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Implementation

Purpose of the URSSA

To collect self-report data from students involved in an undergraduate research program in order for undergraduate research program administrators to evaluate student outcomes at the program-level.

Course Level: What kinds of courses is it appropriate for?

Undergraduate research students

Content: What does it assess?

Lab skills (Thinking and working like a scientist, Personal gains related to research work, Skills, Attitudes and behavior)

Timing: How long should I give students to take it?

15-20 minutes

Example Questions

Example questions from the URSSA:

1. How much did you GAIN in the following areas as a result of your most recent research experience?	no gains	a little gain	moderate gain	good gain	great gain	not applicable
1.1 Analyzing data for patterns.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.2 Figuring out the next step in a research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.3 Problem-solving in general.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. How much did you GAIN in the following areas as a result of your most recent research experience?	no gains	a little gain	moderate gain	good gain	great gain	not applicable
3.1 Writing scientific reports or papers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.2 Making oral presentations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.3 Defending an argument when asked questions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Access: Where do I get the assessment?

You can view a copy of the URSSA on the [developers' website](#). You can administer the URSSA online for free at www.salgsite.org, using [these instructions](#).

Versions and Variations: Which version of the assessment should I use?

The latest version of the URSSA, released in 2012, is version 1.

Administering: How do I give the assessment?

- The URSSA is given only as a post-test.
- Use the online survey tool at www.salgsite.org to administer the URSSA online.
- Use [these instructions](#) for setting up and administering the URSSA online using the SALG Site.
- Only use of the URSSA with groups of at least 10 undergraduate research students, in order to keep student responses anonymous.
- If the survey is administered online, there are four core groups of questions that are “locked” and cannot be altered or deleted. There are remaining items that are optional and can be deleted, moved, or edited. Those using the survey with a group of programs can lock additional questions they do not wish individual program directors to edit.

Scoring: How do I calculate my students' scores?

- Different question types on the URSSA are scored differently. There is no overall score on the URSSA.
- For the core items, (Thinking and working like a scientist, Personal gain, Skills, Attitudes and behaviors), take the mean value of the score (1-5) for each question, and the take mean of the questions in each core category.
- For the yes/no questions, you can look at the percentage of your students who answer yes.
- For short answer questions, no scoring is necessary.

Clusters: Does this assessment include clusters of questions by topic?

There are four constructs in the URSSA: These include:

- 1) Thinking and Working Like a Scientist: focuses on understandings of the process of scientific research and the nature of scientific knowledge.
- 2) Personal Gains Related to Research Work: meant to assess affective characteristics of confidence, comfort, and general self-efficacy with conducting research and working on a research team and in a lab.
- 3) Skills: the closest to the traditional academic outcomes associated with more direct assessments. These skills, which are common across disciplines include writing scientific reports or papers, making oral presentations, and conducting observations in the lab or field.
- 4) Attitudes and Behaviors: focuses on attitudes and behaviors linked to working in a scientific community and feelings of creativity, independence, and responsibility around working on scientific projects.

Table 1 (from [Weston and Laursen 2015](#)) shows which questions correspond to each construct.

Thinking and Working Like a Scientist	Personal Gains
Q1 Analyzing data for patterns Q2 Figuring out the next step in a research project Q3 Problem-solving in general Q4 Formulating a research question that could be answered with data Q5 Identifying limitations of research methods and designs Q6 Understanding the theory and concepts guiding my research project Q7 Understanding the connections among scientific disciplines Q8 Understanding the relevance of research to my course work	Q9 Confidence in my ability to contribute to science Q10 Comfort in working collaboratively with others Q11 Confidence in my ability to do well in future science courses Q13 Ability to work independently Q14 Developing patience with the slow pace of research Q15 Understanding what everyday research work is like
Skills	Attitudes and Behaviors
Q16 Writing scientific reports or papers Q17 Making oral presentations Q18 Defending an argument when asked questions Q19 Explaining my project to people outside my field Q20 Preparing a scientific poster Q21 Keeping a detailed lab notebook Q22 Conducting observations in the lab or field Q23 Using statistics to analyze data Q24 Calibrating instruments needed for measurement Q25 Understanding journal articles Q26 Conducting database or Internet searches Q27 Managing my time	Q28 Engage in real-world science research Q29 Feel like a scientist Q30 Think creatively about the project Q31 Try out new ideas or procedures on your own Q32 Feel responsible for the project Q33 Work extra hours because you were excited about the research Q34 Interact with scientists from outside your school Q35 Feel a part of a scientific community

^aQuestion numbers correspond to factor model in Figure 1. Gains scale: 1 → 5 = no gains → great gains.

Typical Results: What scores are usually achieved?

Comparison of biology research undergraduate experience (REU) students' URSSA mean scores with a matched sample of non-biology students who also participated in an REU, from [Weston 2013](#). The results shown below are divided out by construct, where the constructs contained the "core" group of URSSA items. There were additional items on the version of the URSSA used by Weston, but the results are not reported here.

Table 6 Comparison of BIO REU years with matched sample: 2011 – 2012

		BIO REU 2011	BIO REU 2012	Non-BIO REU
THINKING & WORKING LIKE A SCIENTIST	Mean	4.2*	4.17*	4.0*
	Standard Deviation	.67	.67	.7
	Valid N	304	372	1119
PERSONAL GAIN	Mean	4.32*	4.24*	4.1*
	Standard Deviation	.67	.69	.7
	Valid N	304	392	1115
SKILLS	Mean	3.88*	3.91*	3.7*
	Standard Deviation	.83	.76	.8
	Valid N	304	392	1113
ATTITUDES AND BEHAVIORS	Mean	4.22*	4.19*	3.9*
	Standard Deviation	.73	.72	.8
	Valid N	304	395	1105

Interpretation: How do I interpret my students' scores in light of typical results?

- You can look at your mean scores on the four categories of core items, where a higher mean score in a category means your students self-reported more favorably in that category, e.g., a higher mean score in the personal gain category indicates that your students reported a higher personal gain as the result of your program.
- You can compare the mean scores on the four groups of core items between groups of undergraduate research students. For example, you could compare your program before and after you made a change to it.
- You can also look at the percentage of students who answer "yes" to the yes/no questions, and track the changes over time as your work to change and improve your program.

Resources

Where can I learn more about this assessment?

T. Weston and S. Laursen, [The Undergraduate Research Student Self-Assessment \(URSSA\): Validation for Use in Program Evaluation](#), CBE Life. Sci. Educ. **14** (3), 1 (2015).

Translations: Where can I find translations of this assessment in other languages?

Background

Similar Assessments

There is also the Survey of Undergraduate Research Experiences (SURE) by David Lopatto.

Research: What research has been done to create and validate the assessment?

Research Validation: Gold Star ★

This is the highest level of research validation, corresponding to all seven of the validation categories below.

- ✓ Based on research into **student thinking**
- ✓ Studied using **student interviews**
- ✓ Studied using **expert review**
- ✓ Studied using **appropriate statistical analysis**
- ✓ Research conducted **at multiple institutions**
- ✓ Research conducted **by multiple research groups**
- ✓ **Peer-reviewed publication**

Research Overview

The questions on the URSSA were based on longitudinal interviews of 76 students about the benefits and learning gains they experienced through undergraduate research activities. A sample of 80 faculty were also interviewed about working with the undergraduate research students. Using the interview findings, the developers created a survey blueprint, wrote items and reviewed the survey with their advisory board. The survey was then piloted with students using think around interviews, and revised. The underlying structure of the survey was assessed with confirmatory factor analysis and the developers found the four components of the survey represent separate but related constructs. Average scores from item blocks formed reliable but moderate to highly correlated composite measures. Additionally, some questions about student learning gains (meant to assess individual learning) correlated to ratings of satisfaction with external aspects of the research experience. The pattern of correlation among individual items suggests that items asking students to rate external aspects of their environment were more like satisfaction ratings than items that directly ask about student skills attainment. Finally, survey items asking about student aspirations to attend graduate school in science reflected inflated estimates of the proportions of students who had actually decided on graduate education after their UR experiences. As of May 1, 2014, 3671 students had taken the URSSA across the United States and Canada. The URSSA results are published in eight peer-reviewed publications.

Developer: Who developed this assessment?

Tim Weston, Sandra Laursen, Anne-Barrie Hunter & Heather Thiry

References

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- A. Hunter, T. Weston, S. Laursen, and H. Thiry, [URSSA: Evaluating Student Gains from Undergraduate Research in the Sciences](#), CUR Quarterly **29** (3), 15 (2009).
- S. Laursen, [Challenges and opportunities for measuring student outcomes of undergraduate research](#), presented at the Physics Education Research Conference 2015, College Park, MD, 2015.
- S. Laursen, A. Hunter, E. Seymour, T. DeAntoni, K. De Welde, and H. Thiry, [Undergraduate Research in Science: Not Just for Scientists Anymore](#), in *Handbook of College Science Teaching: Theory, Research, and Practice*, edited by J. Mintzes and W. Leonard, (2006), p. 55.
- S. Laursen, A. Hunter, E. Seymour, H. Thiry, and G. Melton, [Undergraduate Research in the Sciences: Engaging Students in Real Science](#) (2010).
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- T. Weston and S. Laursen, [The Undergraduate Research Student Self-Assessment \(URSSA\): Validation for Use in Program Evaluation](#), CBE Life. Sci. Educ. **14** (3), 1 (2015).