Learning Outcomes Assessment at a Large Research-Intensive University

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Assessment
University of Arizona Facts

- Research Intensive Land Grant
- 40,000 Students
- 350 Undergraduate Majors
- Graduate Programs
- Professional Programs
- HLC Accredited
Assessment at the University of Arizona

Senior Vice-Provost for Academic Affairs

Office of Instruction & Assessment

One full-time assessment position

One split faculty-development and assessment position

OIA Director helps with assessment
Brief Background of UA Assessment

- Assessment Coordinator Council (ACC)
- Early 2000’s
- Representative from each college
- Adopted the Assessment Cycle
- Developed scoring rubric for assessment plans
Assessment at the UA

The University of Arizona has long recognized the importance of assessment and evaluation in improving the quality of its academic and support programs for students. Rather than viewing assessment as a reaction to demands for accountability, it is viewed as a continuous source of knowledge for institutional improvement. As assessment initiatives spread throughout the campus community, the goal is to build appreciation for assessment of student achievement as a productive way to understand and improve learning and teaching.

A summary of the University's assessment plans and activities since 1995 can be seen here.
Implemented in 2011-2012, departments report their programs’ assessment efforts in their Academic Program Review (APR), which is done every 7 years. They also update the assessment webpage. Assessment plans are rubric scored and an improvement plan is developed by the department and OIA reviewer. All plans are re-scored every 1, 3 and 5 years post-APR.
Two Problems

Homegrown webpages
• Difficult to update and maintain
• Instead of accruing data, departments tend to replace it

General Education Program
• Composed of hundreds of courses across the university
• Difficult to assess and track
The search begins….

Early checkers

7th Cohort

What to do, what to do?

The search begins....
Watermark’s Platforms

Taskstream AMS by Watermark
• Accountability Management System
  • Allows for a systematic approach to reporting program assessment
  • Template-based

Aqua by Watermark
• A streamlined way of doing direct assessment of student work
3 Main Focus Areas

- Move all assessment programs from the homegrown pages into Taskstream AMS by Watermark.
- Use for syllabi collection
- Use for General Education Program Assessment
Nutrition, Food and You covers the principles of human nutrition. Topics include digestion, absorption and metabolism of energy nutrients; vitamin structure and function; minerals in the body; eating disorders; nutrition and the life cycle; nutrition and disease; food safety; and the world food situation. The emphasis of the course is the scientific approach to understanding human nutritional needs for proper growth, development and life.

The course is designed to help you learn and understand the basic concepts that are the foundations of our understanding of:

- Current nutritional standards and guidelines, and how these are used.
- Influence of nutrient availability on diversity and evolution.
- Cells as the basic units of structure and function in humans.
- Human physiology; the circulatory system, the neurological system and the digestive system as models for functionality at the multi-cellular level.
- Special nutritional needs (athletics, weight management, pathologies).
- Development and nutrition throughout the life cycle, from embryo to elderly.
- Scientific versus anecdotal evidence in health and wellness.
- Nutrition and disease, for both deficiency and degenerative diseases.
- Nutrition and lifestyle choices in health and wellness.
- Food as a vector in disease.
- Chemical and biological effects of preservation in foods.

Key concepts to be covered include:

- The cell as the fundamental unit of tissues and organs.
- Biochemical reactions for energy and growth.
- Qualitative and quantitative aspects of energy metabolism
  - Hormones and neurotransmitters; effects on appetite and hunger.
- Genetic, environmental and behavioral causes of disease.
**Taskstream AMS by Watermark – Gen Ed Syllabi Review Rubric**

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<th>Learning outcomes</th>
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<th>value: 2.00</th>
<th>value: 3.00</th>
<th>value: 4.00</th>
<th>Score/Level</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Syllabus does not include any version of student learning outcomes, objectives, or goals for the class, nor is there any mention of the four general education program learning outcomes.</td>
<td>Syllabus has some level of learning outcomes, objectives or goals, but they are not written in a measurable format, or they are not aligned with the general education program learning outcomes.</td>
<td>Syllabus has learning outcomes, objectives or goals, most of which are measurable, however, they do not align with the general education program learning outcomes.</td>
<td>Syllabus has clear, measurable learning outcomes, objectives or goals and they are aligned with the general education program learning outcomes.</td>
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<table>
<thead>
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<th>value: 3.00</th>
<th>value: 4.00</th>
<th>Score/Level</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>There are no formal learning assessment activities listed in the syllabus. In the absence of clear and measureable learning outcomes, this criterion receives a 1.</td>
<td>There are some assessment activities listed in the syllabus, but it is not clear how they are aligned with outcomes.</td>
<td>Assessment activities are aligned with course outcomes, but do not align with general education program student learning outcomes.</td>
<td>Assessment activities are aligned with both course and program learning outcomes. (These activities may be embedded in course assignments and/or exams.)</td>
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<th>Writing Requirement</th>
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<th>value: 2.00</th>
<th>value: 3.00</th>
<th>value: 4.00</th>
<th>Score/Level</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing assignments are not integrated in the course requirements or there is no writing assignment involving a revision process or writing assignments do not add up to a minimum of 10 pages or 2500 words over the term.</td>
<td>Writing assignments are integrated in the course requirements however it is unclear as to how they are evaluated for format, organization, style, grammar, and punctuation, as well as content or there may not be at least one writing assignment involving a revision process before submitting a subsequent draft for grading. Writing assignments add up to a minimum of 10 pages or 2500 words over the term.</td>
<td>Writing assignments are integrated in the course requirements but do not include multiple assignments or writing assignments are evaluated for format, organization, style, grammar, and punctuation, but not necessarily content or analysis or at least one writing assignment involves a revision process in which students receive instructor and/or peer feedback on a first draft and make substantive revisions before submitting a subsequent draft for grading. Writing assignments add up to a minimum of 10 pages or 2500 words over the term, but it is not clear if one or more writing assignments of at least 750 words is done outside of the class session.</td>
<td>Writing assignments, both formal and informal, are integrated in the course requirements through more than one means. Writing assignments emphasize critical inquiry through attention to the process of writing. Writing assignments are evaluated for format, organization, style, grammar, and punctuation, as well as content and participation in the scholarly conversation. At least one writing assignment involves a revision process in which students receive instructor and/or peer feedback on a first draft and make substantive revisions before submitting a subsequent draft for grading. Writing assignments may vary in number and length but add up to a minimum of 10 pages or 2500 words over the term. One or more writing assignments of at least 750 words is to be done outside of the class session.</td>
<td></td>
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</table>
Taskstream AMS by Watermark – Program Assessment

General Information

- Standing Requirements
  - Mission and Overview Statement
  - Program Learning Outcomes
  - Curriculum Map
  - Process of Assessment
  - Archived Assessment documents

- 2017-2018 Assessment Cycle
  - Assessment Plan
  - Assessment Findings
  - Changes in Response to Findings
  - Status Report
Taskstream AMS by Watermark – Program Assessment Plan

**Assessment Plan**

**Outcome: Outcome 1.1 Microbial classification**

Upon graduation, Microbiology majors will be able to identify the defining structures and functional characteristics of various microorganism classes: viruses, prokaryotes, eukaryotes and sub-groups of microorganisms within these classes.

**Measure: SLO 11 assessment in MIC421b midterm**

**Course level: Direct - Student Artifact**

**Details/Description:** The midterm exam in MIC421b. Microbial techniques require students to use staining and biochemical techniques to identify a bacterial isolate.

**Acceptable Target:** I would expect 70% of the students to correctly identify the two unknown organisms.

**Ideal Target:** Our ideal target is 90% of our students are able to properly identify unknown bacteria using standard bacteriology techniques.

**Implementation Plan (timeline):** These data were collected in the Fall 2016.

**Key/Responsible Personnel:** Dr. Wilbur, the primary instructor for the three sections of MIC421b.

**Outcome: Outcome 1.2 Phylogenetics**

Upon graduation, microbiology majors will be able to understand the basis of molecular phylogenetic classifications, and demonstrate the ability to apply fundamental principles of evolution underpin microbial phylogenetics in the identification of unknown organisms.

**Measure: SLO 12 assessment in MIC421b**

**Course level: Direct - Student Artifact**

**Details/Description:** MIC421b, Microbial techniques, is a laboratory course. In this course, the students are asked to identify unknown organisms using both biochemical and standard staining techniques. On the midterm and final exam, students are asked to use their understanding of phylogenetics to answer short answer questions on the Midterm exam.

**Acceptable Target:** This is a course for Microbiology majors, so I would expect 90% of the class to receive a grade of at least 80% on the exam.
BS Microbiology | PREVIEW
Workspace: Program Assessment

Assessment Findings

Outcome: Outcome 1.1 Microbial classification
Upon graduation Microbiology majors will be able to identify the defining structures and functional characteristic of various microorganisms classes viruses, prokaryotes, eukaryotes and sub-groups of microorganisms within these classes.

Measure: SLO 1.1 assessment in MIC421b midterm
Course level: Direct - Student Artifact

Details/Description: The midterm exam in MIC421b, Microbial techniques requires students to use staining and biochemical techniques to identify a bacterial isolate.

Acceptable Target: I would expect 70% of the students to correctly identify the two unknown organisms.

Ideal Target: Our ideal target is 90% of our students are able to properly identify unknown bacteria using standard bacteriology techniques.

Implementation Plan (timeline):
These data were collected in the Fall 2016.

Key/Responsible Personnel: Dr. Wilbur, the primary instructor for the three sections of MIC421b.

Findings for SLO 1.1 assessment in MIC421b midterm

Summary of Findings:
64 students took the midterm practical exam, where two unknown bacteria were identified using standard bacteriology techniques, (microscopic and biochemical techniques). Grades were assessed in three phases, Phase 1) Gram-stain/streak to Isolation (30 pts), Phase 2) Genus level identification (40 points) and Phase 3) species level identification (30 points). The average grade was 84/100 with 53/64 getting 80 points or greater.

Results:
Acceptable Target Achievement: Met; Ideal Target Achievement: Approaching

Recommendations:
I feel that between our students experience in MIC205L and MIC421b microbiology majors are able to classify unknown organisms. In an attempt to increase the success rate I have implemented more species identification practice.

Reflections/Notes:
# Taskstream AMS by Watermark – Program Outcomes Assessment Map

<table>
<thead>
<tr>
<th>Courses and Learning Activities</th>
<th>Introduced</th>
<th>Practiced</th>
<th>Assessed</th>
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<td>MI209A General Microbiology</td>
<td>I</td>
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<td>MI205L Biology of Microorganisms Laboratory</td>
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<td></td>
<td>A</td>
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<tr>
<td>MI221P Microbial Physiology</td>
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<tr>
<td>MI250 Core Concepts in Microbiology</td>
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<tr>
<td>MI230L Microbial Genetics Laboratory</td>
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<td>MI221P Microbial Genetics</td>
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<td>MI2400 Microbial Techniques</td>
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<tr>
<td>MI219 Immunology</td>
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</tbody>
</table>

**Legend:**
- I: Introduced
- P: Practiced
- A: Assessed

**Outcomes:**

1. **Outcome 1.1 Microbial classification**
   - Upon graduation, microbiology majors will be able to identify the defining structures and functional characteristics of various microorganism classes, viruses, prokaryotes, eukaryotes, and sub-groups of microorganisms within these classes.

2. **Outcome 1.2 Phylogenetics**
   - Upon graduation, microbiology majors will be able to understand the basis of molecular phylogenetic classifications, and demonstrate the ability to apply fundamental principles of evolution underpinning phylogenetic classification in the identification of unknown organisms.

3. **Outcome 1.3 Microbial physiology**
   - Upon graduation, microbiology majors will be able to identify the basic features of cellular physiology, including cellular mechanisms, metabolism, and biosynthetic reactions.

4. **Outcome 1.4 Gene regulation**
   - Upon graduation, microbiology majors will be able to outline the fundamental features of gene expression and regulation. Broadly, microbiology majors will be able to describe the different modes of transcription between organisms, & recognize the translation from mutational to disease.

5. **Outcome 1.5 Mutualism and disease**
   - Upon graduation, microbiology majors will be able to demonstrate the ability to find and evaluate information from credible sources, including scientific articles. Understand, synthesize, & communicate key ideas from technical sources, and communicate scientific ideas and concepts.

6. **Outcome 1.6 Communicate scientific ideas**
   - Upon graduation, microbiology majors will be able to demonstrate knowledge and understanding of the scientific methods used to study microorganisms.

7. **Outcome 1.7 Laboratory skills and safety**
   - Upon graduation, microbiology majors will be able to demonstrate a commitment to the skills necessary to work effectively & safely in a microbiology laboratory.

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**Legend:**
- I: Introduced
- P: Practiced
- A: Assessed

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**The University of Arizona**
How to Implement?

- Piloted with volunteer programs during summer
  - APR Cohort 7
  - 1, 3, or 5 year review
- Met with individuals for 1 hour training session
- Enabled us to get more familiar with the system and its features.

- Full rollout January 2018
- Two scheduled workshops each month for targeted colleges
- Additional designated walk-in hours for questions and help if needed
“I have found Taskstream by Watermark to be so helpful. I had no training in the assessment lingo and really didn’t understand how it all fit together.

The Taskstream program provides the scaffolding and appropriate placeholders for the information that we need to build an assessment program. I finally get the idea that learning outcomes should be constructed with the measurement activities (quantitative with rubrics and all that) in mind at the same time, at least that’s the way it seems to make sense to me. I didn’t understand that before.

We had a set of learning outcomes for our program and then we set out to try to develop activities and it didn’t seem obvious how to bring it all together and we spent a long time struggling with that. The Taskstream program sets it all out very clearly and it is easy to use.”
Use of Aqua by Watermark

- Used to rubric score/evaluate General Education Syllabi
  - Ensure the General Education policies are being met

- Writing study to evaluate student writing across the institution
  - To judge effectiveness of instructor writing workshops
  - Compare writing in General Education courses and major writing emphasis courses

- Roll-out to other colleges/programs
  - Undergraduate Writing Program
ABSTRACT

Unified multimodal symmetries have led to many technical advances, including courseware and the producer-consumer problem. In our research, we disprove the appropriate unification of lambda calculus and extreme programming. In this work we understand how 802.11b can be applied to the analysis of the Turing machine.

1. INTRODUCTION

Recent advances in scalable epistemologies and flexible theory collaborate in order to accomplish object-oriented languages. To put this in perspective, consider the fact that acclaimed mathematicians mostly use courseware to solve this issue. In our research, we disconfirm the visualization of context-free grammar, which embodies the appropriate principles of hardware and architecture. Clearly, low-energy modalities and “fuzzy” models offer a viable alternative to the study of DHTs.

In this position paper we present a novel system for the study of Moore’s Law (Price), which we use to confirm that rasterization and the World Wide Web are often incompatible. The basic tenet of this approach is the synthesis of RPCs. In addition, the basic tenet of this solution is the improvement of simulated annealing. Existing symbiotic and ubiquitous algorithms use scatter/gather I/O to control scatter/gather I/O.

Despite the fact that we are the first to introduce unstable models in this light, much related work has been devoted to the investigation of checksums [6]. It remains to be seen how valuable this research is to the networking community. Furthermore, although Timothy Leary also constructed this solution, we harnessed it independently and simultaneously. Unlike many prior methods [24], we do not attempt to simulate or provide the World Wide Web. This work follows a long line of prior approaches, all of which have failed. Olle-Johan Dahl [6], [4] and C. Hoare et al. [10] constructed the first known instance of ubiquitous communication.

III. ARCHITECTURE

1. AAC&U CRITICAL THINKING VALUE ...
2. AAC&U WRITTEN COMMUNIC...
Aqua by Watermark - Syllabi

Outcome Performance
Gen Ed Syllabi Rubric

AVERAGE BY CRITERION

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Average: 2.59</th>
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<tbody>
<tr>
<td>Learning outcomes</td>
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<tr>
<td>Assessment of Learning</td>
<td></td>
</tr>
<tr>
<td>Writing Requirement</td>
<td></td>
</tr>
</tbody>
</table>

1 2 3 4
Takeaways

Trying to do it yourself is good, BUT why re-invent the wheel?
Taskstream AMS by Watermark

• Gave opportunity for renewed focus on assessment
• Helped programs understand the assessment cycle
• Promoted standardized reporting
• Allowed alignment of General Education Learning Outcomes with Institutional Learning Outcomes
Aqua by Watermark

- Ease of review
- Brought data together from multiple cycles
- Reporting
Thank you! Questions?

Questions are guaranteed in life; Answers aren't.

But we will do out best!

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Integrated Learning Center

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Q&A

Thank you