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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.

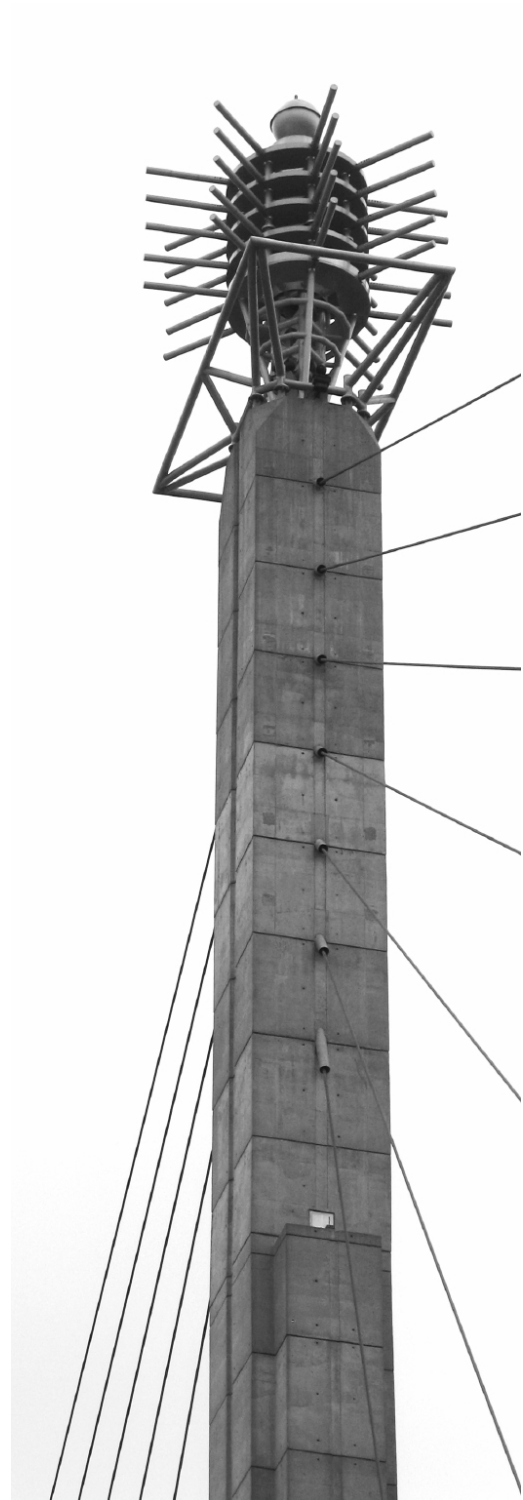


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SUMMER SCIENCE RESIDENTIAL ACADEMY AND MEDICAL INTERNSHIPS, 2010: EXECUTIVE SUMMARY

The University of Kansas Medical Center successfully implemented the Summer Science Residential Academy and Medical Internships during the summer, 2010. Data support the success of the program meeting three of its four outcomes, showing mixed results for one outcome and having 93% of the enrollment needed to meet its program output.

The Summer Science Residential Academy and Medical Internships (SSA), 2010 successfully met:

Outcome 1. Increase participants' knowledge of science:

Significant growth in student knowledge of science was found in all three curricular areas.

Outcome 2. Increase participants' interest in higher education:

An increase in participants' interest in higher education was found.

Outcome 3. Increase participants' interest in health careers:

An increase in participants' interest in health careers was found.

Outcome 4. Provide program components to increase participants' preparation for post-secondary learning:

Program components were provided to increase student preparation for post-secondary learning.

Additional enrollment was needed to meet the program output:

Output 1. 30 minority, underserved, or disadvantaged high school students will participate in SSA:

28 minority, underserved, or disadvantaged high school students participated in SSA.

SUMMER SCIENCE RESIDENTIAL ACADEMY AND MEDICAL INTERNSHIPS, 2010: INTRODUCTION

The Resource Development Institute (RDI), under contract with The University of Kansas Medical Center Research Institute, Inc. evaluated the Summer Science Residential Academy and Medical Internships, 2010.

The Summer Science Residential Academy and Medical Internships (SSA), 2010 was scheduled from Saturday, June 12th through Thursday, July 22nd. As part of developing and implementing the SSA, one output and four outcomes were identified.

- Output 1. 30 minority, underserved, or disadvantaged high school students will participate in SSA.
- Outcome 1. Increase participants' knowledge of science.
- Outcome 2. Increase participants' interest in higher education.
- Outcome 3. Increase participants' interest in health careers.
- Outcome 4. Provide activities to increase participants' preparation for post-secondary learning

The topics of: brain function and addiction, the circulatory system, and genetic variation were chosen as curriculum foci for the SSA.

Methodology

Student Survey

Growth in Knowledge

Student growth was measured through pre- and post-programming surveys in three curricular areas: brain function and addiction, the circulatory system, and genetic variation. Surveys were administered by SSA staff on a rolling basis prior to, and immediately after, instruction in each content block. Pre- and post-programming surveys within each topic were identical and were comprised of multiple-choice questions. The survey for brain function and addiction contained eight questions while the other two content areas each used surveys with ten questions. (Please see Appendices A through C for copies of surveys.)

For each of curriculum area, 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. Additionally, composite scores were recorded per student indicating the number of questions answered correctly in the three curricular areas combined. Composite pre- and post- programming scores were also examined using paired samples t-tests.

Student Interest in Health Professions

SSA participants completed pre- and post-programming survey questions regarding their interest in health professions and their plans to study medicine. 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. An open-ended question allowed students to specify medical career interests. Frequencies of responses and qualitative analysis were used to analyze the results. Student interest in health profession data were gathered with demographic data prior to programming through a survey distributed to the students at their first instructional session (Appendix D). Post-programming questions were included in the student satisfaction survey.

Student Satisfaction

The student satisfaction survey was distributed in two parts. Part one was completed during the intern readiness meeting on July 10th. Part two was distributed at the Closing Ceremony Thursday, July 22nd. (Please see Appendices E and F.) Survey questions were in multiple formats, including free response questions and five-point Likert-style questions with response options including *Strongly Disagree*, *Disagree*, *Neutral*, *Agree*, and *Strongly Agree*. Descriptive statistics and qualitative analysis were used to interpret the results. Student satisfaction data were collected regarding: counselors, mentors, teaching, studying and academic performance, preparation for a college learning environment, interest in health professions, and overall program satisfaction.

Staff Survey

Fourteen staff were surveyed to examine staff satisfaction with SSA. Staff surveys were conducted electronically using the Internet-based survey host *Survey Monkey*. The staff received email invitations to participate on July 12, 2010, the first day the survey was available. Reminder emails were sent on July 19, 2010 and July 23, 2010 to those who had not previously responded. The survey closed on July 24, 2010. Survey questions addressed staff demographics as well as satisfaction with both SSA planning and staff involvement in SSA. 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 G for the Staff Survey.)

Parent Survey

A survey designed to collect parent satisfaction with the Summer Science Academy was administered at the Closing Ceremony, Thursday, July 22nd. The parent surveys included six, 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 addressed parent perception of their students' knowledge about medical education and their perceptions of the value of program components preparing their students for learning in a college environment. Descriptive statistics and qualitative analysis were used to examine results. (Please see Appendix H for the Parent Survey.)

Results

Demographics

Twenty-eight students completed pre-programming surveys during the 2010 SSA. Of the 28, the typical attendee was a Black (54%), non-Hispanic (82%), female (68%) entering the senior year of high school (68%) during fall, 2010. (More detailed student race/ethnicity data may be found in Appendix I.) The primary language spoken at home for the majority of students was English (71%), but Spanish (14%) and Hmong-speaking students (11%) also attended. Students were from a variety of Kansas City, Kansas schools and zip codes, detailed in Figures 1 and 2, with just under half of the students attending Sumner Academy and a third living in the 66104 zip code.

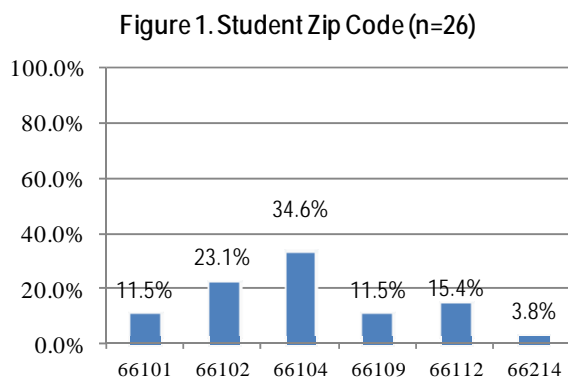
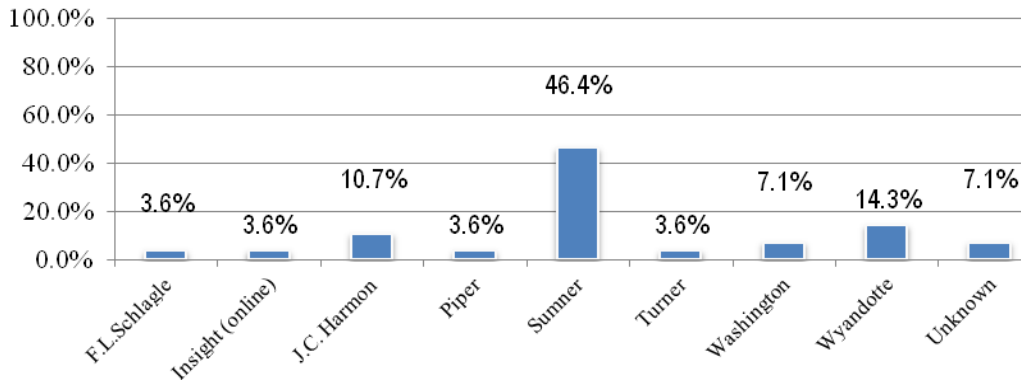


Figure 2. School (n=28)



Growth in Knowledge

Growth in participant knowledge was determined by examining the number of correct responses per student to survey knowledge questions specific to three content areas: brain function and addiction, the circulatory system, and genetic variation.

Results noted in Table 1 demonstrate that students successfully increased their knowledge in each curriculum area. Students’ mean scores increased most from pre- to post-programming surveys in the circulatory system content area, with students more than doubling their mean scores.

To determine if the increase in scores was significant, paired t-tests were run. (However, it must be noted that the sample size was small.) 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 all three 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

Topic and # of Matched Surveys	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	Significant?
Brain Function and Addition (n=27)	8	3.78	7.11	+3.33	Yes .000***
Circulatory System (n=27)	10	3.59	9.44	+5.85	Yes

					.000***
Genetic Variation (n=19)	10	5.26	8.74	3.47	Yes .000***

***Results significant at the $p < .001$ level.

Survey results, by question, are presented in Appendix J.

Students self-reported an increase in knowledge of medical terminology to the prompt, “I am familiar with medical terminology/vocabulary. In response to a 5-point Likert-style question (where 1=*strongly disagree*, 2=*disagree*, 3=*neutral*, 4=*agree*, and 5=*strongly agree*) the mean response by students before programming was 3.07; the mean response after programming was 3.75, evidencing a shift in response from a score indicating *neutral* to a score indicating *agree*. A paired sample t-test was run (n=28) to examine the strength of the results. The results were found to be significant at the $p \leq .001$, indicating very strong results that the increase was not due to chance or an error.

Student Interest in Higher Education and Health Careers

Quantitative Measures

Pre- and post-programming measures of student interest in higher education and health careers through Likert-type scaled responses showed no impact/mixed results of programming. While mean student responses increased regarding plans to take pre-med classes in college and thinking about going into a medical career, paired t-tests showed the changes were not significant. Mean scores decreased for plans to attend college. Again, paired t-tests showed the change was not significant. For all results in Table 2, the lack of significance indicates a lack of programmatic impact. However, it should be noted that the pre- and post-programming means regarding student intent to attend college were extremely high, allowing little room for programmatic growth in this area; both pre- and post- scores of this measure indicate strong agreement with the given statements. All students (100%) noted on pre-surveys agreement or strong agreement to the statement that they plan to attend college. Additionally, all but one of the post-programming means were greater than 3.5, indicating an overall tendency toward agreement to all higher education and health career statements.

Table 2. Student Self-Reported Interest in Health Career and Higher Education

Topic and # of Matched Surveys	Before Academy Mean	After Academy Mean	Pre- to Post-Survey Change in Mean	Significant?
I plan to attend college.	4.89	4.86	(-0.03)	No ($p = 0.53$)
I plan to take pre-med classes in college.	3.18	3.39	+0.21	No ($p = 0.11$)
I am thinking about going	3.39	3.64	+0.25	No

into a medical career.

($p = 0.09$)

1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree

Qualitative Measures

Interest in Higher Education

Student responses to open-ended survey questions indicate that the internship experience did impact student interest in higher education and health careers.

When queried, "How has your internship experience influenced the likelihood that you will go to college?" responses from twenty students fell into the following three categories:

- Eight students were already planning to go to college. (40%)
- The internship did influence the decision to go to college for six students. (30%)
- The internship provided experiences in new fields, sparking student interest (for five students) in careers that require college education, specifically forensic science and dentistry. (25%)

One student noted that the internship increased the desire to experience more jobs and training.

The strong impact of the internship experience on the likelihood students will go to college is evidenced by examining responses from the twelve students who did not note in qualitative responses previous plans to go to college (twenty respondents minus eight who noted existing college plans). Of those twelve, all but one (92%) indicated that the internship impacted their desires to attend college.

Student responses to open-ended survey questions also indicate that the internship experience did impact student interest in graduate school. When queried, "How has your internship experience influenced the likelihood that you will go to graduate school after college?" responses from nineteen students fell into the following four categories:

- Seven students were already planning to go to graduate school anyway. (37%)
- The internship did influence the decision to go to graduate school for five students. (26%)
- The internship provided a new experience for one student who is now considering a medical field (5%), necessitating attending graduate school.
- The internship did *not* influence the decision to attend graduate school for four students (21%)

Two additional students indicated that the internship experience helped them stay on track and try harder.

The impact of the internship experience on the likelihood students will attend graduate school is seen by looking at the responses from the twelve students who did not note previous plans to

go to graduate school. Of those twelve, six students (50%) showed evidence the internship impacted their decision to attend graduate school.

Interest in Health Careers

Student responses to the question, "How has your internship experience influenced the likelihood that you will enter a medical career field?" show the internship experience was effective in increasing student desire to enter a medical field. Twenty student responses fell into the following categories:

- Three respondents noted that they had previously identified a medical career. (15%)
- Twelve responses showed influence of the programming. (60%)
- Five students identified that the programming had not influenced their interest in a health career. (25%)

The positive impact of the programming can be seen in looking at the responses of students who had not decided on a medical career prior to the programming. Of those 17 students, 71% showed evidence the internship impacted the likelihood they would enter a medical career field.

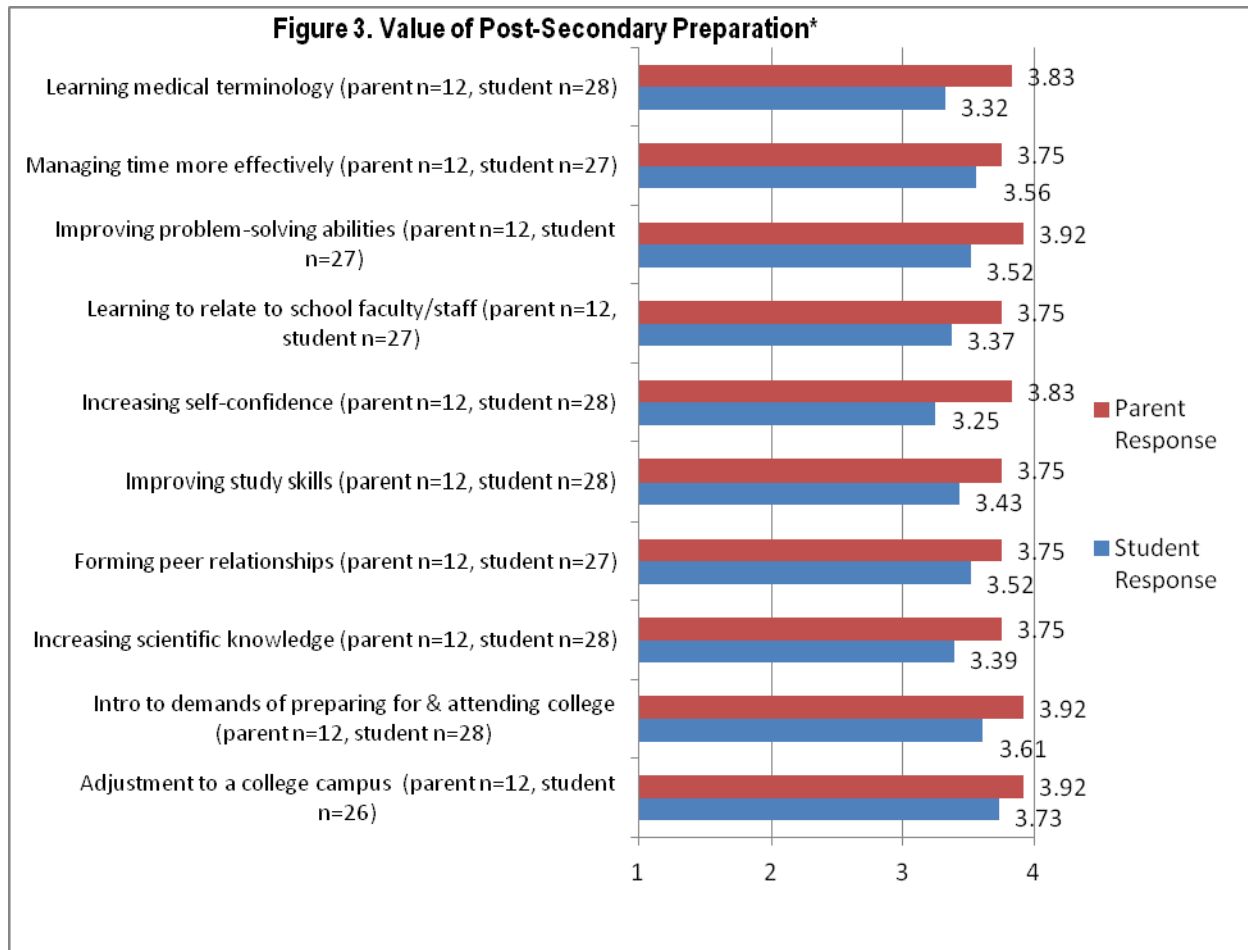
Medical career choices of interest to the students include the following:

- Athletic trainer
- Brain surgeon
- Childcare
- Chiropractor
- Cosmetic surgeon
- Dentist
- Dermatology
- Forensic scientist
- General Practitioner
- Geneticist
- Genetic Engineer
- Medical assistant
- Mortuary scientist
- Neurologist
- Nurse
- Obstetrician
- Orthodontist
- Respiratory therapist
- Pediatric nurse
- Pediatrician
- Pharmacist
- Physical therapist
- Psychologist
- Radiologist
- Respiratory therapy
- Surgeon
- Therapist

Student Preparation for Post-Secondary Learning

Student and parent responses indicate programming was provided to prepare the students for post-secondary education. Parents consistently assigned slightly higher mean values to all categories of preparation than students, with parents assigning the highest mean value to program components directed toward: improving problem-solving skills, introducing students to the demands of preparing for and attending college, and adjustment to a college campus. Students also assigned the highest mean values to adjustment to a college campus and introducing students to the demands of preparing for and attending college. The largest

differences in mean values were found for components which: increased student self-confidence, taught medical terminology, and improved student problem-solving abilities. Responses shown in Figure 3 indicate perceived value, with ratings of 1=*No Value*, 2=*Mild Value*, 3=*Moderate Value*, and 4=*High Value*.



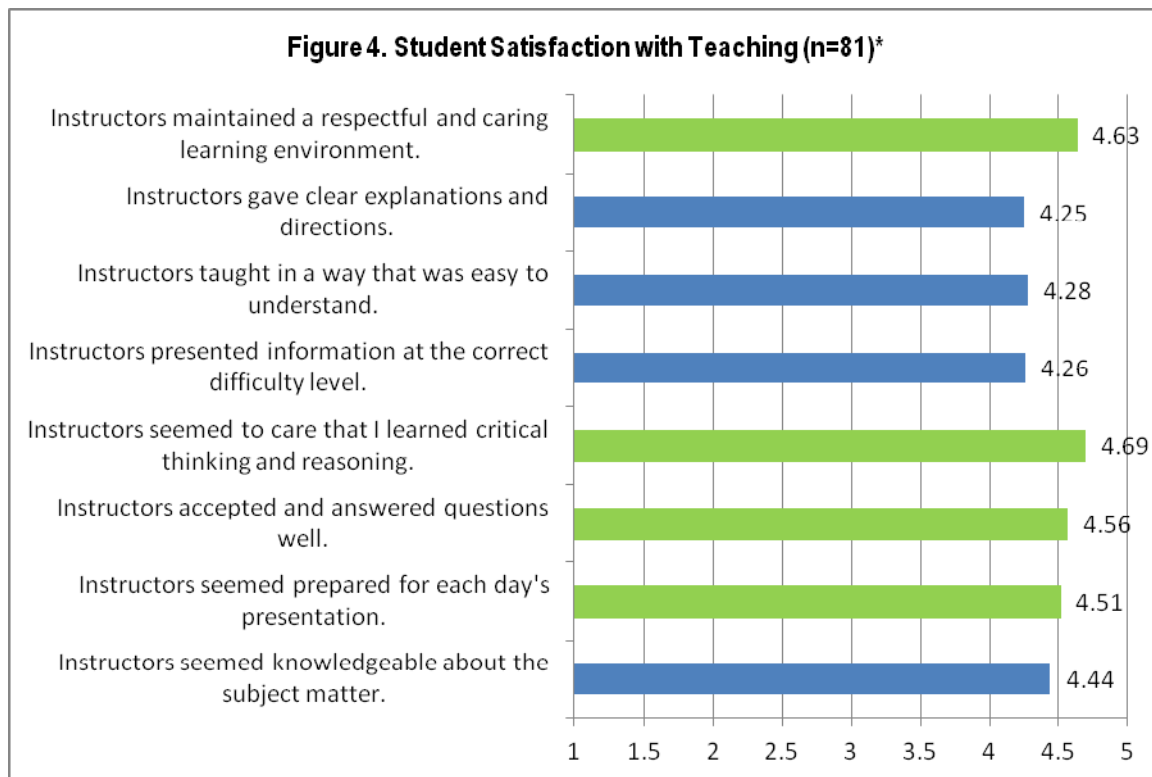
All parents and 96.4% of participants responded that the students' knowledge about medical education changed as a result of participation in SSA.

Student Satisfaction

Twenty-eight students completed Academy satisfaction questions. Questions addressed SSA teaching, program staff, the value of specific program components, students' personal learning and performance, as well as overall participant satisfaction.

Teaching

Student survey responses were obtained regarding each of the three instructional rotations (brain function and addiction, the circulatory system, and genetic variation), providing up to 84 responses to teaching queries. Mean responses on a five-point scale indicate that students *agreed* (mean scores from 3.45 to 4.4 noted in Figure 4 in blue) or *strongly agreed* (mean scores of 4.45 and above shown in Figure 4 in green) with all statements. Results show a high level of student satisfaction with the teaching at SSA.



* 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree

Seventeen students included additional comments regarding instruction at SSA. The majority (53%) supported the data shown in Figure 4 and included the following comments:

- “All of the teachers were caring and nice.”
- “Great job!”
- “I enjoyed being in each of these classes and was able to learn so many new interesting information.”
- “I enjoyed every class and instructor.”
- The classes “were very good and kept me motivated”.

Several additional comments addressed the balance of the amount of curricular content with the time available. Two respondents noted that all curriculum areas should have had six or more instructional days, while one student indicated that the classes always ran longer than scheduled. Two participants commented specifically that the circulatory system curriculum

“had too much going on”. “Getting a project every day in circulatory was a little difficult for me.”

Program Staff

Student survey responses regarding program counselors and mentors were positive. No responses of *disagree* or *strongly disagree* were received.

Student support of the counselors included:

- 92.9% *agreed* or *strongly agreed* the counselors seemed knowledgeable and caring about all students,
- 92.9% *agreed* or *strongly agreed* the counselors provided positive adult role models,
- 89.3% *agreed* or *strongly agreed* the counselors were fair in discipline matters,
- 96.4% *agreed* or *strongly agreed* the counselors seemed to care if the students had a good overall camp experience, and
- 92.9% *agreed* or *strongly agreed* the counselors maintained a respectful and caring dorm environment.

Additionally, student written comments indicated the students appreciated counselors who could balance fun with following rules. While some participants noted the counselors were too strict, others cited instances in which the counselors were too lax. Comments pertaining to the strength of the counselors’ roles and interactions with the students highlight the strength of some of the developed relationships:

- “I appreciate all of the care and guidance from the counselors. Counselors...helped keep me on track.”
- “Counselors made this time complete.”
- “...they helped me with everything even life.”
- “They were great. They can sense a bad mood miles away and try to fix it.”

The participants also noted satisfaction with the mentors. Although more respondents were *neutral* regarding mentors than were *neutral* regarding counselors, no responses of *disagree* or *strongly disagree* were received:

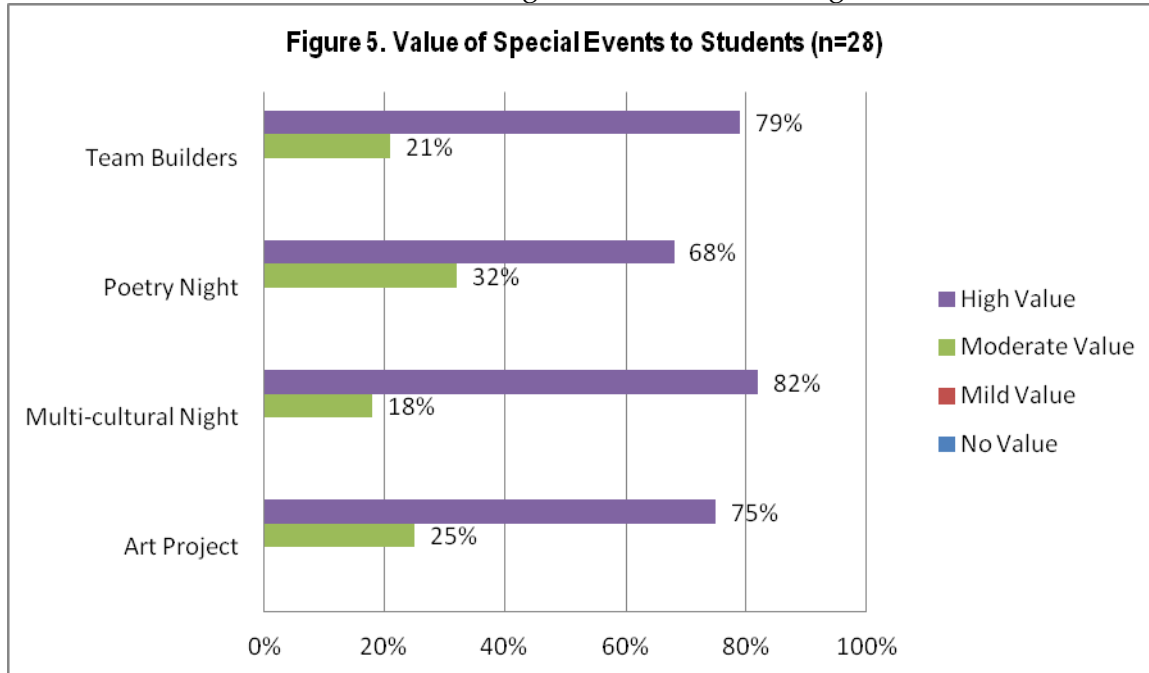
- 78.6% *agreed* or *strongly agreed* the mentors seemed knowledgeable and caring about all students,
- 71.4% *agreed* or *strongly agreed* the mentors provided positive role models,
- 85.7% *agreed* or *strongly agreed* the mentors seemed to care the students had a good overall camp experience, and
- 78.6% *agreed* or *strongly agreed* the mentors maintained a respectful and caring environment.

Written comments regarding mentors evidenced the participants’ appreciation of mentors who served as leaders by being role models. Mentors were appreciated who: “didn’t let power go to their head”, made students comfortable and welcome, and “were responsible and did their part as role models”. However, students did notice that not all mentors carried the same amount of

responsibility and some mentors were in cliques. Multiple responses indicated that the mentors did their best and were still learning.

Value of Program Components

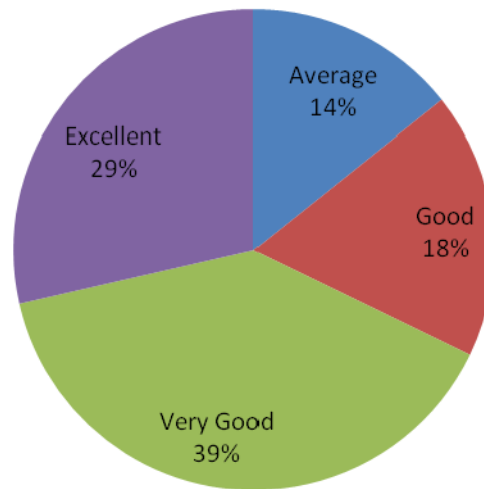
Students also provided feedback on the value they saw in the SSA special events. All students indicated the events had moderate or high value as shown in Figure 5.



Student Personal Learning and Performance

When asked to rate their own performance in SSA, most students (39.3%) indicated they had done a *very good* job and 85.7% rated their own performances as above average (*good, very good, excellent*). Detailed responses are shown in Figure 6.

Figure 6. Student Assessment of Own Performance (n=28)



All students reported they studied zero to two hours a day, both during the week and on the weekend.

Sixty-eight percent of the SSA participants responded that they did not fall behind in their coursework. The most-often cited reasons for falling behind included: *didn't balance study time well* (3), *didn't understand the material presented* (3), and *other* (a lot of stress, had to leave, and computer difficulties). Detailed responses are shown in Table 3.

Table 3. Reasons Students Fell Behind* (n=28)

	After Academy Mean
Did not fall behind	67.9%
Spent too much time socializing	3.6%
Didn't balance study time well	10.7%
Tired and/or sick	7.1%
Didn't know the vocabulary used	3.6%
Not prepared for the amount of work	3.6%
Student attitude about the amount of work	3.6%
Didn't understand material presented	10.7%
Other	10.7%

*Students could mark multiple responses, results do not sum to 100%.

One fourth of the participants (n=28) reported that additional assistance would have been helpful during SSA. However, when identifying needed supports, more than 25% of the

students responded. Needed help was identified in the following areas: improving reading/writing/study skills (7.1%), time management (28.6%), more resource sessions (14.3%), test-taking skills (17.9%), stress management (32.1%), and other (7.1%). Students clarified “other” as including independence (3.6%) and social activities (3.6%). (Students were able to select more than one needed additional support.)

Twenty-one students reported special help or assistance they received. Their responses are grouped in the following categories:

- General support and encouragement and transition to being away from home;
- Academics;
- Social interactions;
- Navigating the campus;
- Stipend; and
- Hearing how the counselors’ personal experiences and education contributed to their professional success.

Internship Satisfaction

Thirteen of the twenty respondents met directly with their internship preceptors four days per week. The preceptors mentored the students through a variety of activities including: Explaining certain diseases, teaching students how to do specific tasks, having the interns shadow the preceptor, talking about different pathways to medical careers, explaining medical procedures, discussing college and admittance, and having the interns shadowing on rounds,

The students identified specific activities in which they participated during internships. While two students noted that they did “not much” and there were “none” activities in which they participated, the other eighteen respondents were involved in:

- Shadowing the trainees,
- Working in the Simulation Lab in the Nurse Academy at KUMED,
- Taking pictures,
- Using a suction tool,
- Watching surgeries,
- Walking dogs,
- Watching animals being groomed and washed,
- Assisting dentists,
- Cutting slides,
- Talking to professionals,
- Helping trainees with tools,
- Cleaning flasks,
- Measuring ethanol,
- Freezing liquids in pathology,
- Taking vitals of a baby in the Simulation Lab, and

- Touring the hospital to see opportunities for nurses.

Student responses identify what they learned during their internships. These responses can be grouped by content learned and procedures learned as well as career selection and training (Table 4).

Table 4. Student Learning during Internship* (n=280)

Content and Procedures	Medical terminology
	Cancer
	Everything about animals
	Different surgeries and medicines given to animals
	Information is essential to helping animals
	Animal care
	How to preserve antibodies
	It's important to be accurate during an experiment
	How to make gel substances
	I don't want to be in a lab
Career Selection and Training	There are many different types of labs
	Dentistry school is very difficult
	In order to become a dentist you have to take the DRL
	In 4 years you can become a dentist.
	It takes a 17 on the ACT to get into UMKC
	I takes hard work and focus to be in a medical career
	Psychologist do a lot of things
	Sometimes you find what you want to do in something you don't expect
	There are many different opportunities for nurses
	Nurses will always be in demand
The hardship of being a nurse	

Participants found the following activities exciting and rewarding: seeing a tooth crowned, getting to see sick animals get better, working with the dogs, meeting nice people and getting to know their problems, oral surgery, participating in Nurse Academy, taking pictures of tissues, mixing chemicals to make antibodies, and watching a veterinarian save an animal.

Student recommendations regarding improving the internship program include: making it longer, making it shorter, communicating with the preceptor prior to the internship to allow potential interns to know what is offered at that location, and having more activities the students can engage in other than watching.

Overall Student Satisfaction

Students responded to several open-ended questions providing information regarding their overall satisfaction with SSA.

When identifying program highlights (students were asked to list three), 27 students replied:

- Thirteen participants identified highlights that emphasized the social aspects of SSA. These responses included more structured social activities, such as team builders, as well as informal interactions.
 - “It was really great just to get to know everyone here...I made friends that I know I’ll never forget.”
 - “Working in teams”.
 - “Hanging out as a whole group”.
- Special events (poetry night, multi-cultural night, trips to museums and amusement parks, etc.) were prominent in responses from 14 students.
- Academic content and ACT preparation were noted by 11 students.
- Being independent and experiencing a college environment were highlights of four students.
 - “I was exposed to living on my own...I saw how college might work.”
 - “Gaining a better feeling of independence”.
 - “Getting used to college life”.

SSA met students’ expectations through helping students: find who they are, become more ready for college, increase their confidence levels, have fun, become independent from their parents, learn science, and prepare for the ACT. Students noted that at SSA they expected more: fun, bonding time with other youth, less work, easier content, and less difficulty adjusting to the rules. It is important to note that of the ten students who discussed SSA not meeting expectations, four identified that the dorms were not what they expected. Three students specifically mentioned the bed bugs and bug spray.

Students identified changes they would make to SSA in the following categories:

- Scheduling,
 - Adding a free day,
 - Adding extra weeks in the academy,
 - Shortening the ACT classes, and
 - Increasing the number of activities.
- Curriculum,
 - Including a dermatology internship,
 - Make the classes more college-like
 - Letting students vote on the curriculum content areas, and
 - Adding more classes.
- Activities.
 - Changing team builders so students are not paired with the same group members for the duration of SSA,
 - Having more field trips, and
 - Including more group activities.

Overall student satisfaction was very evident in the additional comments students provided, including:

- “I love this program and when I graduate I want to come back and help.”
- “It gave a good college feel being on campus everyday.”
- “This program was good experience and I would recommend it to everyone. It gave me a chance to narrow my college choices down. Thanks for everything!”

SSA Staff Survey

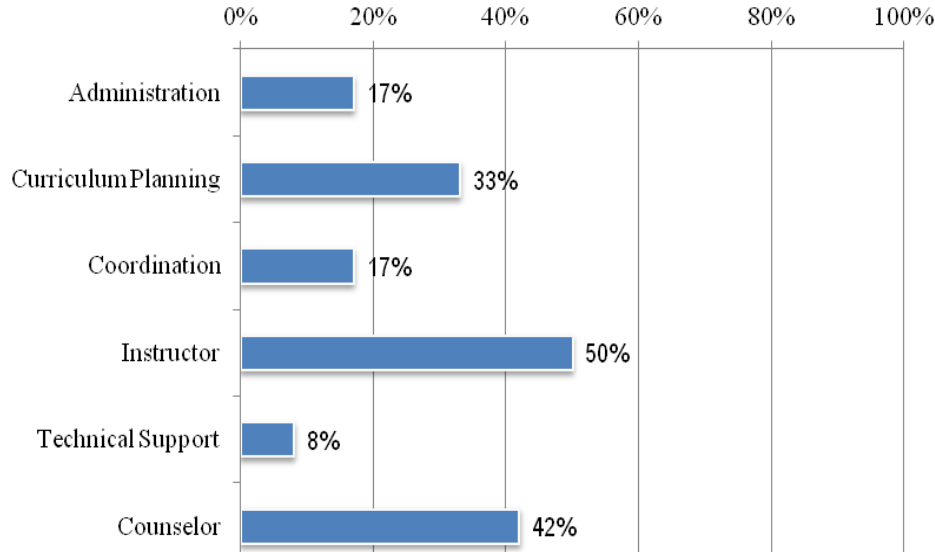
Twelve of the fourteen staff responded to the survey. The typical staff member was an African American (45.5%), non-Hispanic (83%), female (67%). Academy staff were from a variety of zip codes in the Kansas City metropolitan area, including nine in Kansas [66044 (2), 66047, 66101 (2), 66102, 66112, 66201, and 66226] and three in Missouri [64108, 64109, and 64116]. Four of the staff share zip codes with student participants.

Additional data describing the staff include:

- Half were full time staff and half were part time staff;
- 83% attended the cultural competency training for SSA personnel;
- 92% were involved in planning, administering, or providing technical support or other services prior to the opening day of the SSA;
- 73% were involved in planning, administering, or providing technical support or other services during SSA;
- Staff had participated in previous Academies a mean of six times (with a range of 1 to 11 years), including the 2009-2010 academic year;
- Ten of the twelve (83%) had previous experience teaching middle or high school students; and
- The eight responding staff indicated they had attended a median of 4 planning meetings.

Half of survey respondents (50%) noted they were Academy instructors, while more than two out of five were counselors and approximately a third of the respondents were involved in curriculum planning. Additional roles are specified in Figure 7. (The survey question allowed respondents to select more than one role; total responses are greater than 100%).

Figure 7. Summer Science Academy Staff Roles (n=19)



Staff Satisfaction with SSA Planning

Ten survey items addressed staff satisfaction with the planning process. Ten Academy staff members reported involvement with planning SSA 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 SSA administration and coordination, with 100% of the respondents noting that the contributions of all those involved with planning were respected and the project director coached new staff in expectations of the project. Detailed satisfaction responses for the planning process are shown in Table 5.

Table 5. Staff Satisfaction with Planning (n=10)

Question	Agree or Strongly Agree	Neutral	Disagree or Strongly Disagree	N/A or No Response
The contributions of all those planning SSA were respected.	100%	-	-	-
Meeting time was used productively.	90%	10%	-	-
My abilities were used effectively during SSA planning.	90%	10%	-	-
Positive communication methods/patterns were used by staff throughout the SSA planning process.	90%	10%	-	-
There was sufficient planning time prior to the start of SSA.	70%	20%	10%	-
Those planning the SSA were recognized for their contributions.	90%	10%	-	-
The Project Coordinator provided sufficient faculty training in cultural competency.	90%	-	-	10%

The Project Director worked to coach new faculty/staff in behavioral, professional, and educational expectations of the project.	100%	-	-	-
*For my personal planning needs, the pre-SSA training of staff included sufficient emphasis on best practices and educational philosophy when teaching middle and high school students.	90%	-	10%	-
*For the overall SSA staff, the pre-SSA training included sufficient emphasis on best practices and educational philosophy when teaching middle and high school students.	80%	10%	10%	-

Open-ended responses clarified two items in Table 5 (marked with *) regarding individual and overall pre-SSA training needs in best practices and educational philosophy when teaching middle and high school students. Written comments addressed SSA planning and the timing of planning. Several respondents indicated that more planning time was needed prior to the Academy. This would allow time for curricular changes to be completed prior to going over the curriculum. This was noted as a particular concern for the new teachers who had to catch up with a hurried approach. It was also reported that the planning and curriculum requirements of running SSA concurrently with SEPA programming strained SSA’s planning and curriculum capacity. A suggestion was made that two staff be devoted to curriculum development and planning – one for SSA and another for SEPA.

An additional respondent noted that it is important that the curriculum and instruction be more efficient and effective teaching the curriculum to the students in a more meaningful way.

Academy staff identified barriers that made planning SSA difficult. Identified barriers which *were* resolved included:

- How to engage students in the subject and keep them focused on the topic at hand;
- Staff changes; and
- Scheduling meetings that were appropriate for all attending.

Only one staff member noted a barrier that was *not* resolved during planning; this was working with an instructor that didn’t have strong support in what the respondent was doing.

Staff Satisfaction with SSA Implementation

Seventeen 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 SSA.

Academy implementation responses were positive. While some staff responded neutrally to questions, few responses of *Disagree* or *Strongly Disagree* were recorded. Staff responses can be

organized to provide insight into administrative practices, curriculum and instruction, and student interest. Shown in Table 6 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 four 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 that new staff were oriented to the teaching expectations of the academy. Additionally, staff felt the SSA 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 respondents noted that the curricula were presented in ways that were easy for the students to understand, positive communication methods were consistently used with students, and that the Academy increased the students' knowledge of life science. More than 80% also *agreed* or *strongly agreed* that the difficulty level and amount of information was appropriate as well as that conducting the program as a residential program on a college campus contributed to their understanding of post-secondary education. However, one out of four respondents *disagreed* or *strongly disagreed* and 13% were *neutral* that students were familiar with medical terminology.

Satisfaction with Student Interest

Staff responses to survey items addressing administrative practices were exceedingly positive and are shown in Table 6. All respondents *agreed* or *strongly agreed* with items addressing student interest – interest in medicine, interest in pursuing a medical career, and topics engaging students.

Table 6. Staff Satisfaction with SSA Implementation (n=8)*

Question	<i>Agree or Strongly Agree</i>	<i>Neutral</i>	<i>Disagree or Strongly Disagree</i>	N/A or No Response
ADMINISTRATIVE PRACTICES				
My abilities were used effectively during SSA.	100%	-	-	-
SSA was well organized.	88%	-	13%	-
SSA staff were recognized for their contributions.	88%	13%	-	-
I was informed of the SSA goals/objectives prior to the event.	100%	-	-	-
Any questions I had regarding SSA were responded to in a timely manner.	100%	-	-	-
The length of the SSA program was appropriate.	88%	13%	-	-
New camp staff were oriented to the teaching expectations of the camp. (n=7)	100%	-	-	-

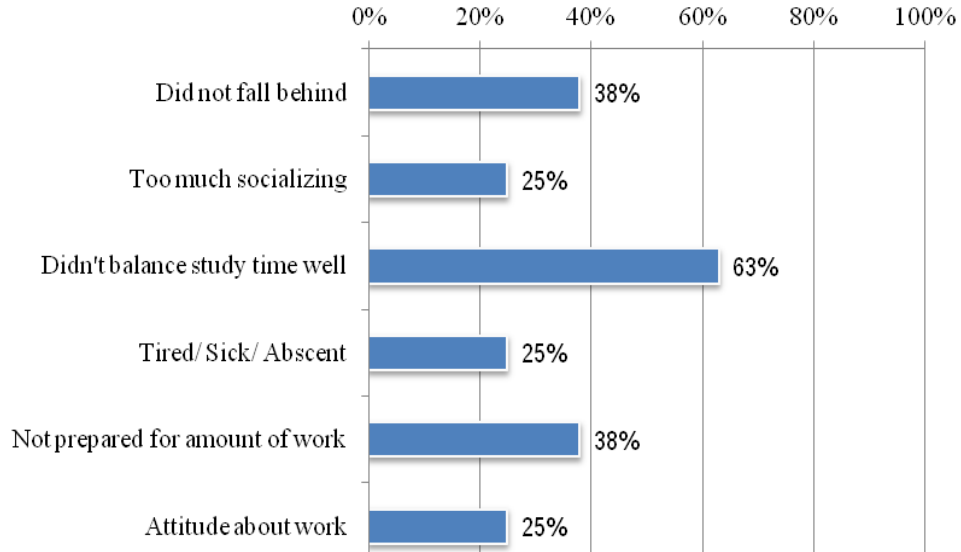
CURRICULUM AND INSTRUCTION				
Positive communication methods/patterns were consistently used with the students.	100% ^x	-	-	-
The difficulty level of the SSA curriculum was appropriate.	88% ^x	13%	-	-
The amount of information in the SSA curriculum was appropriate.	88% ^x	13%	-	-
Curriculum content was presented in ways that were easy for students to understand.	100% ^x	-	-	-
Students were familiar with medical terminology (vocabulary).	63%	13%	25%	-
Students learned about life sciences at camp. (n=6)	100% ^x	-	-	-
Conducting SSA as a residential program on a college campus contributed to the students' understanding of the process of post-secondary education.	88% ^x	13%	-	-
STUDENT INTEREST				
The SSA topics engaged the students.	100%	-	-	-
Students appeared interested in medicine.	100%	-	-	-
Students appeared interested in going into a medical career.	100%	-	-	-

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

Seven out of eight respondents indicated that students' knowledge about post-secondary education changed a *high degree/a lot of change* as a result of their participation in the program; the remaining individual indicated *moderate/some change*. Similarly, six out of eight respondents indicated that students' knowledge about medical education changed a *high degree/a lot of change* as a result of their participation in the program; the remaining two individuals indicated *moderate/some change*.

In order to better prepare for future sessions, staff surveys included questions about students that "fell behind"; the most prevalently perceived reason for a student falling behind was that the student didn't balance study time well (63%). Additional reasons are specified in Figure 8. (The survey question allowed respondents to select more than one role; total responses are greater than 100%).

Figure 8. Reasons Students Fell Behind (n=8)



Respondents felt that the following assistance would be beneficial to students:

- Time management (6),
- Reading/writing/study skills (4),
- Stress management (3),
- Test-taking skills (2), and
- More resource sessions (1).

All staff indicating applicability responded that the following program components were of high value:

- Adjustment to a college campus,
- Introduction to the demands of preparing for and attending college,
- Increasing scientific knowledge,
- Forming peer relationships,
- Increasing self-confidence,
- Learning to relate to school faculty/staff,
- Learning medical terminology,
- Art Project special event,
- Multi-cultural Night at KUMC special event, and
- Team Builders special event.

Additionally, respondents indicated that the following components were of high value or moderate value:

- Improving study skills,

- Improving problem-solving abilities,
- Managing time more effectively, and
- Poetry Night at the Blue Room special event.

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

Barriers

Respondents indicated no barriers or difficulties that made it difficult to teach the students.

Staff and Participant Engagement and Interest

Survey respondents identified a wide variety of SSA experiences that were the most engaging for themselves and for the students. The most engaging for the students included:

“Being in the labs”,

“Hands on experience”

“Classroom activities, teambuilder, poetry night, and multicultural night. The students interacted very well with each and seemed more “open” to engage with their peers.”

Learning to live in a dorm setting and away from home is probably the most engaging due to it taking up 24 hours per day...everyday.”

“Relaxing and understanding the dorm life”.

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

- Academic:
 - Planning curricula, and
 - Helping students on an individual basis
- Interpersonal:
 - Engaging with staff,
 - Watching students perform for multi-cultural night,
 - Helping teenagers learn how to be social with others,
 - Working with mentors and students as a group to enhance their cooperation, and
 - Helping parents say goodbye to their students after on-site orientation
- Professional:
 - Having conversations with students that were meaningful to their futures,
 - Mentoring the students in the dorm setting,
 - Gaining the trust of the students and parents, and
 - Providing a safe experience emphasizing learning and pro-social development moving the students toward higher education in health careers.

Suggestions for Future Summer Science and Math Academies.

Specific programmatic suggestions noted by staff can be organized by two topics – planning and administrative practices. Suggestions regarding planning include:

- Beginning the planning earlier,
- Incorporating into planning ways to work with the mentors to better understand the role of leadership/mentoring, and
- Organizing some lunch periods to increase the number of peers students interact with.

Additional suggestions organized by administrative practices include:

- Working with staff for more consistent enforcement of the Code of Conduct,
- Extending the length of the Summer Science Academy, AND
- Negotiating with the university to move back to the previously-used dormitory.

All responding staff indicated they would participate in the Summer Science Academy again, if asked.

Parent Satisfaction

Parent satisfaction surveys were returned by 12 parents. Nine questions addressed overall satisfaction with SSA. 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 7. Mean responses on a five-point scale indicate that parents *agreed* (mean score from 3.45 to 4.4) with the statement *At SSA my student learned science information that he/she had not learned at school*. Parents *strongly agreed* (mean scores of 4.45 and above) with all additional statements. Results show a high level of parent satisfaction with SSA.

Table 7. Mean Parent Satisfaction Responses

Statement	Mean Response
SSA was well organized.(n=11)	4.82
The amount of communication between the SSA staff and parents/guardians was appropriate.(n=12)	4.58
I knew how to contact program staff, if needed (n=12)	4.75
At SSA my student learned science information that he/she had not learned at school. (n=10)	4.40
I would recommend SSA to other students/families. (n=11)	4.82

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

Eighty-three percent of parents reported the Summer Science Academy increased their student's interest in a medical career. Additionally, all parents responded that the students' knowledge about medical education changed as a result of participation in SSA.

Previously presented in Figure 3 are parent responses regarding student preparation for post-secondary learning. Parents noted the following activities as being of high value (mean

responses greater than 3.5 on a 4-point scale) in preparing their students for post-secondary studies: learning medical terminology, managing time more effectively, improving problem-solving abilities, learning to relate to school faculty/staff, increasing self-confidence, improving study skills, forming peer relationships, increasing scientific knowledge, introduction to the demands of preparing for and attending college, and adjustment to a college campus.

Twelve parents identified their students' favorite parts of SSA.

- Four parents cited the college/dorm experience.
- Four also identified meeting peers and social interaction.
- One noted the internship.
- Three indicated the learning and curriculum.
- One each identified eating, the poetry workshop, and mentorship.

Responses were provided to improve SSA. Two respondents noted that the stipends need to be ready on time since the students look forward to receiving it. An additional parent noted that the change of date for the closing ceremony happened too far into the summer for the parent to adjust a work schedule.

Additional comments praised the program, stating:

- "My daughter commented that she learned some good study habits."
- "This program was very beneficial."
- "Keep this program intact to benefit all students."

Conclusions and Recommendations

Conclusions

The University of Kansas Medical Center successfully implemented the Summer Science Residential Academy and Medical Internships during the summer, 2010. Data support the success of the program meeting three of its four outcomes, showing mixed results for one outcome and having 93% of the enrollment needed to meet its program output.

- **Outcome 1. Increase participants' knowledge of science:**
Significant growth in student knowledge of science was found at the $p < .001$ level for each of three curriculum areas: brain function and addiction, the circulatory system, and genetic variation.
- **Outcome 2. Increase participants' interest in higher education.**
An increase in participants' interest in higher education was found. While the quantitative data showed no impact of programming, all student responses (pre- and

post-) evidenced *strong agreement* the students planned to go to college. Strong qualitative data from students regarding their medical internship programs showed increased interest in higher education in responses to open-ended questions. Increased interest was found for students to attend college and to attend graduate school. Fifty percent of the interns who did not note previous plans to go to graduate school showed evidence the internship impacted their decision to attend graduate school. Ninety-two percent of students who did not previously indicate plans to go to college indicated the internship impacted their desires to attend college.

- **Outcome 3. Increase participants' interest in health careers:**

An increase in participants' interest in health careers was found. While the quantitative data showed no significant impact of programming, an increase in student interest in medical careers was found and mean responses to the statement *I am thinking about going into a medical career* increased from the category of *neutral* to the category of *agree*. Student responses to the question, "How has your internship experience influenced the likelihood that you will enter a medical career field?" show the internship experience was effective in increasing student desire to enter a medical field. Of the students who had not previously decided on a medical career, 71% showed evidence through qualitative responses that the internship impacted the likelihood they would enter a medical field.

- **Outcome 4. Provide program components to increase participants' preparation for post-secondary learning:**

Program components were provided to increase participants' preparation for post-secondary learning. Students, parents, and program staff reported the following program components of high or moderate value in preparing students for post-secondary learning: learning medical terminology, managing time more effectively, improving problem-solving abilities, learning to relate to school faculty/staff, increasing self-confidence, improving study skills, forming peer relationships, increasing scientific knowledge, introduction to the demands of preparing for and attending college, and adjustment to a college campus.

- **Output 1. 30 minority, underserved, or disadvantaged middle and high school students will participate in SSA.**

28 minority, underserved, or disadvantaged high school students participated in SSA.

Recommendations

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

2. It is recommended that changes in the planning process be made to complete curriculum planning earlier.
3. It is recommended that program staff and administration consider separating the summer SEPA and SSA curriculum workload to be shared by more than one person.