV. Assessment ........................................................................................................................ 8  
   Course Design ....................................................................................................................... 8  
   Non- to Low- Graded Assignments ..................................................................................... 10  
   Graded Assignments ............................................................................................................ 13  
   Exams .................................................................................................................................... 13  

IV. Feedback Strategies ........................................................................................................... 14  
   Instructor Feedback .............................................................................................................. 14  
   Self- and Peer- Review ......................................................................................................... 15  

V. Faculty Development .......................................................................................................... 16  
   Assessment Training ............................................................................................................ 16  

Networking Contacts ............................................................................................................. 18  

Appendix: Multiple Choice Examples based on Bloom’s Taxonomy ......................... 19
I. Research Methodology

**Project Challenge**
Leadership at a member institution approached the Forum with the following questions:

- What assessment methods do contacts use to evaluate student progress in large classes? What tools or technologies enhance assessment in large classes?
- How do contacts design assessment methods that encourage high order learning objectives (i.e., demand complex analysis and synthesis) and can be completed at a large scale?
- How do instructors manage the feedback workload? What feedback methods are most time-efficient and effective?
- How do contacts educate faculty about effective assessment and feedback methods in large classes? How do they integrate these methods in faculty development practices?

**Project Sources**

- Joordens, Steve. “Peer & Self Assessment Strategies for Large Classes.” University of Toronto Centre for Teaching Support & Innovation, August 2011.
The Forum interviewed center for teaching and learning representatives at large research universities with high enrollment courses.

### A Guide to the Institutions Profiled in this Brief

<table>
<thead>
<tr>
<th>Institution</th>
<th>Location</th>
<th>Type</th>
<th>Approximate Enrollment (total/undergraduate)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rensselaer Polytechnic Institute</td>
<td>Northeast</td>
<td>Private</td>
<td>6,500/ 5,000</td>
<td>Research Universities- (very high research activity)</td>
</tr>
<tr>
<td>University of California-Los Angeles (UCLA)</td>
<td>Western Pacific</td>
<td>Public</td>
<td>38,300 / 27,200</td>
<td>Research Universities- (very high research activity)</td>
</tr>
<tr>
<td>University of Michigan-Ann Arbor</td>
<td>Midwest</td>
<td>Public</td>
<td>42,700 / 27,400</td>
<td>Research Universities- (very high research activity)</td>
</tr>
<tr>
<td>University of Texas-Austin</td>
<td>Southern Central</td>
<td>Public</td>
<td>51,100 / 38,400</td>
<td>Research Universities- (very high research activity)</td>
</tr>
<tr>
<td>University of Toronto*</td>
<td>Northeast</td>
<td>Public</td>
<td>46,000 / 33,300</td>
<td>Medical Doctoral University</td>
</tr>
<tr>
<td>University of Washington-Seattle</td>
<td>Western Pacific</td>
<td>Public</td>
<td>42,400 / 29,000</td>
<td>Research Universities- (very high research activity)</td>
</tr>
</tbody>
</table>

Source: Macleans University Rankings and National Center for Education Statistics

*Information gathered through secondary research
II. Executive Overview

Key Observations

Instructors provide frequent feedback at a low administrative cost through peer review, self-assessment, and low- or non-graded assignments. Group assignments provide mutual feedback of student progress throughout the course without adding a great volume of work to instructors.

Instructors use technology-based quizzes to facilitate instruction, feedback delivery, and assessment management. Contacts identify prevalent use of classroom response systems to facilitate instruction. The Course Transformation Program at the University of Texas redesigns lower-division large enrollment courses to inverted classrooms, which combine online and face-to-face instruction so instructors can spend more time interacting with students and less time lecturing. Tools include interactive lessons, automated assessment, and feedback mechanisms for instructors. Though not yet widespread, contacts report higher student exam scores, better attendance, and significantly fewer disparities in grades among students in inverted classrooms.

Instructors construct higher-order fixed-choice exams to reduce the volume of work associated with free-response evaluations. Many instructors invest time to construct scenario-based multiple-choice questions that assess student’s critical thinking and save time in evaluation. Instructors who prioritize free-response evaluations (e.g. essays, short answers, etc.) apply rubrics to evaluate student responses more effectively and efficiently across a large class.

Faculty select the structure and content of training sessions through learning communities. Groups of six to twelve faculty members meet over the course of the semester to share strategies in assessment for large classrooms. Topics include incorporation of technology, small-group discussions, and higher-order exams at a large scale.
III. Overview

Class Sizes and Structure

Classes of 75 Students or More Require Large-scale Assessment Strategies

Contact institutions maintain large enrollment courses across all disciplines, in particular for lower-division courses that fulfill students’ general education or major requirements. All large courses at UCLA (i.e. 300 students or more) include mandatory discussion sections led by graduate student teaching assistants. At the University of Texas, large classes enroll between 100 and 500 students and courses only break into discussion sections if departments can afford graduate teaching assistants.

Large Class Sizes and Structure at Contact Institutions

<table>
<thead>
<tr>
<th>Institution</th>
<th>Large Class Size</th>
<th>Small-group Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rensselaer Polytechnic Institute</td>
<td>100+</td>
<td>Recitation groups of 30 students for all large classes</td>
</tr>
<tr>
<td>UCLA</td>
<td>300+</td>
<td>Mandatory discussion sections for all large classes</td>
</tr>
<tr>
<td>University of Michigan</td>
<td>75-500</td>
<td>May or may not include discussion or lab sections</td>
</tr>
<tr>
<td>University of Texas</td>
<td>100-500</td>
<td>Discussion sections only if graduate teaching assistants available</td>
</tr>
<tr>
<td>University of Washington</td>
<td>100-750</td>
<td>May or may not include lab sections or quiz sections</td>
</tr>
</tbody>
</table>

Employ Undergraduate Learning Assistants at a Lower Cost than Graduate Assistants

Instructors at the University of Texas who are unable to hire graduate teaching assistants employ undergraduate learning assistants who serve as peer tutors and assist in evaluating low- or non-graded assessments, such as homework assignments or weekly quizzes. Math instructors at the Rensselaer Polytechnic Institute select forty undergraduates each year to participate in a math mentorship program. Undergraduate mentors assist first-year students with class content and homework assignments. The program has achieved a 100 percent retention rate, as all mentors remain in the program until graduation. The center for teaching and learning staff at Rensselaer Polytechnic Institute aspire to apply this learning assistant model to other disciplines at the institution.

Contacts emphasize careful selection of undergraduate learning assistants. Assistants are typically third- or fourth-year students of strong academic standing who performed successfully in the relevant course.
Institutions Incorporate Online-instruction in their Largest Courses to Promote Higher Levels of Learning

All contact institutions note growing faculty interest in flipped or inverted classroom models that combine online and in-class content delivery. Students learn more class content through online educational platforms outside of class (e.g., videos, online tutorials, interactive textbooks, etc.) and complete short online quizzes to self-assess comprehension. Therefore, faculty spend more time interacting with students and addressing students’ needs, rather than lecturing new content.

Inverted classrooms are not restricted by discipline. University of Texas piloted the program in introductory biology, statistics, and chemistry courses with online education tools developed at Carnegie Mellon University and Harvard University. The program now extends to introductory courses in micro and macroeconomics, literature, psychology. At the University of Michigan, instructors from molecular, cellular, and developmental biology and political science incorporate similar online educational platforms to courses.

IV. Assessment

Course Design  Identify Learning Outcomes Before Selection of Assessment Method

All contacts recommend instructors consider assessment selection in the early stages of course design to ensure assessment methods align with targeted learning outcomes.

Course Design Process

1. Understand the Learning Context
   Consider the subject area, course content, and classroom resources (i.e. available technology) that impacts learning.

2. Identify Student Learning Objectives
   Specify the expected change in student learning, metrics to demonstrate the change, and levels of change in learning.

3. Determine Assessment Method
   Decide what assessment methods evaluate targeted learning objectives. If necessary, select the most appropriate technology to achieve these goals.

4. Select Instructional Materials
   Consider the background knowledge and skills students need to be successful. Select course materials that will prepare students to perform well on selected assessments.
Instructors Assign Students Multiple Methods of Assessment to Address all Orders of Thinking

Instructors apply Bloom’s Taxonomy of Educational Objectives to target different levels of learning and select assessment items that demonstrate breadth of understanding. Contacts at the Rensselaer Polytechnic Institute recommend instructors obtain at least three items of assessment for each type of assessment to better measure consistency in student performance. As largely enrolled courses are typically lower-division, instructors apply this framework to resist heavy emphasis on items that only assess the rote memorization (i.e., “knowledge” domain). While many versions exist and have been modified by scholars, frameworks generally include the following levels of learning:

Taxonomy of Educational Objectives

<table>
<thead>
<tr>
<th>Orders of Thinking</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation</td>
<td>Judge the value of material for a given purpose.</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Create new content and structures.</td>
</tr>
<tr>
<td>Analysis</td>
<td>Logically differentiate between the content and structure of material.</td>
</tr>
<tr>
<td>Application</td>
<td>Apply learning to new situations.</td>
</tr>
<tr>
<td>Comprehension</td>
<td>Show understanding of material.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Recall previously learned material.</td>
</tr>
</tbody>
</table>

Provide Clear Assessment Criteria During Course Introduction to Inform Students of Learning Expectations

Contacts at UCLA recommends instructors present the course syllabus as a contract to students that students can refer to throughout the course. In contrast to small-size classes, instructors at the University of Michigan resist revisions to the grading rubric because mid-course adjustments are difficult to implement at large-scale.

Many instructors apply rubrics to individual graded assignments to ensure consistency and transparency in grading methods to students. At the University of Michigan instructors ask students to apply a rubric to evaluate former student sample responses as a strategy to introduce the grading process.

**Non- to Low-Graded Assignments**

Informal Assessments Notify Both the Student and Instructor of Student Progress

Instructors assign frequent short assignments (see table) that carry little to no weight on the final grade to assess student progress at a lesser administrative burden than heavily graded assignments. Contacts at UCLA note that this strategy allows instructors to refocus the next lecture and quickly address gaps in student comprehension. Instructors at the University of Washington often provide general oral feedback during class rather than individual written comments to more quickly respond to students. One biology instructor observed that the quality of low-graded assignments declines in absence of oral feedback.

Because low-stakes assessments are brief, instructors may ask students to complete assignments either in or outside of class. Instructors assign low-stakes assessments prior to instruction to gauge student comprehension of course readings, or after instruction to ask students to reflect on the previous lesson plan. Contacts acknowledge students’ complaints that they are ill-prepared when tested on content prior to instruction. To mitigate this resistance, one instructor from the University of Texas offers reading guides that outline terminology, formulae, and technical concepts to prepare students for readings and homework assignments (see appendix for example).

### Common Low- to Non-graded Assignments in Order of Popularity

<table>
<thead>
<tr>
<th>Assessment Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reading Quizzes</strong></td>
<td>Instructors administer brief short-answer or fixed-choice quizzes before instruction begins. Many instructors administer auto-graded online quizzes that students complete outside of class to reduce instructor’s administrative burden.</td>
</tr>
<tr>
<td><strong>Response Papers</strong></td>
<td>Students write brief compositions each week that respond to a reading or topic presented in class.</td>
</tr>
<tr>
<td><strong>Online Practice Test</strong></td>
<td>Instructors offer previous versions of an exam along with an answer key either in print or online. Students may take the exam and self-assess to prepare for the graded assignment.</td>
</tr>
<tr>
<td><strong>Minute Papers</strong></td>
<td>Students write for one to two minutes to respond to a prompt, or summarize their lessons learned from the day’s lecture.</td>
</tr>
<tr>
<td><strong>Learning Paragraphs</strong></td>
<td>At the end of each week students submit a paragraph that summarizes the concepts they have learned or the skills they have gained. This gives students writing practice and an opportunity to reflect on and synthesize their learning.</td>
</tr>
</tbody>
</table>
Technology Tools Measure Students’ Progress in Real-Time and Help Tailor Instruction to Address Immediate Student Needs

Instructors are increasingly integrating technology into their classrooms with online quizzes and classroom response systems (e.g., i>clickers) across all disciplines. These tools allow instructors to quickly gauge student learning and target lessons to address students’ questions, which improves the quality of course instruction and reduces the impersonal nature of a large lecture format.

The center for teaching and learning at UCLA supports a variety of classroom response systems models and includes information on their website to help instructors select one that best suits their course.¹ Because classroom response technology costs students approximately $35 per device, contacts at the University of Washington suggest instructors select a common model to reduce students’ expenses.

While instructors at the University of Michigan and the University of Texas employ i>clickers in their classrooms, contacts note growing interest in educational platforms that comply with students’ personal computers, smartphones, or tablets. Students may watch online tutorials or videos and answer web-based quizzes to assess comprehension. Unlike classroom response systems, this technology allows for greater free-response questions. These platforms also include a component of peer learning that prompts students to engage in digital discussions with their classmates.

Technology-based Educational Platforms at Contact Institutions

<table>
<thead>
<tr>
<th>Technology</th>
<th>Description</th>
<th>Developer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer Instruction</td>
<td>This learning module intersperses lectures with quiz questions, called ConcepTests, designed to expose common difficulties in understanding the material. Students respond to questions independently in one to two minutes, and then spend two to three minutes discussing their answers in groups of three to four. This process enables students and instructors to assess students’ understanding of concepts before leaving the classroom.</td>
<td>Mazur Group, Harvard University</td>
</tr>
<tr>
<td>Open Learning Initiative</td>
<td>The tool includes technology-based assessments, interactive tutors, and feedback mechanisms for instructor use in and outside the classroom.</td>
<td>Carnegie Mellon University</td>
</tr>
<tr>
<td>Texas Online World of Education Research (TOWER)</td>
<td>The online education platform includes quizzes, surveys and group chats. The software partners students in virtual groups of five to engage in group chat through their individual electronic devices (e.g., computers, mobile phones, tablets, etc.). The software prompts students to answer questions until they arrive at the correct answer.</td>
<td>University of Texas</td>
</tr>
<tr>
<td>Tegrity Lecture Capture</td>
<td>Tegrity (uw.tegrity.com) is a video and screen capture tool that also supports video content from external sources. Instructors may record lectures or assign student video projects.</td>
<td>University of Washington</td>
</tr>
</tbody>
</table>

Catalyst Web Tools are a set of web-based communication applications designed available to all instructors. Applications include online discussion boards, quick polls, surveys, and quizzes as well as file management and gradebook.

**Learning Management Systems (LMS)**

All contact institutions recommend a campus-wide LMS for all instructors. Through an LMS, instructors assign, collect, and grade assignments more efficiently. Instructors may also post grades and audio/video feedback. Many LMS include online discussion boards to prompt out-of-class discussion.

**MyMathLab**

The series of online modules feature free-response exercises correlated directly to mathematics and statistics textbooks. Instructors can also customize MyMathLab to better meet their students’ learning objectives.

Contacts at the University of Texas note that instructors identify higher student exam scores, better attendance, and significantly fewer disparities in student grades in inverted classrooms that employ online education platforms. Contacts hope to expand these tools to other courses and remark on the minimal hardware cost to the institution. According to an institution-wide survey at the University of Texas, 99 percent of students reported they owned a personal computer or smartphone. During a pilot program, one instructor offered ten iPads for free student rental. In a class of 500 students, only one student selected to rent the iPad.

---

**Instructors Find Low-tech Alternatives to Supplant Classroom Clickers**

Technological tools further reduce the volume of work for instructors of large classrooms, but rely on institution-wide infrastructure, such as campus-wide internet access and tech support services. Rather than classroom clickers, an instructor at the University of Texas uses scratch-off quizzes to encourage small-group learning in the classroom. Students individually complete and submit a multiple-choice reading quiz. Students then divide into groups to complete the same quiz as a team. Teams self-assess answers through scratch-off quizzes and immediately gauge their comprehension of the course material. Final grade quizzes reflect both group and individual responses.
Graded Assignments

Apply Rubrics to Evaluate Critical Thinking Assignments Consistently and Efficiently Across a Large Class

Contacts recommend analytic rubrics that evaluate student-work based on a set of criteria with several scales of completion and quality. Instructors may organize rubrics by learning objectives (e.g. critical thinking) or assessment items (e.g., homework, quizzes, exams, etc.) to inform students’ of aspects in their academic performance that exceed, meet, or fall below expectations.

Contacts at UCLA recommend instructors attach the rubric or common grading sheet to each student’s paper to more quickly identify the individual strengths or weaknesses within a paper. A grading sheet summarizes trends across all students’ assignments and instructors may easily indicate which trends apply to a student’s paper. Grading sheets include additional space to provide targeted comments to the student.

Rubrics apply well to essays, research papers, oral presentations, group projects, case studies, and labs reports. Contacts at the University of Washington recommend instructors reduce the page length of assignments in large classes, and suggest that students gain as much from developing a tightly crafted short research paper as they can from a longer assignment.

Assign Group-based Work to Reduce the Number of Responses to Evaluate

In an inverted classroom at the University of Texas, students engage with course material outside of class and work in teams to solve problems in class. Because students submit assignments in groups of five, the instructor reduces the number of items to grade from 500 students to only 100 items.

Exams

Higher-order Fixed-Choice Questions Reduce Time Spent on Grading Exams but Requires Significant Time to Design

Examinations may include both free-response (e.g. short answer, diagrams, mathematic problems, etc.) and fixed-choice questions (i.e. a set of multiple-choice, true-false, or matching questions). Due to grading ease, instructors commonly prefer fixed-choice questions for their examinations. Contacts at the University of Michigan emphasize that assessment in large classrooms is inherently labor-intensive, and instructors choose to either invest more time in the design of fixed-choice questions or evaluation of free-response assignments.

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed-choice Questions</strong></td>
<td><strong>Free-response Questions</strong></td>
</tr>
<tr>
<td>Easy and reliable scoring</td>
<td>Easy to construct</td>
</tr>
<tr>
<td>Easy to measure simple and complex learning outcomes</td>
<td>Easy to measure complex learning outcomes</td>
</tr>
<tr>
<td>More time-consuming to construct</td>
<td>More time-consuming to grade</td>
</tr>
<tr>
<td>More challenging to evaluate higher orders of learning</td>
<td>More difficult to ensure consistency in grading over a large class</td>
</tr>
</tbody>
</table>
Although fixed-choice tests typically focus on students’ lower-order thinking (i.e., retention of concepts, facts, etc.), instructors use scenario-based questions to test higher orders of thinking and application of knowledge. Contacts at the University of Texas and University of Toronto offer sample multiple choice questions to address each category of learning of Bloom’s taxonomy (see appendix).

### Multiple-choice Questions Based on Taxonomy of Educational Objectives

<table>
<thead>
<tr>
<th>Orders of Thinking</th>
<th>Learning Objective</th>
<th>Sample Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation</td>
<td>Evaluate a given scenario</td>
<td>Given scenario x, which of the following would be your top priority as a researcher?</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Design a solution to a problem from a given scenario</td>
<td>Given passage y, which one of the following propositions is most essential to the final conclusion?</td>
</tr>
<tr>
<td>Analysis</td>
<td>Recognize unstated assumptions from a given scenario</td>
<td>Given the formula, which variable should you increase to have the maximum effect on z?</td>
</tr>
<tr>
<td>Application</td>
<td>Apply framework from previously acquired knowledge</td>
<td></td>
</tr>
<tr>
<td>Comprehension</td>
<td>Describe an example of a term or concept</td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>Identify the meaning of a term or order of events</td>
<td></td>
</tr>
</tbody>
</table>

## IV. Feedback Strategies

**Instructor Feedback**  
*Offer Students a Summary of Common Errors to Deliver Targeted Feedback on a Large Scale*

Contacts encourage instructors to provide students prompt and frequent feedback to better ensure an impact on student learning. To reduce the administrative burden of individual commentary, instructors may summarize general patterns or trends in total student performance in-class or through the course website. Instructors at the University of Michigan record verbal commentary of student academic performance through screen cast technology. Instructors employ this tool at a large scale to walkthrough a solution for common errors, and at the individual level to provide targeted feedback more efficiently than handwritten comments.
Instructors Incorporate Self- and Peer-assessment to Deliver Multiple Rounds of Feedback for a Single Assignment

Instructors emphasize iterative feedback that allows students to receive feedback and revise work to better impact student learning. Because instructors have little time to edit multiple assignments in large classrooms, students review their peers’ assignments and provide feedback. Instructors at the University of Texas ask students to upload documents to Critique It, an online communication tool, to facilitate peer review and train students on effective peer evaluation strategies.

A professor at the University of Toronto developed the online-based tool, peerScholar, to randomly select and deliver student responses for anonymous peer review. Through this tool, students receive ample feedback from the instructor and peers, while reducing the grading burden of the instructor to only the final phase of the assignment.

Peer Review Process through peerScholar

Phase 1: Read and respond with written argument

Instructors ask students to write a brief composition that highlights a single idea, argument, or counterargument in three to six paragraphs.

Phase 2: Learn from peers

Students receive six anonymous peer compositions and provide each peer written constructive commentary. Students deduce characteristics of stronger or weaker arguments through comparison and gain a sense of their work relative to their peers.

Phase 3: Revise in the context of peer feedback

Students apply the feedback from six of their peers to revise their argument. Students assess the validity of each comment and rate the usefulness of each comment.

Phase 4: Receive final grade

Students receive final grade from instructor:
- 3 points reflect the quality of the composition, basic writing as well as argumentation.
- 3 points reflect the quality of feedback you provide to peers
- 3 points reflect the quality of revision

---

V. Faculty Development

Assessment Training

Diversify Faculty Support Services to Meet Individual, Department, and Campus-wide Needs

Of the services that the center for teaching and learning (CTL) at the University of Michigan offer, 51 percent of participants attend through campus-wide programs, 32 percent through department-specific services, and 13 percent through personal consultations. Contacts at Rensselaer Polytechnic Institute, the University of Texas, and the University of Washington emphasize faculty-led learning communities that meet in a series across the semester or year as these programs target faculty interests and availability.

Faculty Training Options

- **Individual Consultations address individual instructional needs.** Instructors typically work one-on-one with CTL staff to review student feedback (e.g., course evaluations) and improve assessment and feedback methods.

- **Department Workshops address discipline-specific needs.** The CTL staff at the University of Texas organize a Large Class Colloquium upon request for departments with high enrollment courses, because instructors value discipline-specific strategies. Staff invite 25-30 instructors from the department to a single-day assembly of themed discussion groups. Groups typically address classroom response systems, small-group work, and teaching assistant policies in large classrooms.

- **Faculty Learning Communities afford faculty freedom of workshop content and structure.** Weekly learning committees at the University of Washington convene six to twelve faculty members around themes of research, technology, or pedagogical research to share teaching strategies. The CTL at the University of Michigan organizes monthly meetings over the course of the year to better accommodate faculty members’ schedules. At University of Texas, faculty members receive a $500-$1,000 stipend to lead learning community discussions every two weeks.

- **Campus-wide Workshops address pedagogical topics that span all disciplines.** At all institutions, campus-wide workshops typically focus on applications of technology in the classroom including educational platforms and classroom response systems. All contact institutions recommend minimal training, in the form of an in-person workshop or online modules for all instructors using LMS (e.g., Blackboard, Canvas, Google+ etc.). Contacts at the University of Washington note that instructors are more likely to succeed if they understand the structure and applications of the LMS before they start course design. They also recommend tiered training for all instructors to teach the basic and advanced features of the LMS.

Publish Online Resources Such as PDF Teaching Guides and Video Tutorials to Meet Broad Faculty Demand

Contacts identify CTL websites as a significant outreach tool to inform faculty members with less interest or availability to participate in workshop series. The CTL website at the University of Michigan received over 21,000 unique visits from within the campus community between 2011 and 2012.¹ The number of website visits exceeds the total number in-person services provided within the same year. One of the most frequently visited pages,

“Teaching Strategies,” includes a link to strategies for teaching large classes and lectures1. Contacts at University of Texas stress that instructors learn best from peer examples shared on the website through short videos as “teaching testimonials” that describe innovative instruction at the institution.

The UCLA website includes a database that indicates the technological capabilities for each classroom, so instructors can easily design classroom activities and select technology tools in advance.

---

Networking Contacts

Rensselaer Polytechnic Institute
Josephine Seddon
Student assessment Specialist, Institutional Research
Phone: (518) 276-3884
Email: carneg2@rpi.edu

University of California-Los Angeles
Joanne Valli-Meredith
Director, Evaluation and Educational Assessment
Phone: (310) 206-2785
Email: joanney@oid.ucla.edu

University of Michigan-Ann Arbor
Debora Meizlish
Assistant Director, Center for Research on Learning and Teaching
Phone: (734) 763-2394
Email: debmeiz@umich.edu

University of Texas-Austin
Dawn Zimmaro
Senior Director, Director of Assessment, Center for Teaching and Learning
Phone: (512) 232 2639
Email: dawn.zimmaro@austin.utexas.edu

University of Washington-Seattle
Karen Freisem
Senior Consultant, Center for Teaching and Learning
Phone: (206) 543 6591
Email: kfreisem@uw.edu
Appendix: Multiple Choice Examples based on Bloom’s Taxonomy

Knowledge questions

Outcome: Identifies the meaning of a term.
Reliability is the same as:
   a. consistency.
   b. relevancy.
   c. representativeness.
   d. usefulness.

In the area of physical science, which one of the following definitions describes the term “polarization”?
   a. The separation of electric charges by friction.
   b. The ionization of atoms by high temperatures.
   c. The interference of sound waves in a closed chamber.
   d. The excitation of electrons by high frequency light.
   e. The vibration of transverse waves in a single plane.

Outcome: Identifies the order of events.
What is the first step in constructing an achievement test?
   a. Decide on test length.
   b. Identify the intended learning outcomes.
   c. Prepare a table of specifications.
   d. Select the test types to use.

Comprehension questions

Outcome: Identifies an example of a term.
Which one of the following statements contains a specific determiner?
   a. America is a continent.
   b. America was discovered in 1492.
   c. America has some big industries.
   d. America’s population is increasing.

Outcome: Interprets the meaning of an idea.
The statement that “test reliability is a necessary but not sufficient condition of test validity” means that:
   a. a reliable test will have a certain degree of validity.
   b. a valid test will have a certain degree of reliability.
   c. a reliable test may be completely invalid and a valid test completely unreliable.

Outcome: Identifies an example of a concept or principle.
Which of the following is an example of a criterion-referenced interpretation?
   a. Derik earned the highest score in science.
   b. Erik completed his experiment faster than his classmates.
   c. Edna’s test score was higher than 50 percent of the class.
   d. Tricia set up her laboratory equipment in five minutes.

---

Which one of the following describes what takes place in the so-called PREPARATION stage of the creative process, as applied to the solution of a particular problem?

a. The problem is identified and defined.
b. All available information about the problem is collected.
c. An attempt is made to see if the proposed solution to the problem is acceptable.
d. The person goes through some experience leading to a general idea of how the problem can be solved.

Application questions

Outcome: Distinguishes between properly and improperly stated outcomes
Which one of the following learning outcomes is properly stated in terms of student performance?

a. Develops an appreciation of the importance of testing.
b. Learns how to write good test questions.
c. Realizes the importance of validity.

Outcome: Tests for the application of previously acquired knowledge (the various memory systems).
Which one of the following memory systems does a piano-tuner mainly use in his occupation?

a. Echoic memory
b. Short-term memory
c. Long-term memory
d. Mono-auditory memory
e. None of the above

Outcome: Improves defective test questions.
Directions: read the following test question and then indicate the best change to make to improve the question.

Which one of the following types of learning outcomes is most difficult to evaluate objectively?

a. A concept.
b. An application.
c. An appreciation.
d. None of the above.

The best change to make in the previous question would be to:

a. change the stem to incomplete-statement form.
b. use letters instead of numbers for each alternative.
c. remove the indefinite articles “a” and “an” from the alternatives.
d. replace “none of the above” with “an interpretation.”

Analysis question

Outcome: Recognizes unstated assumptions.
Directions: Read the following comments a teacher made about testing. Then answer the questions that follow by circling the letter of the best answer.

“Students go to school to learn, not to take tests. In addition, tests cannot be used to indicate a student’s absolute level of learning. All tests can do is rank students in order of achievement, and this relative ranking is influenced by guessing, bluffing, and the subjective opinions of the teacher doing the scoring. The teacher-learning process would benefit if we did away with tests and depended on student self-evaluation.”
Which one of the following unstated assumptions is this teacher making?

a. Students go to school to learn.
b. Teachers use essay tests primarily.
c. Tests make no contribution to learning.
d. Tests do not indicate a student’s absolute level of learning.

**Outcome: Identifies the meaning of a term.**

Which one of the following types of test is this teacher primarily talking about?

a. Diagnostic test.
b. Formative test.
c. Pretest.
d. Summative test.

**Outcome: Analyze whether a word fits with the accepted definition of pragmatism.**

Directions: Read carefully through the paragraph below, and decide which of the options A-D is correct.

“The basic premise of pragmatism is that questions posed by speculative metaphysical propositions can often be answered by determining what the practical consequences of the acceptance of a particular metaphysical proposition are in this life. Practical consequences are taken as the criterion for assessing the relevance of all statements or ideas about truth, norm and hope.”

a. The word “acceptance” should be replaced by “rejection.”
b. The word “often” should be replaced by “only.”
c. The word “speculative” should be replaced by “hypothetical.”
d. The word “criterion” should be replaced by “measure.”

**Synthesis question**

**Outcome: Identifies relationships.**

Directions: Read the following comments a teacher made about testing. Then answer the questions that follow by circling the letter of the best answer.

“Students go to school to learn, not to take tests. In addition, tests cannot be used to indicate a student’s absolute level of learning. All tests can do is rank students in order of achievement, and this relative ranking is influenced by guessing, bluffing, and the subjective opinions of the teacher doing the scoring. The teacher-learning process would benefit if we did away with tests and depended on student self-evaluation.”

Which one of the following propositions is most essential to the final conclusion?

a. Effective self-evaluation does not require the use of tests.
b. Tests place students in rank order only.
c. Test scores are influenced by factors other than achievement.
d. Students do not go to school to take tests.