RSU General Education: Measuring Student Proficiency

Using ETS Proficiency Profile

M. Millikin, Accountability and Academics, April 12, 2013
The photo below, taken during a protest of the Beijing Olympics in 2008, provides an excellent case for general education.

Would we have allowed Nazi Germany to host the Olympics?
Student Learning Outcomes

- General Education
- Entry Level or Developmental
- Program Level
- Institution Level
RSU Strategic Plan: Goals

- Academic Excellence
- Enrollment Management
- Diversity
- Resources
- Accountability
- Community Engagement

Source: Rogers State University Strategic Plan
Measuring Student Learning Outcomes

- **Direct** (cognitive)
- **Indirect** (affective)

**Formative**

**Summative**

**Student Learning**

**General Education**

**Program Level**

**Entry Level or Developmental**

**Institution Level**
RSU’s General Education SLOs

1. Acquire and evaluate information.
2. Analyze and integrate knowledge.
3. Develop perspectives and an understanding of the human experience.
4. Communicate effectively.

Refer to Section II of Annual Student Assessment Report for 2011-2012 to OSRHE
Evaluating General Education Outcomes

OSHRE requirement:
• Evaluate student progress in general education formatively (between 45 and 60 credit hours)
• Report annually
Assessing General Education Proficiency

Primary Assessment of General Education within Academic Departments

Secondary Assessment of General Education Outcomes between 45-60 credit hours
Are RSU students learning to think critically, read and write at appropriate levels?

- “Appropriate levels” is operationally defined as scores on the ETS Proficiency Profile equivalent with other bachelor’s degree-conferring institutions.
- Formative measure occurring between 45 and 60 credit hours (OSHRE definition)
RSU’s General Education SLOs

1. Acquire and evaluate information.
2. Analyze and integrate knowledge.
3. Develop perspectives and an understanding of the human experience.
4. Communicate effectively.

ETS Proficiency Profile Factors

1. Reading
2. Writing
3. Mathematics
4. Critical Thinking
Research Design

Repeated Measures Design

Fall 2011 and 2012 Entering Freshmen

Pretest → Learning → Posttest

Fall 2010 and 2011 Entering Freshmen

Learning → Posttest

Between 45 – 60 credit hours
Peer Analysis (Normative)

- RSU Fall 2011 & 2012 Entering Freshmen
  - Posttest

- RSU Spring 2012 & 2013 Sophomores
  - Learning
  - Posttest

- Peer Fall 2007-12 Entering Freshmen
  - Pretest

- Peer 2007 - 2012 Sophomores
  - Between 45 – 60 credit hours
  - Learning
  - Posttest
RSU Sample: Pretest

- Students with no General Education
- Fall 2011 and Fall 2012 first-time freshmen
  - No transfer hours
  - No concurrent enrollment hours
  - No 100% online
  - No Bartlesville
  - **Fall 2011:** 110 students randomly selected from 472 entering freshmen* (baccalaureate and associate)
    - N = 80 participants (one not completed) or 73% response rate
  - **Fall 2012:** 94 students identified (baccalaureate only)
    - N = 69 participants or 73% response rate
    - 70 students needed for 95% confidence level
  - Incentive of $10 on Hillcat Card; enrollment hold

*Based on capacity of Testing Center*
Students with General Education at RSU

- Spring 2012 sophomores
  - Had 45 – 60 credit hours including Spring 2012
  - Did not transfer to RSU
  - Did not earn concurrently enrolled credits in high school
  - Were not 100% online

- Spring 2012: 120 students randomly selected from 141 eligible
  - 93 needed for 90% confidence level
  - N = 17 participants or 14% response rate

- Spring 2013: 70 students identified
  - N = 55 or 79% response rate (60 needed for 95% confidence level)
- Incentive of $10 on Hillcat card; enrollment hold added spring 2013

*Based on capacity of Testing Center (two additional computers available)*
Time and Place of Testing

- Entering Freshmen Testing
  - Campus Testing Centers
  - August – September (or until completed)
- Sophomore Testing
  - Campus Testing Centers
  - January – February
    (or until March 31)
Peer Institutions in ETS Proficiency Profile Database (July 2007-June 2012)*

- Select peers by number and type of institutions in database
  - **Entering Freshmen**: Public Baccalaureate institutions only (July 2007 – June 2012)
    - 19 Institutions
    - 28,741 students (RSU_{fall2012} n= 69; RSU_{fall2011} n=79***)
  - **Sophomores**: Public Baccalaureate institutions only
    - 15 Institutions
    - 27,664 students (RSU_{spring2013} n = 55; RSU_{spring2012} n=17)

*Must select at least 10 institutions.*  **Included associate degree-seeking students**
Peer Institutions - Freshmen
Mean size = 1,513 of institution cohort bank

- Athens State University (AL)
- Coastal Carolina University (SC)
- Colorado State University Pueblo (CO)
- Dickinson State University (ND)
- Elizabeth City State University (NC)
- Lander University (SC)
- Lewis-Clark State (ID)
- Lock Haven University (PA)
- Metropolitan State College of Denver (CO)
- Missouri Southern State University (MO)
- Missouri Western State University (MO)
- Shawnee State University (OH)
- Shepherd University (WV)
- University of Maine – Fort Kent (ME)
- University of Maine – Presque Isle (ME)
- University of South Carolina – Aiken (SC)
- University of South Carolina – Upstate (SC)
- West Virginia University - Parkersburg (WV)
- Winston-Salem State University (NC)
Peer Institutions – Sophomores
Mean size = 1,848 of institution cohort bank

- Athens State University (AL)
- Coastal Carolina University (SC)
- Colorado State University Pueblo (CO)
- Dickinson State University (ND)
- Elizabeth City State University (NC)
- Lander University (SC)
- Metropolitan State College of Denver (CO)
- Missouri Southern State University (MO)
- Missouri Western State University (MO)
- Shawnee State University (OH)
- Shepherd University (WV)
- University of South Carolina – Aiken (SC)
- University of South Carolina – Upstate (SC)
- West Virginia University - Parkersburg (WV)
- Winston-Salem State University (NC)
How did we do?
Entering Freshmen

Freshman
Sophomore
Junior
Senior
Peer standard deviation = 6.8
RSU standard deviation = 16.6

Fall 2011 Mean = 431.9 included associate-degree seekers

Peer Mean = 439.7

Peer Mean = 439.7
Entering Freshmen: RSU and Peers
Skills Subscores

Max

Min

Critical Thinking 110.7 110.5  s = 1.9

Reading 116.6 117.2  s = 2.4

Writing 113.3 112.7  s = 1.4

Mathematics 112.2 111.4  s = 1.7
Entering Freshmen: RSU and Peers
Context-based Subscores

<table>
<thead>
<tr>
<th></th>
<th>Peer Mean</th>
<th>RSU Mean</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humanities</td>
<td>114.3</td>
<td>114.0</td>
<td>100.0</td>
<td>130.0</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>112.0</td>
<td>112.5</td>
<td>105.0</td>
<td>125.0</td>
</tr>
<tr>
<td>Natural Sciences</td>
<td>114.5</td>
<td>114.2</td>
<td>120.0</td>
<td>130.0</td>
</tr>
</tbody>
</table>

$s = 1.9$  $s = 1.9$  $s = 1.8$
Summary of Proficiency Classifications
RSU Fall 2012 Entering Freshmen

- Proficient
- Marginal
- Not Proficient

Reading, Level 1
Reading, Level 2
Critical Thinking
Writing, Level 1
Writing, Level 2
Writing, Level 3
Mathematics, Level 1
Mathematics, Level 2
Mathematics, Level 3
RSU classifications are bright colors; Peer classifications are darker colors.
Sophomores
Sophomores: RSU and Peers
Total Score Distribution

Peer Mean = 439.6
Peer standard deviation = 6.8
RSU standard deviation = 17.7
Sophomores: RSU and Peers
Skills Subscores

Max

Peer Mean  RSU Mean

Min

Critical Thinking  Reading  Writing  Mathematics

s = 1.8  s = 2.4  s = 1.4  s = 1.7
Sophomores: RSU and Peers
Context-based Subscores

- **Humanities**: Peer Mean = 114.0, RSU Mean = 115.2, $s = 1.9$
- **Social Sciences**: Peer Mean = 112.6, RSU Mean = 112.9, $s = 1.9$
- **Natural Sciences**: Peer Mean = 114.2, RSU Mean = 114.8, $s = 1.7$
Summary of Proficiency Classifications
RSU Spring 2013 Sophomores

- Reading, Level 1
- Reading, level 2
- Critical Thinking
- Writing, Level 1
- Writing, Level 2
- Writing, Level 3
- Mathematics, Level 1
- Mathematics, Level 2
- Mathematics, Level 3

Proficient, Marginal, Not Proficient
RSU classifications are bright colors; Peer classifications are darker colors.
Freshman to Sophomore Comparison
ETS Proficiency Profile Score

Composite Score

RSU Entering Freshmen: 438.1
ETS Entering Freshmen: 439.7
RSU Sophomores: 441.5
ETS Sophomores: 439.6

*ETS database for Baccalaureate Colleges only
## Comparison of RSU Entering Freshmen to Sophomores

<table>
<thead>
<tr>
<th>RSU Cohort</th>
<th>N</th>
<th>ACT Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSU Fall 2011 Freshmen</td>
<td>79</td>
<td>19.7</td>
</tr>
<tr>
<td>RSU Spring 2012 Sophomores</td>
<td>17</td>
<td>22.1</td>
</tr>
<tr>
<td>RSU Fall 2012 Freshmen</td>
<td>69</td>
<td>21.5</td>
</tr>
<tr>
<td>RSU Spring 2013 Sophomores</td>
<td>54</td>
<td>21.8</td>
</tr>
</tbody>
</table>
Is there a difference in ETS PP total scores between RSU freshmen and sophomores when controlling for ACT?
ETS Proficiency Profile Score

ETS PP Total Score

RSU Entering Freshmen

RSU Sophomores

438.1

441.5
Summary and Conclusions

- Likely generalizable samples of Freshmen and Sophomores
  - Trust but verify
- RSU students enter as freshmen on par with normative database
- RSU sophomores have greater gains than normative sample
- RSU sophomores experience increases in general education accounting for ACT
Recommendations

- Continue testing with increased sample sizes
- Test exiting seniors
Proficiency Levels: Reading and Critical Thinking

- **Level 1** - Students who are proficient can:
  - recognize factual material explicitly presented in a reading passage
  - understand the meaning of particular words or phrases in the context of a reading passage

- **Level 2** - Students who are proficient can:
  - synthesize material from different sections of a passage
  - recognize valid inferences derived from material in the passage
  - identify accurate summaries of a passage or of significant sections of the passage
  - understand and interpret figurative language
  - discern the main idea, purpose or focus of a passage or a significant portion of the passage
Proficiency Levels: Reading and Critical Thinking

- **Level 3/Critical Thinking** - Students who are proficient can:
  - evaluate competing causal explanations
  - evaluate hypotheses for consistency with known facts
  - determine the relevance of information for evaluating an argument or conclusion
  - determine whether an artistic interpretation is supported by evidence contained in a work
  - recognize the salient features or themes in a work of art
  - evaluate the appropriateness of procedures for investigating a question of causation
  - evaluate data for consistency with known facts, hypotheses or methods
  - recognize flaws and inconsistencies in an argument
Proficiency Levels: Writing Skills

Level 1 - Students who are proficient can:

- recognize agreement among basic grammatical elements (e.g., nouns, verbs, pronouns and conjunctions)
- recognize appropriate transition words
- recognize incorrect word choice
- order sentences in a paragraph
- order elements in an outline

Level 2 - Students who are proficient can:

- incorporate new material into a passage
- recognize agreement among basic grammatical elements (e.g., nouns, verbs, pronouns and conjunctions) when these elements are complicated by intervening words or phrases
- combine simple clauses into single, more complex combinations
Proficiency Levels: Writing Skills

- **Level 3** - Students who are proficient can:
  - discriminate between appropriate and inappropriate use of parallelism
  - discriminate between appropriate and inappropriate use of idiomatic language
  - recognize redundancy
  - discriminate between correct and incorrect constructions
  - recognize the most effective revision of a sentence
Level 1 - Students who are proficient can:

- solve word problems that would most likely be solved by arithmetic and do not involve conversion of units or proportionality. These problems can be multistep if the steps are repeated rather than embedded.
- solve problems involving the informal properties of numbers and operations, often involving the Number Line, including positive and negative numbers, whole numbers and fractions (including conversions of common fractions to percent, such as converting "1/4" to 25%).
- solve problems requiring a general understanding of square roots and the squares of numbers.
- solve a simple equation or substitute numbers into an algebraic expression.
Proficiency Levels: Mathematics

- **Level 2** - Students who are proficient can:
  - solve arithmetic problems with some complications, such as complex wording, maximizing or minimizing, and embedded ratios. These problems include algebra problems that can be solved by arithmetic (the answer choices are numeric)
  - simplify algebraic expressions, perform basic translations, and draw conclusions from algebraic equations and inequalities. These tasks are more complicated than solving a simple equation, though they may be approached arithmetically by substituting numbers
  - interpret a trend represented in a graph, or choose a graph that reflects a trend
  - solve problems involving sets; problems have numeric answer choices
Level 3 - Students who are proficient can:

- solve word problems that would be unlikely to be solved by arithmetic; the answer choices are either algebraic expressions or numbers that do not lend themselves to back-solving
- solve problems involving difficult arithmetic concepts, such as exponents and roots other than squares and square roots, and percent of increase or decrease
- generalize about numbers (e.g., identify the values of \( x \) for which an expression increases as \( x \) increases)
- solve problems requiring an understanding of the properties of integers, rational numbers, etc.
- interpret a graph in which the trends are to be expressed algebraically or one of the following is involved: exponents and roots other than squares and square roots, percent of increase or decrease
- solve problems requiring insight or logical reasoning
Peers N = 27,664
RSU N = 55
ETS mandates >50 respondents to generate a report
   RSU implemented the abbreviated version
      Each student receives 1/3 of test
Peers from Freshman cohort not in Sophomore cohort
   Lewis-Clark State (ID)
   Lock Haven University (PA) graduate
   University of Maine – Fort Kent (ME)
   University of Maine – Presque Isle (ME)
Comparison of RSU Entering Freshmen to Sophomores

Is there a difference in ETS PP total scores between RSU freshmen and sophomores when controlling for ACT?

\[ H_0: M_1 = M_2 \]

There is no difference in mean ETS PP total scores as a function of freshman (no gen ed course work) and sophomore status (three semesters of gen ed course work at RSU) when controlling for ACT

where \( M_1 \) = mean ETS PP total score for fall 2012 sample of entering RSU freshmen

where \( M_1 \) = mean ETS PP total score for spring 2013 sample of RSU sophomores

Alpha \( \leq .05 \); 95% confidence level
Comparison of RSU Entering Freshmen to Sophomores

- Reject the null hypothesis. There is indeed a difference (increase) in mean ETS PP total score between freshmen and sophomores
  - Even when controlling for the 0.3 greater sophomore mean ACT score
    - $F = 8.871$; Critical value of $F = 3.949$
  - Significant difference at the 99% confidence level