

Launch-IT
An NSF Information Technology Experiences for Students and Teachers (ITEST) Project
Interim Report for the Summer Program (July 21st, 2007 – August 7th, 2007)

Student & Staff Recruitment

The three-week 2007 Launch-IT summer camp was very successful in terms of student commitment. We were able to recruit 55 students from the Lehigh Valley area including Easton, Allentown, and Bethlehem. The student population represented 19 schools throughout the Lehigh Valley with 35 returning students and 20 new students. The student pool was diverse considering race, gender, socio-economic background, and skill set. The nature of the student mix served to be beneficial as students found themselves making friends and networking across school districts.

In terms of Launch-IT staff, we expanded the number of college students involved and recruited eight undergraduate information technology assistants, with various college backgrounds. In addition to having staff members with IT background, it was important to have a multifaceted group of college students involved providing different role models and success examples for the Launch-IT students.

In addition to having undergraduate representation on the staff, Launch-IT had 5 LV STEM (Lehigh Valley Science, Technology, Engineering and Mathematics) graduate students volunteer for a week as part of their orientation for their LV STEM appointment. These graduate students served as a valuable asset to the classrooms, as many had prior teaching experience, and all added to the diversity of our teaching staff in terms of their educational background and career aspirations.

The Launch-IT 2007 summer program hosted at Lehigh University consisted of several key components: team curriculum, on-campus field trips, guest speakers, creative activity time, a roller-coaster design project, and the Closing Explosion.

Robotics Team

The focus for the Robotics curriculum was design emphasized through the use of robotics and rockets for the 6th grade and 7th grade students. The robotics team served as the funnel for the Launch-IT pipeline of IT inspired students therefore the Robotics' team included a wide variety of activities to appeal to young scholars. Activities included history lessons on the Hero engine, hands-on rocket experiments, robot simulation, lessons on website legality and reliability, travel plan missions, structure building competitions, a marble run, soldering activities, and pod casts.

After learning about the history of the first steam engine and witnessing rockets simulators online, the students on the Robotics team were ready to make their own rockets. The rocket experiments included an Alka-Seltzer rocket constructed from Alka-Seltzer and an empty film cartridge. After constructing a basic Alka-Seltzer rocket, students had to conceive different designs in order to balance a pay-load and achieve maximum height with the flight of their rockets.

The robotics lessons educated students to the wide range of capabilities of the robots used on Mars. Thanks to the NSF and PITA grants, students had access to a state-of-the-art robots equipped with the latest in artificial intelligence. Before using a remote control interface created by two LV STEM & Launch-IT graduate students, the 6th & 7th graders had to first be orientated as to how the robot functions (parts, how it works, and of course the cost). After orientation and several demonstrations students were ready to drive the robots themselves. The robots were operating in the Mars Yard, a makeshift Martian surface with a mural of the Martian terrain and horizon, at Harrison Morton High school in Allentown, PA via remote control. Using the newly-created interface program students navigated the robots to complete different missions. The missions required teamwork, planning of an effective strategy, as well

as incorporating their knowledge of geometry, as the missions would require reaching a certain destination point with the least amount of turns or navigating a circuit that represented an equilateral triangle.

The final project of the Robotics team had the students working in teams, the girls' team and the boys' team. Students had to create an assembly manual for the leg of the robots using PowerPoint and a digital camera to take pictures of the robot parts. The directions were written as the students took the leg apart, then after completion of the manuals the teams switched instruction manuals and had to put the leg back together using the other teams' directions. Overall the students on the robotics team were pushed to think logically and creatively as they were faced with many projects focusing on the design aspect, requiring proper planning, teamwork and execution. The critical thinking skills that these students developed and enhanced during the summer Launch-IT program will benefit the students throughout their academic year at school and provide them with the skill set that is beneficial for next years on involvement in Launch-IT, launching them towards successful futures in academia and beyond.

Fuego Flash team

The Fuego Flash team consisted of 8th grade students and 9th grade students. The focus of the Fuego Flash team was to learn some basic applications of Flash and Action Script. In addition to having learned basic programming skills, students were exposed to math lessons highlighting the use of geometric shapes and tessellations, First in Math 24 online skill building exercises, and studied how to interpret and break UPC and ISBN codes.

Students used Flash and Action Script to create their own jukebox on the computer. Each student imported a song for their jukebox and designed custom animation to complement their song choice and own personal style. After the completion of the jukeboxes, students participated in their version of "The Apprentice" where each student presented their final jukebox creations to their peers for constructive criticism. Students enjoyed this activity as they had to exemplify public speaking skills, use their creativity to present an appealing marketing plan, and best of all the exercise did not feel like work, but more like role playing.

The Fuego Flash teaching team described their students as being highly motivated to learn Flash and create their jukebox designs. And although sometimes writing code had the students frustrated, overall the students were determined to succeed, and in the end they requested more knowledge on the software programs and inquired as to how they could access these programs at home on their own computer.

Java team

The Java team consisted of 10th, 11th, & 12th graders and their curriculum focus was to develop basic programming skills, learn object-oriented design, and preparation for AP Java and college. The main IT project for the Java team involved the development of ticket machines using Java. Students were able to learn basic programming skills to create a functioning ticket machine able to sell tickets based on how many tickets have already been sold. Students also utilized Flash to create an interface prototype that could be customized for the student's particular ticket machine, adding a sense of pride and ownership to the project. Students also explored and utilized Dreamweaver to display summaries of their ticket machines and present their final projects.

In addition to learning straight forward programming skills, the Java team had to use their analytical skills as well. Students were presented with real life complications with their ticket machines and solve problems. The problem solving activity was grounded in grammar and object-oriented design, as students had to first dissect the word problems, identify classes, attributes, methods and parameters in the design, and then develop their design with a Unified Modeling Language (UML) diagram tool. After designing

the UML for a movie ticket machine, the students implemented it in Java, learning how to create methods with assignments, if-then and looping constructs.

In addition to object-oriented design and programming, the Java team incorporated a lesson on computer ethics. The computer ethic topics included copyright infringement, privacy, and censorship. Students were assigned to teams to prepare a PowerPoint presentation and then educate their peers on their specific computer ethics topic. The PowerPoint exercise was instrumental in expanding upon the student's computer skill set as well as, enhancing public speaking, presentation abilities, and teamwork.

Students on the Java team also had the opportunity to discuss their future aspirations in more detail with the guest speakers during the professional panel created solely for the 10th, 11th, and 12th grade Launch-IT participants. In addition to hearing these speakers present to the Launch-IT students as a whole during the morning session, it was important to provide an opportunity for the oldest students to speak to these IT professionals in a more intimate setting, to allow for students to ask more personal questions regarding career choices, their future educational aspirations and create an environment for personal interaction for networking purposes.

Lehigh University On-Campus Field Trips

To enhance student awareness about the multitude of applications of Information Technology, Launch-IT scheduled several Lehigh University on-campus field trips to explore the technology resources available on a college campus. The four educational trips included visiting the Glass Lab in Materials Science & Engineering, visiting the Research Experiences for Undergraduate E-NOSE robotics project in Mechanical Engineering, time spent with librarians giving a virtual tour of the Digital Library, and a presentation on mobile robotics in the Computer Science & Engineering department.

E-NOSE, involved a presentation by biology and engineering students who designed a robot able to track and identify scents electronically. Students were taken through a sensory experiment with jelly beans as an introduction to a graduate student presentation on the complications and challenges of designing a machine that attempts to recreate the human sense of smell.

The on-campus trips allowed Launch-IT students to witness the various departments at Lehigh University engaged in interesting uses of IT and helped inspire the students about the possibilities for college and careers in IT.

Guest Speakers - IT Professionals

Students gained first hand knowledge about careers in Information Technology from local information technology professionals. Guest speakers provided detailed information on their day to day job responsibilities, background on how they were able to navigate through high school and college to find themselves in their current occupation. The local professional that visited Launch-IT included Dilivium Graphic Arts, Just Born Inc, Alcatel-Lucent, Merck, and Johnson & Johnson. The time spent with these IT professionals served as an invaluable resource for young students inspired by the possibilities of information technology.

The representatives from Alcatel-Lucent, Merck and Johnson & Johnson made their visit a day long affair. After their presentation to all of the Launch-IT students in the morning, the trio visited all three IT teams in their classrooms, ate lunch with the Launch-IT students, contributed during creative activity time, and finally participated in a panel discussion with the Java team (10th, 11th, & 12th graders) to initiate an in-depth conversation concerning college and careers. The professional IT guest speakers were a pivotal element of Launch-IT Program as these individuals were able to convey their life stories and their professional journeys, both triumphs and failures, to illustrate to students how anyone regardless of background can achieve academically and professionally.

Creative Activity Time

In addition to exposing at-risk students to the field of information technology and college opportunities, Launch-IT incorporated an additional educational feature to stimulate students. Students were exposed to a creative activity time that focused on teamwork and communication skills, self-expression, and games intended to exercise the imagination. These activity sessions were designed to increase self-confidence, generate appreciation and respect for ones peers, enhance public speaking abilities, and broaden their imagination. Students responded positively to the creative activity time as it provided a great balance to the educationally rigorous program and allowed students to continue their personal development socially & artistically.

Rollercoaster Competition

The IT design project was created to provide cross-collaboration between grade levels and to present students with an example of a multidisciplinary project. The 2007 summer design project was a roller coaster competition. The competition was a unique project as in incorporated several aspects of IT and design. Roller coasters were evaluated based on technical merit (engineering & design), theme and creativity, and IT research and design.

Students were divided into groups based upon grade level and proven leadership abilities. Students began the project with computer research on the history of the roller coaster then they created preliminary sketches in order to use online computer programs to simulate their designs. The research component was extensive to emphasis the importance that proper planning leads to successful execution. According to the students, the best part of the project was the field research. The Launch-IT students and staff went to Dorney Park, took pictures of actual roller coasters and their designs and to ride the roller coasters judging for rider appeal. The goal was to incorporate certain components of the roller coasters from Dorney Park into their design, to consider consumer appeal and evaluate design feasibility. The research, IT history of roller coasters, on-line roller coaster simulation, and the Dorney Park field research were aspects of the project that contributed to a group's final score. The more detailed and complete the research, the more points that were awarded.

After the completion of an intense week of research, students were equip with supplies including glue guns, scissors, popsicle sticks, paper clips, and cardboard boxes to construct their roller coasters. The challenge was to create rollercoaster from recycled materials only (i.e. empty soda cans, milk cartons, newspaper, bottle caps). Although at the start of the project some students doubted the feasibility of completing a project of this scale in just three weeks, a the conclusion of the summer session students were surprised to find that with proper time management, creative enthusiasm, and teamwork all groups completed innovative rollercoaster designs and competed for the first place, second place, and third place awards. The rollercoaster design project was a successful way to integrate students across grade levels to illustrate another fun and interesting application technology.

Closing Explosion

To commemorate the 2007 Launch-IT summer session, Launch-IT students, school guidance counselors, school administrators, teachers, community leaders, program advocates, parents, friends, and family were invited to Launch-IT's Closing Explosion. The Closing Explosion was an opportunity for students to share their academic achievements accomplished throughout the three week Launch-IT summer experience. Students from each team presented their final works in a presentation for a group of over 70 attendees. Java team members presented their websites created with Dreamweaver to display their custom ticket machines. Students on the Fuego Flash team presented their jukeboxes designed using Flash and Action script, and the Robotics team featured their instruction manuals on how to assemble a leg on their Mars robots through PowerPoint presentations. Students, parents, and school administrators alike enjoyed

the opportunity to celebrate the conclusion of the three-week Launch-IT program over exhibitions highlighting student projects, summer memories shared by Launch-IT students, and presentations from all three IT teams.

Overall the team curriculum, on-campus technology field trips, guest speakers, creative activity time, roller coaster competition, and Closing Explosion served to be valuable components of the Launch-IT summer experience. The 2007 Launch-IT summer session was a success in terms of student recruitment and retention, interesting IT activities provided in and out of the classroom and diverse networking opportunities for students with IT professionals, teaching staff and undergraduate and graduate students. We look forward to expanding upon these activities and ideas used during the summer program to continue to launch Launch-IT as a well-rounded beneficial information technology camp for students throughout the Lehigh Valley.

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Evaluation Report
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Overview

The Launch-IT Program conducted a three-week summer program from Monday, July 23rd to Thursday, August 9th. The classes were held from 8:15 to 4:15. Fifty-five students were recruited to participate in the summer program. Seventy-one percent of them were from underrepresented minorities (Black or Hispanic/Latino), and 58% were women. The Robotics Team began with 9 students, and all of the students attended the sessions until the end of the program. The Flash Team had 25 students, and seven dropped from the program, leaving 19 students at the end. Finally, the Java Team began with 21 students, and finished with 16 students.

Mr. Don Stahl, a middle-school technology teacher, taught the Robotics Session for 6th and 7th graders. He was assisted by Graduate Fellow, Isaac Rieksts, and several Undergraduate IT Assistants. Dr. Glenn Blank was the faculty advisor for this team. The Flash Team, for 8th and 9th graders, was led by middle-school technology teacher, Jane Carr, along with faculty advisor, Dr. Lynn Columba. Graduate Fellow Mike Sands, worked with this group along with the Undergraduate IT Assistants. This team also included Kelly Mumma, who used this experience as a practicum to get her certification from Lehigh University in Elementary and Special Education. Finally, Chad Neff led the Java Team of 10th and 11th graders, along with the help of Dr. Glenn Blank, who also served as faculty advisor for this team. The Graduate Fellow was Tammie Peffer, and Undergraduate IT Assistants were also present. These individuals were present for the entire three-week period; however, Teaching Fellows associated with the LV STEM Program also volunteered for one week in order to get experience working in the classroom with students who are similar to those they will see in the fall. The LV STEM Program is a GK-12 Teaching Fellow Program funded by the National Science Foundation.

Activities. The typical day started for the students as a joint session led by the Launch-IT Program Director, Melodie Kent, and her assistant, Teniece Johnson. Breakfast food was available, and Teniece Johnson led an activity to engage the students. After this, students went to their assigned classroom or computer lab to meet with their team. The teams planned a variety of activities, including computer-related activities, the 24 Math game, and outdoor projects.

On the first day, the Program Director explained the Roller Coaster Competition (discussed in more detail below), and on the last day of the first week, the students took a field trip to Dorney Park, a local amusement park that contains six roller coasters. In addition to simply having fun, the students photographed roller coasters to research them and get ideas for the coasters they would create. In addition to the individual team activities, there were presentations for all Launch-IT students given by IT professionals from several businesses, including Diluvium, Just Born Candies, and Alcatel-Lucent. Students also visited four other sites on campus where they heard presentations on areas related to IT. These included a visit to the Glass Lab in Materials Science and Engineering, a presentation by engineering and biology REU students trying to create a robot that can follow a scent, a visit to the library regarding the Digital Library Services, and a presentation on Robotics by a professor from Computer Science and Engineering.

The summer program ended with a Closing Explosion, where finger foods were served while parents and other visitors viewed the students' roller coasters on display as well as other projects produced during the course of the program. Afterwards, all assembled in a lecture hall where students from each team demonstrated what they had learned to parents and school administrators. The boys' and girls' teams from the Robotics Session explained manuals they had created with directions for assembling the leg of a robot. The Flash Team gave an overview of their activities and showed examples of jukeboxes they created using Flash. The Java Team presented websites that they produced using Java programming. All the students were introduced and received a certificate of attendance. The Program Director also announced the winner and runners up in the Roller Coaster Competition.

Although there was not an official count, the Program Director estimated that between 50 to 60% of the parents attended. The evaluator was present for this event and can verify that there were a great deal of parents attending with the students as well as several school administrators. A local high school principal told the evaluator that she was pleased to attend the event because a student from her school attended the summer session. This principal was impressed with the quality of all the students' work, and she hoped that other students from her school would attend in the future. Parents with whom the evaluator spoke said that their children enjoyed the program; one mother said her son was so enthusiastic that they wished the program could have lasted longer.

Roller Coaster Competition. The Program Director planned and managed this activity. The Launch-IT students were assigned to one of ten roller coaster teams that included students from all three of the Launch-IT levels (Robotics, Flash, and Java). The roller coasters, which were designed for a marble, were restricted in size (75 cm x 75 cm x 100 cm). A list of allowable materials was provided, such as marbles, wood sticks, balsa wood, glue guns and sticks, glue, paint, poster board, various office supplies, and a disposable camera. Students could use other available materials (e.g. plastic bottles, wire, string, etc. if approved by the team leader) but were not to spend any money on these items. The roller coaster teams were given time each week to work with their teammates to design and construct the coaster. The Program Director and her assistant used a rubric to rate the final products on technical merit (50 points), theme and creativity (25 points), IT and Design (25 points), and they could earn bonus points for extras, such as, vertical loops, track openness, or engineering (50 points). The averages for the 10 teams on each of these categories were 23.5, 18.2, 13, and 29.2 respectively. The overall average for all teams was 83.9. The winning teams received scores of 113, 107, and 105 for first, second, and third place prizes. The team members received trophies and certificates in recognition of their achievement.

Evaluation

Method. The evaluation for the Launch-IT Summer Session employed three methods of assessing the program. First, all program participants were to complete on-line feedback forms on last day of each week. The students rated various aspects of the program: working on the computer, learning about the computer, doing schoolwork with a Lehigh student; outside speakers; outside activities, food, and bus service. They indicated whether they were not at all, a little, pretty, or very satisfied. If there were “not at all” or only “a little” satisfied, they were asked to explain. They were also asked to list what they liked best and least during the week and to describe briefly what they learned in the week. The survey also contained a space for them to suggest what might make the program better. The IT Teachers, Graduate Fellows, and Faculty Advisors also completed an on-line feedback form. They were asked to estimate the level of student interest in the following: hands-on computer activities, lectures about the computer, mentoring/ tutoring, communication skills training, outside speakers, outside activities, and other activities. They were also asked the best part of the week and what needed improvement. Unfortunately, the response rate for this survey was poor for the summer. This lack of compliance will have to be addressed with the team members in the future.

As a second method of assessment, the evaluator met with the students in the Robotics Team and the Flash Team. The students were asked what they liked about the Launch-IT Program, whether they would recommend it to their friends, what they learned about technology that surprised them, their careers, and how they might use technology in their careers. This face-to-face interaction provides important feedback about the Launch-IT Program’s success in keeping the students interested and engaged.

A third method was used to judge whether the sessions imparted technical skills to the students. Each team was asked to assign a technology-related project to be completed during the summer, which would be scored using a rubric. In trying to find a generic rubric that could be used by all teams for a variety of projects and for a range of ages, the evaluator met with Dr. Lynn Columba, Associate Professor of Education and Human Services in Lehigh’s College of Education. Dr. Columba, who is also a faculty team advisor for the Flash Team, suggested two rubrics that were rather general and could serve the purpose. These rubrics were circulated among the teams to get feedback. This strategy met with only limited success.

The Robotics Team requested a meeting with the evaluator. At the time of the meeting, the students had already completed their projects, which entailed using the computer to produce a manual for assembling the leg of a robot. The class was divided into a Boy’s Team and a Girl’s Team. The IT teacher did not feel comfortable having the teams rate the other team’s manual, because the students did not have the rubric before they began the project. As a compromise, the teams were supposed to rate their own work using the rubric, and the Teacher and Fellow would provide a second and third perspective for each team. After numerous requests, these ratings were not provided to the evaluator. The Flash Team provided scores to a rubric that rated aspects of a Jukebox the students created by using Flash. The rubric rated the Design, Timeline, Actionscript, and Components on a 4-point scale with 1=Poor, 2=Satisfactory; 3=Good; 4=Excellent. The rubric contained well-constructed descriptions for each category, providing a good assessment of the quality of the students’ work, but interestingly, it was not the generic rubric that was created with the help of Dr. Columba, the Flash Team’s faculty advisor. The Java Team reviewed the generic rubric, and thought it could be used with some minor revisions. Graduate Fellow Tammy Peffer offered to revise the rubric and instruct the students on how it would be used. The rubric rated students on Organization, Content Requirement, Originality, Content Knowledge, Visuals, Mechanics, and this team added a category called Cooperation. In three instances, a project was rated by two individuals; either the IT Teacher and one or two Fellows. In one of the cases, the teacher’s score was 4 points lower than the Fellow, but the others were within 1½ points of each other.

Results. *Launch-IT Student Feedback.* The results of the feedback surveys for the Launch-IT students can be found in Appendix 1, and the IT Teachers and Graduate Fellows' survey results are in Appendix 2. All of the students were between "pretty" and "very" satisfied with working on the computer, learning about the computer, and outside activities. The satisfaction level for working on the computer stayed constant over the three weeks of the summer session. For several other aspects of the program, the satisfaction level rose as the project progressed, for example, learning about the computer, doing schoolwork with a Lehigh student, and outside speakers. The students were most satisfied with the outside activity for the first week—understandable, because it involved going to the amusement park.

Also, throughout the project the students were between "pretty" and "very" satisfied with the food provided through the program and "pretty" satisfied with the bus service. A number of the comments from those who were not satisfied or only a little satisfied tended to deal with the food or bus problems. These were only a small subset of the groups; only 7 out of 107 responses did not like the food, and all but 1 of these responses were in the first week only. Only 10 of 67 respondents were not happy with the bus service; 3 in the first week, 4 in the second week, and 2 in the third week. Since the students were not asked to identify themselves, it may be that the same individuals responded the same way in more than one week. In the first week, three individuals from the Java session felt the sessions were a bit boring, and in the second week, four students were not happy with the outside speakers.

In the first week, several Robotics' students enjoyed an activity that involved working with model rockets on the Internet, and others enjoyed doing the podcasts or going to the glass lab. Four students mentioned that everything was great. In weeks two and three, they overwhelmingly mentioned working with the robots as the activity they enjoyed most. The Flash students were happy working with Flash in both weeks one and two, and others mentioned that they enjoyed the interaction with the other students and the activities with the Program Assistant, Teniece Johnson. The Java students worked with Flash the first week, and a large number of students mentioned that as the best part of the week. In the following weeks, they mentioned learning Java, working on the computer, Dreamweaver, outside activities, and the activities with Teniece.

When asked what they liked least, most of the Robotics' students said that they liked everything, especially in the first week. In the second week, two students did not enjoy the 24 game (a computer-based math game), and by the third week, seven of the students mentioned this activity as their least favorite. The Flash students did not enjoy the math lessons the first week, and five students mentioned that they minded the computer work, but four students said they enjoyed everything. In the second week, three students mentioned tessellations as their least favorite activity. The Java students had a bit of trouble understanding the Java explanations the first week, and a few students were bored. In the second week, five students mentioned that the field trip was their least favorite activity, and by the third week, four of the students commented that iJava was very confusing.

The students were asked to describe briefly what they learned each week. In the Robotics sessions, the students learned how robots work and how to disassemble and assemble a robot leg. They also learned about the laws of physics through rocket modeling. Others learned about different types of glass, general computer information, roller coasters, and making pod casts. Students in the Flash sessions worked with the Flash Program to create their own jukeboxes. They learned to program simple code to use animation and create buttons and videos for their jukeboxes. Almost every student in this session mentioned that they learned to use the Flash Program. In addition, students learned about bar codes, such as the UPC and ISBN codes, and how to crack these codes. Others mentioned Pentiminoes and tessellations, and they learned about glass, roller coasters, and about Lehigh University. One student also wrote that he/she learned social skills. Finally, the Java students spent a great deal of time learning how to write Java code; however, they also learned about Flash, Dreamweaver, and computer ethics.

Given the chance to make any comments about or suggestions for the program, the students in the Robotics and Flash sections tended to request different types of foods or comment about having to walk to activities on campus. Several students requested more field trips or activities outside of the classroom. A student in the Java sessions suggested learning different programs, such as Photoshop, 3D Studio Max, and Maya. This individual had fun working with Flash and Eclipse along with the Java sessions.

IT Teacher and Graduate Fellow Feedback. The team for each of the three sessions (Robotics, Flash, and Java) consisted of a faculty team advisor, a technology teacher, a Graduate Fellow, undergraduate s (either paid or volunteer), and two Graduate Teaching Fellows from the LV STEM GK-12 Teaching Fellow Project. These latter students assisted with the Launch-IT summer sessions to gain experience working with middle and high school students, since they will be working with similar students in local schools during the academic year. All of the members of the teams were asked to complete the feedback form at the end of each week; however, compliance was spotty. None of the faculty team leaders responded, and one of the three teachers did not give feedback. All of the Graduate Fellows responded, and seven of the undergraduates responded at least once during the three-week period.

The IT Teachers and Graduate Fellows believed that the students were most interested in working on the computer, while the undergraduate IT assistants and LV STEM fellows believed that they enjoyed the outside activities the most. The students were almost equally satisfied with those two areas, with an overall means of 3.52 and 3.49 (out of 4.0) respectively, which would indicate that they were between “pretty” and “very” satisfied. The graduate and undergraduate assistants estimated that the students were between “somewhat” and “moderately” interested in learning about the computer, but the students actually were between “pretty” and “very” satisfied with these areas (mean of 3.35 over all 3 weeks).

The IT team members reported that several parents participated in the activities. Parents attended a field trip to the glass lab, and one student’s parents came to observe a session. In the Flash session, one parent sat with a group and participated in one of the activities. When asked what they felt was the best part of the week, most of the IT team members mentioned specific activities or projects that the students were doing. Some were most pleased with the students’ progress. Others mentioned the activities periods with Teniece, the field trips, the outside speakers, or other non-computer-related activities. They made some suggestions for improvement each week. A number of them mentioned that they would like to incorporate more hands-on activities and more time with Teniece to keep the students relaxed and focused. Several respondents also felt that they could have better time management. There were various suggestions by individuals, which tended to deal with the specific topic areas. In the comments section, several team members mentioned how much the students appeared to enjoy learning. Two individuals commented about assistance in the classroom, one mentioning that he/she was very happy with the help and another feeling that the IT assistants were gone more than they were present. In all, the comments were very positive.

Meetings with Robotics and Flash Teams. On the last day of the summer session, the evaluator met with the students from the Robotics and the Flash Teams. The teachers and Fellows left the room for these 20-minute sessions.

The Robotics students, consisting of 6th and 7th graders, were almost equally divided between males and females at this meeting. However, the boys did most of the talking and even taunted the girls to speak when the evaluator directed questions to them. They sat on opposite sides of the room. When discussing this phenomenon with the Graduate Fellow, he mentioned that this was the very reason that the Robotics Team decided to separate the students into a boys’ team and a girls’ team for working on the robot project. It gave the girls the opportunity work on the robots without interference or direction from the boys. The evaluator asked each student to mention one thing that he or she liked best about the summer sessions. They mentioned working with the robots, the rockets, and the field trip to Dorney Park to

research roller coasters. One girl said she enjoyed learning how to solder, which was a part of the final project of assembling a robot leg. Not everyone voiced a dislike, but the more vocal students (generally boys) did not like working on the 24 Math program, saying that they were good in math and did not need these exercises. When asked what they would like to work on in future sessions, they said they would like to work with iPods, the Flash Program, jukeboxes, or boom boxes. The things that surprised them about technology was that technology is everywhere, and they were also surprised at the types of equipment needed for robots and the time it takes to solder. As would be expected, they had not settled on careers at the tender age of 12 or 13, and the careers they mentioned varied from an automotive engineer to an archeologist. All of the students said that they enjoyed the Launch-IT sessions, so the evaluator was surprised when one girl responded that she would not recommend the program to her friends. When asked why not, she replied that she did not like her other friends, and she made new friends in the Launch-IT Program.

The Flash students, which consisted of primarily 8th and 9th graders, presented a very different dynamic. There were 18 students present at the meeting, and almost all of them spoke up at one time or another. They were extremely enthusiastic. They liked creating a jukebox and including their own music and designs. They also enjoyed playing “Apprentice”, where they had to market their jukeboxes, and the student who did the best job received an award. Others mentioned enjoying working with geometric shapes, the roller coaster competition, and their activities with Teniece after lunch. This group had very little that they did not like about the sessions. Some students said that one of the speakers was not very interesting, but generally, they enjoyed the work they did in the sessions. One student mentioned that she would have liked more activities to break up the sessions in the classroom. Following this, another student said he did not like being disturbed for other activities when he was working on his project. Since there were two diametrically opposed opinions, the evaluator polled the students. Nine students wanted more activities, and nine students wanted less. Since this was not a great problem, it is probably safe to assume that the Flash team has the right mix of activities for a diverse group. If it should become problematic, perhaps there is a way to make some of the activities voluntary. The careers for this group varied greatly as well, although each of the students mentioned how technology might be used in the career they mentioned. A few of the students indicated that they would not continue in the sessions during the academic year. At least one was because of moving to another school, and one of the boys did not seem interested in pursuing this activity further. Still, the majority of the students had an overwhelmingly positive attitude toward the summer sessions.

Project Ratings. Each team was asked to assign a computer-related project to demonstrate that the students learned the material presented during the sessions. The students’ projects were to be rated using a rubric suggested by Dr. Lynn Columba, although the teams were told they could revise the rubric slightly to make it more relevant to their particular project. The Robotics Team divided the students into two teams, girls on one team and boys on the other, and had each team disassemble a robot leg. Then they were to write an instruction manual using PowerPoint that would describe how to reassemble the leg. Then the teams exchanged manuals and used the other team’s manual to reassemble the leg. Although no rubric scores were submitted for this activity, the evaluator discussed the project with one of the Fellows. He felt that the boys’ team was more comfortable with physically disassembling and assembling the leg, but the girls’ team produced a clearer manual. Each team also demonstrated their manuals at the Closing Explosion to all the other Launch-IT participants and parents.

The Flash team had students use Flash to create a jukebox. Their projects were rated using a rubric to rate the Design, Timeline, Actionscript, and Components. For each criterion, the students were rated as 1=Poor, 2=Satisfactory, 3=Good, and 4=Excellent. The students received the highest rating for Jukebox Design, for which all students received an excellent rating. They also did very well on the Flash Timeline, where the overall score was 3.7. The mean for Actionscript was 3.0, and the mean for rating the Flash Components was 3.4. Six students each received overall average scores of 4 or 3.8. The other

six students' scores ranged from 2.8 to 3.3. This would indicate that all students did a satisfactory job on their projects, and the majority of them did "good" or "excellent", and the teachers were very satisfied with the students' performance. The Flash students, too, demonstrated several of their jukebox creations at the Closing Explosion.

Students created Ticket Machines, designed Java programming to print the tickets, created Flash interface prototypes, inserted programs into applet, and modified and personalized them. They were instructed to use Dreamweaver to produce a descriptive summary of the ticket machine project and to demonstrate their work. Twelve projects were rated, most by a combination of IT teachers and Fellows. Peer Launch-IT students provided another rating. Three of the projects received scores from a single rater, i.e., a Graduate Fellow only or a peer student only. Both the IT Teachers/Graduate Fellows and peer students rated the projects on the following criteria: organization, content requirements, originality, content knowledge, visuals, and mechanics. The teachers used a simple rubric that rated the students on a 3-point scale of 1=Minimal, 2=Satisfactory, and 3=Excellent. The students used a 4-point scale with more detailed descriptions of what to expect for each level of each criterion, with 1 being the lowest rating and 4 being the highest rating. Since the two groups of raters used different rating scales, percentages of the total possible score were computed, and where more than one rater of the same status (e.g., two students) rated the same project, those percentages were averaged. The scores for each project (as a percent of the total possible score) are listed below.

	IT Teacher/ Fellow	Peer Student
Project 1	100.0%	95.8%
Project 2	100.0%	89.6%
Project 3	94.4%	95.8%
Project 4	94.4%	93.8%
Project 5	91.7%	79.2%
Project 6	83.3%	97.9%
Project 7	83.3%	74.6%
Project 8	77.8%	83.3%
Project 9	72.2%	83.3%
Project 10	55.6%	95.8%
Project 11	38.9%	88.8%
Project 12	19.4%	89.6%
Overall Average	75.9%	89.0%

Two projects received perfect scores from the IT Teachers and Graduate Fellows, and an additional seven projects received ratings of 72% or better. Only three projects received lower ratings, i.e., 56% or lower. From looking at the table above, one can see that the students' ratings do not correlate with the teacher/fellow ratings. This may have occurred for two reasons: the students may not have had a clear enough grasp of the rubric, or they did not want to be too hard on their peer students. The team's Graduate Fellow felt that the students' ratings reflected the project creator's popularity rather than the quality of the work. A discussion with the team will determine whether it is still a valuable exercise for students to apply the rubrics to others' work as well as to their own.

Listed below are the averages of each criterion in the rubric, broken down by the raters' status. The IT teachers and Graduate Fellows rated an additional criterion labeled "cooperation". Although the average for cooperation is listed below, this category was not computed in the percentages listed above.

IT Teacher/Fellow

Peer student

	(Scale 1 to 3) Average	(Scale 1 to 4) Average
Organization	2.4	3.5
Content Requirement	2.3	3.4
Originality	2.5	3.5
Content Knowledge	2.1	3.3
Visuals	1.8	3.4
Mechanics	2.2	3.2
Cooperation	2.4	

The averages show that the IT teachers and Graduate Fellows felt that the students' work was satisfactory or better (1=Minimal, 2=Satisfactory, and 3=Excellent). They rated the students highest in originality, organization, and cooperation. The lowest rating was for visuals, although this category is still rated as satisfactory. The students also provided the highest ratings for organization (the student presented the information in a logical sequence) and originality (there was significant evidence of originality and inventiveness, and the student used some original ideas along with other works).

The results of the rubrics for the roller coaster competition, for the Flash team's jukeboxes, and for the Java team's ticket machines demonstrate that the students did learn important concepts, software, programming, and techniques during the summer session. For the Saturday sessions of the 2007-08 academic year, a concerted effort will be made to produce a more standardized rubric that can be used by all three teams and will be available before the students begin their assignments.

Analysis. The results of the evaluation of the summer session show that the Launch-IT Program was successful in recruiting capable students who were interested in learning about technology. These students fit the aims of the program to focus on women and underrepresented minorities as well as students at risk because of socioeconomic or academic deficits. The student participants were satisfied with learning about the computer as well as with the hands-on computer work. There was a mix of other activities, such as working with the Program Manager on the roller coaster project, outside speakers, field trips, and activities with a Project Assistant, and these were well-received. Some parents were involved, either observing a session or attending a field trip, and there was good attendance by parents at the Closing Explosion. In discussions with the evaluator, the students were enthusiastic about the program, and many of them indicated that they would like to continue in the academic year. The IT Teachers and Graduate Fellows felt that the students were interested in the sessions, and they believed that the students performed satisfactorily in projects that demonstrated their competencies with the technology that they learned. The Program has made significant process toward the goals that were set out in the proposal.

Code for Satisfaction: 1=Not at all satisfied; 2=A little satisfied; 3=Pretty satisfied; 4=Very satisfied

	All Students		
	Week 1	Week 2	Week 3*
Working on the computer	3.5	3.5	3.5
Learning about the computer	3.2	3.4	3.5
Doing your schoolwork with a Lehigh student	3.0	3.1	3.4
Outside speaker	3.1	3.2	3.4
Outside activity	3.6	3.3	3.5
Food	3.4	3.4	3.4
Bus service	3.2	3.2	3.1

	Robotics Team		
	Week 1	Week 2	Week 3
Working on the computer	3.7	3.4	3.4
Learning about the computer	3.0	3.1	3.5
Doing your schoolwork with a Lehigh student	3.1	2.8	3.2
Outside speaker	2.9	3.1	3.4
Outside activity	3.7	3.5	3.6
Food	3.4	3.4	3.5
Bus service	3.0	3.4	3.4

	Flash Team		
	Week 1	Week 2	Week 3
Working on the computer	3.6	3.6	
**	3.5	3.6	
Doing your schoolwork with a Lehigh student	3.0	3.3	
Outside speaker	3.1	3.5	
Outside activity	3.6	3.5	
Food	3.4	3.5	
Bus service	3.4	3.7	

	Java Team		
	Week 1	Week 2	Week 3
Working on the computer	3.2	3.6	3.6
Learning about the computer	3.0	3.3	3.5
Doing your schoolwork with a Lehigh student	2.9	3.0	3.5
Outside speaker	3.1	2.9	3.3
Outside activity	3.5	3.1	3.4
Food	3.4	3.3	3.4
Bus service	3.1	2.6	2.9

Appendix 1: Evaluation from Launch-IT Students

* Code for Satisfaction: 1=Not at all satisfied; 2=A little satisfied; 3=Pretty satisfied; 4=Very satisfied

** Code for Student Interest: 1=Not at all interested; 2=Somewhat; 3=Moderately; 4=Very interested

	All Weeks (7/23, 7/30, and 8/6/07)			
	Students	Teachers	Fellows	Undergrad IT Assts/ TEM Fellows
Working on the computer	3.52	4.00	3.89	3.58
Learning about the computer	3.35	3.00	2.50	2.33
Doing your schoolwork with a Lehigh student	3.10		3.00	2.88
Outside speaker	3.16	3.67	3.00	2.92
Outside activity	3.49	3.60	3.67	3.75
Food	3.41			
Bus service	3.18			
Communication skills	na	3.00	2.17	2.88

Appendix 2: Evaluation of Launch-IT Students compared to STEM Teachers, Graduate Fellows and Undergraduate IT Assistants and LV STEM Graduate Fellows