

Entering Research Learning Assessment (ERLA) Paired Surveys

The *Entering Research Learning Assessment (ERLA)* paired surveys were validated with undergraduate and graduate research trainees. The seven scales, each of which assesses an area of trainee development, may be used independently or together as a comprehensive assessment of trainee learning gains. The parallel trainee/mentor versions of the instrument can be used to assess the degree of alignment between trainees' self-assessment of their gains and mentors' assessment of their trainee's gains. This instrument is also available from the authors. For more information on the psychometric properties of the scale, item ordering and scoring, contact the authors at enteringresearch@education.wisc.edu.

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Entering Research Learning Assessment – Trainee

How much did you gain in your ability to do the following over the course of your research experience?

	no gain	a little gain	moderate gain	good gain	great gain
1. Understand the theory and concepts guiding your research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Practice regular and open communication with your research mentor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Think of yourself as a scientist/researcher.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Identify forms of unethical practices or research misconduct.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Determine the next steps in your research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Analyze data.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Identify the biases and prejudices that you have about others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Set research career goals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Ask questions to clarify your understanding of your research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Design a research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Fit in with the research culture of your discipline.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Formulate a research question/ hypothesis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Demonstrate understanding and comprehension regarding your research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Tailor your research communications for different audiences (e.g., general public, disciplinary conference, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Do experiments.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How much did you gain in your ability to do the following over the course of your research experience?

	no gain	a little gain	moderate gain	good gain	great gain
16. Confidence in staying motivated and committed to your research project when things do not go as planned.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Determine the appropriate experimental approach to investigate your research question.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Keep detailed research records (e.g., a lab/field notebook).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. Communicate the relevance of your research to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. Understand the consequences of unethical practices or research misconduct.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. Use the tools, materials, and equipment needed to conduct research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. Work independently on your research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. Confidence in pursuing a career in research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. Use logic and evidence to interpret data.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. Communicate the context, methods, and results of your research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. Advocate for others who may be marginalized or excluded from the research environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. Develop a plan to pursue a research career (determine the next step in your training).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. Work in the research environment comfortably.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How much did you gain in your ability to do the following over the course of your research experience?

	no gain	a little gain	moderate gain	good gain	great gain
29. Understand that the process of discovery is iterative and never ending.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30. Collect data.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
31. Understand the safety precautions relating to your research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
32. Fit in with the culture of your research group.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
33. Make a case for your research question based on the literature.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
34. Practice regular and open communication with your research team members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
35. Identify the biases and prejudices that others may have about you.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
36. Confidence in conducting research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
37. Work effectively with the subject of study (e.g., mathematical models, mice, plants, rock formations).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
38. Call yourself a researcher when talking to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
39. Explore possible research career pathways.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
40. Behave like a researcher in your discipline.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
41. Align your research experience goals and expectations with your research mentor's.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
42. Take action to address unethical practices or research misconduct.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
43. Feel like you belong in research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How much did you gain in your ability to do the following over the course of your research experience?

	no gain	a little gain	moderate gain	good gain	great gain
44. Use logic and evidence to build arguments and draw conclusions from data.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
45. Accept and use criticism of your research to improve your research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
46. Understand the impact of biases on your interactions with others in a research environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
47. Conduct a research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
48. Confidence in coping with challenges when they arise in your research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
49. Determine an analysis plan/statistical methods to analyze your data.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50. Investigate problems when they arise in your research (e.g. troubleshoot).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
51. Understand how others might experience research differently based on their identity (e.g. race, socioeconomic status, first-generation status, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
52. Confidence in completing your research training.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
53. Make detailed observations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

ERLA – Trainee Scoring: The item numbers corresponding to each area of trainee development are listed below. Area of trainee development sub-scores can be calculated by summing the score for each item and dividing by the total number of items. Individual items should be scored as follows: *no gain* (1); a little gain (2); moderate gain (3); good gain (4); great gain (5).

Research Comprehension and Communication Skills (15 items): 1, 2, 6, 9, 13, 14, 19, 24, 25, 28, 29, 34, 41, 44, 45.

Practical Research Skills (13 items): 10, 12, 15, 17, 18, 21, 30, 31, 33, 37, 47, 49, 53.

Research Ethics (3 items): 4, 20, 42.

Researcher Identity (6 items): 3, 11, 32, 38, 40, 43.

Researcher Confidence and Independence (7 items): 5, 16, 22, 36, 48, 50, 52.

Equity and Inclusion Awareness and Skills (5 items): 7, 26, 35, 46, 51.

Professional and Career Development Skills (4 items): 8, 23, 27, 39.

Entering Research Learning Assessment – Mentor

How much did your [trainee/student researcher] gain in their ability to do the following over the course of their research experience? If you did not observe your [trainee/student researcher] engaged in a particular skill, please select “did not observe.”

	no gain	a little gain	moderate gain	good gain	great gain	did not observe
1. Understand the theory and concepts guiding their research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Practice regular and open communication with you.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Identify forms of unethical practices or research misconduct.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Determine the next steps in their research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Analyze data.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Set research career goals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Ask questions to clarify their understanding of their research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Design a research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Fit in with the research culture of your discipline.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Formulate a research question/hypothesis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Demonstrate understanding and comprehension regarding their research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Tailor their research communications for different audiences (e.g., general public, disciplinary conference, etc.).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Confidence in staying motivated and committed to their research project when things do not go as planned.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Determine the appropriate experimental approach to investigate their research question	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Keep detailed research records (e.g., a lab/field notebook).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How much did your [trainee/student researcher] gain in their ability to do the following over the course of their research experience? If you did not observe your [trainee/student researcher] engaged in a particular skill, please select “did not observe.”

	no gain	a little gain	moderate gain	good gain	great gain	did not observe
16. Communicate the relevance of their research to others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Demonstrate understanding of the consequences of unethical practices or research misconduct	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Use the tools, materials, and equipment needed to conduct research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. Work independently on their research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. Confidence in pursuing a career in research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. Use logic and evidence to interpret data.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. Communicate the context, methods, and results of their research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. Advocate for others who may be marginalized or excluded from the research environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. Develop a plan to pursue a research career (determine the next step in their training)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. Work in the research environment comfortably.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. Demonstrate understanding that the process of discovery is iterative and never ending.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. Collect data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. Demonstrate understanding of the safety precautions relating to their research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29. Fit in with the culture of your research group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30. Make a case for their research question based on literature	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How much did your [trainee/student researcher] gain in their ability to do the following over the course of their research experience? If you did not observe your [trainee/student researcher] engaged in a particular skill, please select “did not observe.”

	no gain	a little gain	moderate gain	good gain	great gain	did not observe
31. Practice regular and open communication with your research team members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
32. Confidence in conducting research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
33. Work effectively with the subject of study (e.g., chemicals, mathematical models, mice, plants, rock formations)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
34. Demonstrate understanding of possible research career pathways.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
35. Behave like a researcher in your discipline.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
36. Align their research experience goals and expectations with your goals and expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
37. Take action to address unethical practices or research misconduct.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
38. Act like they belong in research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
39. Use logic and evidence to build arguments and draw conclusions from data.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
40. Accept and use criticism of their research to improve their research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
41. Conduct a research project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
42. Confidence in coping with challenges when they arise in their research project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
43. Determine an analysis plan/statistical methods to analyze their data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
44. Investigate problems when they arise in their research (e.g. troubleshoot).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
45. Demonstrate understanding of how others might experience research differently based on their identity (e.g. race, socioeconomic status, first-generation status, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
46. Confidence in completing their research training.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
47. Make detailed observations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

ERLA – Mentor Scoring: The item numbers corresponding to each area of trainee development are listed below. Area of trainee development sub-scores can be calculated by summing the score for each item and dividing by the total number of items. Individual items should be scored as follows: *no gain/did not observe* (1); a little gain (2); moderate gain (3); good gain (4); great gain (5).

Research Comprehension and Communication Skills (15 items): 1, 2, 5, 7, 11, 12, 16, 21, 22, 25, 26, 31, 36, 39, 40.

Practical Research Skills (12 items): 8, 10, 14, 15, 18, 27, 28, 30, 33, 41, 43, 47.

Research Ethics (3 items): 3, 17, 37.

Researcher Identity (4 items): 9, 29, 35, 38.

Researcher Confidence and Independence (7 items): 4, 13, 19, 32, 42, 44, 46.

Equity and Inclusion Awareness and Skills (2 items): 23, 45.

Professional and Career Development Skills (4 items): 6, 20, 24, 34.