Authentic Assessment for Today’s Students

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OLSUME
Outline

- Purpose of assessment
- Examples of assessment at Waterloo
- Lessons from pandemic teaching
Assessment Is Curriculum

- What do we want our students to learn?
  What skills do we want them to have?

- We should test them on that!
Assessment Times and Goals

- When and why do we assess our students?

<table>
<thead>
<tr>
<th></th>
<th>Diagnostic</th>
<th>Formative</th>
<th>Summative</th>
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</thead>
<tbody>
<tr>
<td><strong>Goal</strong></td>
<td>What students already know</td>
<td>What students are learning</td>
<td>What students have learned</td>
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<tr>
<td><strong>When</strong></td>
<td>Beginning</td>
<td>Ongoing</td>
<td>End of term</td>
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<tr>
<td><strong>Graded</strong></td>
<td>No</td>
<td>Yes or No</td>
<td>Yes</td>
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Assessment Principles

- Authentic
- Aligned with learning goals
- Achievable
- Associated with course
- Agency
Universal Design for Learning

- Multiple means of engagement, representation, action & expression towards firm goals with flexible means
- Explain the purpose and learning outcomes of tasks
- Give choices of topic/format of deliverable
- Exemplars (not just one – show variance), rubrics, templates
- Revise & resubmit (“early bird”) deadline
- Slip days and/or “best X of Y”
- Get student comments on projects to improve for next time
- Multiple options for participation marks
Self-Assessment

- Questions (MC/TF) with instant feedback
- Could be incorporated into lectures or not
- Reinforce key topics, highlight important ideas for later
- Ungraded, but similar to questions on graded assessments
- Examples
  - Linear Algebra – midterm/final prep self-questions
  - Calculus – optional test retakes
  - Statistics – thought question polls on discussion board
  - Multivariable Calculus – multiple ways to show engagement
Reflective Writing

- Reflective assignment(s) where students reflect on goals for the course and what they have learned
- Summarize important course concepts in plain language
- Describe a problem you struggled with but now understand
- Discuss what made you want to study this topic
- Explain whether you achieved your goals for the course

Examples
- Number Theory – explaining importance to non-math students
- Statistics – probability models inventory
Projects

- Authentic tasks - something they might have to do in the workplace
- Multi-stage or scaffolded
- Choice of mode for deliverable and topic where possible
- Peer evaluation within and between groups

Examples

- Biostatistics – synthesize 3 papers on a health topic, poster session
- Actuarial Science – create and document a spreadsheet to solve a problem, write up the results in a memo
- Probability – model a topic with a Markov Chain, presentation or video and report
Oral Exams

- Great way to check students’ level of understanding
- Ask students to define, evaluate, compare, discuss process, or explain their solution to a problem
- Give students practice and allow reference material

Examples
- Pure Math – have students walk through a proof
- Linear Algebra – follow-up to midterm
- Calculus – chance of being selected to explain solutions
- Statistics and Actuarial Science – concept questions
Flipped/Blended Learning

- Make use of existing video lectures for content delivery
- Knowledge check questions and pre-class quizzes
- In-class group activities focusing on key learning outcomes
- Class feels like both a learning activity and an assessment
- Can add flipped activities in small stages
- Examples
  - Large first year Computer Science course
  - Medium third year Statistics course
Other Assessment Types

- Exams with reference material and extra time
- Discussion boards
- Research paper review
- Blog posts
- Video assignment
- Math Salons
How Grading Schemes Changed

Average Weight of Assessment Categories 2019 vs. 2021 vs. 2022

- Exams
- Tests
- Assignments
- Other

- 2019
- 2021
- 2022
Other Pandemic Lessons

- Flexibility
- Online office hours
- Backchannel chat for student questions
- Polling
- Online discussion groups
- Video recordings