

Applied Learning Student Questionnaire (ALSQ): Technical Document

Introduction: The following survey asks about your attitudes and opinions. Some of the items in this survey use the word STEM. STEM means Science, Technology, Engineering, and Math. We want to find out about your experience in this program.

We are interested in comparing your attitudes at the beginning of this program to your attitudes now. Please take a few moments to think back on how you felt at the beginning of this program compared to how you feel now. For each item, please bubble in the number that most closely matches your agreement or disagreement both in the left column (Before) AND in the right column (Now).

<i>PRE/POST (retrospective)</i>	
<i>CONSTRUCT</i>	<i>ITEMS</i>
1. Motivation- Intrinsic Value PRE/POST	1. I prefer class work that is challenging so I can learn new things. 2. It is important to me to learn what is being taught in this program. 3. I like what I am learning in this program. 4. I think I will be able to use what I learn in this program in other classes. 5. Even when I do poorly on a test I try to learn from my mistakes. 6. I think that what I am learning in this program is useful for me to know. 7. I think that what we are learning in this program is interesting. 8. Understanding this subject is important to me. 9. I enjoy Science, Technology, Engineering, or Math (STEM) in general.
2. Self-Management/Self-Regulation PRE/POST ¹	10. I turn all my assignments in on time. 11. I miss class often. (n) 12. I am often late for class. (n) 13. I set aside time to do my homework and study. 14. When I promise to help with a project, I follow through. 15. I am a hard worker. 16. I finish whatever I begin.
3. Intent to Persist PRE/POST	17. I am considering a career in Science, Technology, Engineering, or Math (STEM). 18. I intend to get a college degree in a Science, Technology, Engineering, or Math (STEM). 19. I can see myself working as a STEM professional. 20. Someday, I would like to have a career in STEM. 21. I intend to graduate from high school.

Note. (n)=negatively worded items. All items will be assessed on a 5-point likert scale (1, strongly disagree; 3, neither agree nor disagree; 5, strongly agree)

¹ See Appendix A for more information regarding construct

Instructions for Post only items: Please think about the activities and projects that you did in this class. For each item, please bubble in the number that most closely matches your agreement or disagreement now. For these items we are only interested in your thoughts and opinions now.

POST ONLY	
<i>CONSTRUCT</i>	<i>ITEMs</i>
4. Problem Solving POST ONLY	22. (In this program, my teacher(s)...)Tells me how to improve my work. 23. (In this program, my teacher(s)...)Lets us choose our own topics or projects to investigate. 24. (In this program...)I work out explanations on my own. 25. (In this program ...)I have opportunities to explain my ideas. 26. (In this program ...) We plan and do our own projects and/or experiments. 27. (In this program ...) We work on real-world problems. <i>(added)</i> 28. (In this program ...) We have class discussions. 29. (In this program ...) We investigate to see if our ideas are right. 30. (In this program ...) We need to be able to think and ask questions. 31. (In this program ...) We are expected to understand and explain ideas.
5. Implementation Activities POST ONLY	32. (In this program, my teacher(s) Takes notice of students' ideas. 33. (In this program, my teacher(s) Shows us how new information relates to what we have already learned. 34. (In this program ...) We learn what scientists/mathematicians/other STEM professionals do. 35. (In this program ...) We do our work in groups. 36. (In this program ...) We interact with scientists/technicians/engineers/mathematicians or other STEM professionals.

Note. (n)=negatively worded items. All items will be assessed on a 5-point likert scale (1, strongly disagree; 3, neither agree nor disagree; 5, strongly agree)

Total Items= 36

Appendix A. New Self-Management/Self-Regulation Construct

NEW Self-Management/Self-Regulation Items)- PRE/POST	
New Self-Management/Self-Regulation Construct Items¹ PRE/POST	<ol style="list-style-type: none"> 1. I turn all my assignments in on time. 2. I miss class often. (n) 3. I am often late for class. (n) 4. I miss appointments I have made if I'd rather not go. (n) 5. When I promise to help with a project, I follow through. 6. I am a hard worker. 7. I finish whatever I begin. 8. I am diligent.
<i>a. Self-Management: Self-Regulation</i>	<ol style="list-style-type: none"> 1. I ask myself questions to make sure I know the material I have been studying. 2. Even when study materials are dull and uninteresting, I keep working until I finish. 3. Before I begin studying I think about the things I will need to do to learn. 4. When I'm reading I stop once in a while and go over what I have read. 5. I work hard to get a good grade even when I don't like a class.
<i>b. Personal Responsibility Scale</i>	<ol style="list-style-type: none"> 1. When I borrow something, I fail to return it. (n) 2. I turn all my assignments in on time. 3. I miss class often. (n) 4. I am often late for class. (n) 5. I miss appointments I have made if I'd rather not go. (n) 6. When I promise to help with a project, I follow through. 7. If it means giving up some personal pleasures, I delay studying. (n)
<i>c. GRIT Scale</i>	<ol style="list-style-type: none"> 1. New ideas and projects sometime distract me from previous ones. (n) 2. Setbacks don't discourage me. 3. I am a hard worker. 4. I often set a goal but later choose to pursue a different one. (n) 5. I have difficulty maintaining my focus on projects that take more than a few months to complete. (n) 6. I finish whatever I begin. 7. I am diligent.

¹Note. The new construct items are derived from previous measures noted as "a. Self-Management: Self-Regulation," "b. Personal Responsibility Scale," and "c. GRIT scale." Highlighted items were incorporated in to the new construct.

For more information regarding the Personal Responsibility and GRIT scales, please see the following sources:

Personal Responsibility scale

<http://www.sbp-journal.com/index.php/sbp/article/view/1100>

<http://connection.ebscohost.com/c/articles/8771826/development-student-personal-responsibility-scale-10>

GRIT scale

<http://aea365.org/blog/?p=6350>

<http://www.sas.upenn.edu/~duckwort/images/Grit%20JPSP.pdf>

<http://www.sas.upenn.edu/~duckwort/gritscale.htm>

Appendix B. Summary of Original Constructs

n= 97

Constructs	Description	Cronbach's Alphas	# of Items	Pre/Post or Post
1. Motivation: Self-Efficacy	Confidence in one's ability to perform well. Example, "I expect to do very well in this class."	.908	9	
2. Motivation: Intrinsic Value	Goals of mastery, learning and challenge. Example, "It is important for me to learn what is being taught in this class."	.864	10	Pre/Post
3. Self-Management: Cognitive Strategy Use	Learning and test-taking strategies. Example, "I outline the chapters in my book to help me study."	.866	12	
4. Self-Management: Self-Regulation	Effortful and persistent learning. Example, "Even when study materials are dull and uninteresting, I keep working until I finish."	.630	6	Pre/Post
4. Student Personal Responsibility	<i>added</i>	.740 ¹	7	Pre/Post
4. Grit	<i>added</i>	.800 ²	7	Pre/Post
5. Problem Solving	Higher-order cognitive tasks. Example, "I work out explanations in science on my own."	.829	9	Post only
6. Beliefs about Science	Intent to persist in science as a career or academic endeavor. Example, "I might consider a career in a science-related field after I graduate."	.599	6	
7. Implementation activities	Hands-on activities and real-world applications. Example, "In my science class, we do our work in groups."	.618	6	Post only

Note. Cronbach's alpha is a measure of the internal consistency of the construct. This statistic ranges from 0 to 1.00 and the higher the value the better. An alpha of .80 or higher is considered to have achieved very good measurement reliability; an alpha of .65 is considered acceptable (Field, 2009). 54 items total; some items apply to more than one construct. ¹alpha level obtained from previous research involving 281 high school and college students. ²alpha level obtained from previous research involving 1308 high school students.