Supplementary Material: Perceptions and Misconceptions about the Undergraduate Laboratory from Chemistry, Physics and Biology Academics

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1. ASLE student survey.

ASELL Student Evaluation of an Experiment

The experiment you have just completed is being evaluated by a process called ASELL. An important part of this evaluation process involves collecting feedback on students’ experience of the exercises, which is the purpose of this survey. Your responses are anonymous, and participation is voluntary. Put your answers by completely filling in the circle corresponding to your response to each of the fourteen statements below. If you feel you cannot answer a particular question, just leave it and go on to the next question. Erase errors thoroughly. Please ensure you also complete the additional questions on the reverse of this sheet.

Experiment:

Instructions:
Please fill in one box only for the following 14 statements corresponding to the scale indicated by completely filling the circle □ with a blue or black ballpoint pen.

1. This experiment helped me to develop my data interpretation skills..............
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

2. This experiment helped me to develop my laboratory skills......................
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

3. I found this to be an interesting experiment...........................................
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

4. It was clear to me how this laboratory exercise would be assessed...........
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

5. It was clear to me what I was expected to learn from completing this experiment ..............................................................................................................
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

6. Completing this experiment has increased my understanding of chemistry..................................................................................................................
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

7. Sufficient background information, of an appropriate standard, is provided in the introduction .................................................................
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

8. The demonstrators offered effective supervision and guidance ..........
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

9. This experimental procedure was clearly explained in the lab manual or notes.................................................................................................
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

10. I can see the relevance of this experiment to my chemistry studies ......
    - Strongly Agree
    - Agree
    - Neutral
    - Disagree
    - Strongly Disagree

11. Working in a team to complete this experiment was beneficial.............
    - Strongly Agree
    - Agree
    - Neutral
    - Disagree
    - Strongly Disagree

12. The experiment provided me with the opportunity to take responsibility for my own learning.................................................................
    - Strongly Agree
    - Agree
    - Neutral
    - Disagree
    - Strongly Disagree

For each of the next two questions use the separate scales indicated

A = ‘way too much’ B = ‘too much’ C = ‘about right’ D = ‘not enough’ E = ‘nowhere near enough’

13. I found that the time available to complete this experiment was ..........
    - Strongly Agree
    - Agree
    - Neutral
    - Disagree
    - Strongly Disagree

14. Overall, as a learning experience, I would rate this experiment as .........
    - Strongly Agree
    - Agree
    - Neutral
    - Disagree
    - Strongly Disagree

Please turn over and complete the additional questions on the back of this form
15. Did you enjoy the experiment? Why or why not?

16. What did you think was the main lesson to be learnt from this experiment?

17. What aspects of the experiment did you find most enjoyable and interesting?

18. What aspects of the experiment need improvement and what changes would you suggest?

19. Please provide any additional comments on this experiment here

Please return this survey to your demonstrator.
Thank you for your participation.
2. ASELL Staff Survey.

Participant Perceptions of Laboratory Learning Experiences

My Discipline

In the past, ASELL (Advancing Chemistry by Enhancing Learning in the Laboratory) has surveyed students about their laboratory learning experiences using an instrument called the ASELL Student Learning Experience (ASLE) survey. Question 14 of the ASLE survey probes the students' overall perception of their learning experience with a specific laboratory activity:

| 14. Overall, as a learning experience, I would rate this laboratory activity as |
|---------------------------------|-------|-------|-------|-------|
| A                                | B     | C     | D     | E     |
| ‘excellent’                       | ‘good’| ‘average’| ‘poor’| ‘very poor’|

Consider 12 of the other ASLE questions listed below.

Please indicate which four (4) ASLE questions you think would correlate most strongly with students' perception of their "overall" laboratory learning experience by checking the "Yes" box.

Please indicate which four (4) ASLE questions you think would correlate least strongly with students' perception of their "overall" laboratory learning experience by checking the "No" box.

<table>
<thead>
<tr>
<th>ASLE questions</th>
<th>Yes correlates</th>
<th>No Does not correlate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. This laboratory activity helped me to develop my data interpretation skills.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. This laboratory activity helped me to develop my laboratory skills.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I found this to be an interesting laboratory activity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. It was clear to me how this laboratory activity would be assessed (graded).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. It was clear to me what I was expected to learn from completing this laboratory activity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Completing this laboratory activity has increased my understanding of [discipline].</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Sufficient background information, at an appropriate level, is provided in the introduction to this laboratory activity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. The lab instructor offered effective supervision and guidance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. The procedure for this laboratory activity was clearly explained in the lab manual or notes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I can see the relevance of this laboratory activity to my [discipline] studies.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Working in a team to complete this laboratory activity was beneficial.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. The laboratory activity provided me with the opportunity to take responsibility for my own learning.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Correlation between Items 1-12 on ASLE and Item 14.

**Item = Data Analysis**

\[ R^2 = 0.62 \]

**Item = Lab Skills**

\[ R^2 = 0.38 \]
R² = 0.69

Item = Interest

R² = 0.43

Item = Clear Assessment
Item = Clear learning objectives

\[ R^2 = 0.60 \]

Item = Increased understanding of subject

\[ R^2 = 0.66 \]
Item = Background material

$R^2 = 0.36$

Item = Instructors

$R^2 = 0.25$
$R^2 = 0.59$

Item = Practical Notes

$R^2 = 0.58$

Item = Relevance to studies
Item = Teamwork

$R^2 = 0.00$

Item = Responsibility for own learning

$R^2 = 0.70$