Summer 2008 Southern Tier SciFair Report

Program Description

The Southern Tier SciFair (STSciFair) program ran from July 21 – August 14th, 2008. This program was developed as a project of MST-Connect and run as a partnership among Cornell University's SciCentr program, Corning Community College (CCC), and GST BOCES. Designed as a summer science and technology camp, STSciFair was held in eight school districts in Chemung, Steuben, and Tioga Counties of New York State. The districts are Addison, Bath, Campbell-Savona, Corning/Painted Post, Elmira City, Elmira Heights, Horseheads, and Spencer-Van Etten. These districts are all within the Greater Southern Tier (GST) BOCES region of New York State. Four of these districts are small rural systems that average more than 50% students on free and reduced lunch. The urban schools in Elmira also have a high rate of free and reduced lunch and in fact, averaging over the total student population from participating districts, more than 38% of the students in these districts are eligible. Of all the districts, only Elmira City Schools , at 20%, have more than 5% minority students.

Preparation

SciCentr director, Margaret Corbit, worked with the partners and schools to facilitate the program. The SciCentr technical coordinator Richard Bernstein worked with GST BOCES and the school sites to set up the worlds and accounts for the summer program. Program manager, Catherine Norton-Barker oversaw evaluation and provided EduPlay training. Mary Rose Walker and Job Alexander served as Cornell's Student Coordinators. Browsers were installed and in most cases tested in advance of the program on computers in labs at the various schools. Teachers were recruited to Coach the summer camp teams through the school administrations, all of whom participate in MST-Connect. Financial support and the in-kind contributions of the training and mentoring resource at CCC and the Showcase site, Wings of Eagles Discovery Center, were enabled through MST-Connect. A "Menu" of standards-related project topics was developed by two teachers on the organizing committee. Cornell designed and hosts a project Web site at http://www.stscifair.scicentr.org with program information.

Training

Coaches (17 from the GST region) and Mentors (10 recruited by CCC) were trained during the week of July 14-18th at CCC prior to the program running. On the first day, several speakers, including the CCC president, Floyd F. Amann, Ph.D., addressed the importance of familiarizing students with virtual worlds to help the Coaches grasp the magnitude of the technologies they would be using in the 21st Century workplace. SciCentr staff delivered introductory training.

Hands-on training began with an introduction to the software (CUni system of Active Worlds) through exploration and play in Cornell's custom training world, EduPlay. Staff, including Student Coordinators, used social icebreaking activities adapted to virtual worlds to begin team-building. Following the SciFair Model, the Student Coordinators oversaw basic technical training, ending on the second day with demonstrations of more advanced features.

Mentors and Coaches were teamed to ensure the best possible technical support for all Coaches and adequate Mentor/student ratios. These teams worked together on Day Three to develop mini SciFair projects. On the fourth day of training, Mentors created mini technical lessons while the Coaches prepared their classrooms and computer labs. On the last day, Coach/Mentor teams presented the methods they would use to introduce the campers to the medium and how they would use it to help them learn about science at a Showcase luncheon hosted by Corning, Inc.

STSciFair Summer Camp

For four weeks, the Coaches ran camps from their home schools. Mentors logged in and participated from a computer lab at CCC. The Student Coordinators spent the first few days of the program inworld while onsite at CCC, assisting the mentors and fielding questions from the teachers. The preliminary issues were mostly technical.

For the remainder of the program, the Student Coordinators split their time among site visits to the schools, team meetings with the mentors, and online mentoring, as well as general administrative and planning activities. They made full use of a car leased by Cornell for the month of the program. Virtual world telegrams and e-mail were the most frequently used methods of communication for troubleshooting. All Mentor-Coach pairings were successful. In one case, it was necessary for the Coaches and Mentors to meet again face-to-face to develop a plan for ongoing communication.

A part-time volunteer mentor (rising 9th-grader) assisted two of the schools remotely both from his home and the lab at Cornell. He served as a technical expert with the program and devoted all of his time to trouble shooting and supporting specific sites. The students readily interacted with him, asking questions. He, in turn, received peer mentoring from a CCC student on his way to engineering school. The intern's role was invaluable, and we would recommend incorporating technical interns into future programs.

The showcase took place on August 14 at Wings of Eagles Discovery Center (WEDC). GST BOCES provided laptops and coordinated network access at WEDC. The event was hosted by Corning, Inc. Student groups showcased their work simultaneously in an auditorium while a brief video played overhead. Everyone then moved into the hangar area where several speakers stressed the importance of these emerging technologies. Lunch was served for more than 200 guests. Approximately 300 attended overall and two television stations sent reporters to the event. All participants and supporters were thanked, and then medals were presented to the students and certificates were given to mentors.

Site Projects

District	# of students	Topic
A	18	Conservation—students focused on endangered species
B	6	Tornado Alley—tornado precautions, a tornado watch, the consequences of a tornado, and scientific measurements of tornadoes.

C	7	The digestive system—an up close and personal tour.
D	6	The circulatory system and its function
E	8	Conservation
F	16	Biomes: definitions of each one, typical flora, fauna, etc.
G	7	The Rainforest: different canopy layers and what would be found in each
H	13	Genetics: how genes work, mapping the human genome, mitosis and meiosis

Evaluation

All participants were given the option to opt out of the evaluation and the methods and instruments for this evaluation were approved by the Institutional Review Board at Cornell University prior to implementation. Parental consent and student assent were required of all participants under 18 years of age. All pre and post surveys were administered through an online system (i.e, Survey Monkey). In addition, all campers but one had completed media releases.

CAMPERS

Approximately 81 middle school students were served across eight Southern Tier schools. Of these, 74 provided consent to participate in the evaluation, resulting in a 91% overall participation. The students ranged between 10 and 14 years old, which varied by school. There were more boys (63%) represented in the evaluation group than girls (37%). Using virtual worlds was a new experience for most students (88%). Twelve percent (12%) reported encountering the program through one school's summer Jumpstart program and in-curriculum 6th Grade CyberCiv (i.e, virtual ancient civilizations) programs and another school's afterschool SciFair (i.e., virtual science fair) program.

At the showcase, several teachers remarked that they would recruit differently now that they have run the camp once. We hope that this would result in more girls participating, as those in the program were as enthusiastic about it as the boys (see below).

Measures
The following measures were administered before and after the program. All of the schools had students who completed both sets of measures.

Science Attitude. The Brief Science Attitude Measure was developed by independent evaluators at University of Washington through NSF funding for the development of SciCentr's Jumping Genes virtual world, contains six 5-point Likert-type agreement items, such as "I like Science," with a possible range of 6 to 30. A higher score indicates a more positive attitude about Science. This measure was developed to target those with the poorest attitudes (i.e., those in the 1st quartile) and to look for change over the course of a program. The mean of the overall group was 24.91, with a first quartile cut-off of 23. The target group's scores significantly improved from a mean of 19.92 on the pre-test to a mean of 21.58 at the end of the program, $t(11)=2.75$, $p < .05$

Math Attitude. The Brief Math Attitude Measure was developed by independent evaluators at University of Washington through NSF funding for the development of SciCentr's Jumping Genes virtual world, contains six 5-point Likert-type agreement items, such as "I am good in Math," with a possible range of 6 to 30. A higher score indicates a more positive attitude about Math. This measure was developed to target those with the poorest attitudes (i.e., those in the 1st quartile) and to look for change over the course of a program. The mean of the overall group was 22.91, with a first quartile cut-off of 21. The target group's scores improved from a mean of 16.00 on the pre-test to a mean of 19.08 at the end of the program, $t(10)=2.17$, $p < .10$, approaching statistical significance.

School Attitude Assessment Survey-Revised (SAAS-R). The students' school attitudes were also assessed pre and post. The SAAS-R was designed to identify academically able students who underachieve (McCoach & Del Siegle, 2003). The survey is comprised of 35 likert-type agreement statements on a 7-point scale, which are averaged to form a composite score. There are five factors within this measure: academic self-perception (ASP), attitudes toward teachers (ATT), attitudes toward school (ATS), goals and motivation/self-regulation (MOT). A composite average (AVG) of all five factors gives a general indication of school attitude. Each of these has a range from 1 to 7, with higher numbers indicating more positive attitudes.

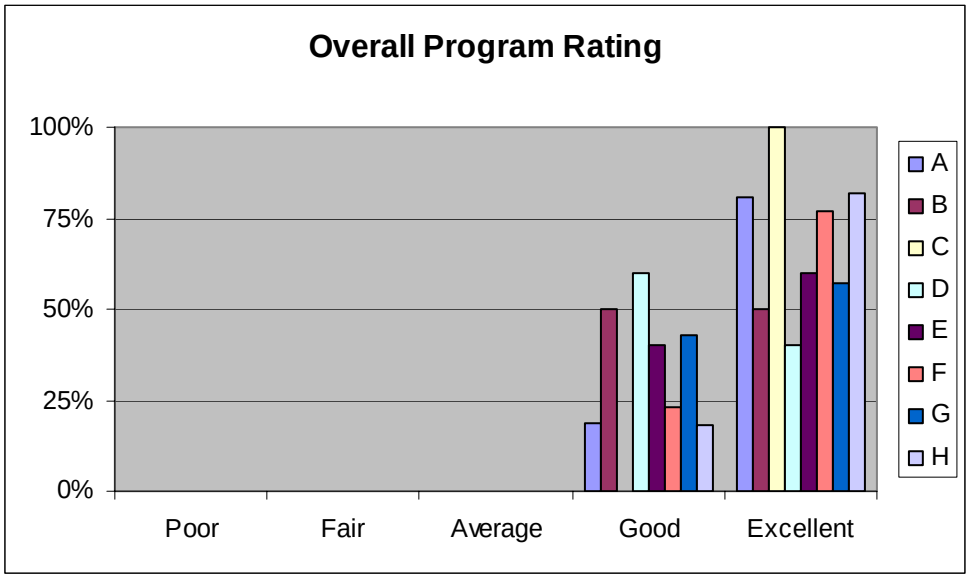
School Attitudes

Range 1 - 7	Pre	Post
Overall School Attitude	5.96	5.99
Academic Self-perceptions	5.84	6.05*
Attitude Toward Teachers	5.93	5.92
Attitude Toward School	5.77	5.55
Goals	6.64	6.63
Motivation/ Self-regulation	5.74	5.85

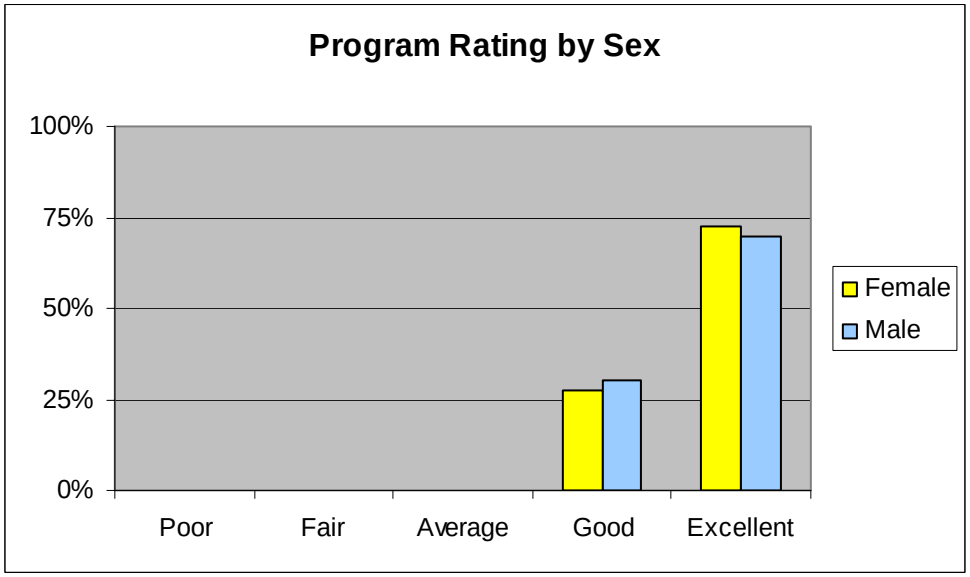
The students were a self-selected group (i.e., they signed up for a voluntary summer school program) who came into the summer program with already positive attitudes about school. There were no significant changes in these scores, except for Academic Self-perceptions, which rose from a mean of 5.84 to 6.05 at the end of the program, $t(49)=3.15$, $p<.05$.

Program Rating & Feedback

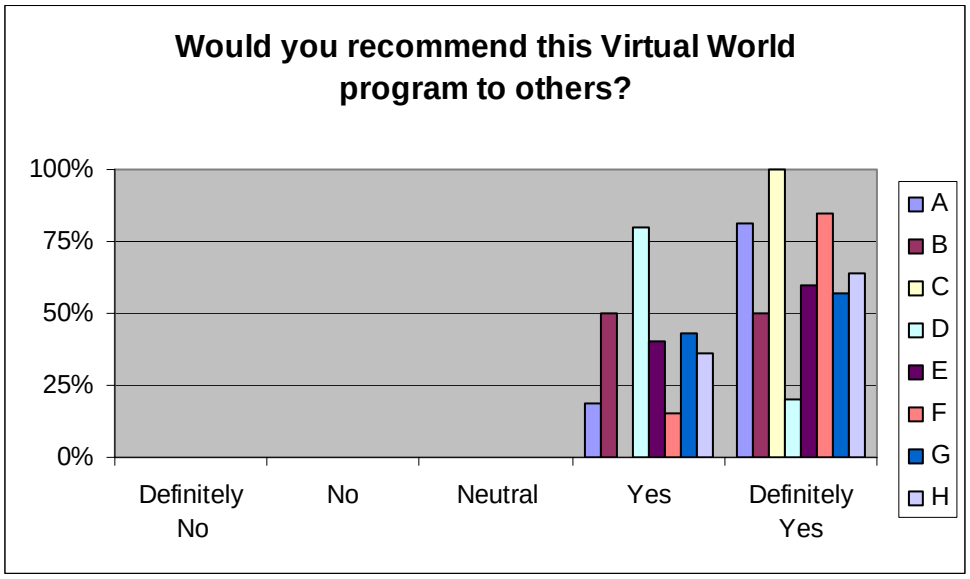
The program was well received by all of the students, who rated it good to excellent.



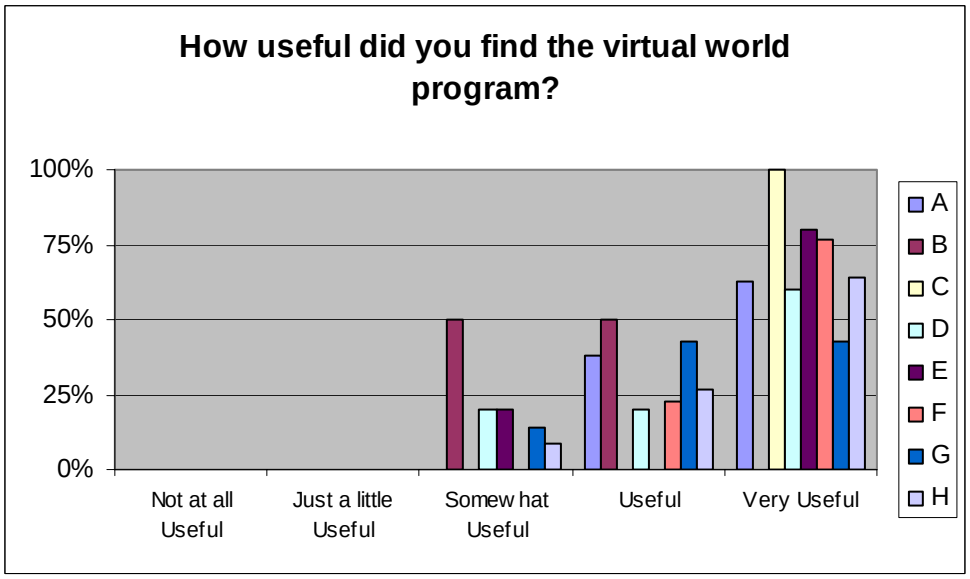
And the appeal was slightly greater for the girls in the program.



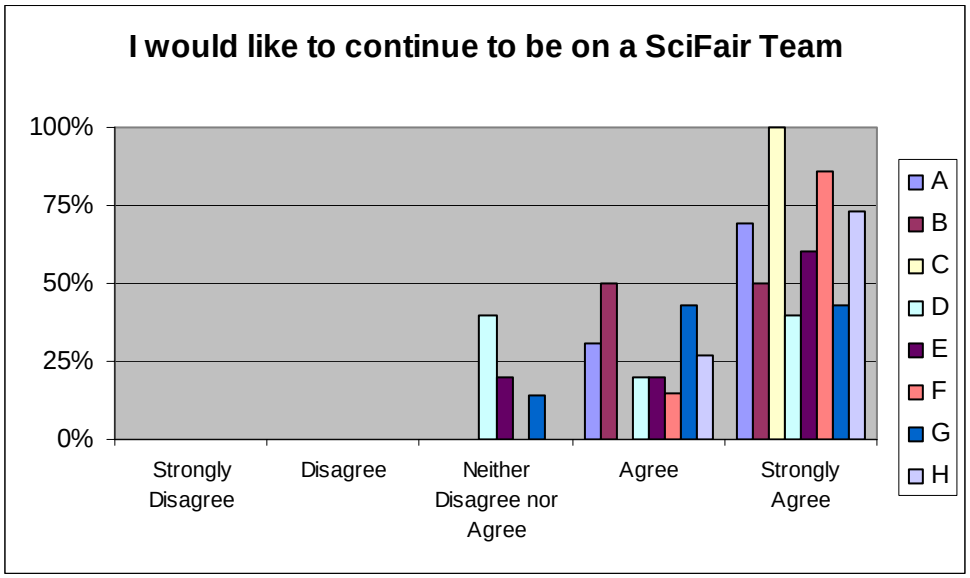
Similarly, all of the students said they would recommend the program to others.



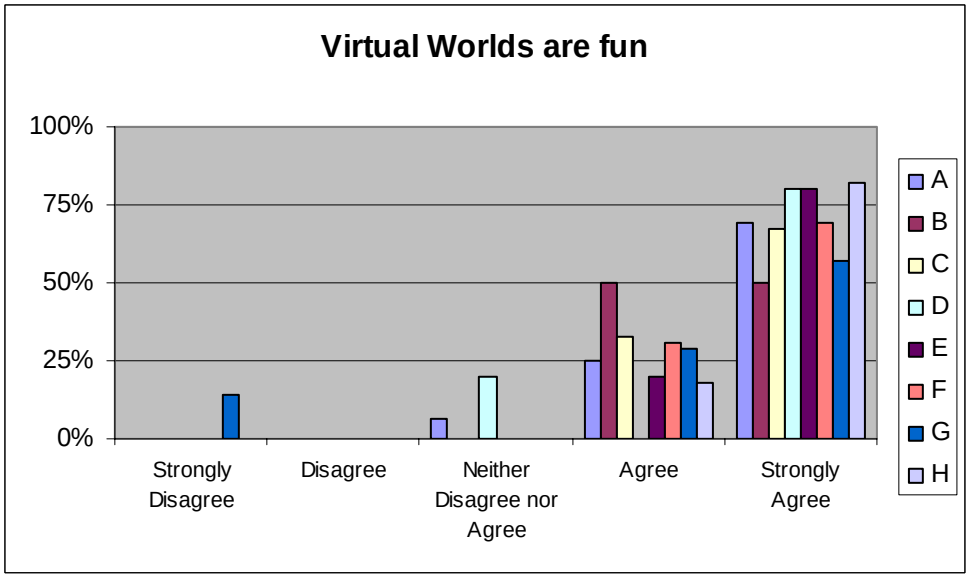
The students were only slightly less enthusiastic about the usefulness of the program.



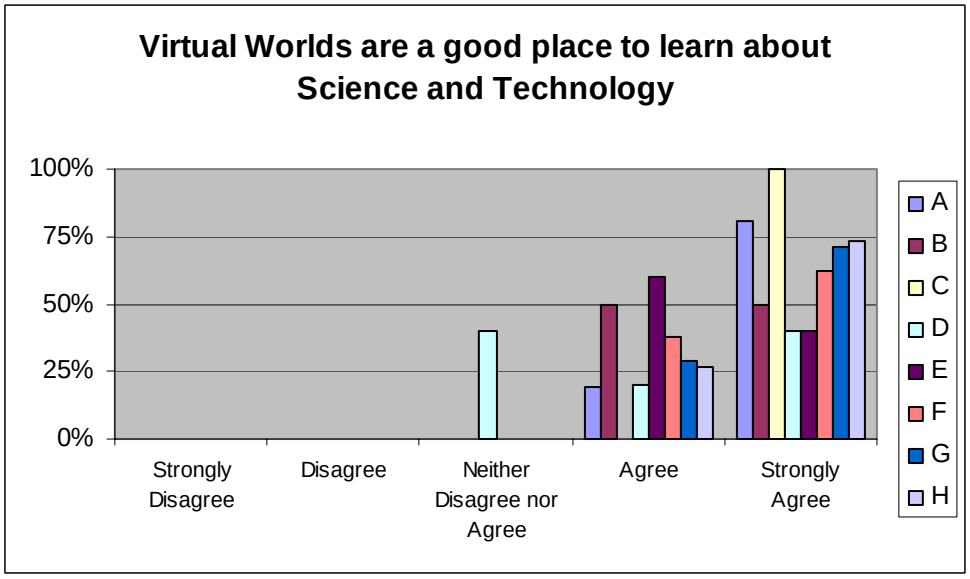
The majority of students stated they wanted to continue.



And they thought that virtual worlds are fun.



Most of the students said they thought virtual worlds are a good place to learn about Science and Technology.



COACHES

Fifteen teachers participated as Coaches in STSciFair (Addison 2, Bath 1, Campbell-Savona 2, Corning-Painted Post 1, Elmira City Schools 3, Elmira Heights 2, Horseheads 2, Spencer-Van Etten 2). All completed pre and post surveys. Nine teach Science, one teaches Science and Mathematics, and one each teach Mathematics, IT/Computer Arts, Pre-K, Social Studies, and children with disabilities.

While many of the questions in the teacher survey might be of interest to the associated school administrations, we felt that they many were more relevant to a year-long program. In response to suggestions gathered at the fall MST-Connect meeting, Cornell revised the survey instrument and is sending it out as a follow-up as soon as it is approved by the Cornell IRB.

Coach Survey Results

The Coaches gave the program high ratings: 4 Good and 11 Excellent. All would recommend the program to other teachers. And all found the program useful.

Team Status Reports

Coaches were also asked to complete Team Status Reports midway through the month. These reports included the following comments:

Approach:
"Introduction to basic world concepts; using a pre-developed guidebook; Brainstorming and researching individual subtopics; using the internet and reference; books in the school library; World design and construction developed through whole group discussions and activities."

"Hands-on visual demonstrations; Internet researching methods; library/book research; basic world design and construction techniques; brainstorming; working in pairs/teams; experimentation and modification; creation of food webs."

Mentors:
"Having the mentors is a tremendous help, the kids love to ask them questions and pick their brains for more information. They are an extreme help, because us teachers spend most of our time assigning objectives, keeping on task and helping students."

Best Practices:
"At the beginning [of each day] have specific objectives for the day; at the end, choose one of the objectives at random for each student to complete. Perform refreshers the following day."

"Show-Replicate-Experiment"

Lessons Learned:
"The students will know more than you about this program after a few days. Have all the students perform in equal shares, otherwise they will pick a leader and sometimes that doesn't work well with others. If you do assign partners, choose them wisely so they are both putting in equal amounts of work."

"Students have ideas that sometimes are more complicated than the program can do. That they learn pretty quickly and like to build but are not as interested in researching their topic or actually putting in the information. They would just rather go on building stuff. I was surprised how well they work together building in the same space. The students were really proud of what they built and wanted to show it off as much as possible."

"With the age group we had, students needed direction then time to experiment. Plan more than you think you will need because students learn faster than we did (o;"

"Having the students move away from the computer and go to desks during key instruction worked well; allowing time to "play" every day gives students incentive to finish lessons; provide opportunities to be away from the computer to do real-world activities breaks up the monotony; have students help one another when they master new skills; have a backup plan for out of world activity in case computers are down!"

"Pre-planning with technical support staff is needed; have a game plan for dividing the world for large groups of students; try to prevent interruptions; pair students with care; pre-plan long-term goals prior to summer"

MENTORS

Five of ten mentors completed part of the pre and post surveys, which included a detailed career motivation survey used in an ongoing meta-analysis. Four completed the follow-up questions for the program. The group dispersed quickly at the end of the program and follow-up communications did not result in more compliance. Of those who completed the post survey,

75% had a positive mentoring experience. All would recommend the experience to others. One did not have a good experience with his/her coach. General response to the program was very positive. Two mentors expressed an interest in taking the program with them to their transfer institutions.

In the post survey comments, the Mentors requested a later starting hour and suggested that they be able to work with the students in person at least part of the time. (Note: there are administrative issues with this.) They stated that they enjoyed "[l]etting the kids use their imaginations and being there to help them when they need it." One found "[t]he biggest challenge is that I can not physically go and look at the screen of the student to see what it is that they are seeing." And when asked what the most valuable part of the experience was, one responded "[n]etworking with various people with different sets of skills and experiences" while another expressed satisfaction from "[h]earing the kids say thank you for helping so much."

Recommendations

1. Future Coach/Mentor training locations should be as comfortable as possible and should include air conditioning and reliable computers.
2. Having the Mentors and the Coaches undergo the training together was extremely beneficial for all parties.
3. If possible, Mentors should be given the opportunity to make site visits to interact with the students. This would require background checks for the mentors and a way to provide transportation, but is worth trying to arrange.
4. A check-in system should be established for Mentors. They should understand when they are recruited that they are required to work from the computer lab provided each day. While there were no problems with Mentors logging in for sessions, there were some instances of Mentors logging in from off-site. In general, the more social interaction and support for the Mentors, the better.
5. All sites should have two Mentors and two Coaches, if possible.
6. Mentors should have continuing technical training sessions after the teams log off. This should alleviate the strain put on the Student Coordinators for technical support and allow them to focus on bigger issues and make more site visits.
7. Mentors should be given a fieldtrip to and information on any institution that the teams will be visiting on fieldtrips.
8. More effort should be made to ensure the software is installed and tested by school IT staff before the program begins.
9. A follow-up meeting in January should be held to sustain Coach interest and initiate plans for the next camp.
10. The program should leverage online STEM resources such as ThinkFinity.org and integrate them into the scaffolding of the topic "Menu".
11. Development of the "Menu" should be integrated with a session for recruited Coaches that introduces the project-based approach and gives them a head start on program planning.
12. Teachers should be encouraged to prepare a few classroom-based activities that are supplemental to the SciFair process. These will be important in case the server goes down or other major technical problems arise that prevent them from logging in.
13. Program marketing within schools should be geared to attract more female students.

Next Steps

The general response to STSciFair was extremely positive and MST-Connect is committed to working toward a sustained partnership to support this program. Funds have been lined up for a spring after school SciFair based on a modified model of the summer camp. This should build interest in the more intensive summer program. Care will need to be taken to ensure that students who come with experience are challenged and that their expertise be acknowledged and leveraged in the camp. A CIT model should be considered for older teens. MST-Connect will feature STSciFair in its December presentation to its Board of Champions.

References

McCoach, D. & Siegle, D. (2003) The school attitude assessment survey-revised: a new instrument to identify academically able students who underachieve. Educational and Psychological Measurement, 63, 414.

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