DESIGNING ASSESSMENT TOOLS AND ASSESSING STUDENT TRANSFORMATION IN WOMEN’S AND GENDER STUDIES CLASS: WOMEN IN SCIENCE AND ENGINEERING

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Presentation Outline

* Introduction
* Course Components & Grading
* Research Methodology
  * Preliminary Research
  * Rubric
  * Assignment Organization
  * Rubric Testing & Revisions
  * Preliminary Assessment
* Preliminary Results
* Challenges
* Future Activities
* Impacts
* Questions
Introduction

* Women in Science and Engineering course history
* Course purpose and details
* Women in STEM LLC participants
* Instructor observations & development of study
* Course components
### Course Components & Grading

<table>
<thead>
<tr>
<th></th>
<th>A $\geq$ 95%</th>
<th>91% $\geq$ B+ $\geq$ 89%</th>
<th>81% $\geq$ C+ $\geq$ 79%</th>
<th>71% $\geq$ D+ $\geq$ 69%</th>
</tr>
</thead>
<tbody>
<tr>
<td>94% $\geq$ A- $\geq$ 92%</td>
<td>88% $\geq$ B $\geq$ 85%</td>
<td>78% $\geq$ C $\geq$ 75%</td>
<td>68% $\geq$ D $\geq$ 62%</td>
<td></td>
</tr>
<tr>
<td>F $\leq$ 61%</td>
<td>84% $\geq$ B- $\geq$ 82%</td>
<td>74% $\geq$ C- $\geq$ 72%</td>
<td>F $\leq$ 61%</td>
<td></td>
</tr>
</tbody>
</table>

In-Class Participation and Homework (25%)
Journals (10%)
Report and Presentation (20%)
Scholarly Article Review (15%)
Hands-On Activity Presentation and Documentation (10%)
Volunteer Service and Paper (5%)
Final Paper (15%)
Methodology: Preliminary Research

* Investigate existing tools
* Determine assessment factors
* Create assessment rubric
* Future assessment techniques
* Analyze a sample set of data
Methodology: Rubric Development

- Self-Efficacy in STEM
- Awareness of the impact of difference and diversity in STEM
- Heightened awareness of gendered power relations
- Behavior changes regarding gender
- Understanding the purpose of gender studies in STEM
Methodology: Assignment Organization

* IRB Approval
* Large undertaking:
  * 10 semesters, ~25 students/semester, up to 7 assignments/student
* Student names and grades removed from assignments
* Journal assignments added to journal entries
* Students assigned random code
* Files named using standardized convention and saved on shared workgroup
  * File naming schemes included: assignment code (J=Journal, VS=Volunteer Service, and FC=Final Course Reflection), submission number, student code, fall or spring semester, 2-digit year code
Methodology:
Rubric Testing and Revisions

* Preliminary rubric tested
* Excel file to tally student scores (color coded)
* Check for complete set of assignments
* Review and rate assignments
* All work from one student rated in succession
* Proposed modifications and modified rubric
Methodology:
Preliminary Assessment

* Goal to assess 10% of student work
* Each review of full set of assignment took several hours
* Several students’ work reviewed multiple times during rubric revisions
* Assignments reviewed and rated
Preliminary Results

- Males did not comment on self-efficacy (2 out of 28)
- Females often commented on self-efficacy (27 out of 34)
- Behavior changes regarding gender not discussed until later in the semester if at all
- Difference between “No growth-o” versus “Absent-N/A”
Preliminary Results

* Difference in scores from the beginning of the semester (Journal 1) and the end of the semester (Final Course Reflection)
* Increase in scores one or more points
### Preliminary Results

<table>
<thead>
<tr>
<th>Student</th>
<th>Self-efficacy</th>
<th>Awareness of the impact of difference and diversity in STEM</th>
<th>Heightened awareness of gendered power relations</th>
<th>Behavior changes regarding gender</th>
<th>Understanding the purpose of gender studies in STEM</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>NA</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>1</td>
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<tr>
<td>3</td>
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<td>-1</td>
<td>2</td>
<td>1</td>
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<tr>
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<td>NA</td>
<td>0</td>
<td>0-1</td>
<td>2</td>
<td>0</td>
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<td>1</td>
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<tr>
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<td>NA</td>
<td>1</td>
<td>0-1</td>
<td>1-2</td>
<td>NA</td>
</tr>
</tbody>
</table>

Notes:
(1) NA indicates that a score was missing at the beginning of the semester, the end of the semester, or both beginning and end.
(2) A positive score indicates an improvement in a given category from the beginning of the semester to the end of the semester.
Preliminary Results

* Difference in scores from the beginning of the semester (Journal 1) and the end of the semester (Final Course Reflection)
* Increase in scores 1 or more points
* Individual student comments:
  “I took more away from this single event than I have in my whole life.”
* Female students all scored “3-Proficient” or “4-Advanced” in self-efficacy by the end of the semester
Challenges

- “No growth-o” versus “Absent-N/A”
- Varied length of journal assignments
- Students’ writing ability
- Categorizing entries
- Single assessor
Future Activities

- Stratified random sample
- Additional assessment using rubric
- Multiple reviewers & inter-rater reliability
- Statistically significant analyses
- Complimentary assessment
Impacts

* Pedagogical guidance
* Retention of women students
* Better environment for women in EMS
* Transformed attitudes and behaviors
* Instructor impact
* Future grant applications
* Dissemination
Questions