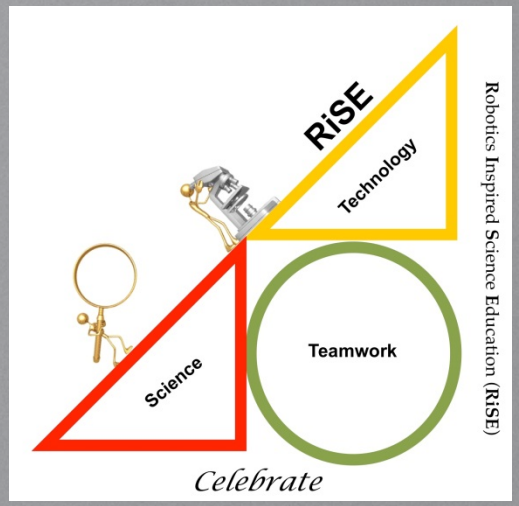
GRAF's Robotics Inspired Science Education (RiSE) 2011 Survey Report

June 3rd 2012

Prepared by :
Dr. Ashitey Trebi-Ollennu and Dr. Yaw Okraku-Yirenkyi

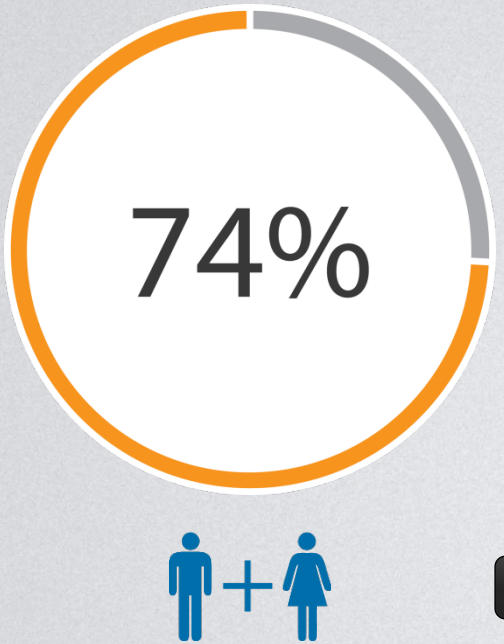
98% of the alumni rated their RiSE 2011 experience as "excellent" or "good"



Introduction

- The Ghana Robotics Academy Foundation (GRAF), in collaboration with the AITI-KACE) and U.S. Embassy in Ghana, invited RiSE 2011 alumni to complete a survey, a total of 399 alumni.
- The survey questionnaire was based on 2005 U.S. FIRST survey report “More than Robots:An Evaluation of the FIRST Robotics Competition Participant and Institutional Impacts by Alan Melchior, Faye Cohen, Tracy Cutter, and Thomas Leavitt Center for Youth and Communities Heller School for Social Policy and Management Brandeis University,Waltham, MA”
- The objective of the survey was to identify the educational effects that participation in RiSE 2011 had on students. Specifically, the survey inquired about students’ confidence and interest in science, technology, engineering, and mathematics (STEM) coursework and their plans to pursue STEM careers as a result of their involvement with RiSE 2011.
- In addition, the survey asked in depth questions about their family characteristics, their satisfaction with RiSE 2011, and also to provide their impressions about various aspects of their RiSE 2011 experience.
- The first part of the report provides demographic information, personal history, and family characteristics as self-reported by respondents.
- The second part indicates overall respondents' satisfaction and impact on their interest in STEM education and careers post RiSE 2011.

Respondents Demographics



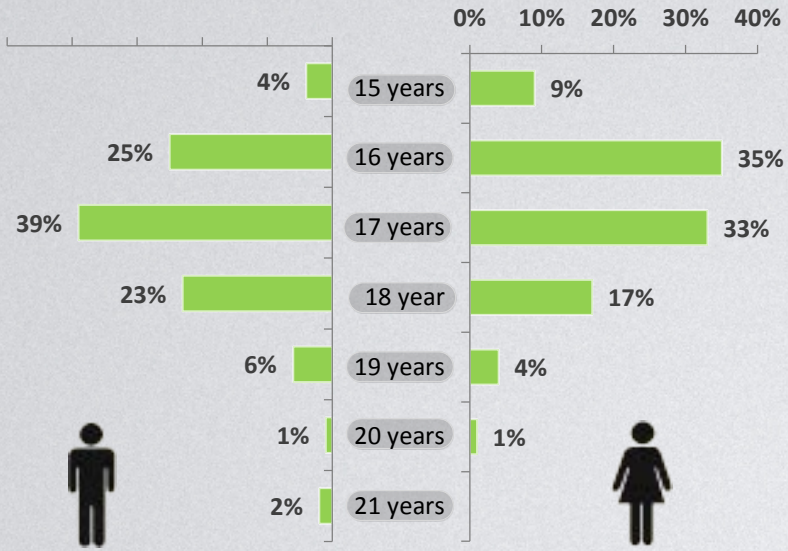
N=294

The overall response rate for the RiSE 2011 alumni is 74%. The response rates for all ten regions and all demographic groupings are also consistently high, and the respondent characteristics match very closely those of the overall alumni population of RiSE 2011.

50% of the respondents were male and 50% female.

294 alumni responded out of 399 from 32 SHS out of 40 RiSE 2011 SHS.

Respondents Demographics



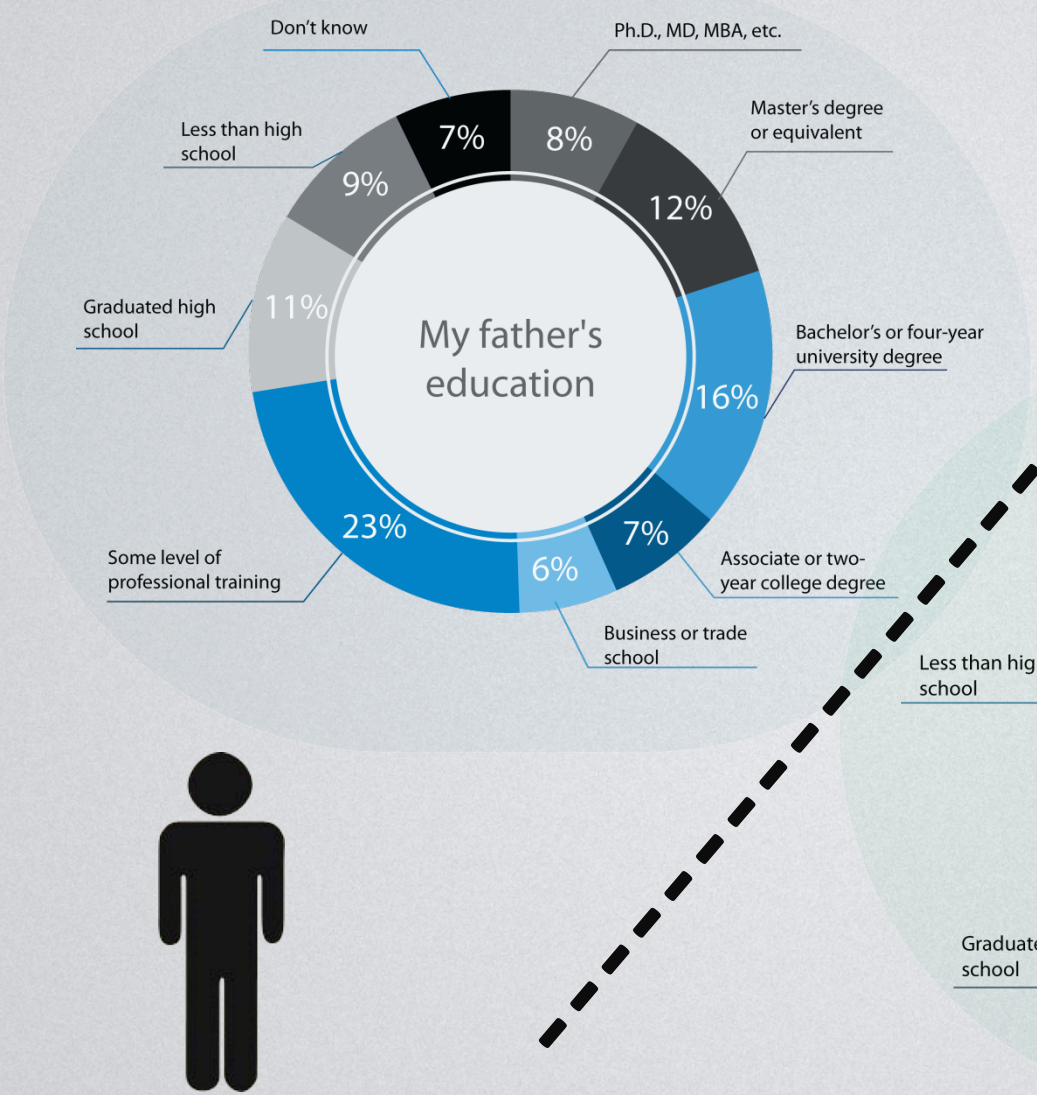
Age Distribution

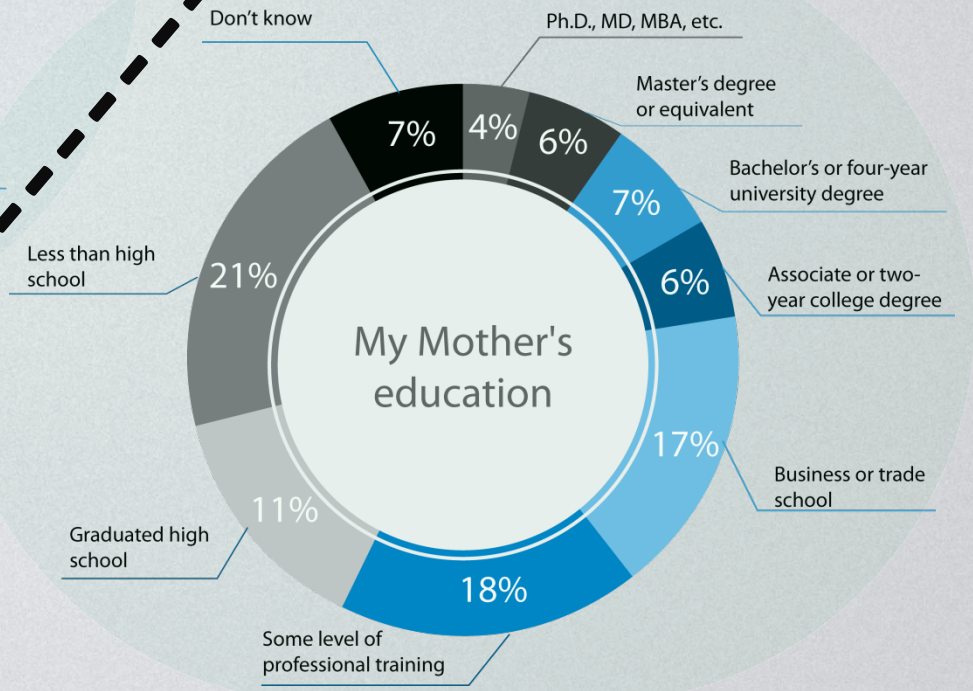
About 31% of the respondents are under the age of 17 years, 62% are between 17 years and 18 years, and 8% are over the age of 19 years.

SHS Year Distribution

57% of the respondents are third year students, 40% are second year students, 2% fourth year students and 1% first year students.

Respondents Demographics





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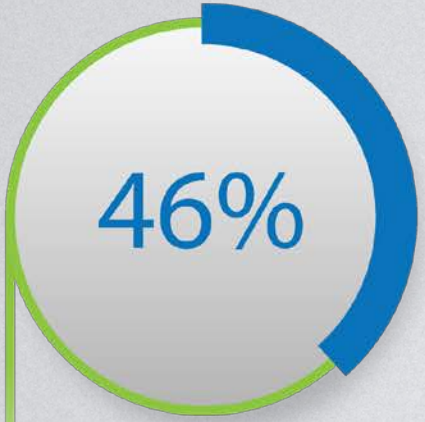
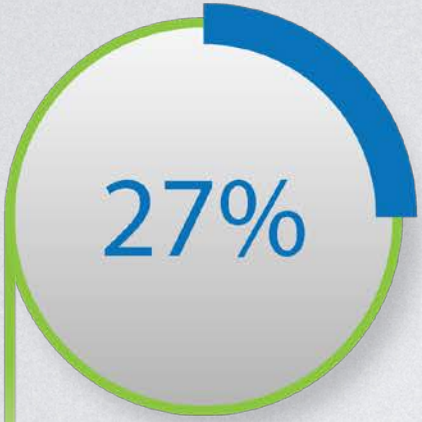
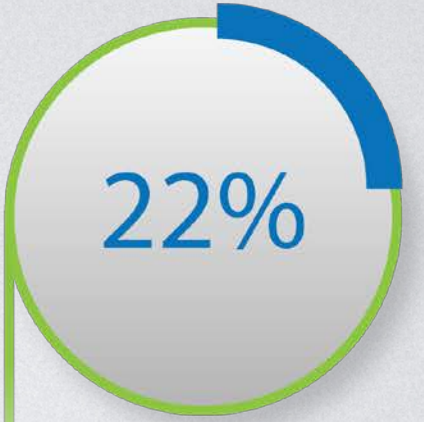


46% came from families where neither parent had attended 4-year or 2-year college



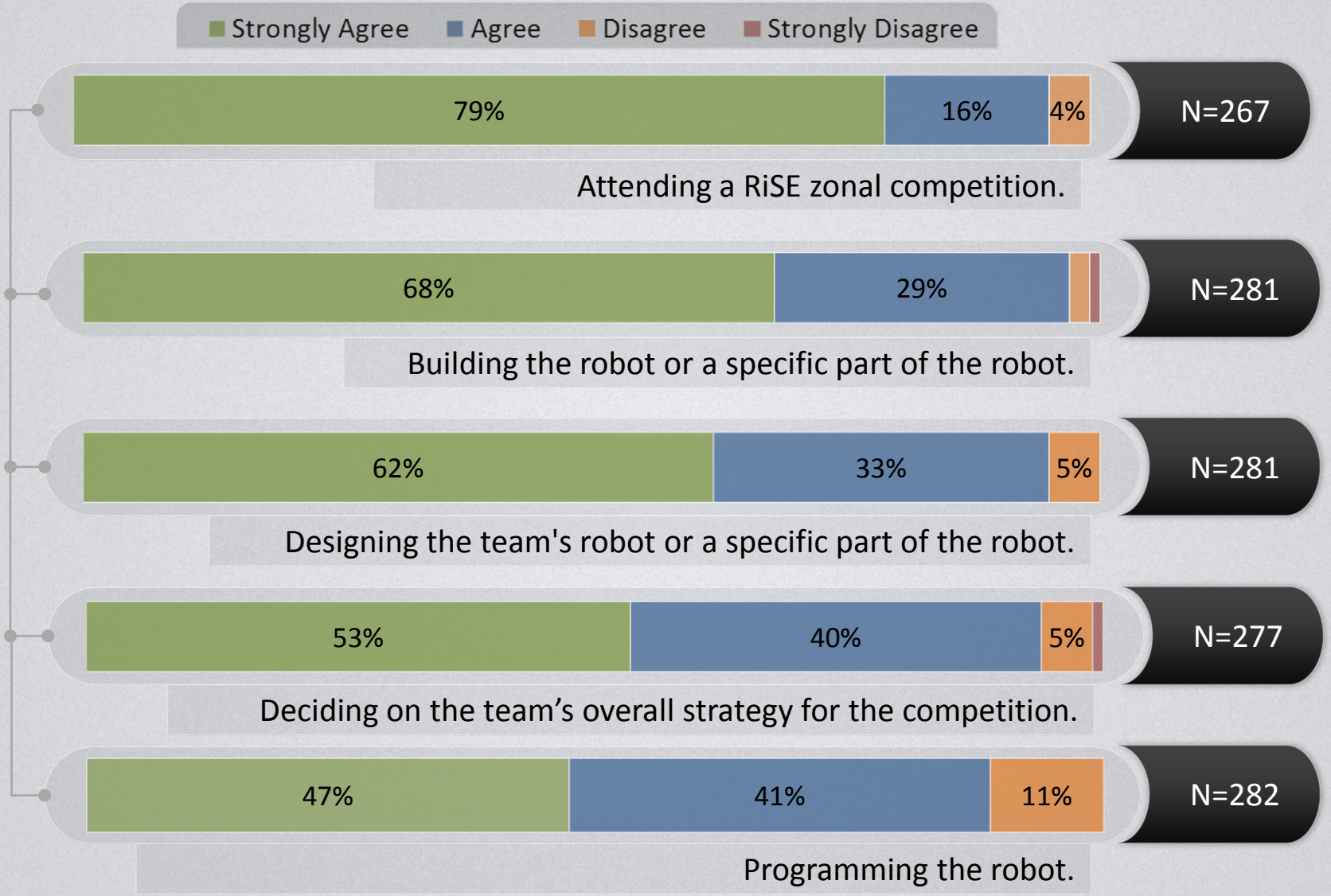
27% came from families where only one parent attended 4-year or 2-year college.



22% came from families where both parents highest level of education is graduated high school or less than high school

19% came from families where both parents graduated from a four or two-year college

Q2. Level of Participation in RiSE 2011 Activities



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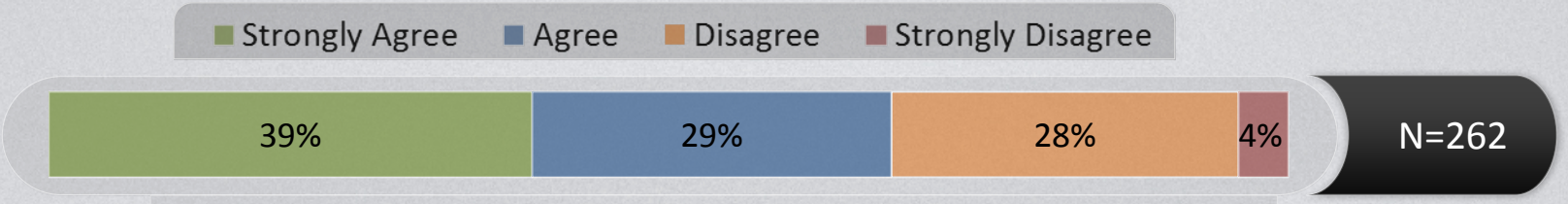


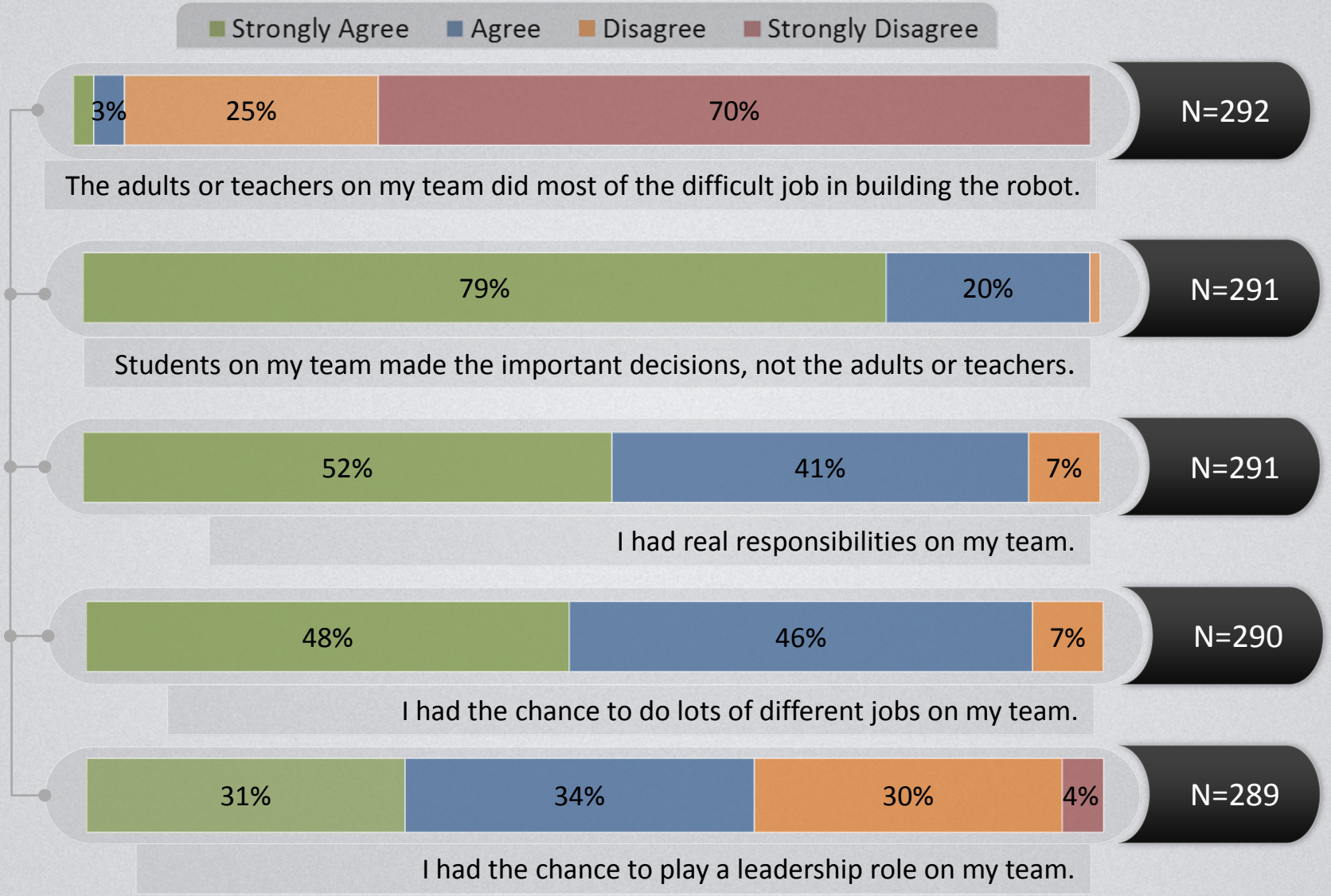
Making a presentation to the judges at a RiSE zonal competition.

Summary : Q2. Level of Participation in RiSE 2011 Activities

The level of involvement of each respondent in RiSE 2011 varied depending on the task they were assigned on their team. However, almost all respondents were fully engaged in core team activities (Q2).

93%	Team members reported involvement in the core team activities of deciding on the overall team strategy.
95%	Designing the robot or a specific part and building the robot or a part of the robot.
89%	Reported involvement in programming the robot.
90%	Respondent rated their overall level of involvement as a 4 or 5 on a scale of 1 to 5, with 5 indicating “very involved”.
68%	Reported making a presentation to the judges at the competition.

Q4. Quality of the RiSE 2011 Experience



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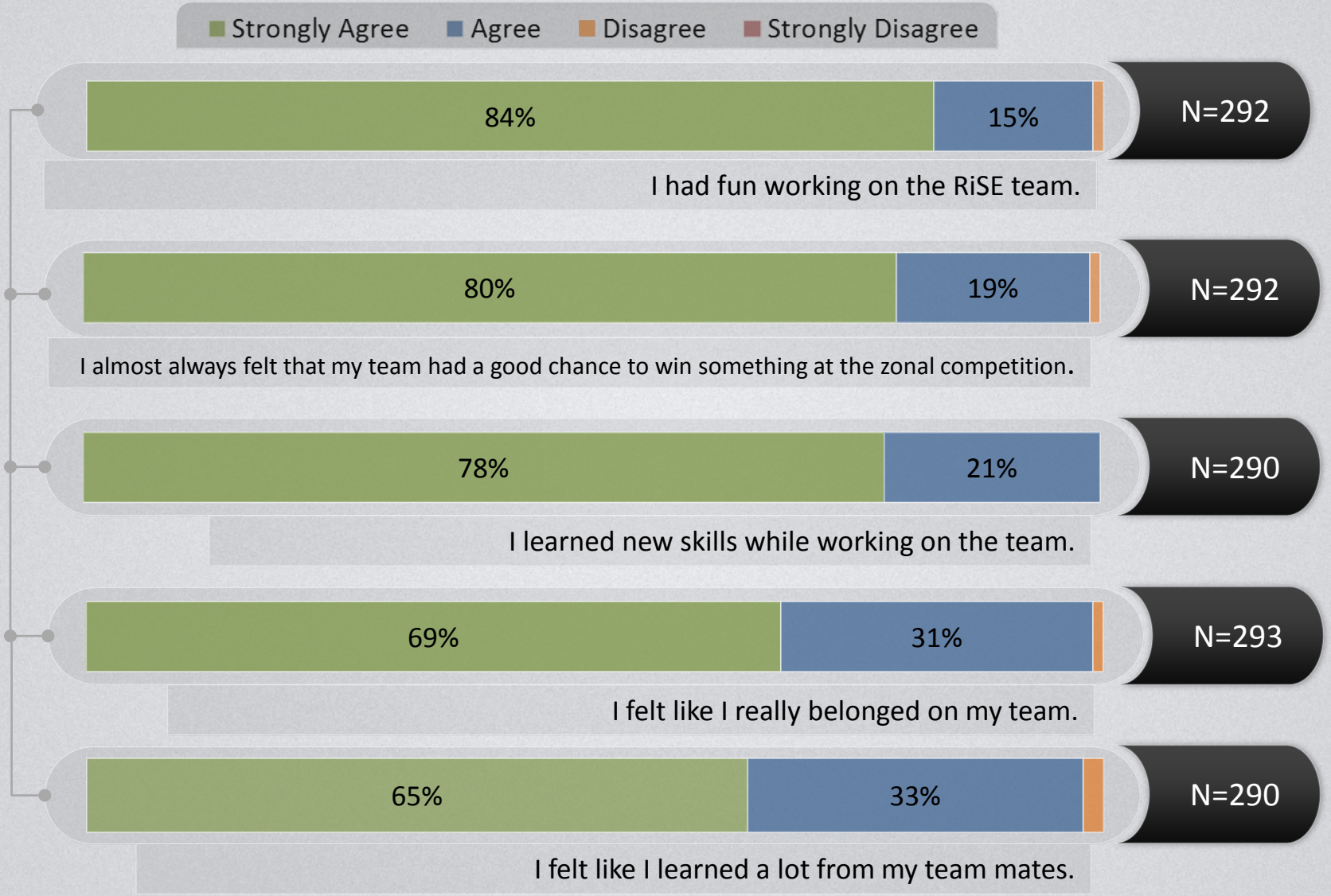
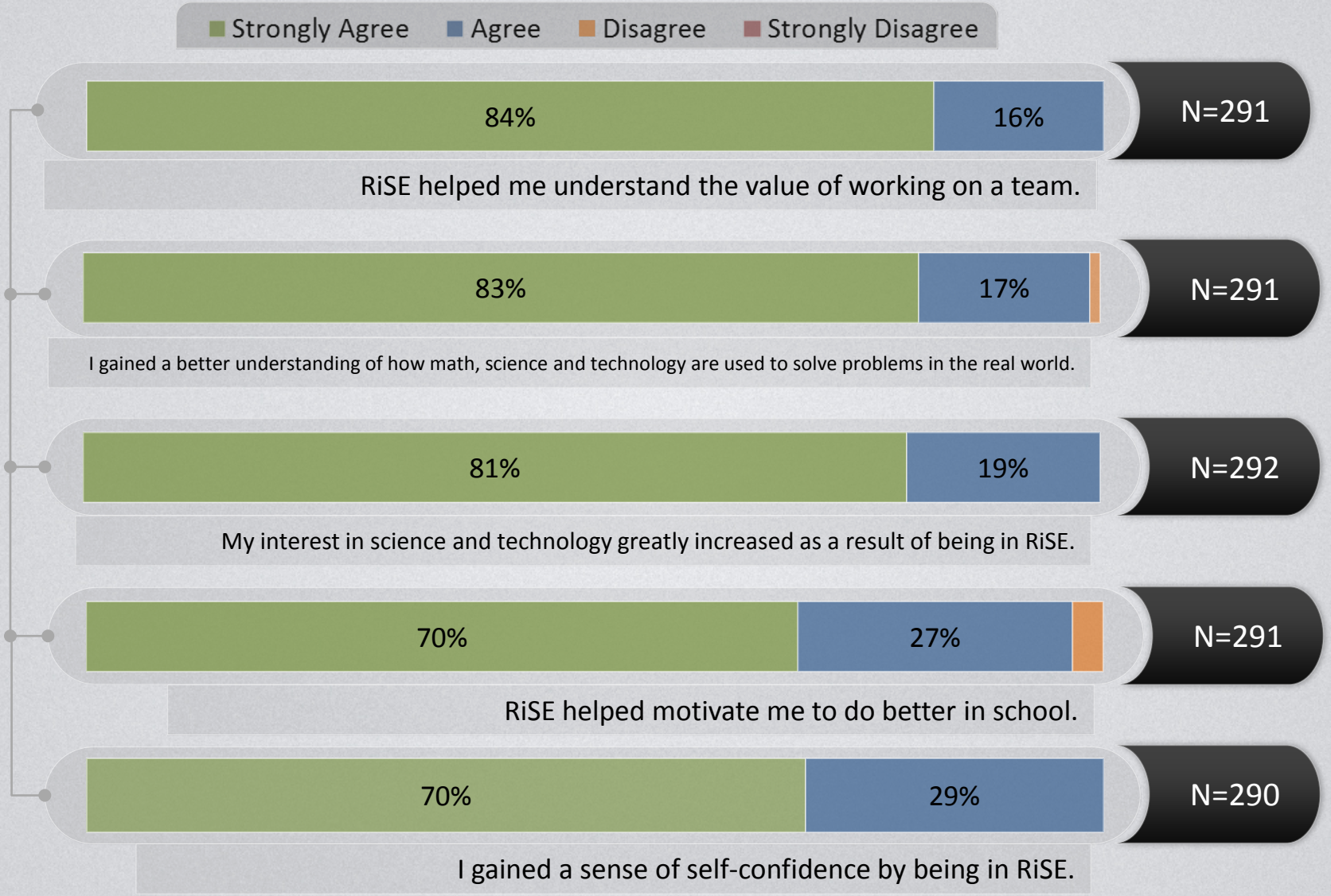


Summary : Q4. Quality of the RiSE 2011 Experience

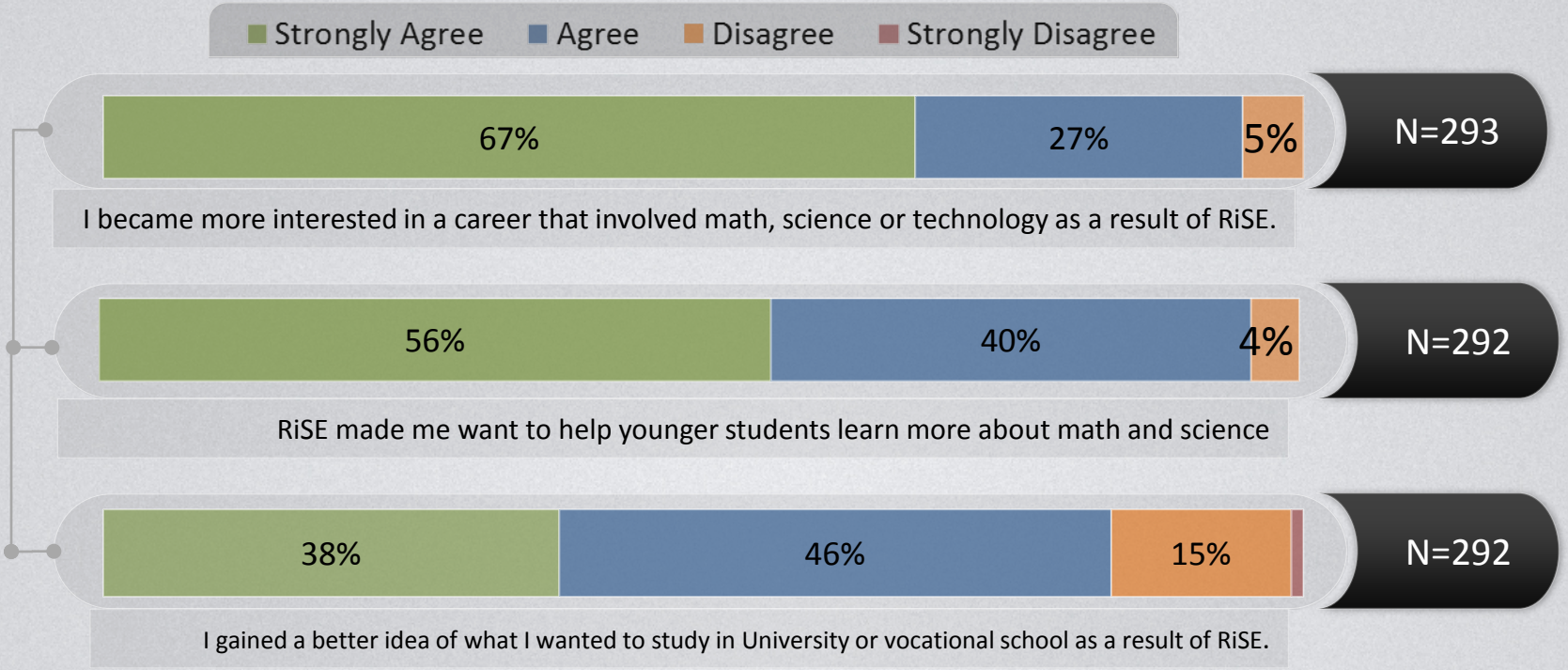
Nearly all alumni respondents felt RiSE 2011 had provided them with a holistic challenging real life experiences that effectively promote positive youth development as a support to academic achievement and becoming competent, contributing adults (Q4).

93%	Alumni indicated they had “real responsibilities”
65%	Respondents felt they had an opportunity to play a leadership role.
99%	Reported that students made the important decisions.
99%	Nearly all alumni reported having fun.
99%	Alumni felt they “really belonged” on their team.

Q5. Impacts on knowledge and Behavior



Q5. Impacts on knowledge and Behavior

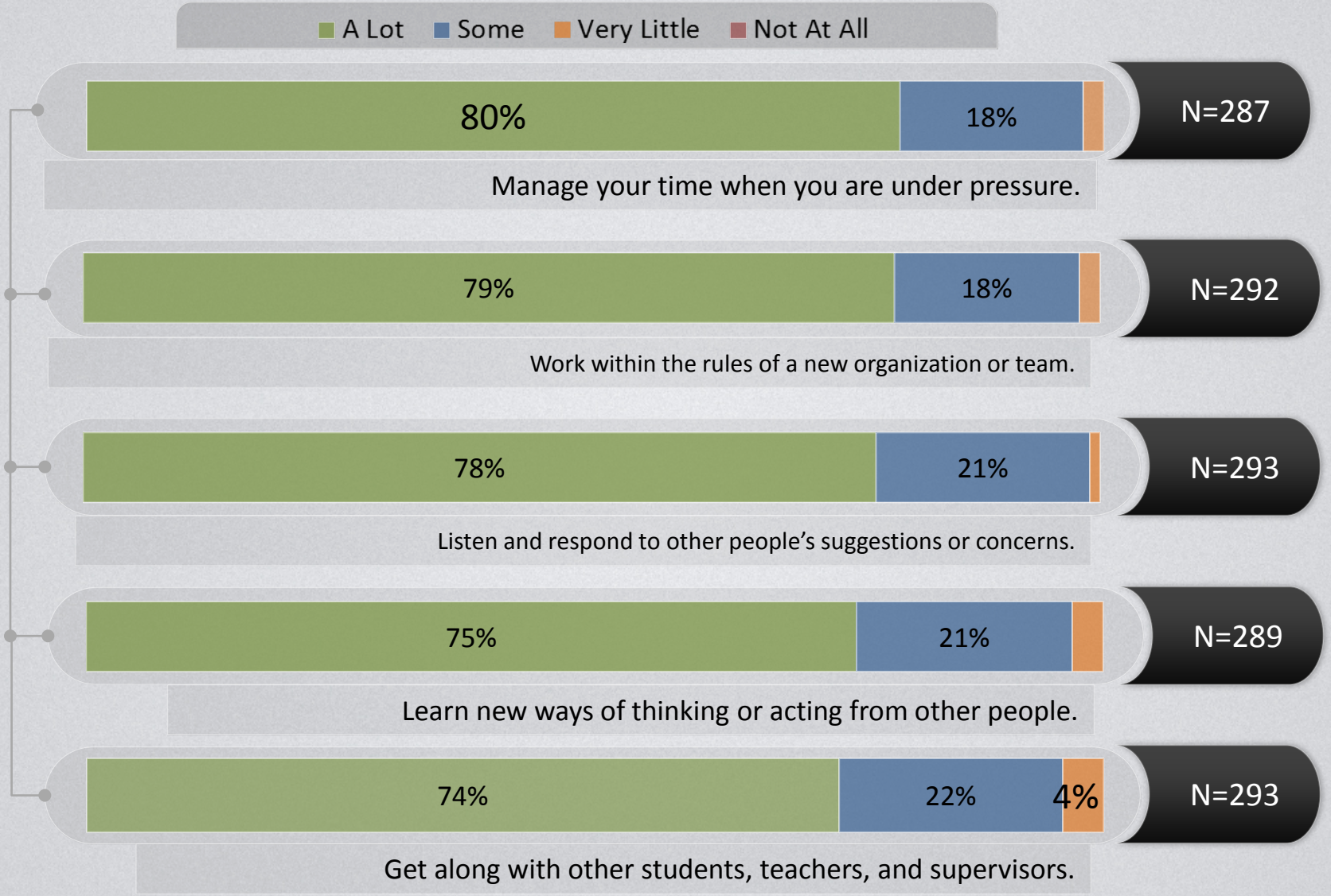


Summary : Q5. Impacts on knowledge and Behavior

Over two-thirds of the alumni also reported a positive impact on their attitudes towards teamwork, an increase passion for science and technology, and a boost in self-confidence (Q5)

99%	All alumni respondents indicated that they had greater appreciation of the value of teamwork.
99%	Almost all alumni respondents reported an increased understanding of the critical role of science and technology play in everyday life.
94%	All alumni respondents reported an increased interest in science and technology generally, and increased interest in STEM careers.
99%	Nearly all alumni respondents reported an increase self-confidence.
97%	Alumni respondents reported an increased motivation to do well in school.

Q6. Impacts on participant skills



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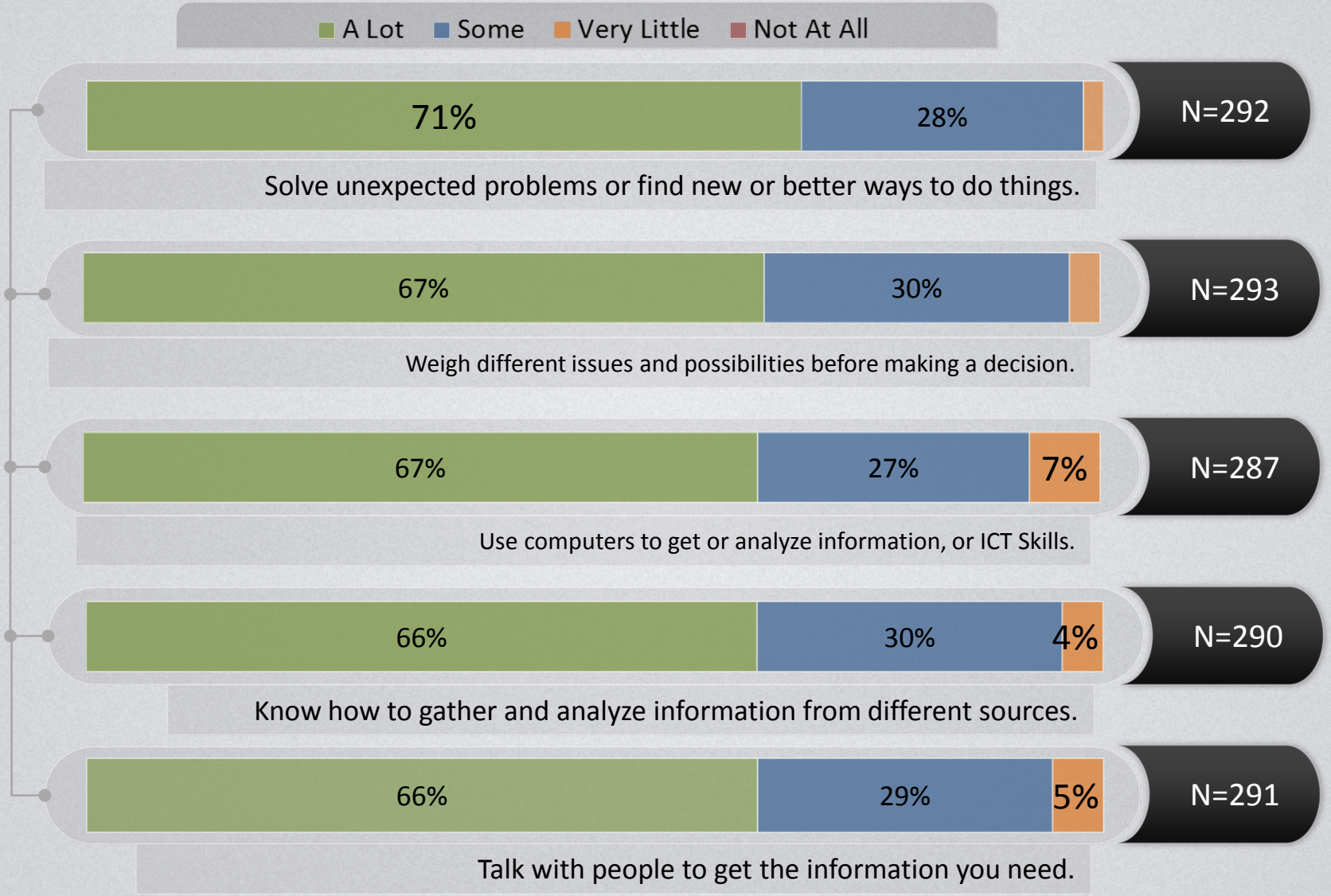

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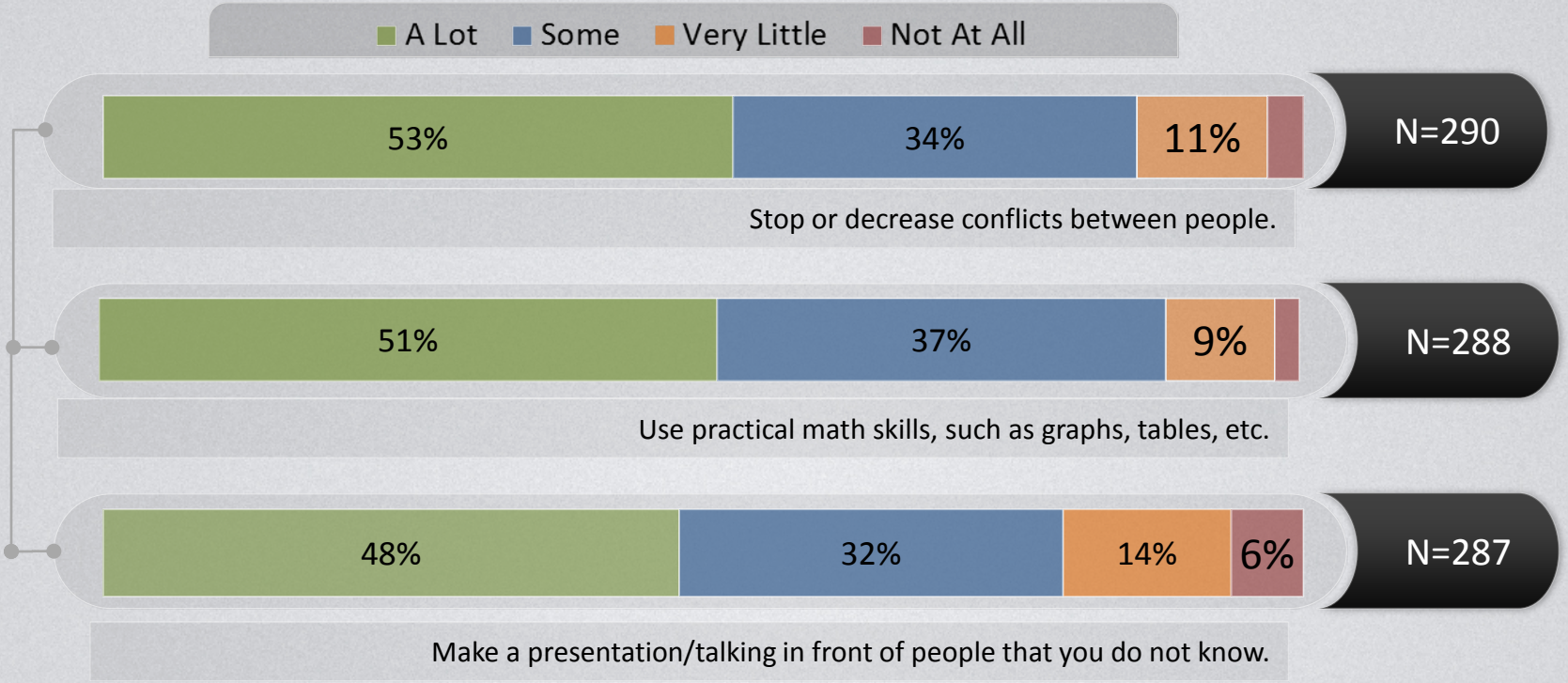


Summary : Q6. Impacts on participant skills

Nearly all of the participants reported that RiSE 2011 had helped them gain career-molding experience and skills such as communications, interpersonal, problem-solving, and practical application of classroom curriculum in real-world settings (Q6).

97% Respondents reported learning important communications skills, such as active listening and responding to other people's suggestions and how to talk with people to get information.

96% Learned teamwork and interpersonal skills. 96% reported learning how to get along with other students, and teachers; 98% learned to work within the rules of a new organization or team.

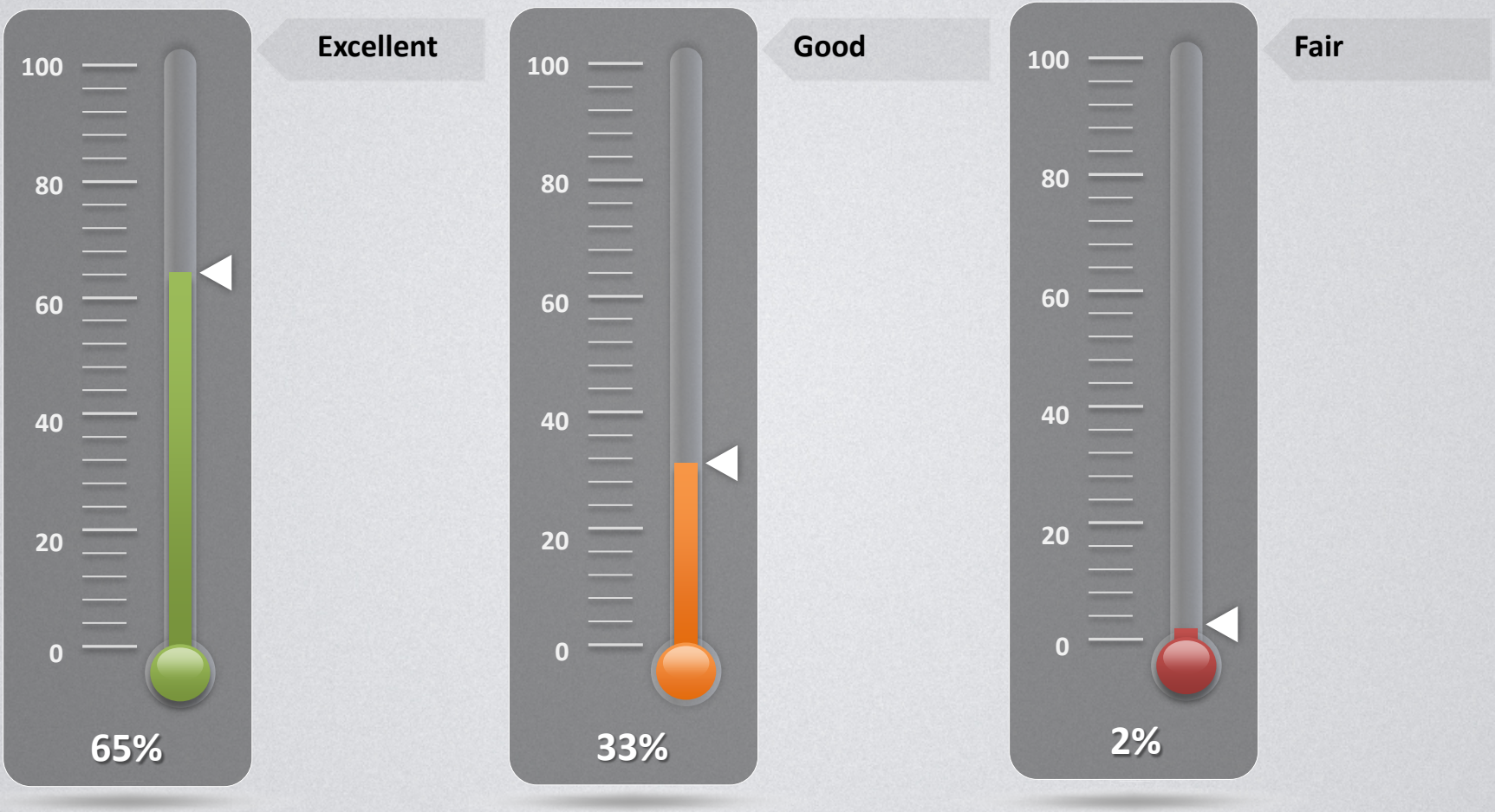
97% Learned problem-solving and time management skills: how to solve unexpected problems (98%); how to manage their time under pressure (97%).

97% Learned how to weigh issues and options before making decisions (97%); and how to gather and analyze information (97%).

90% Learned to apply traditional academic skills in real-world setting: 94% reported learning how to use computers to retrieve and analyze data, and 88% reported learning about using practical math skills.

Q11. Overall Satisfaction RiSE 2011

N=290



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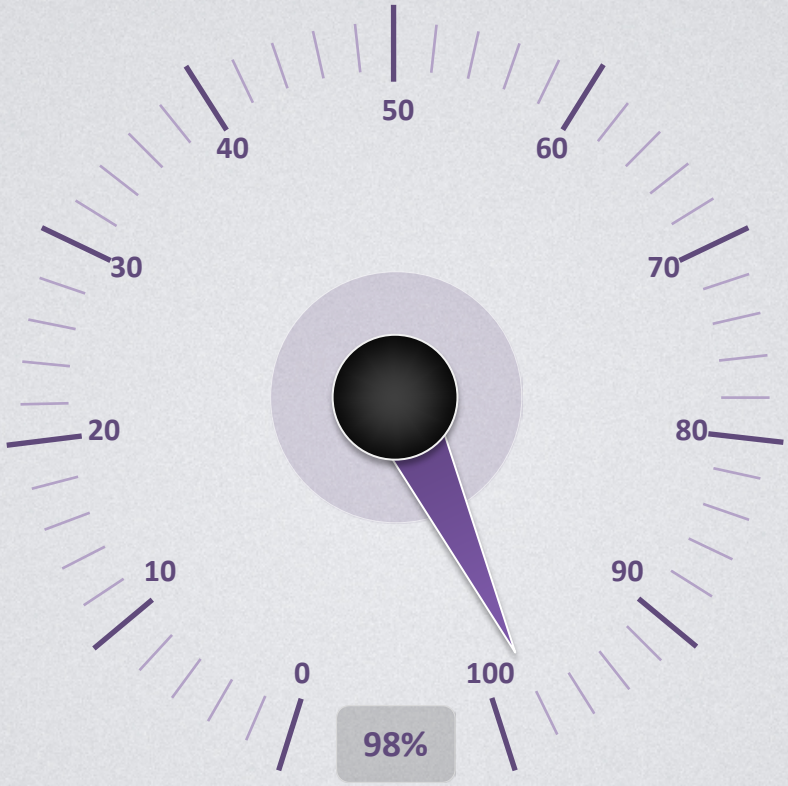


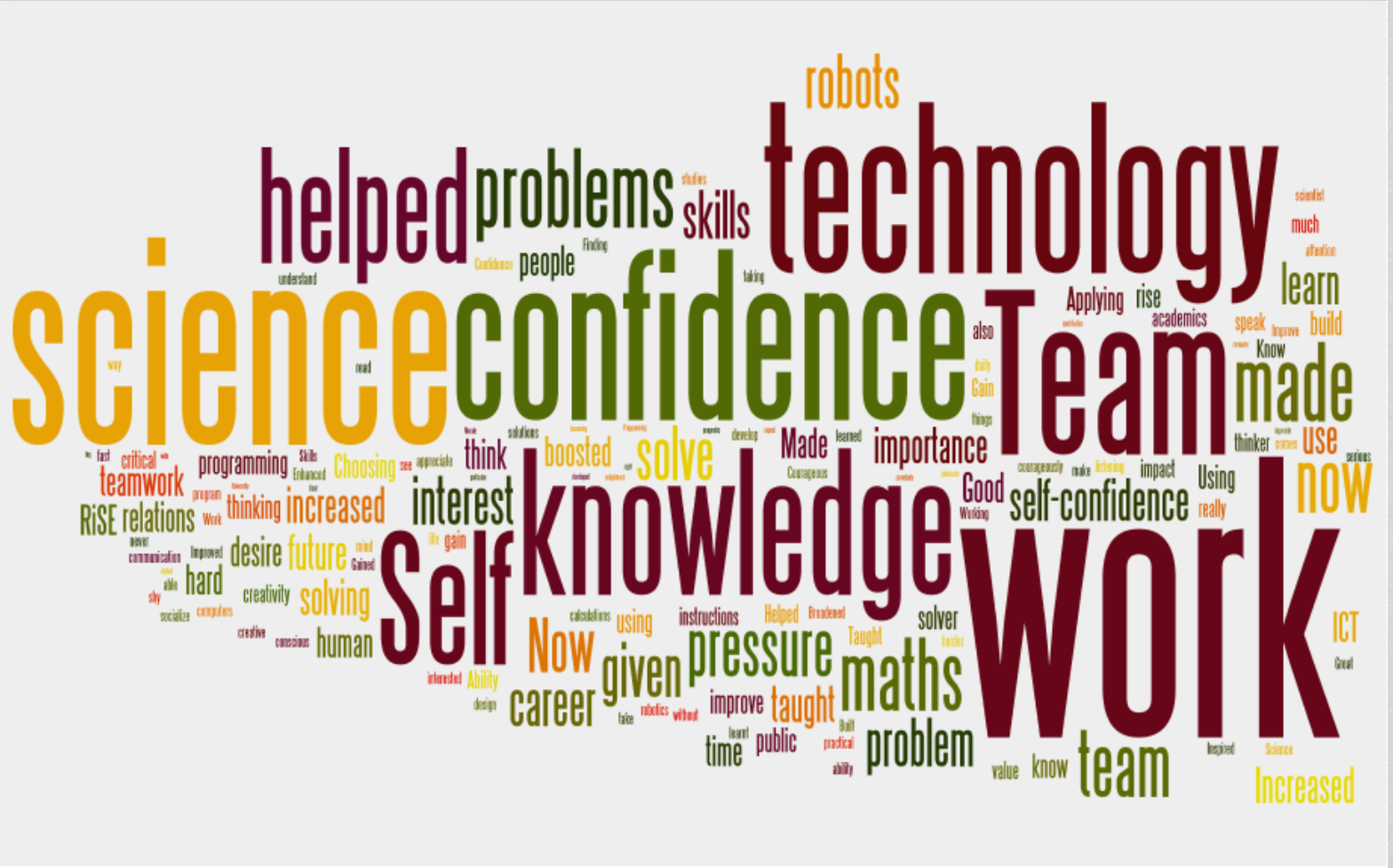
98% of the alumni rated their RiSE 2011 experience as “excellent” or “good”

Open Ended Questions Analysis

- Response to open-ended questions reinforce earlier quantitative findings: participants cited a positive impact on their attitudes towards teamwork, an increase passion for science and technology and increased self-confidence and motivation, as long-term impacts from RiSE 2011.
- **Word clouds:**
  - Word clouds have become an increasingly popular visualization tool for large amounts of text.
  - Word clouds show frequencies of words visually. The most common words are displayed larger, while the less frequent words appear smaller.
  - Word clouds are a fun and attractive way to display words from survey comments and open ended text questions.
- In the following two slides word clouds will be used to display the words from the respondents comments on the open ended questions from this survey. The two word cloud tools that we used are wordle http://www.wordle.net and tagcrowd http://tagcrowd.com/.
- The results of the two word clouds analysis are consistent with the previous quantitative findings.

Word Cloud Created In Wordle Based On Respondents Comments To Open Ended Questions.

What they said. Wordle.com



Word Cloud Created In Tagcrowd Based On Respondents Comments To Open Ended Questions.

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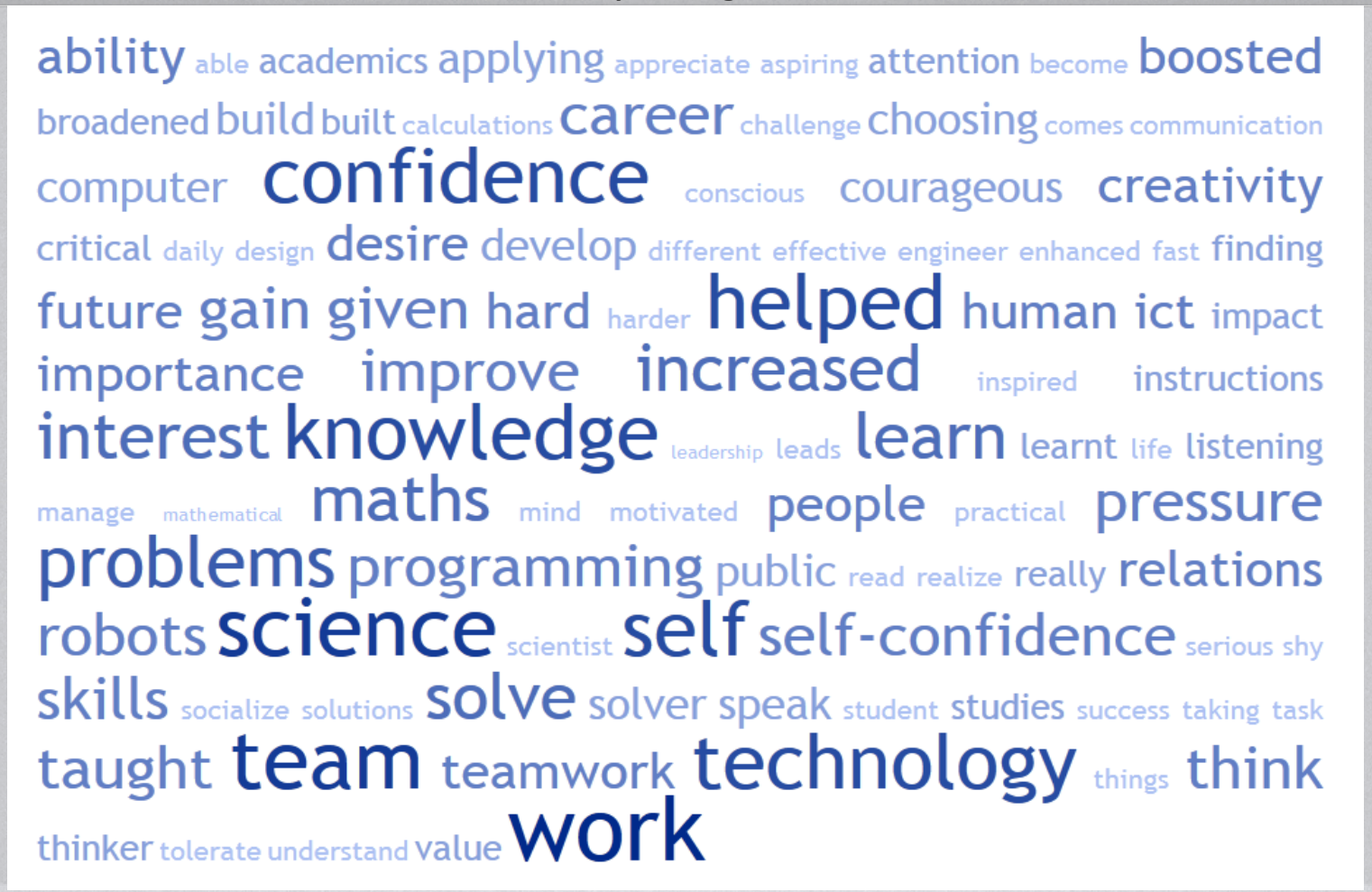

Summary of Findings

- Overall, a vast majority RiSE 2011 alumni respondent indicated that participation in RiSE 2011 provided them a career-molding experience and skills such as communications, interpersonal, problem-solving, and practical application of classroom curriculum in real-world settings. In addition, it had a positive impact on their attitudes towards teamwork, an increase passion for science and technology, and a boost in self-confidence. Also RiSE 2011 experience has provided them with a holistic challenging real life experiences that effectively promote positive youth development as a support to academic achievement and becoming competent, contributing adults.
- The survey results also indicated opportunities for improvement including:
  - Provide opportunities for more students from each SHS to present their team's work to the judges.
  - Provide more computers and Lego kits during the workshop.
  - Provide a better audio visual system.
  - Issue certificates to each participant.
  - Make prizes and awards equitable between first, second and third places.
  - Expand the program to include more senior high schools.
  - Organize a national championship in addition to the zonal championships.

GRAF

ghanarobotics.org

GRAF'S VISION

To transform the learning experience of young Ghanaians by connecting science theory with practice and hands-on learning experience to draw students to pursue education and career opportunities in science, technology, engineering, and math (STEM).

GRAF'S MISSION

Our mission is to inspire, unlock creativity, innovation and passion for science and technology for young Ghanaians, by using the motivational effects of robotics to deve lop science, engineering and technology skills, while building well-rounded leadership skills including self-confidence, emotional intelligence, communication, and stewardship.

RISE'S MISSION

Robotics Inspired Science Education (RiSE) Workshop mission is to inspire and energize teachers, middle school, high school and college students in Ghana to pursue education and careers in science, technology, engineering, and mathematics (STEM) by using the motivational effects of robots to connect theory with practice.

Acknowledgments

GRAF extends its sincere appreciation to the following organizations and people for devoting their time and expertise, organizing and collating the survey results.

GHANA-INDIA KOFI ANNAN CENTRE OF EXCELLENCE IN ICT

1. Jennifer A. Mmabila
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3. Cliff Osei-Afriyie
4. Dr. Yaw Okraku-Yirenkyi

US EMBASSY, GHANA

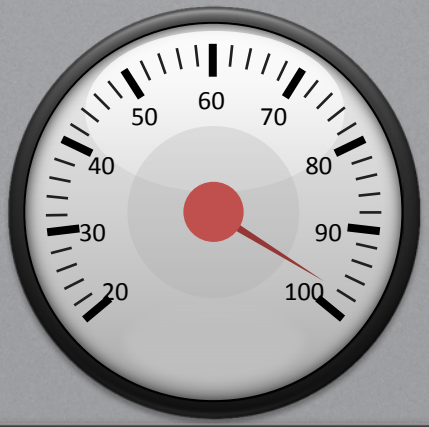
1. Aaron Fishman
2. Patience Charway

GRAF

1. Samuel Allotey, Wing Cdr Rtd , Founding Member
2. Kwesi Dickson , Founding Member
3. Nii Ashitey Kofi Ollennu, Founding Member

THANK YOU!

For your attention



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