

2013 RRISD Globaloria Program – Survey Analysis

Executive Summary

The Summer Enrichment Program, Kids Investing in Careers, Knowledge, and Skills (or KICKS) was first implemented in Round Rock ISD in 2008 as a way to address the growing population of at-risk children in the district who did not have enriching summer activity opportunities. While originally conceived as a general enrichment program, Summer KICKS refocused in 2011 on STEM education in response to the district's identified need to close achievement gaps in those areas. The 2013 program engaged two national STEM initiatives: **Globaloria**, a project-based learning platform for game design where students create their own video game, and **Future City**, another project-based learning experience in which students design, build, and present a "future" city using SimCity software. Round Rock ISD collaborated with Skillpoint Alliance, an Austin-based workforce and education non-profit organization, to provide third-party data collection and program evaluation services, as well as teachers and community volunteers to staff the program. This report looks primarily at the Globaloria program, in particular the data collected from participant surveys before and after the program. One objective of this document is to assess how effective the Globaloria classes were at providing students with STEM course knowledge and interest, technological competency, and career awareness. In addition, this report aims to provide suggestions and recommendations for future RRISD Summer KICKS Programs.

Highlights from this report include:

- Students in Globaloria (and in Summer KICKS programs overall) demonstrated a greater knowledge of energy sustainability topics and performed better on sample science TEKS questions after participating in the program;
 - Students participating in Globaloria expressed increased interest in pursuing college after high school graduation overall and across all key sub-groups (Black or African-American, Hispanic, and/or female);
 - After completing the Summer KICKS program, students in Globaloria reported greater interest in STEM fields (computer programming, mechanical or electrical engineering, math, and science);
 - Results from the surveys suggest students developed a better awareness of the rigor of pursuing STEM careers and fields; and
 - Survey evidence suggests that Globaloria was successful in accomplishing programmatic goals and had a greater impact than the Future City program in terms of student performance outcomes.
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Research Entity

Skillpoint Alliance is a 501(c)(3) nonprofit organization that builds partnerships among industry, education and the community, leading to college and career success for Central Texans, while meeting employers' needs for a qualified workforce. The Science, Technology, Engineering & Math (STEM) Council at Skillpoint Alliance is a consortium of high-tech executives and education leaders that address workforce and education needs of the engineering and high-tech industries in the region. The STEM Council particularly focuses on promoting project-based K-16 STEM education programs, applying classroom learning for industry engagement, and increasing the number and diversity of students on a STEM career path.

Summer KICKS Program at Round Rock ISD

The Summer Kids Investing in Careers, Knowledge, and Skills (KICKS) program was established in 2008 to address the growing population of at-risk children in RRISD who did not have enriching summer activity opportunities. With key financial and advisory support from the KDK-Harman Foundation, Summer KICKS refocused in 2011 from a

general enrichment program to STEM education in response to the district’s identified need to close achievement gaps in those areas.

In 2013, Round Rock ISD and the Round Rock ISD Education Foundation collaborated with Skillpoint Alliance for the district’s Summer KICKS program. The 2013 program was offered exclusively for the district’s middle-school at-risk youth (rising seventh-, eighth, and ninth-graders) and took place at Hernandez Middle School. Students were recruited by counselors, personnel from after-school programs that serve at-risk students, teachers, and community members. Students attended four half-days a week for four weeks (a total of 64 hours of instruction). Approximately half of the students participated in Globaloria, where students designed and programmed web-based video games that explored STEM topics through a mix of instruction, team-based learning, and on-line networking with experts and peers. The remaining students participated in Future City, in which students planned a city of the future using SimCity Deluxe software, built a scale model of their city using recyclable materials, and presented their “future” city to peers and visiting parents.

Skillpoint Alliance provided trained educators and community volunteers to staff the program, while Round Rock ISD provided teacher’s aides to help with classroom management, facilities, management and clerical support, and evaluation services. Students participated in a pre- and post-survey of their interest in computer programming, their mastery of TEKS-based computer programming skills, and their knowledge of and interest in computer programming careers. These surveys were conducted jointly by Skillpoint Alliance, Summer KICKS, and the RRISD Department of Evaluation and Statistical Analysis.

District Demographic Information

RRISD includes the majority of the City of Round Rock, Texas, as well as portions of the City of Austin, a small area of the City of Cedar Park, and unincorporated portions of Williamson and Travis counties. Approximately 46,500 students attend the district, which has witnessed a 15% increase in enrollment since 2009. In Table 1, RRISD’s ethnic base is compared to state total demographics.

	Round Rock ISD	Texas
African American	10.7%	14%
Hispanic	26.2%	48.6%
White	51%	33.3%
Asian/Pacific Islander	11.7%	3.7%
Native American	0.4%	0.4%

The racial/ethnic demographic breakdown for the 2013 RRISD Summer KICKS program as a whole and Globaloria individually was as followed:

	Overall	Globaloria
African American	17.91%	13.79%
Hispanic	23.88%	20.69%
White	19.4%	24.14%
Asian/Pacific Islander	34.33%	34.48%

Overall, the KICKS program is split evenly between genders. However, the Globaloria program was predominantly male (approximately 69%). **Note:** Only 67 of a total 117 program participants completed

both the pre- and post-surveys issued during the Summer KICKS program. As such, we cannot reflect the overall impact the program would have had if all participants had the opportunity to complete the program. The demographics above are taken from the pre-survey population and some students did switch programs between the pre- and post- survey evaluations.

According to the Texas Tribune’s “Public Schools Explorer” database, RRISD students perform above state average in passing TAKS exams. A majority of students are prepared for college in both English/Language Arts and Math. For 2010, the passing rate across all grades for ELA in the district was 96% (versus 92% state), 88% for Math (82% state), 91% for Science (84% state), and 98% for Social Studies (96% state). Across RRISD, 28.7% of students are identified as “Economically Disadvantaged,” 31.4% as “At-Risk,” and 8.3% as having “Limited English Proficiency.” TAKS passing rate by race/ethnicity is displayed in Table 3 below:

	Round Rock ISD	Globaloria
African American	69%	63%
Hispanic	74%	69%
White	90%	84%
Asian/Pacific Islander	96%	89%
Native American	74%	76%

Organization of Survey Data

In order to accurately gauge the effectiveness of the RRISD 2013 KICKS Summer Program, it was important to ensure that the pre- and post-survey participants were exactly matched. Although over 115 students participated in the pre-survey questionnaire, only around 80 filled out the post-survey. Of those 80, exactly 67 students had also completed the pre-survey. This analysis, therefore, is looking at how Summer KICKS affected the post-survey results of these 67 participants, approximately half of which participated in Globaloria. This approach avoids a potential selection bias. Students who fill out the post-survey are more likely to be responsible students that have a positive outlook on the program. Because the pre-survey results includes those students who may have dropped out of the program or simply did not take the post-survey, the post-survey results would likely be skewed in favor of the Summer KICKS program instead of measuring its true effect for each individual student. Restricting analysis to those students who took both surveys allows for a more accurate measurement of the program’s impact. As discussed earlier, a few students classified as participating in Globaloria in the pre-survey were switched to Future City in the post-survey, whether this was a deliberate decision on the part of the program administrators or simply a surveying error is unknown to this researcher. This analysis is therefore consistent by the 67 individuals participating in Summer KICKS overall but not by the number of participants in the Future City and Globaloria programs. Furthermore, a sample size such as this does not allow for a precise evaluation of trends, but can still be used to determine some effects of the Summer KICKS within this particular group.

Key Results and Interpretations

Survey evidence indicates the program was successful in meeting its objectives. In looking at participation in tech-based activities, Globaloria students experienced a moderate increase in confidence across all question categories. Nearly 70% of students in the post-survey claimed confidence in tech-based activities.

The program made students more confident using technology. In post-surveys, there was a 12% decrease in the number of Globaloria students reporting that they find it “a challenge to create and design projects using technology.” The outcomes were consistent with Future City results.

For students participating in Globaloria, there was a significant increase in student confidence in using digital media tools. Students reported a 12% increase in confidence using software to create a game, a 25% increase in confidence designing a game for an audience; and a 14% increase in confidence in computer programming. Approximately 70% of students in the post-survey claimed confidence across all tech-based activities included in the surveys, representing a 3% increase.

Participants performed well in the knowledge-based questions of the survey. 87% of Globaloria participants correctly identified whether a number of energy sources were either renewable or non-renewable. RRISD students were also more successful in correctly answering the following three TEKS science questions after participating in Summer KICKS:

- *Using your knowledge of the water cycle, what process delivers water to clouds?*
- *Which of the following is the BEST example of a location where biomass decay would occur?*
- *Which of the following is the BEST location to find surface water AND ground water?*

The Globaloria program alone experienced a 10% increase in correct responses (with 79% of the students answering the TEKS questions correctly in the post-survey), suggesting that the Globaloria program was successful in imparting critical STEM knowledge to its students.

For students participating in Globaloria, there was a significant increase of interest in targeted STEM fields. Students reported a 14% increase in interest in electrical or mechanical engineering, 11% increase in interest in math, and a 13% increase in science. This evidence suggests that Globaloria, a technology-intensive program, was successful in developing STEM interest in student participants. It is also noteworthy that in a separate survey category asking students how often they engage in computer programming, Globaloria participants responded with an 11% increase in responses that were either “I do this all the time” or “I do this often.” Aggregate STEM interest for the whole of Summer KICKS as reported in the post-survey was about 54% in all 67 students, much larger than results from comparable national surveys. Still, the program did not meaningfully impact student interest in computer programming over the four week study period.

There was a 16% increase in the number of Globaloria students reporting an interest in pursuing college after graduation from high school. Overall, 82% of the RRISD Summer KICKS program participants reported an interest in college. Future City students were comparatively more interested in

college at the outset of the program (89% pre-survey) and the program did not significantly impact this cohort. Meanwhile, the Globaloria students were less pre-disposed to attend college at the outset (52% pre-survey) and had more room for the program to make an apparent impact (68% post-survey). In general, both programs appear to actively and effectively support higher education.

Sub-Demographics & Results

Globaloria’s results for key sub-demographics—namely students who identified as African-American, Hispanic, and/or female—contained some encouraging outcomes.

Overall, students saw a roughly 16% increase in interest in targeted STEM topics (computer programming, electrical or mechanical engineering, math and science). As noted in Table 4, STEM interest increased by approximately 22% for females, 18% for Asian students, 8% for Hispanic students, and 40% for White students. This across-the-board evidence again supports the success of Globaloria’s goals. African-American students reported no change in interest in STEM topics, leading this researcher to wonder whether this could be indicative of looking at so small a sample size.

	Pre-Survey	Post-Survey	<i>Change</i>
Total Students	51.72%	68.00%	16.28%
African American	25.00%	25.00%	0.00%
Hispanic	66.67%	75.00%	8.33%
White	42.86%	83.33%	40.47%
Asian/Pacific Islander	60.00%	77.78%	17.78%
Male	50.00%	68.42%	18.42%
Female	44.44%	66.67%	22.23%

Overall, students saw a roughly 16% increase in selecting “college” as a post-graduation option. As noted in Table 5, college interest increased by approximately 17% for females, 42% for Hispanic students, 25% for African American students, and 40% for White students. Asian students reported a decreased interest in college, again suggesting statistical noise, since there was 100% interest at the beginning of the program. Overall, it appears that the RRISD Summer KICKS Program was successful in increasing interest in higher education for at-risk sub-groups.

	Pre-Survey	Post-Survey	<i>Change</i>
Total Students	51.72%	68.00%	16.28%
African American	0.00%	25.00%	25.00%
Hispanic	33.33%	75.00%	41.67%
White	42.86%	83.33%	40.48%
Asian/Pacific Islander	100.00%	88.89%	-11.11%
Male	45.00%	63.16%	18.16%
Female	66.67%	83.33%	16.67%

Extensions & Recommendations

It would be preferable, from a program evaluation perspective, for the program populations to be as similar as possible. The Future City and Globaloria programs had different student populations (skewed female and male, respectively) and pre-survey responses between the two programs were markedly different. As discussed earlier, interest in pursuing college was initially very high in Future City, so the impact of the KICKS program was not as substantial as that of Globaloria, whose predominantly male population began June with much less overall interest in college. If the program could be constructed in future years to include more evenly matched cohorts, student outcomes could be directly compared and used to determine which program was more effective in accomplishing its goals.

There should be a greater emphasis on recruiting key sub-groups (African-American, Hispanic, and female students), particularly if one of the program's goals is to engage populations that are underrepresented in STEM fields. Furthermore, the Summer KICKS program claims a focus on recruiting exclusively at-risk students. Even if at-risk students were the only students directly recruited for Summer KICKS, some way to identify at-risk status via the pre- and post-surveys would be helpful in determining how successful the program is in recruiting these students. It may be worthwhile for the program administrators to develop target numbers or percentages of at-risk and key-subgroup participants successfully recruited into Summer KICKS. Similarly, Globaloria's student population in RRISD Summer KICKS was predominantly male; ideally, the program should contain roughly equal proportions of male and female participants.

This researcher recommends a greater emphasis in completing the post-survey in order to avoid significant drop-offs in observations. In applying a surveying approach as the RRISD Summer Kicks Program has, it is crucial that as many participants as possible complete both the pre- and post-survey. Only then can a more comprehensive evaluation of the program occur. Many participants were excluded in this analysis because they only completed one survey.

Finally, it is recommended that the survey instrument be improved to include more concise, direct statements that are apparent and distinct from one another. This survey was distributed to middle school students as a continuation of previous research conducted by World Wide Workshop, which included some awkward phraseology. One such example was the question: "It's a challenge to really understand how to design and create projects using technology." In this case, some survey respondents may have been unclear if the question was assessing whether students find the use of "technology" challenging or the actual "design projects." The answer choices should likewise be apparent and distinct from one another. It is not entirely clear, for instance, how "Not sure" and "Not really confident" are different. From a data standpoint, binary answer choices such as "Interested" and "Not interested" would have provided clearer results. When the answer choices are clear, the outputs are more measurable and the survey overall is more reliable. The question inquiring about post-graduation plans was very open and students were able to respond with "4-year degree," "2-year degree," "Technical School," "Military," "Not Sure," or simply entering their own answers into the field. Still, students could select all or none of these options, making it difficult to evaluate true student feelings of pursuing post-secondary education.