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Kansas City's Leader for Evaluation, Research, and Consultation Services

Picture: One of Bartle Hall's art deco pylons, an unmistakable fixture in the Kansas City skyline.

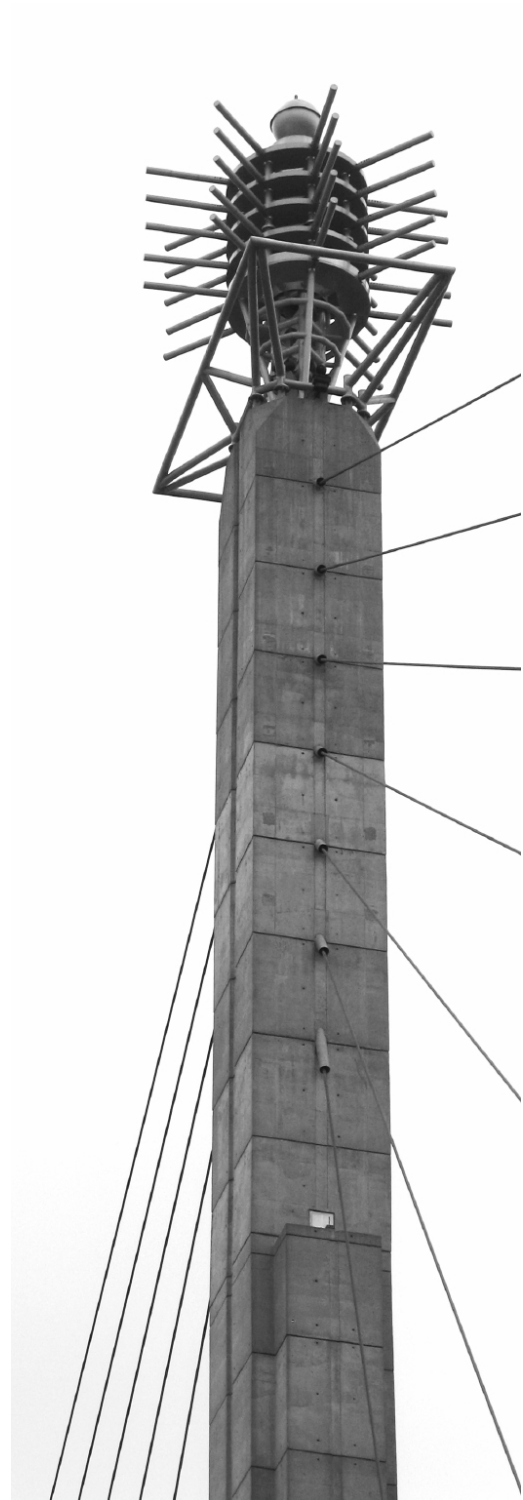


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SATURDAY SCIENCE AND MATH ACADEMY 2009-2010: EXECUTIVE SUMMARY

The University of Kansas Medical Center successfully implemented the 2009-2010 Saturday Science and Math Academy. Data support the success of the program meeting its program output and three of four program goals; the fourth goal evidenced mixed results.

Saturday Science and Math Academy successfully met:

Output 1. 120 minority, underserved, or disadvantaged middle and high school students will participate in Saturday Science and Math Academy.

125 minority, underserved, or disadvantaged middle and high school students participated in Saturday Science and Math Academy.

Outcome 1. Increase participants' knowledge of math through project-based learning.

Significant growth in student knowledge of math was found.

Outcome 2. Increase participants' knowledge of science through project-based learning.

Significant growth in student knowledge of science was found.

Outcome 3. Increase participants' motivation to enter science-related careers.

The majority of respondents noted that participating in Saturday Academy made them more interested in a science-related career. Additional pre- to post-programming data were inconclusive.

Mixed results were found for:

Outcome 4. Increase participants' motivation to enter math-related careers.

The majority of respondents noted that participating in Saturday Academy made them more interested in a math-related career. However, pre- to post-programming data suggested a negative impact of programming.

SATURDAY SCIENCE AND MATH ACADEMY 2009-2010: INTRODUCTION

The Resource Development Institute (RDI), under contract with The University of Kansas Medical Center Research Institute, Inc. evaluated the 2009-2010 Saturday Science and Math Academy.

As part of developing and implementing the Saturday Academy, one output and four outcomes were identified.

- Output 1. 120 minority, underserved, or disadvantaged middle and high school students will participate in Saturday Science and Math Academy.
- Outcome 1. Increase participants' knowledge of math through project-based learning.
- Outcome 2. Increase participants' knowledge of science through project-based learning.
- Outcome 3. Increase participants' motivation to enter science-related careers.
- Outcome 4. Increase participants' motivation to enter math-related careers.

The topic of green construction techniques and living provided the lens focusing efforts on Saturday Academy outcomes. Instruction included an emphasis on green building design as well as environmental footprints as students applied their knowledge through the construction of model buildings.

Methodology

Student Survey

Growth in Knowledge

Student growth was measured through pre- and post-programming surveys. Pre-programming surveys in math and in science were administered by Saturday Academy staff Saturday, October 10, 2009 (for surveys, please see Appendices A and B). The corresponding post-surveys (Appendices C and D) were administered by the project evaluator Saturday, April 10, 2010. The science surveys included 22 questions to measure camper growth in knowledge while the math surveys contained ten knowledge questions.

For each of the two curriculum areas (math and science), a total score was recorded as the number of questions answered correctly by each student. Change in student knowledge represented by the change in scores from before to after programming was examined using paired samples t-tests.

Student Interest in Life Sciences and Health Professions

Saturday Academy participants completed pre- and post-programming survey questions regarding their interest in life sciences and health professions with responses of *Yes* or *No*. Open-ended questions allowed students to specify careers in science or math that were of interest. Frequencies of responses and qualitative analysis were used to analyze the results.

Student Satisfaction

Participant satisfaction questions were included in the post-Academy science survey. Survey questions incorporated five-point Likert-style questions with response options including *Strongly Disagree*, *Disagree*, *Neutral*, *Agree*, and *Strongly Agree*. Descriptive statistics were used to interpret the results. Three, free-response questions were asked to allow participants to include additional information which was analyzed qualitatively.

Staff Survey

Twenty-two Saturday Academy staff were surveyed to examine staff satisfaction with Saturday Academy. Staff surveys were conducted electronically using the Internet-based survey host *Survey Monkey*. The staff received email invitations to participate on April 20, 2010, the first day the survey was available. Reminder emails were sent on April 27, 2010 and May 3, 2010 to those who had not previously responded. The survey closed on May 4, 2010. Survey questions addressed staff demographics as well as satisfaction with both Saturday Academy planning and staff involvement in the Academy. The question format varied and included five-point Likert-style questions with response options of *Strongly Agree*, *Agree*, *Neutral*, *Disagree*, and *Strongly Disagree* as well as open-ended responses. Descriptive statistics and qualitative analysis were used to examine results. (Please see Appendix E for the Staff Survey.)

Parent Survey

A survey designed to collect parent satisfaction with the Saturday Academy was given by the project evaluator Saturday, April 17, 2010 prior to the Saturday Academy Closing Ceremony. The parent surveys included five, five-point Likert-style questions with response options of *Strongly Agree*, *Agree*, *Neutral*, *Disagree*, and *Strongly Disagree* as well as three open-ended questions. Additional questions with response options of *yes/no* addressed parent perception of their students' science and math interest and learning. Descriptive statistics and qualitative analysis were used to examine results. (Please see Appendix F for the Parent Survey.)

Results

Student Survey

Demographics

One hundred twenty-five students completed pre-programming surveys during the 2009-2010 Saturday Science and Math Academy; 62 were high school students and 63 were middle school students. Of the 125, the typical attendee was a Black (34%), non-Hispanic (65%), seventh grade (22%), female (68%). (More detailed student race/ethnicity data may be found in Appendix G.) The primary language spoken at home for the majority of students was English (62%), but Spanish (26%) and Hmong-speaking students (8%) also attended. Students were from a variety of Kansas City, Kansas schools and zip codes, detailed in Figures 1 and 2, with just under a third of the students attending Summer Academy and most students living in the 66102 and 66104 zip codes.

Figure 1. Student Zip Code (n=95)

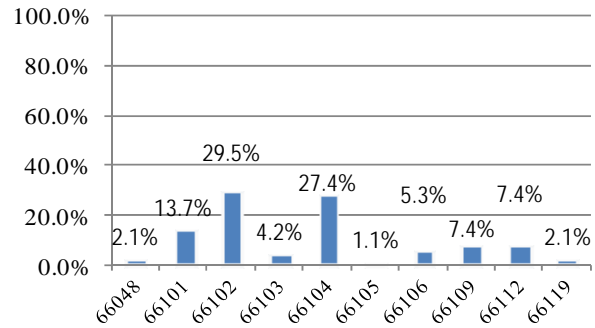
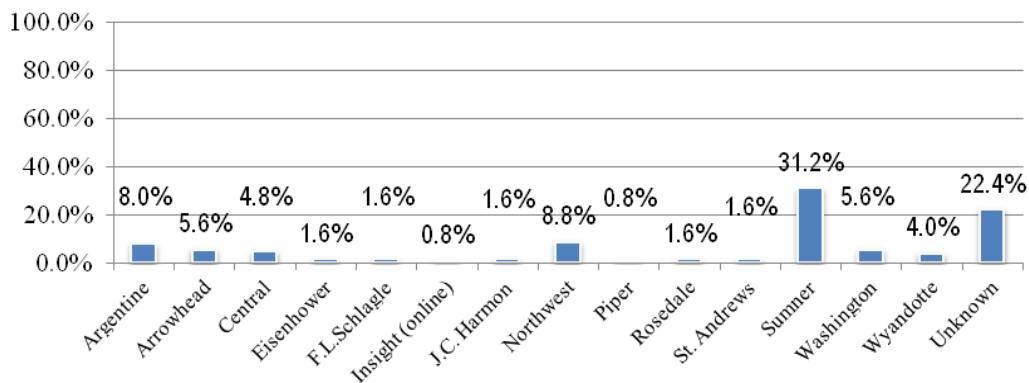


Figure 2. School (n=125)



Growth in Knowledge

Growth in participant knowledge was determined by examining the number of correct responses per student to survey knowledge questions specific to math and science. The number of matched pre- to post-programming survey results was much smaller than expected for both math and science. A scheduling conflict necessitated that many students take the ACT test and miss Saturday Academy the day post-surveys were administered. It is unknown what impact this had on outcome data.

Results noted in Table 1 demonstrate that Saturday Science and Math students successfully increased their science and math knowledge. The change in scores was statistically significant at the $p \leq .001$ level. It is important to note the strength of the significance with these data. Statistical test results are often considered significant if the probability of the observed change being due to chance or an error is 5% or less; smaller probability indicates that change is less likely to be due to chance. The significant results found for both program components had a much smaller probability level and were found to be significant at the $p < .001$ level, indicating a less than one tenth of one percent chance that the change in scores was due to chance or an error.

Table 1. Student Growth in Knowledge

	Number of Questions per Outcome	Before Academy – Mean # Correct per Student	After Academy – Mean # Correct per Student	Pre- to Post-Survey Change in Mean # Correct	Significance
Math Scores (n=56)	10	4.41	5.68	+1.27	.001***
Science Scores (n=61)	22	7.79	9.72	+1.93	.000***

***Results significant at the .001 level.

Survey results, by question, are presented in Appendices H and I.

Students perceived that their knowledge increased due to participating in Saturday Academy.

- 86.7% responded that they learned science during the Academy that they had not already been taught at school.
- 69.9% reported they learned math at Saturday Academy that they had not previously been taught at school.

Student Interest in Higher Education and Science and Math Professions

Mixed results were found regarding student interest in math and science careers. While the students responded directly that the Saturday Academy increased their interest in science and math careers, comparison of pre- to post-programming scores did not mirror these results. However, 97% of all respondents indicated they plan to attend college.

- 68.3% of respondents (n=82) noted that participating in Saturday Academy made them more interested in a math-related career.
- 65.5% of respondents (n=84) noted that participating in Saturday Academy made them more interested in a science-related career.
- 48.5% of students indicated prior to Saturday Academy they were thinking about going into a science profession, while the post-programming result dropped slightly to 43.4%.

This decrease was not significant ($p = .496$), indicating the change was due to chance or an error rather than the programming.

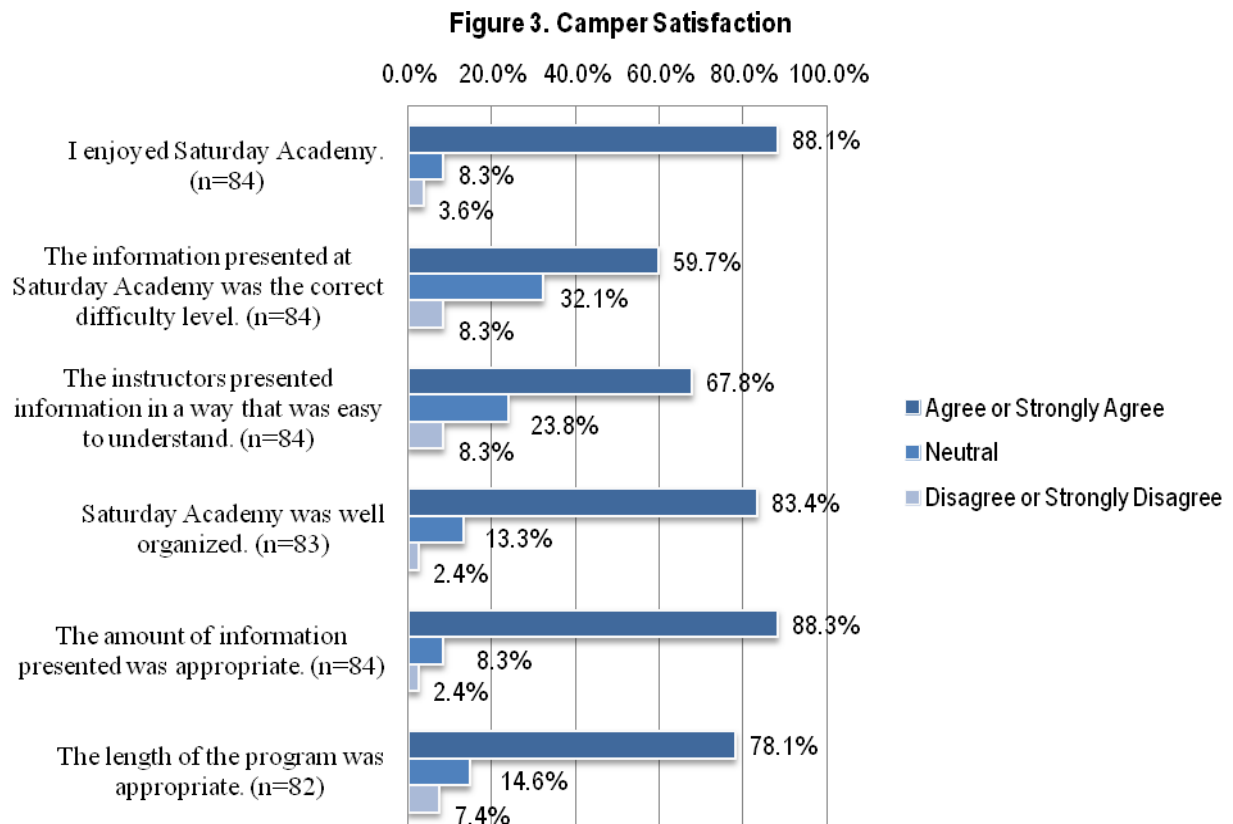
- 51.5% of students replied prior to the Academy they were thinking of going into a math profession, while only 30.1% made the same response at the conclusion of Saturday Academy. This decrease was statistically significant ($p < .001$) indicating a less than one tenth of one percent chance the decrease was due to chance or an error, and suggesting a negative impact of programming.

Career choices of interest to the students include the following:

- Education:
 - High school math, and
 - Elementary school.
- Law:
 - Lawyer, and
 - Criminal investigator.
- Healthcare:
 - Pediatrician,
 - Pharmacy technician,
 - Pharmacist,
 - Physical therapist,
 - Dentist,
 - Doctor,
 - Nurse,
 - Respiratory therapist,
 - General practitioner,
 - Neurologist,
 - Obstetrician,
 - Neonatologist,
 - Psychologist, and
 - Veterinary medicine.
- Finance:
 - Banker,
 - Investment banker, and
 - Accountant.
- Business:
 - Management.
 - PR. and
 - International Relations.
- Engineering:
 - Electrical engineer,
 - Computer engineer, and
 - Mechanical engineer.
- Design:
 - Architect, and
 - Designer.
- Physical/Earth science:
 - Astronomer, and
 - Biochemist.
- Biology.
 - Biologist, and
 - Marine biologist.

Student Satisfaction

More than 80 students completed Academy satisfaction questions. Almost 90% enjoyed the Academy, with more than four out of five participants (88.3%) agreeing that the amount of information presented was appropriate and that Saturday Academy was well-organized (83.4%). Slightly more than three-fourths of the participants agreed that the length of the program was appropriate. More than half of the participants noted agreement with the remaining program aspects. Detailed responses are shown in Figure 3.



Participant satisfaction was also evidenced through the large list of program components that the students enjoyed, many of which referenced: the activity-based nature of the instruction, interpersonal interactions, mentoring, learning, and the stipend. Students' favorite parts of Saturday Science and Math Academy included:

- Activity-based learning:
 - Slightly more than half of the comments (42 of 83 comments) specifying favorite Academy components referenced hands-on, project and experiment-specific learning.

- Many students cited specifically that they liked building the scale models of green (environmentally friendly) houses.
- Experiments and lab work were also noted frequently as being a favorite part of the Academy.
- Interpersonal interactions:
 - Students enjoyed the social interactions that were incorporated into the Academy. Structured interaction time through team builders and through working in small groups was identified as a favorite program component.
 - Students also identified that networking with peers, getting to know people, and making new friends were important.
- Mentoring:
 - One student identified that working with mentors was a benefit of the program.
- Learning:
 - Students identified the act of learning as a favorite component of Saturday Academy. They enjoyed learning in class, learning new things, and learning things before they would have learned them at school.
 - Additionally, students linked learning to experiencing new things as well as to linking learning to the way Saturday Academy was taught.
 - One student reported a favorite part of the Academy as being “the learning experience from both teachers and students”.
- Stipend:
 - Noted once in student responses was the stipend.

Student survey responses also included the following topics for suggested improvements for Saturday Academy:

- Scheduling;

Students indicated they would have liked to be able to finish their projects. This topic was addressed as students discussed wanting additional days added to the schedule, generally making the program longer, not missing days due to weather, and staying on schedule (particularly in relation to team builders that lasted too long).
- Academic content;

Several students directed comments toward the academic content of the Academy. Students noted a need to have additional, or more difficult, content for the high school students (particularly in math). However, comments also indicated that some curriculum was stretching the participants, especially the complicated vocabulary used during teaching. The math component of the Saturday Academy was also identified as needing change by one student who remarked there was little relevance of the math instruction to the building project.
- Instructional methods:

Student comments on the instructional methods were made by those who were interested in learning additional/more advanced material.

- “We could have learned more in science.”
- “Have a section dedicated to tutoring upperclassmen.”

Comments were also included by those who were working hard to understand the content being taught.

- “Don’t go so fast.”
- “It was very hard for me to understand science.”
- “Explain things more clearly.”
- “Explain little things, even though some students may already know, others may not.”
- “I just think that my learning level was a little to [sic] slow to the things they were teaching me.”

Student satisfaction comments also clearly indicated that the campers enjoyed their experiences.

Typical comments included:

- “I really enjoyed being part of the academy.”
- “It is very fun at academy.”
- “It was great coming here..hope that I can come back next year.”
- “Overall this is a great program & I would recommend it to any high school or middle school student.”
- “The academy really helped me improve in math and science.”

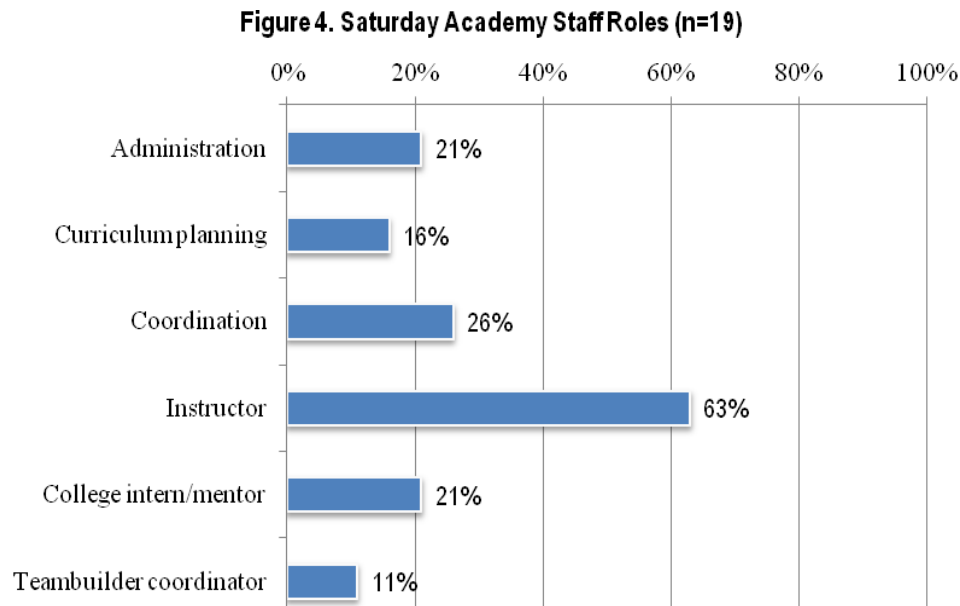
Staff Survey

Nineteen of the twenty-two staff responded to the survey. The typical staff member was an African American (47%), non-Hispanic (79%), male (59%). Academy staff were from a variety of zip codes in the Kansas City metropolitan area, including nine in Kansas [66046, 66049, 66101 (2), 66102 (2), 66104 (2), 66109, 66112 (3), 66202, and 66204] and three in Missouri [64108, 64116, and 64119]. Eight of the staff share zip codes with student participants.

Additional data describing the staff include:

- Staff had participated in previous Saturday Academies a mean of six times (with a range of 1 to 11 years), including the 2009-2010 academic year;
- Fourteen of the nineteen (74%) had previous experience teaching middle or high school students; and
- The ten responding staff indicated they had attended a median of 4 planning meetings.

The majority of survey respondents (63%) noted they were Academy instructors, while approximately a fourth of the respondents were involved in coordinating Saturday Academy. Additional roles are specified in Figure 4. (The survey question allowed respondents to select more than one role; total responses are greater than 100%).



Staff Satisfaction with Saturday Academy Planning

Eight survey items addressed staff satisfaction with the planning process. Fourteen Academy staff members (74%) reported involvement with planning Saturday Academy prior to the beginning of student programming. Due to the small sample size, responses of *Agree* and *Strongly Agree* and of *Disagree* and *Strongly Disagree* were combined for the reporting process.

Staff satisfaction survey responses regarding the planning process were very positive. Responses to all items indicated the majority of Academy staff was satisfied with the planning process. Staff were particularly satisfied with the Saturday Academy administration and coordination, with 100% of the respondents noting that: the contributions of all those involved with planning were respected, meeting time was used productively, and their abilities were used effectively during planning. One respondent did not agree there was sufficient planning time prior to the start of the Academy. Detailed satisfaction responses for the planning process are shown in Table 2.

Table 2. Staff Satisfaction with Planning (n=13)*

Question	Agree or Strongly Agree	Neutral	Disagree or Strongly Disagree	N/A or No Response
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The contributions of all those planning Saturday Academy were respected.	100%	-	-	-
Meeting time was used productively.	100%	-	-	-
My abilities were used effectively during planning.	100%	-	-	-
Positive communication methods/patterns were used by staff throughout the planning process.	100%	-	-	-
There was sufficient planning time prior to the start of Saturday Academy.	85%	8%	8%	-
Those planning Saturday Academy were recognized for their contributions.	93%	8%	-	-
**For my personal planning needs, the pre-academy training of staff included sufficient emphasis on best practices and educational philosophy when teaching middle and high school students.	85%	15%	-	-
**For the overall staff, the pre-academy training included sufficient emphasis on best practices and educational philosophy when teaching middle and high school students.	85%	15%	-	-

*Not all responses sum to 100% due to rounding.

Open-ended responses clarified two items in Table 2 (marked with **) regarding individual and overall pre-Academy training needs in best practices and educational philosophy when teaching middle and high school students. Comments were made by less than half the staff and can be organized by two primary topics- knowledge of concepts/theories and learning activities.

Concept and theory responses highlighted that the instructors each have their own teaching style, but that their “philosophy and best practices are all quite similar.” It was emphasized that each lead staff is paired with a non-lead Academy staff member and that the “overall staff provided good methods, strong supports, and demonstration”. Underlying multiple responses was the expectation that the Saturday Academy faculty use best practices and the “curriculum is designed around this”. However, respondents were divided regarding whether sufficient time was spent on this. While several staff commented that sufficient time was spent on philosophy and best practices, a few noted that additional time could be spent, particularly regarding the knowledge of college interns.

Staff responses also focused on the learning activities linked to the curriculum components. All lessons were developed with the curriculum content and the age of the learners as guides. Respondents were aware of balancing the timing of curriculum planning and implementation; comments indicated both that the staff should be brought together earlier to review activities so their “input could be used to the fullest”, and that training should happen after curriculum adjustments are made so staff can review “methods of instruction”.

Academy staff identified barriers that made planning Saturday Academy difficult. Identified barriers which *were* resolved addressed scheduling issues and included:

- The curriculum planning sessions were held in the middle of the week; previously they had been held on Saturdays. This was resolved as staff passed on missed meeting content to accommodate scheduling conflicts for some staff members.
- A scheduling conflict with the Closing Ceremony caused the ceremony date to be pushed back a week. Some faculty and staff were subsequently not able to participate. However, remaining staff and parent volunteers provided leadership for the event.
- The challenge of using 13 Saturdays this year for programming (6 for high school students, 6 for middle school students, and one for the closing ceremony).

Barriers the staff noted were *not* resolved during planning included:

- Math and science planners met separately. Consequently, discussions coordinating the materials were reported to be insufficient.
- More time was needed for the staff to work with students. There was much to learn in a short time.
- Snow days required make-up days and impacted planning.

Staff Satisfaction with Saturday Academy Implementation

Sixteen survey questions addressed staff satisfaction with the implementation of the Academy. Question responses were recorded on a 5-point scale (*Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree*); however, due to the small sample size the two responses showing levels of agreement were combined for analysis as were the two responses showing disagreement. Seventeen staff indicated their involvement implementing Saturday Academy.

Academy implementation responses were positive. While some staff responded neutrally to questions, no responses of *Disagree* or *Strongly Disagree* were recorded. Staff responses can be organized to provide insight into camp administrative practices, curriculum and instruction, and student interest. Shown in Table 3 are staff response rates.

Satisfaction with Administrative Practices

Staff responses to survey items addressing administrative practices were exceedingly positive. All respondents *agreed* or *strongly agreed* to three queries and more than 80% of all respondents *agreed* or *strongly agreed* with the remaining administrative practices questions. Staff felt strongly that their abilities were used effectively and they were recognized for their contributions. Additionally, staff felt the Saturday Academy was well-organized, noting advance knowledge of goals and objectives and ease of having their questions answered.

Satisfaction with Curriculum and Instruction

Also positive were staff responses regarding curriculum and instruction. All staff (100%) noted that the curricula were presented in ways that were easy for the students to understand and that the Saturday Academy increased the students' knowledge of science. More than 80% also

agreed or strongly agreed that the Academy increased the students' knowledge of math. Results were mixed regarding the content of the curriculum. While the majority of the respondents replied positively regarding both the difficulty of the curriculum and the amount of information in the curriculum, almost a fourth answered they were *neutral* regarding the appropriateness of the amount of information in the curriculum.

Table 3. Staff Satisfaction with Saturday Academy Implementation (n=17)*

Question	Agree or Strongly Agree	Neutral	Disagree or Strongly Disagree	N/A or No Response
ADMINISTRATIVE PRACTICES				
My abilities were used effectively during the academy.	100%	-	-	-
The academy was well organized.	82%	18%	-	-
Academy staff were recognized for their contributions.	100%	-	-	-
I was informed of the academy goals/objectives prior to the event.	100%	-	-	-
Any questions I had regarding the Saturday Academy were responded to in a timely manner.	88%	12%	-	-
The length of the academy program was appropriate.	88%	12%	-	-
CURRICULUM AND INSTRUCTION				
Positive communication methods/patterns were consistently used with the students.	94%	6%	-	-
The difficulty level of the curriculum was appropriate.	88%	12%	-	-
The amount of information in the curriculum was appropriate.	76%	24%	-	-
Curriculum content was presented in ways that were easy for students to understand.	100%	-	-	-
The Saturday Academy effectively increased the participants' knowledge of science.	100%	-	-	-
The Saturday Academy effectively increased the participants' knowledge of math.	82%	12%	-	6%
STUDENT INTEREST				
The Academy topics engaged the students.	94%	6%	-	-
Students appeared interested in science careers. (n=16)	82%	13%	-	6%
Students appeared interested in math careers.	59%	35%	-	6%
Students appeared interested in medical careers. (n=16)	75%	19%	-	6%

*Not all responses sum to 100% due to rounding.

The staff survey included open-ended questions addressing barriers to teaching (met and unmet), fidelity to implementation plans, staff and camper engagement, and suggestions for future Academies.

Barriers

Respondents indicated barriers or difficulties that made it difficult to teach the students, but which **were** successfully resolved. Responses fall into five categories: classroom management,

teachers modeling learning behavior, scheduling, resources, and interpersonal relationships. Specific responses in each category include:

- Classroom management issues:
 - Restless students in the afternoon,
 - Behaviors that interfered with the learning of other students, and
 - Use of cell phones.
- Teachers modeling teaching and learning behavior:
 - Not using cell phones during instructional or group project times,
 - Interacting with students when not specifically teaching, and
 - Carefully planning and organizing for the next class in advance, including inventorying for activities.
- Scheduling:
 - Only meeting every other Saturday, and
 - Attendance (due to snow or to student schedules).
- Resources:
 - Receiving timely supplies, especially during first semester.
- Interpersonal relationships:
 - Development of student/mentor relationships, and
 - Getting to know new people.

Staff highlighted barriers or difficulties that made it difficult to teach the students, but which were **not** resolved. These included: not enough instructional time, attendance patterns of some students, knowledge of the content, communication between the math and science department (included by respondents as both resolved and unresolved), and communicating to students the purpose of the program so students can better frame their learning and personal interactions. Five staff identified that there were no unresolved barriers to teaching.

Fidelity to Implementation Plans

Eighty-nine percent of respondents indicated the Saturday Academy was implemented as planned. Comments addressing the fidelity of the implementation included:

- There was not enough time to accomplish all that was outlined. This was attributed to students taking the projects to “a whole different level”, “planning more than we have time to accomplish”, and snow days.
- The mentors were underutilized.
- The integration of math and science curriculum was planned; however, responses were mixed regarding the effectiveness of the communication between staff members to facilitate the integration.

Staff and Participant Engagement and Interest

Survey respondents also identified a wide variety of Saturday Academy experiences that were the most engaging for themselves and for the students. The most engaging for the students included both activity-based and relational aspects of learning. These items included:

- Participating in lab activities,
- Hands-on activities,
- Building the projects,
- Gaining real-life knowledge,
- Team builders,
- Working in small groups,
- Developing mentor relationships, and
- Building relationships in an academic setting.

Aspects of Saturday Academy cited as being engaging for the staff involved connections that were academic, interpersonal, and professional. These included:

- Academic:
 - Teaching,
 - Connecting science to student personal experiences,
 - Teaching students who want to enhance their academic experiences,
 - Teaching math as a project-based learning activity,
 - Knowing the students wanted to be there, and
 - Facilitating interactive learning,
- Interpersonal:
 - Creating bonds of trust and leadership,
 - Interacting with students and other faculty,
 - Working with a community of students and staff,
 - Team building, and
 - Working with students and staff from a variety of schools.
- Professional:
 - Coaching students who were interested in professional programs,
 - Coaching students as they set and pursue goals, and
 - Mentoring students.

Responses evidenced staff perceptions that the camp very successfully engaged the students. However, staff responses detailing student interest in science, math, and medical careers varied. More staff (82%) noted agreement that the students appeared interested in science careers than in medical careers (75%) and math careers (59%).

Suggestions for Future Saturday Science and Math Academies.

Staff suggestions for future Saturday Academies included requests to continue the program and to expand the program so more students can participate. Specific programmatic suggestions noted by staff can be organized by two topics - curriculum and instruction, as well as administrative practices. Suggestions regarding curriculum and instruction include having:

- More in-depth projects,

- More, smaller projects rather than one large one,
- A community service project,
- More integration of math and science,
- Faculty highlight for students how the faculty identified and achieved their educational goals,
- Continued emphasis on the hands-on, “fun” attitude,
- More developed staff/student interactions based on conversation,
- Fairs or competitions with the completed projects, and
- Increased funding (noted generally, and in a comment specific to food).

Additional suggestions organized by administrative practices include having:

- Cultural competency training for staff reinstated,
- More teacher training,
- Instructors be more organized,
- The schedule changed to return to working with students every session rather than every other session, and
- Programming expand to allow more students to participate.

All responding staff indicated they would participate in Saturday Academy again if asked.

Parent Survey

Parent satisfaction surveys were returned by 62 parents. On the five-point scale, mean scores for all nine survey items indicated agreement or strong agreement with all survey statements as detailed in Table 4.

Table 4. Mean Parent Satisfaction Responses

Statement	Mean Response
Saturday Academy was well organized.(n=59)	4.52
The length of the program was appropriate. (n=61)	4.46
The amount of communication between the Saturday Academy staff and parents/guardians was appropriate.(n=60)	4.43
My student enjoyed Saturday Academy. (n=61)	4.64
I would recommend the Saturday Academy to other students/families. (n=60)	4.80

1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, 5 = *Strongly Agree*

Seventy-eight percent of parents reported their children learned science at Saturday Academy that had not been taught at school while 59.7% of parents reported their students learned math at Saturday Academy that had not been taught at school. Of the middle school parents responding (n=32), 100% reported their children plan to take high school math and science

courses. Of the high school parents responding, 96.0% report their children plan to take college math and 95.8% report their children will take college science classes.

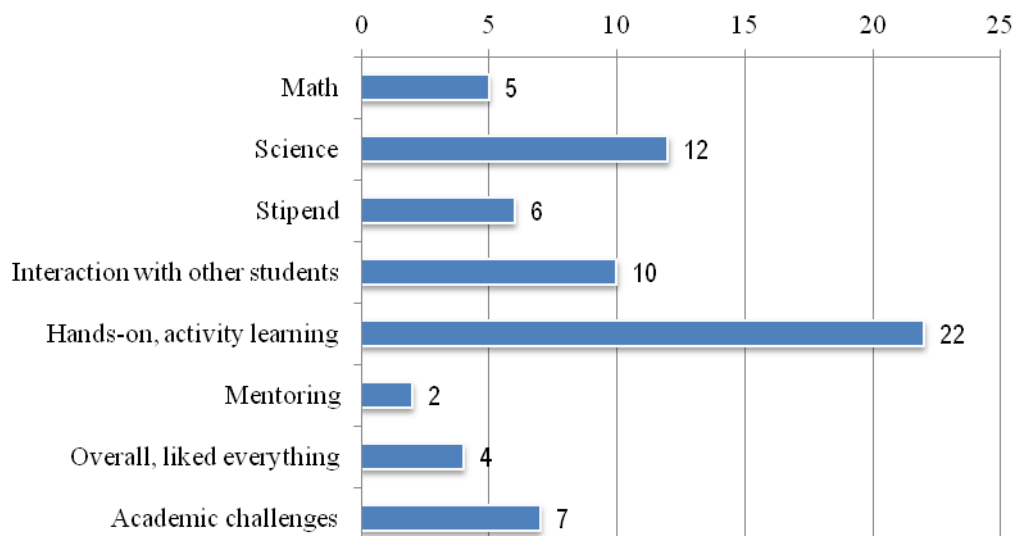
Parent perception of student interest in math and science careers included:

- 46.7% of parents responded that their students were interested in pursuing a science-related career.
- 39.3% of parents noted that their children are thinking about going into a math-related career.
- 83.9% of parents thought the Saturday Academy increased their students' interest in a science career.
- 39.3% of parents thought the Saturday Academy increased their students' interest in a math career.
- 100% of parents reported their children plan to attend college.

Careers identified by the parents in which their students are interested include both medical and non-medical careers. Medical careers included: anesthesiologist, cardiologist, doctor, nurse, pediatrician, pulmonologist, and sports medicine. Non-medical careers included the fields of: architecture, computers, electrical engineering, teaching, accounting, drafting, higher education, mathematics, and wildlife biology.

Fifty-two parents identified their students' favorite parts of the Saturday Science and Math Academy. While some parents noted either science or math, many of those responding identified the hands-on, activity-based and project-centered learning activities as the favorite part of the Academy for their students. Other parents identified the social interactions their youth had, remarking on both the benefits of working in groups and on making new friends. Additional responses and the number of parents selecting each response are noted in Figure 5.

Figure 5. Student Favorite Part of Saturday Academy, as Identified by Parents (n=52)*



*Parents were able to provide more than one answer-results do not sum to the sample size of 52.

Parent feedback through additional written comments included information regarding: scheduling, curriculum and instruction, and social interaction.

- Schedule:
 - Several parents requested extending the program – one parent requested meeting more than one day a week.
 - It is difficult to meet during the spring when it is harder to “make every Saturday meeting”.
- Curriculum and instruction:
 - One parent requested more information for parents about students attending KU and KCKCC.
 - More hands-on activities were requested.
- Social Interaction:
 - One parent noted that her son made great friendships through the program.
 - Parents were appreciative of student opportunities to learn to work in a group.

Additional parent responses praised the program for a variety of reasons, noting that the program:

- Helps students learn,
- Helps students make decisions about their futures,
- Puts the students first,
- Provides enhanced opportunities,
- “Lays a tremendous foundation for college”,

- Helps with student grades, and
- “Provides a good service and opportunity to students interested in pursuing careers in the fields involving math and science.”

Conclusions and Recommendations

Conclusions

Saturday Science and Math Academy was successful in meeting its identified output and three of four outcomes. The fourth outcome evidenced mixed results.

- **Output 1. 120 minority, underserved, or disadvantaged middle and high school students will participate in Saturday Science and Math Academy.**
125 students completed programming surveys -62 in high school, and 63 in middle school. [Initially, 137 students began Saturday Academy, with 117 completing]. All of the participating students attend schools that serve students who are underserved or disadvantaged. Ethnically, 27% of the students reported being Hispanic. Racially, 17% of the participants reported being White, while 34% were Black/African American, 10% were Asian, 5% reported being multi-racial, 3% reported being American Indian or Alaska Native, and no students reported being Native Hawaiian or Other Pacific Islander. Racial information was not reported by 40% of the participants.
- **Outcome 1. Increase participants’ knowledge of math through project-based learning.**
Significant growth in student knowledge of math was found (at the $p \leq .001$ level).
- **Outcome 2. Increase participants’ knowledge of science through project-based learning.**
Significant growth in student knowledge of science was found (at the $p \leq .001$ level).
- **Outcome 3. Increase participants’ motivation to enter science-related careers.**
65.5% of respondents noted that participating in Saturday Academy made them more interested in a science-related career. Pre- to post-programming data were inconclusive.
- **Outcome 4. Increase participants’ motivation to enter math-related careers.**
Results for Outcome 4 were mixed. 68.3% of respondents noted that participating in Saturday Academy made them more interested in a math-related career. However, pre- to post-programming data suggested a negative impact of programming.

Recommendations

1. It is recommended that parent satisfaction surveys be translated into Spanish.

2. It is recommended that the science knowledge survey questions be limited to ten.
3. It is recommended that changes in the planning process be made to allow for increased integration of the math and science content for the 2010-2011 Saturday Science and Math Academy.
4. It is recommended that the Saturday Academy staff investigate ways to meet the academic needs of more advanced students as well as those who are stretched by the curriculum.

APPENDIX A. Math Pre-Programming Survey

APPENDIX B. Science Pre-Programming Survey

APPENDIX C. Math Post-Programming Survey

APPENDIX D. Science Post-Programming Survey

APPENDIX E. Staff Survey

APPENDIX F. Parent Satisfaction Survey

APPENDIX G. Student Inclusion Enrollment Data

APPENDIX H. Math Survey Results, by Question

Math Content, by Question	Percent Correct Pre-Programming Survey			Percent Correct Post-Programming Survey			Change in Percentage Points from Pre-to Post-Survey		
	ALL Students	Middle School Only	High School Only	ALL Students	Middle School Only	High School Only	ALL Students	Middle School Only	High School Only
1. Using ruler to measure in centimeters and millimeters	32% (n=97)	50% (n=50)	13% (n=47)	32% (n=84)	39% (n=41)	26% (n=44)	0	(-11)	+13
2 Using scale on a map	65% (n=97)	60% (n=50)	70% (n=47)	77% (n=85)	68% (n=41)	84% (n=44)	+12	+8	+14
3. Solving a proportion	64% (n=97)	50% (n=50)	79% (n=47)	84% (n=85)	85% (n=41)	82% (n=44)	+20	+35	+3
4. Solving a conversion from cm to mm	59% (n=97)	66% (n=50)	51% (n=47)	79% (n=85)	78% (n=41)	80% (n=44)	+20	+12	+29
5. Solving a conversion from L to kL	41% (n=97)	44% (n=50)	38% (n=47)	52% (n=85)	61% (n=41)	48% (n=44)	+11	+17	+10
6. Solving a conversion from g to mg	40% (n=97)	48% (n=50)	32% (n=47)	54% (n=85)	61% (n=41)	48% (n=44)	+14	+13	+16
7. Solving a conversion from oz to lb	35% (n=97)	34% (n=50)	36% (n=47)	55% (n=85)	51% (n=41)	59% (n=44)	+20	+17	+23
8. Finding perimeter and area of a rectangle using in	60% (n=97)	58% (n=50)	62% (n=47)	67% (n=85)	73% (n=41)	61% (n=44)	+7	+15	(-1)
9. Finding surface area of a rectangular prism in cm	6% (n=97)	0% (n=50)	13% (n=47)	19% (n=85)	2% (n=41)	34% (n=44)	+13	+2	+21
10. Finding the length and width of a rectangle when $l=2w$ and the area is given	38% (n=97)	30% (n=50)	47% (n=47)	51% (n=85)	42% (n=41)	59% (n=44)	+13	+12	+12
Mean change in percentage points per question							+13	+12	+14

APPENDIX I. Science Survey Results, by Question

Science Content, by Question	Percent Correct Pre-Programming Survey			Percent Correct Post-Programming Survey			Change in Percentage Points from Pre-to Post-Survey		
	ALL Students	Middle School Only	High School Only	ALL Students	Middle School Only	High School Only	ALL Students	Middle School Only	High School Only
1.	23% (n=104)	4% (n=50)	41% (n=54)	47% (n=86)	33% (n=42)	59% (n=44)	+24	+29	+18
2.	8% (n=104)	8% (n=50)	7% (n=54)	7% (n=86)	7% (n=42)	7% (n=44)	(-1)	(-1)	0
3.	36% (n=104)	40% (n=50)	32% (n=54)	41% (n=86)	43% (n=42)	39% (n=44)	+5	+3	+7
4.	19% (n=104)	18% (n=50)	20% (n=54)	27% (n=86)	14% (n=42)	39% (n=44)	+8	(-4)	+19
5.	63% (n=104)	64% (n=50)	61% (n=54)	71% (n=86)	83% (n=42)	59% (n=44)	+8	+19	(-2)
6.	53% (n=104)	48% (n=50)	57% (n=54)	69% (n=86)	55% (n=42)	82% (n=44)	+16	+7	+25
7.	77% (n=104)	78% (n=50)	76% (n=54)	93% (n=86)	91% (n=42)	96% (n=44)	+16	+13	+20
8.	15% (n=104)	4% (n=50)	26% (n=54)	16% (n=86)	21% (n=42)	11% (n=44)	+1	+17	(-15)
9.	29% (n=104)	28% (n=50)	30% (n=54)	40% (n=85)	27% (n=41)	52% (n=44)	+11	(-1)	+22
10.	45% (n=104)	34% (n=50)	56% (n=54)	49% (n=86)	36% (n=42)	61% (n=44)	+4	+2	+5
11.	38% (n=104)	28% (n=50)	46% (n=54)	48% (n=86)	26% (n=42)	68% (n=44)	+10	(-2)	+22
12.	30% (n=104)	40% (n=50)	20% (n=54)	20% (n=86)	17% (n=42)	23% (n=44)	(-10)	(-23)	+3
13.	44% (n=104)	42% (n=50)	46% (n=54)	54% (n=86)	45% (n=42)	61% (n=44)	10	+3	+15
14.	47% (n=104)	46% (n=50)	48% (n=54)	31% (n=86)	26% (n=42)	36% (n=44)	(-16)	(-20)	(-12)
15.	59% (n=104)	56% (n=50)	61% (n=54)	84% (n=86)	83% (n=42)	84% (n=44)	+25	+27	+23
16.	63% (n=104)	56% (n=50)	69% (n=54)	67% (n=86)	60% (n=42)	75% (n=44)	+4	+4	+6
17.	24% (n=104)	26% (n=50)	22% (n=54)	77% (n=86)	67% (n=42)	86% (n=44)	+53	+41	+64
18.	19% (n=104)	24% (n=50)	15% (n=54)	31% (n=85)	24% (n=41)	36% (n=44)	+12	0	+21
19.	55% (n=104)	50% (n=50)	59% (n=54)	64% (n=84)	59% (n=41)	70% (n=44)	+9	+9	+11
20.	21% (n=104)	18% (n=50)	24% (n=54)	24% (n=84)	20% (n=41)	28% (n=43)	+3	+2	+4
21.	12% (n=104)	6% (n=50)	17% (n=54)	19% (n=85)	12% (n=41)	25% (n=43)	+7	+6	+8
22.	1% (n=104)	0% (n=50)	2% (n=54)	1% (n=85)	0% (n=41)	2% (n=44)	0	0	0
Mean change in percentage points per question							+9.05	+5.95	+12.0