



# AIS BLANDING PREP 2017 ANNUAL EVALUATION REPORT

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September 2017

*This material is based on work supported by the National Science Foundation under grant number 1649361. The recommendations expressed in this material are those of the author and do not necessarily reflect the views of NSF.*

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## INTRODUCTION

The AIS Blanding PREP 2017 Evaluation Report has been compiled primarily for use by the AIS Blanding PREP administrators and associated stakeholders. The report contains evaluation results for the 2017 summer PREP program operating in Blanding UT.

## EVALUATION RESULTS AND SUGGESTIONS

The evaluation results presented in this section highlight the evaluation findings as evidenced by the data which is currently available.

### STUDENT RECRUITMENT

Individual Utah PREP sites were responsible for recruiting underrepresented populations in their local communities. The AIS Blanding site reported the use of several recruiting techniques including, meetings with parents and teachers, school flyers, and word of mouth. Approximately 30% of students were recruited from school flyers, 40% from meetings, and 30% from word of mouth. Student demographics are shown in Table 1. The AIS Blanding site has been particularly successful in recruiting and retaining female students. Considering the disproportionate number of females in STEM fields, having an equal or almost equal ratio of male and female students could even be considered a success.

Table 1 Summer 2017 PREP Enrollment by Gender

Utah PREP Site	Total Enrollments	Gender	
		Male	Female
ASI Blanding	90	34 (37.8%)	56 (62.2%)

Student ethnicity provides an insight into the effectiveness of recruiting efforts to recruit students from underrepresented ethnic groups. Table 2 details the demographic breakdown of students participating in PREP at the AIS Blanding site. Consistent with the main mission of AIS, the large majority of students were from Native American ethnic groups.

Table 2 Summer 2017 PREP Enrollment by Ethnicity

Utah PREP Site	Ethnicity					
	African American	Pacific Islander, Middle East, Asian	Hispanic	Native American	White	Other
ASI (Blanding)	0 (0.0%)	1 (1.1%)	1 (1.1%)	80 (88.9%)	7 (7.8%)	1 (1.1%)

Overall the recruitment efforts appear to be successful in recruiting students from underrepresented populations considering the demographic makeup of the communities they serve.

### STUDENT RETENTION

Retention for the Utah PREP program is defined as the retention within any given summer program. For example, the percentage of students who started in 2017 and finished in 2017. Retention percentages are therefore calculated by taking the number of students who complete the program in a summer divided by the number of students who started the program. It is important to note that under some circumstances students are dismissed from the program or are not able to continue due to

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extenuating circumstances such as family emergencies or health issues. These students are not included in Summer 2017 site retention rate. Retention results are shown in Table 3.

Table 3 *Within Summer Retention Rates*

Site	2017 Retention
ASI (Blanding)	96%

Retention rates for the AIS Blanding PREP program are remarkably high considering the commitment needed to complete the summer program, including, a strict attendance policy. After accounting for students that were dismissed or forced to leave by extenuating circumstances, the average retention rate for AIS Blanding PREP was 96%. These results help to reinforce the success of the program to 1) recruit students who are committed to the program, 2) adequately communicate the required commitment and rigor of the program during the recruiting process, and 3) administer a program that engages students in a dynamic and engaging learning process.

## INCREASED MATHEMATICS PROFICIENCY

The extent to which student participants demonstrate an increased proficiency in math was assessed in two distinct ways. First students participated in course specific tests. These tests allowed for the measurement of mathematics proficiency within a specific course. Second, students participated in a general math ability test. Average final grades percentages for students in specific courses can be seen in Table 4. The results from the general math ability test show that students had significant gains in mathematics ability during the summer program. These gains can be seen in Table 5.

Table 4 *Average Course Grade Percentage*

Course	Average Course Grade Percentage
Logic	85%
Problem Solving 1	76%
Problem Solving 2	81%
Problem Solving 3	88%
Algebraic Structures	77%
Engineering	83%
Physics	89%
Computer Science	89%
Statistics	73%

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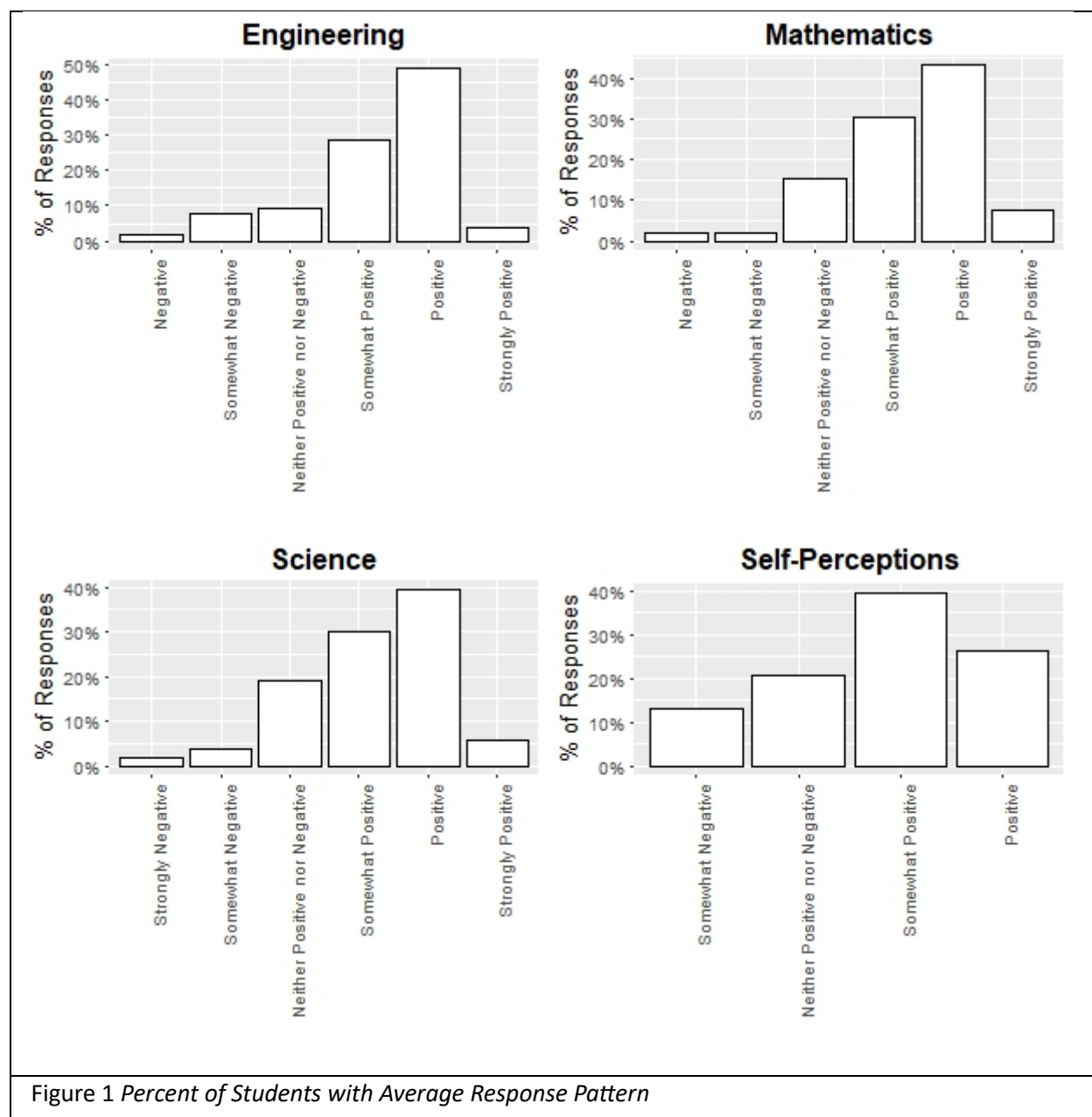
Table 5 *General Math Ability Gains*

PREP Year	Average Increase in Test Percentage Points
Year 1	9%
Year 2	5%
Year 3	8%

## STUDENT ATTITUDES TOWARD STEM

Student attitudes toward STEM related subjects were assessed using an attitude scale that was assembled by Utah PREP site directors, INCLUDES PI and Co-PI team. The items were written by the Utah PREP team, members of individual site research teams, and the published survey *Student Attitudes toward STEM Survey-Middle and High School Students*.<sup>1</sup> Students were asked to take the attitudes survey at the beginning and end of the 2017 summer program.

The survey items relating to student attitudes grouped into four groups namely, Science, Engineering, Mathematics, and Self-Perceptions. The specific survey items belonging to each group can be found in the Appendix. Figure 1 graphs the percent of students who had an average response value to these groups of questions. It is clear from these graphs that the majority of students at AIS Blanding PREP have positive attitudes toward STEM. Though additional analyses, it was apparent that these positive attitudes persisted during all three years of PREP.



The Student Attitudes Toward STEM survey contained a variety of items related to continuing education, and careers. Twelve items were selected from the survey which most directly addressed these topics. Student responses from the pre-survey were compared with responses from the post-survey. Results from data analyses provide evidence that students are maintaining their positive attitudes towards higher education and careers in STEM fields.

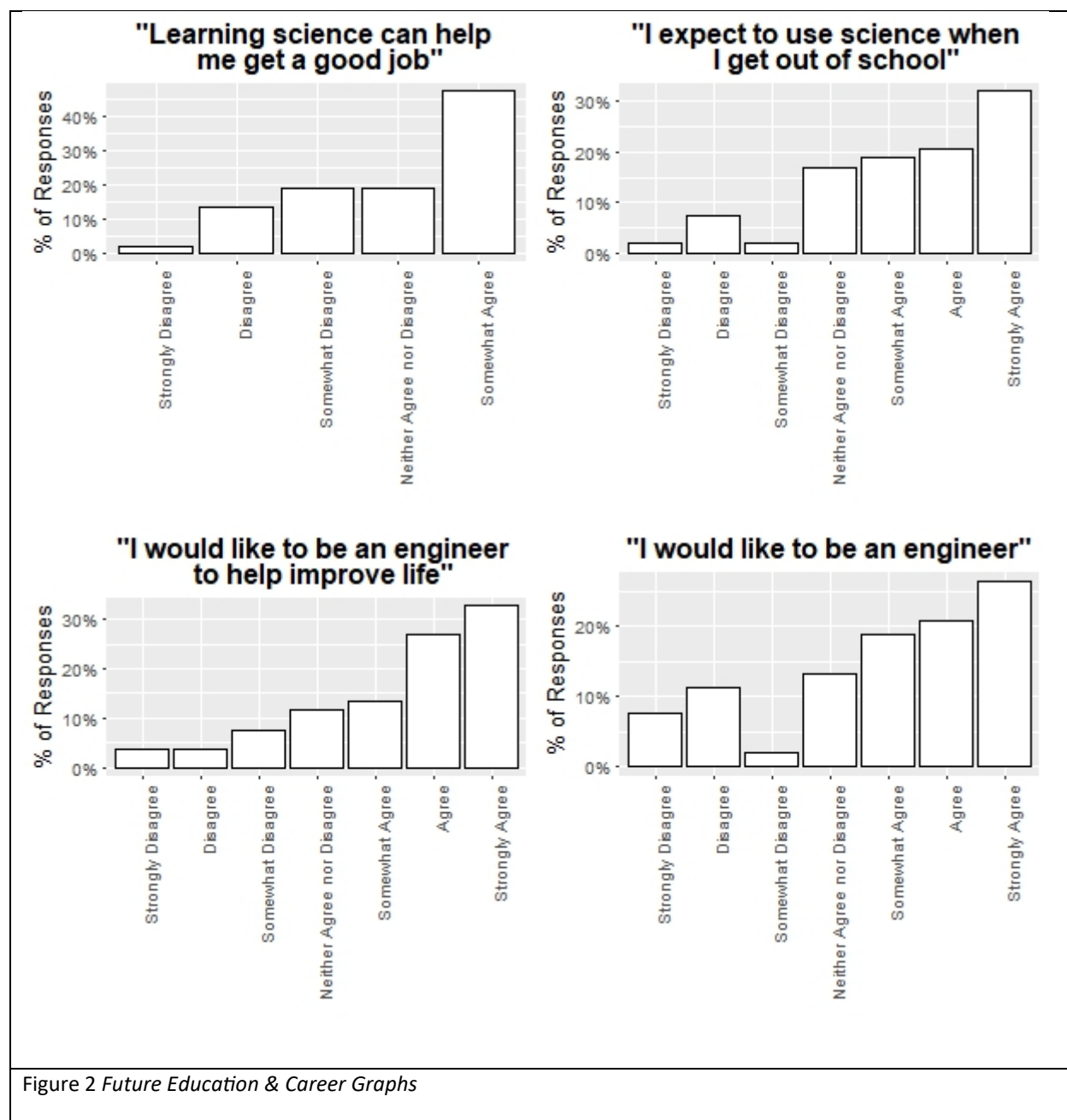
Table 6 provides data on the percent of students who provided positive responses to the questions regarding STEM careers and higher education. The graphs in Figure 2 show the complete distribution of responses for these survey items. It is clear from these results that students have positive attitudes toward STEM careers and future educational opportunities.

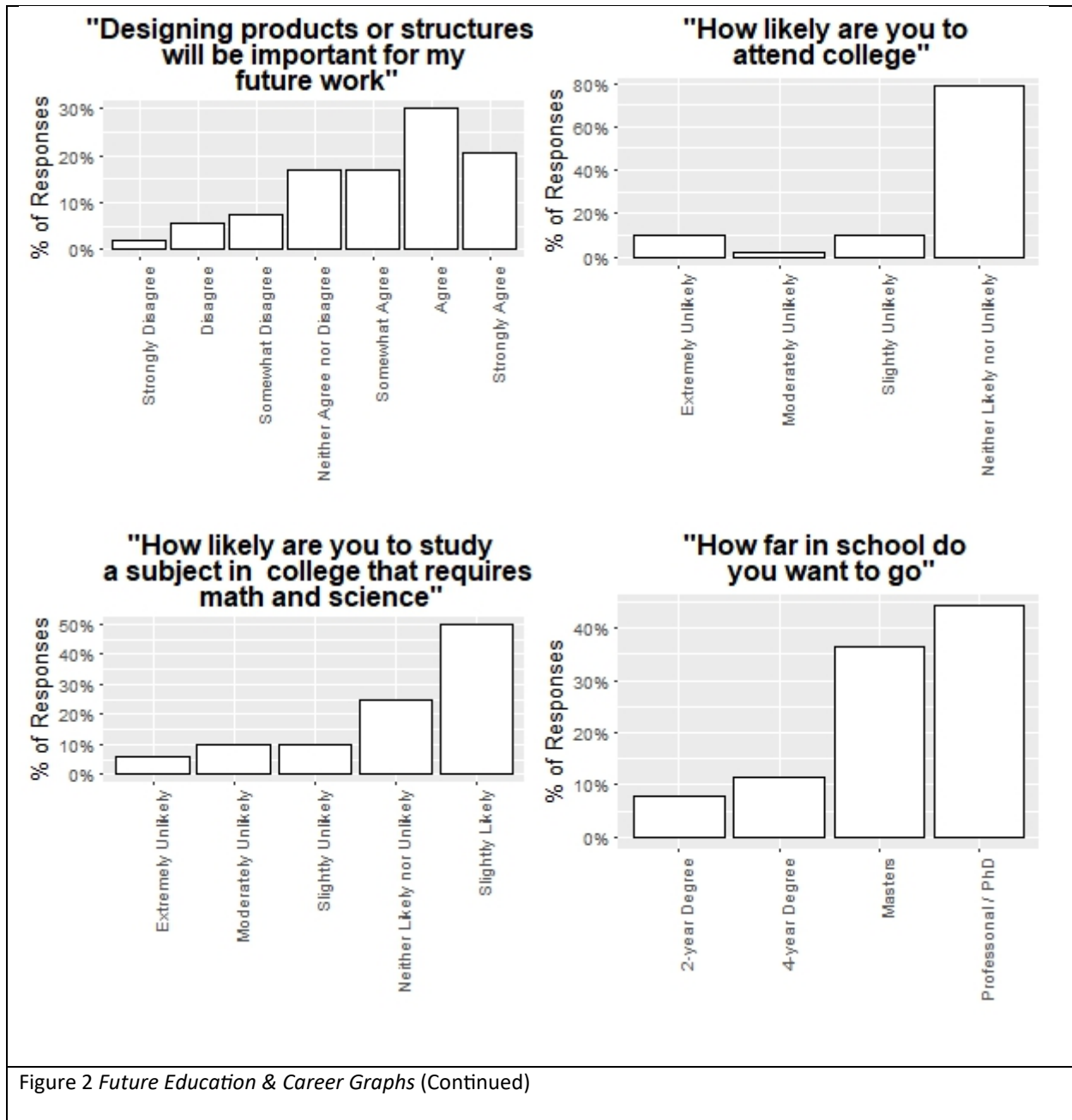
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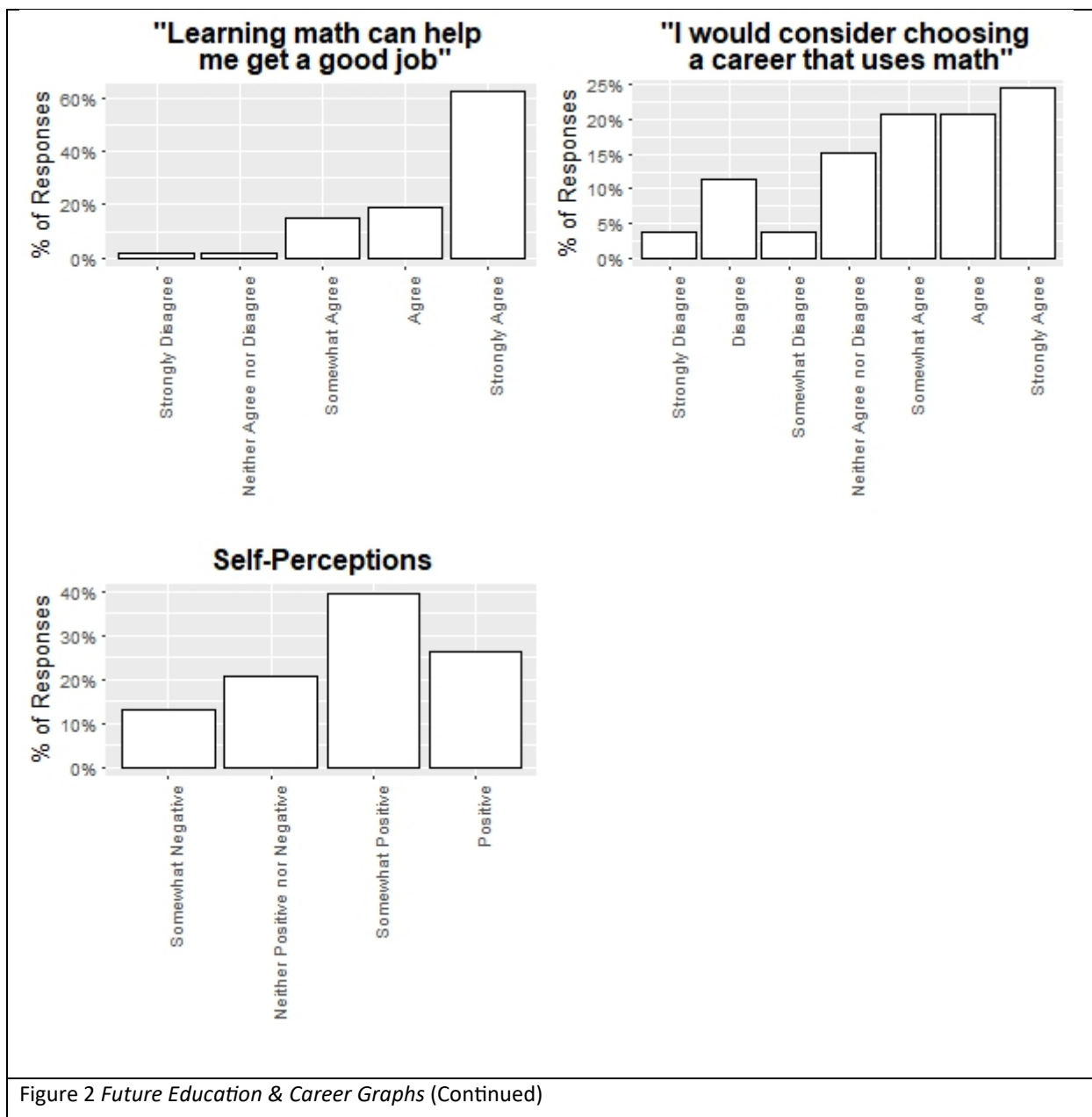
Table 6 Future Education & STEM Careers Items (post-survey results)

Item	% of students selecting either "Strongly Agree" or "Agree"	% of students selecting "Somewhat Agree"	% of student who indicate that they agree to some degree
Learning math can help me get a good job	81.2%	15.1%	96.3%
I would consider choosing a career that uses math	45.3%	20.8%	66.1%
Learning science can help me get a good job	0%	47.2%	47.2%
I expect to use science when I get out of school	52.9%	18.9%	71.8%
I would consider choosing a career that uses science	49.1%	17.0%	66.1%
I would like to be an engineer to help improve life	59.6%	13.5%	73.1%
I would like to be an engineer	47.2%	18.9%	66.1
Designing products or structures will be important for my future work	51.0%	17%	68%
	<b>% of students selecting "Moderately Likely"</b>	<b>% of students selecting "Somewhat Likely"</b>	<b>% of student who indicate that they likely to some degree</b>
How likely are you to study a subject in college that requires math and science	50%	25%	75%
	<b>% of students selecting "Professional / PhD"</b>	<b>% of students selecting "Masters"</b>	<b>% of students selecting "4-year Degree"</b>
How far in school do you want to go	44.2%	36.5%	11.5%









Students were asked the open-ended question “What job would you like to have when you grow up and why?” Student responses varied and some students provided multiple jobs they wish to have. Of these responses 61.3% were STEM related jobs (see Table 7). The top job categories were trades, medical, engineering, and science. Table 8 list the percentage of responses which made up these categories. It appears that the AIS Blanding PREP site is helping to increase or maintain positive attitudes toward STEM related careers.

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Table 7 Percent STEM Careers

STEM Careers	Non-STEM Careers Only
61.3%	38.8%

Table 8 Career Categories by Percent

Career Category	Percent of Students
Trade	22.5%
Medical	20.0%
Engineering	16.3%
Science	12.5%

## STUDENT FOCUS GROUP THEMES

An analysis of students focus group responses found several relevant themes. Many students expressed how the PREP program was benefiting their education. Several students agreed that the teachers at PREP were more challenging than their regular school classrooms and that this increased difficulty pushed them to learn more. One student mentioned a specific way in which PREP was influencing his education when he said:

*[I'm] creating good habits here such as in the classroom, you have to act a little more professional and you have to pay attention. Some of these skills I learned during the first and second year of AIS.*

One student noted the quality of instruction saying:

*Here [at PREP] you can get more. Like the teachers explain it where at school their just like 'here's your homework assignment'...*

A second student added to the previous comment by saying:

*When we get our homework, we have someone here to help us with it; our RAs that have also been there with us also learned the same things that we have in class.*

Some students noted that some of the subjects taught in PREP are not offered in their regular school settings and that the opportunity to participate in PREP was valuable experience because of this. These experiences have also led to several students indicating that they are signing up for more advanced classes in high school. One student said:

*Since I'm here I've learned more I feel more confident so that's why I challenged myself more to do honor classes and, you know, go the hard way rather than, you know, doing the easier stuff... I always try to go for honors.*

As students described the role of social interactions it became apparent that social and emotional aspects of the program were significant for students. One student expressed the importance of the social aspect of PREP saying:

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*I think it's good, the idea of this PREP, because you get to socialize and now I am a part of the anti-social social group.*

After that comment a second student chimed in saying:

*I think a lot of us here are.*

When asked if it was a better social experience than normal school the same student replied:

*In regular school, you are just sitting around and... you feel left out... here you feel like, Yeah!*

Students repeatedly expressed how the experience of living in the dorms was a positive experience that would help prepare them for their future college experience. Several students agreed that being away from home helped them to develop positive life skills such as getting along with others, properly managing their time, and learning to obey rules. One student specifically mentioned that the PREP program has helped him to learn how to cope with homesickness and deal with roommates.

## CONCLUSIONS

The AIS Blanding 2017 Evaluation Report has been presented to inform stakeholders on the program's progress toward a select number of their stated goals and objectives. Results have shown that AIS Blanding PREP has made great progress toward establishing a collaborative effort to fulfill the general goal to broaden participation in STEM related higher education programs and subsequently STEM related careers.

The AIS Blanding PREP program has been successful in recruiting and retaining a large portion of underrepresented populations to participate in the intensive summer mathematics and STEM program. The proportion of students representing traditionally underrepresented populations in STEM fields is notable considering the context in which some sites operate. It was clear that students are being challenged in the PREP program and that their mathematics proficiency is increasing by the end of the seven-week summer program. Students come to PREP with very positive attitudes STEM fields, and particularly mathematics. These positive attitudes are being maintained and even increased throughout all three summers students participate in the program.

## APPENDIX

## STUDENT ATTITUDE SURVEY QUESTIONS BY FACTOR STRUCTURE

<b>Attitude Toward Math</b>	<b>Attitude Toward Science</b>	<b>Attitude Toward Engineering</b>	<b>Student Self-Perceptions</b>
I enjoy learning math	I can do well in science	Engineering is useful in everyday life	With enough time and effort, I think I could significantly improve my intelligence level
I can do well in math	I could do advanced work in science	I am interested in what makes machines work	I can learn to do things that I think are hard
I could do more advanced work in math	I enjoy learning new concepts in science	I am curious about how electronics work	I am a hard worker
Math is useful in everyday life	Science is useful in everyday life	I am good at building and fixing things	I work hard to achieve my goals
Learning math can help me get a good job	Learning science can help me get a good job	I would like to be an engineer to help improve life	I am diligent in finishing my tasks
I understand why math is important in my life	I expect to use science when I get out of school	I would like to be an engineer	I believe that hard work is important for success
I enjoy participating in math-related activities	I understand why science is important in my life	I would like to use creativity and innovation in my future work	I am confident I can include others' perspectives when making decisions
I enjoy working on real-world problems that use math	It is important for me to understand science concepts,	I think about creating new products	I can recognize my teammates strengths
I am successful at solving problems using math	Understanding science gives me a sense of doing well s	Designing products or structures will be important for my future work	I am confident I can work well with students from different backgrounds
Doing math-related activities is important to who I am	It is important that others see me as a science person	I believe that engineers can help improve our world	I am confident that I can make changes when things do not go as planned
It is important for me to understand math concepts, not just complete an assignment	I would consider choosing a career that uses science	Technology is useful in everyday life	I am confident I can lead others to accomplish a goal
Understanding math gives me a sense of doing well	I enjoy participating in science-related activities	I like to work with technology	I am confident I can work well as part of a team

**Student Attitude Survey questions by Factor Structure** (Continued)

<b>Attitude Toward Math</b>	<b>Attitude Toward Science</b>	<b>Attitude Toward Engineering</b>	<b>Student Self-Perceptions</b>
I would consider choosing a career that uses math	I enjoy real-world problems that use science		I am confident I can encourage others to do their best
I expect to do well in next year's math class(es)	I am successful at solving problems using science		I am confident I can manage time wisely when working on a team
I plan to take advanced classes in mathematics	Doing science-related activities is important to who I		I am confident I can make changes when things do not go as planned as part of a team
I would take more math classes even if I didn't have to	I expect to do well in next year's science class(es)		I consider different ways to solve problems
I enjoy working on difficult problems	I plan to take advanced classes in science		I enjoy learning about social studies
	I would take more science if I didn't have to		I enjoy learning about language arts

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## REFERENCES

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<sup>1</sup> Friday Institute for Educational Innovation (2012). *Student Attitudes toward STEM Survey-Middle and High School Students*, Raleigh, NC: Author.