

Lehigh University
Launch-IT (Information Technology)
Annual Report
June 24, 2008

Participants

NOTE: Information has been updated 6/18/08

What people have worked on your project?

PI/Co-PI

Dr. Glenn Blank
Dr. Henry Odi
Dr. H. Lynn Columba

Launch-IT Program Director:

Ms. Teniece Divya Johnson

Teachers

Jennifer Walz, Harrison-Morton Middle School
Jane Carr, Broughal Middle School
Chad Neff, Dieruff High School

Summer Program

Donald Stahl, Harrison-Morton Middle School
Jane Carr, Broughal Middle School
Chad Neff, Dieruff High School

Graduate IT Assistants

Isaac Rieksts
Mike Sands
Tamara Peffer
Nick Moukhine

Summer Program

Chris Janneck
Isaac Rieksts
Mike Sands
Tamara Peffer
Nick Moukhine
Shahida Parvez

Undergraduate IT Assistants

Eric Rosenberg
Safiya Nieves
Chikezie Onyenso
Sonya James
Uhuru Aseto
Gregory Martin

Stanislav Tsanev
Matthew Prestifilippo

Summer Program

Brittany Lewis
Gauri Rastogi
Uhuru Aseto
Bryan White
Sonya James
Allison White
Zahir Carrington

What other organizations have been involved as partners?

Casa Guadalupe, the Boys and Girls Club of Allentown, Easton, and Bethlehem, TechGyrls, KidsPeace and the Southside Initiative of Bethlehem, PA, all helped to recruit participants for Launch-IT, as well as school administrators and teachers in local school districts and charter schools.

Have you had other collaborators or contacts, including with other NSF funded Projects?

LV STEM Project

Much of the curriculums offered were developed through the STEM program.

Activities

1. Describe the major research and education activities of your project.

Brief overview of project

The Launch-IT program is designed to launch Lehigh Valley students towards college and careers in Information Technology (IT), sponsored by the National Science Foundation and the Pennsylvania Infrastructure Technology Alliance and hosted at Lehigh University. Launch-IT is for middle through high school students who are considered at-risk, with limited exposure to Information Technology and college. The Launch-IT Program has hosted sessions in Spring 2007, Summer 2007, and the academic year 2007-2008. The 2007-2008 Launch-IT program consists of monthly Saturday meetings throughout the academic year and a three-week summer program.

The Launch-IT vision is to promote academic achievement in information technology for at-risk middle and high school students in the Greater Lehigh Valley. The goal is to increase the number of women and underrepresented minorities involved in IT education and careers by exposing 6th – 12th grade students to interactive multimedia and IT inspired learning experiences.

Launch-IT will provide a year-round program where students are exposed to a diverse range of IT inspired projects & activities to inspire and challenge young minds. Students will work with college professors, certified teachers throughout the Lehigh Valley, IT professionals, and undergraduate & graduate students from colleges in the Lehigh Valley area.

In order to promote and support academic achievement in the classroom, Launch-IT students will have tutoring sessions every Launch-IT Saturday with college students & teachers. To empower students to strive to be college-bound, Launch-IT students will be inundated with information about college through guest presentations about the admissions process, financial aid, & career services. With continued

parental involvement, support from local middle & high schools, and the enthusiasm & work ethic of our Launch-IT teaching teams, we are driven to launch students into their academic futures with confidence & curiosity.

Launch-IT Student Participants:

6th-7th graders

No. of Students	-	24
Males	-	14
Females	-	10
Hispanic/Latino	-	10
African American/Black	-	10
Caucasian	-	4
Asian Native/American	-	
Other	-	

Summer Program

6th-7th graders

No. of Students	-	9
Males	-	4
Females	-	5
Hispanic/Latino	-	5
African American/Black	-	1
Caucasian	-	3
Asian Native/American	-	-
Other	-	-

8th-9th graders

No. of Students	-	27
Males	-	17
Females	-	10
Hispanic/Latino	-	13
African American/Black	-	6
Caucasian	-	8
Asian Native/American	-	-
Other	-	-

Summer Program

8th-9th graders

No. of Students	-	25
Males	-	9
Females	-	16
Hispanic/Latino	-	15
African American/Black	-	4
Caucasian	-	6
Asian Native/American	-	-
Other	-	-

10th-12th graders

No. of Students	-	15
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Males	-	7
Females	-	8
Hispanic/Latino	-	7
African American/Black	-	5
Caucasian	-	2
Asian Native/American	-	1
Other	-	-

Summer Program

No. of Students	-	21
Males	-	10
Females	-	11
Hispanic/Latino	-	9
African American/Black	-	5
Caucasian	-	3
Asian Native/American	-	4
Other	-	-

A description of MAJOR accomplishments:

The October session of Launch-IT was spent orienting students on the expectations and rules of the Launch-IT Program. The morning activity time focused on clearly expressing student expectations and introducing the students to the Launch-IT IT Assistants that will be accompanying the students throughout their 8-hour day at Launch-IT.

In November 2007 Launch-IT featured guest speaker David Thompson, Assistant Director of Diversity Recruitment and member of the Lehigh University's Admissions Office. Mr. Thompson prepared a student-friendly presentation engaging students in a conversation about college preparation. He highlighted the need for high school students to establish relationships with their high school teachers (for recommendations letters), urged students to establish and maintain successful study habits, and encouraged all students to find what they are passionate about and pursue these interests in their extra-curricular activities. Mr. Thompson assured students that standardized test scores are important, but stressed most importantly that colleges are looking for students that are enthusiastic for learning and well-rounded, participating actively in the classroom as well as being engaged in activities outside of the classroom.

David remained after his presentation to the Launch-IT students to have a more formalized discussion with parents that attended the presentation. The presentation from Diversity Recruitment and the Admissions Office served as an invaluable resource to parents, as they were able to ask specific questions and receive more detailed information about recommendation letters, admission deadlines, early decision versus regular admission, and how students can differentiate themselves from other collegiate applicants. Mr. Thompson provided information on Lehigh's admissions policies in addition to providing information on a generalized level concerning all universities and colleges. The presentation was instrumental in continuing to integrate parent and guardian involvement in the program, and highlighting the need to think ahead to plan accordingly for the future of our college-bound students.

November's featured speaker was Linda Bell, the Director of Financial Aid. Mrs. Bell created informational packets for the Launch-IT students to take home, and brought her 27-years of Financial Aid experience, sharing with the students that anyone can receive money to attend college, with a little bit of work. She recommended that all students considering pursuing higher education file their information with FAFSA (Free Application for Federal Student Aid), plan an accurate estimate for college expenses (including funding for books and extra spending such as laundry/take out), and the importance of filing all

documents before deadline, as missing deadlines can mean missing out on possible funding options. In addition, Mrs. Bell encouraged students and their parents to search for scholarship and funding opportunities. Creating a profile for the student, including their demographic information, possible fields of study, and a list of honors and awards received can be very instrumental in finding the scholarship that best suits the needs and future goals of the student.

Parents were invited to attend both the presentation by the Admissions Office and the Financial Aid Office. At Launch-IT we believe that it is important to begin talking about college and how to prepare to both students and parents.

Launch-IT Logo Design Competition

The goal of the logo design competition was for Launch-IT students to design a graphical logo for the Launch-IT project. It was introduced to Launch-IT students in November 2007 with a Power Point presentation laying out the expectations for the project, introducing the students to important terminology (branding, abstract & literal icons, and taglines), and providing students with their first research assignment. Each student was asked to bring in three different logo designs to begin to raise student awareness of the prevalence of marketing and use of logos throughout today's society.

The logo design project was introduced by Program Director, Teniece Divya Johnson; however the month to month assignments and marketing tutorials were lead by a local IT Professional Jill Cortiglia, Senior Web Designer for Runner's World at Rodale Press with over twelve years of experience in her field.

Over the next seven months Ms. Cortiglia challenged the students with different assignments to create logos and taglines investigating the skill needed to create brands with marketable through lines. Students learned that branding is more than choosing a picture because 'you like it' it has to be related to the product or service you are attempting to market.

The final assignment was to work to create a logo for Launch-IT. The students worked in groups across grade level so that 12th grades students were working with 6th grade students etc. The logo design competition gave students the opportunity to enhance their teamwork and presentational skill set because after a logo and tagline was designed the ideas had to be conveyed to the larger group. Students were asked to present the logo concepts and how their concept would relate to the target audience, students 6th-12th grade like themselves. Finally each group (13 groups total) presented their final logo design to the Launch-IT camp and students vote on which design they liked the best. Ms. Cortiglia then took that winning design and created a graphic design of the logo that was printed on t-shirts for the Launch-IT students at the Closing Explosion. The logo design competition was great because students were able to interact with a successful female working in the IT industry and she was able to give the students a taste of what she does as a graphic designer everyday.



After the morning session and working with graphic designer Jill Cortiglia, students broke out into their team assignments based on grade level. Each team had their own curriculum and IT projects.

During each Launch-IT session students had tutoring time to receive help from undergraduate and graduate students on their school subjects and homework assignments. Lehigh was not the only college to support Launch-IT tutoring with undergraduate volunteers, as Cedar Crest College and their community service organization arranged for undergraduate student volunteers to travel to Lehigh University to work with Launch-IT students during their tutoring time. Those students that were having difficulty in a subject received additional support while other students were working ahead in subjects, and some students utilized online tutorial programs such as Math 24 and PSAT prep programs for high school students.

In March Launch-IT students attended the fifteenth annual Lehigh Valley Science and Engineering Research Fair hosted at the Rauch Field House. The science fair was designed to enhance awareness in the areas of technology, engineering, mathematics, and to motivate students 6th through 12th grade to pursue careers in these fields. Launch-IT students explored over eighty projects on display and interacted with the students that created the projects. The field trip was an opportunity to show Launch-IT students that there are other motivated students exploring the world of science, math and technology. One of our Launch-IT students eight grader, Alexander Cooler, participated in the science fair submitted and placed with a ribbon in the competition with his engineering project, Breaking Bridges investigating bridge sustainability with different materials and designs. The other Launch-IT students were impressed and inspired by Alexander's participation and success in the Lehigh Valley Science and Engineering Research Fair.

Launch-IT is fortunate to have graduate teaching fellows whose research and studies explore the issues facing our at-risk Launch-IT students concerning their involvement in the information technology. We are proud that in addition to working with at-risk students our graduate teaching fellows are developing and exploring solutions to the recruitment and retention of students interested in studying information technology.

Luis Adames, senior Launch-IT student, was accepted into the R.I.T. Rochester Institute of Technology to begin his pursuit of an undergraduate degree in the Fall of 2008. He plans to major in Computer Science. In addition to his involvement in the Launch-IT program, Luis has been employed by Lehigh University's Office of Academic Outreach to create graphic multimedia lessons to each students to work with fractions. Given lesson plans developed by Dr. H. Lynn Columba of the College of Education, Luis first created story boards for each lesson, which were approved by Graduate Fellow Tamara Peffer (who is also a graduate student on the Learning Science and Technology program in the College of Education). Then Luis implemented the story boards for these lessons as interactive mathematics tutorials in Flash. The multimedia lessons are in turn invoked by an intelligent tutoring system for fractions, when it detects significant gaps in a middle school student's conceptual understanding, which requires the instruction that the multimedia lesson can provide. Thus Luis is learning how to be part of a team of software developers with experts in education and computer science.

Now that he has graduated from high school, Luis will also be working as an IT assistant for the upcoming three-week Launch-IT 2008 summer program. Luis will be a valuable asset to the teaching staff, using his personal involvement in Launch-IT as an example of what you can achieve if you are willing to use the resources around you to pursue your dreams. During the summer, Luis will also help our team to recruit another promising Launch-IT student to replace him as a Flash developer for the Fractions tutor.

Project goals for the year and short overview

Recruited over 70 students to participate in a full year of Launch-IT programming

- Launch-IT students, grades six through twelve, were recruited from throughout the Lehigh Valley Area including five districts Easton Area, Wilson Area, Bethlehem Area, Allentown Area and Salisbury Township.

Recruited undergraduate and professional IT assistants

- During the academic year there were eight IT assistants hired to assist teachers in the classroom and serve as role models to the Launch-IT students. Two IT assistants were returning from the 2007 summer session and one IT assistant was a local IT professional working with the Java team.

Assistant Training Session, July and October 2007

- Launch-IT volunteers and IT assistants attended a workshop to learn the program expectations and their specific responsibilities as teaching assistants, tutors, and mentors. All members of the Launch-IT support staff signed commitment letters explaining their job responsibilities and Launch-IT program expectations.

Recruited Volunteers from local colleges

- Launch-IT partnered with The Community Service Organization at Cedar Crest College in Allentown, Pennsylvania. Cedar Crest provided an enthusiastic, experienced group of volunteers during the academic year to tutor in the classrooms helping students with science, reading and math.

Students worked with local IT Professional - Graphic Designer, Rodale Press

- Jill Cortiglia, graphic designer for Runner's World at Rodale Press, led the Launch-IT group through an 8-week logo design competition. Each session students would be introduced to her marketing terminology and engage in activities to create different logos to appeal to varying targeted audience. In addition to the curriculum, Jill provided insight to a field in which she possess 12 years of experience from free-lance work to being an adjunct professor at local Moravian College. Students were also involved in a competition to create a logo for the Launch-IT program and Ms. Cortiglia transferred the winning drawing to digital image that was captured to shirts and provided to Launch-IT students for completing a full-year of the Launch-IT program.

College exposure and preparation for Launch-IT students and parents

- Representatives from Lehigh University's Financial Aid Office and the Office of Admissions and Diversity Recruitment presented pertinent information to the Launch-IT students and parents. The events were scheduled to start to get our Launch-IT students thinking and planning for their college bound futures. Parents were invited so they could continue or begin to engage their children in the planning of applying to college and finding financial aid opportunities.

Holiday Outreach Project: Attitude of Gratitude

- During the holiday season Launch-IT students created over 150 hand crafted inspirational bookmarks for the students in local after school programs at the Boys and Girls Club of Bethlehem, Casa Guadalupe in Allentown, and a TechGyrls a program educating and exposing 4th and 5th grade female students to information technology. It is important that our

Launch-IT students understand the gift of giving and have an attitude of gratitude and a sense of pride for the opportunity to participate in a program such as Launch-IT.

Closing Explosion

- Students, parents, guidance counselors, school administration, and Launch-IT teaching teams celebrated the end of the Launch-IT academic year with presentations from Launch-IT students. Each team had the opportunity to present their collection of IT projects; the presentations included a Java coded word game, Flash animated public service announcements, WebPages, Power point presentations, and gratitude poems for Launch-IT teaching teams.

2007 Summer session goals and accomplishments

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 five graduate students who had been recruited as LV STEM (GK-12) graduate fellow participate in Launch-IT 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 they added to the diversity of our teaching staff in terms of their educational background and career aspirations.

Goals of the Summer Launch-IT Program

- 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.

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 it 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 emphasize 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.

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, an E-NOSE presentation in the Physics lab, time spent with librarians giving a virtual tour of the Digital Library, and a presentation on robotics from the Computer Science & Engineering department.

ENOSE is an NSF REU project at Lehigh in the Mechanical Engineering department. ENOSE undergraduate students in biology and engineering had designed robots able to track and identify scents electronically. The REU students guided Launch-IT students 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 ENOSE trip concluded with a demonstration of the ENOSE in action.

Although all of the four lab visits were different in nature they were bonded by the common theme of technology. Overall the on-campus trips allowed Launch-IT students to witness the various departments at Lehigh University engaged in interesting uses of 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.

2007 Summer session 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 Dream Weaver 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.

A measure of what was changed by your activities, including what worked and what did not work

Review attached evaluation from external evaluator, Jean Russo.

1. Describe the major findings from these activities.

(a) Major achievements and progress to date

Robotics team (6th & 7th grade students)

- **Programming remotely controlled mobile robots in a simulated Martian landscape**

The Robotics team consisted of 6th and 7th grade students and served as the beginning of the Launch-IT pipeline. Students on the Robotics team engaged in hands-on activities and problem solving exercises using rockets and robotics.

What worked / did not work

The soldering hands-on activity worked the best. The soldering grabbed the students' attention and maintained it as they worked to complete a functioning LED to take home. The paper airplane project did not run as smoothly as planned and anticipated. The Web sites and robots worked well, however the classroom activities need to be scheduled for a shorter time period. Too often the time allotted was too much for the students to handle and students would have difficulty maintaining attention.

Accomplishments:

The Robotics team provided the most hands-on activities to inspire 6th and 7th grade students to become and remain interested in information technology. The team began with rocket launching experiments exploring the impact of design and the ability to carry payloads. The Robotics team competed in an egg drop competition to simulate the impact of landing and a soldering experiment teaching students how to create functioning LEDs from batteries and wires. Each student was able to create a functioning LED and take it home to share their work with family and friends, helping to reinforce what was learned as they had to explain how they got the LED to light up.

The emphasis with the Robotics team was teamwork and problem solving. Student engaged in a bridge building activity using bridge building simulators online. In addition, students created paper airplanes investigating different designs and which plane was constructed to fly the furthest. Students also used robotics including the ER1 where students used the program interface to control and manipulate the movements of the ER1. Students had to work in teams to accomplish different missions from traveling in an isosceles triangle to reaching a destination with the least amount of turns. To compliment the hands on activities, students also worked on the creation of web pages after exploring what a good web page consisted of. Each student created their own web page incorporating personal information and their favorite projects from the Launch-IT program. The Robotics teaching team also had students learning about Power Point and effective presentations methods. At the Closing Explosion students from the Robotics team used Power Point to present all the activities that they participated in during the year of programming at Launch-IT and their personalized web page designs.

Retention

The focus was planning fun educationally sound activities about robotics. The soldering activity and robotics seemed to keep students interested in returning.

2007 Summer session Robotics team accomplishments

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 (8th & 9th grade students)

- **Creating a Public Service Announcement using Flash and ActionScript**

The Fuego Flash team had 8th and 9th grade students working with Action Script and Flash to create public service announcements and podcasts about subjects that the students felt strongly about.

Accomplishments:

In addition to exploring Flash the Fuego Flash team incorporated a variety of math lessons to engage students and build mathematic skills. Activities included exploring the number thirteen, IQ block puzzles, Battleship reviewing ordered pairs, calculators and decimal points, dynamic domino races investigating scatter plots, and a high-tech game of treasure hunting with latitude and longitude. Group teambuilding activities consisted of mathematical challenges and puzzles in order to increase student confidence levels when working with math. The Fuego Flash teaching team began each session with a video review comprised of classroom clips from the previous

session. With almost three weeks in between Launch-IT sessions the videos were a successful tool in reviewing information and motivating students as they watched themselves and classmates engaged and excelling in classroom activities.

The IT project for the Fuego Flash, 8th and 9th grade students, team was the creation of a flash animated public service announcement concerning a topic the student felt strongly about. Month by month the Fuego Flash teaching team introduced new uses of the Flash program beginning with the Toolbar; tweening, shape, motion, to exploring the movement of a stick figure the implementation of sound. Curriculum was developed to review the Flash lesson the month before, as the students have almost three weeks in between each Launch-IT session, and then adding to student's knowledge base with the introduction of a new function of Flash. To compliment their enhanced use of the Flash program students were working to create a storyboard to plan the creation of their PSA. Students dealt with topics ranging from exercise as a source of healthy living, to overcoming bullying, and living green. Each student had the opportunity to share their PSA Flash projects at the Closing Explosion and it was inspiring to see how each student utilized flash differently to convey their message.

What worked / did not work

From one of our Launch-IT graduate fellows: "The math activities that we did in class did not seem to hold the interest of the students. I overheard a number of the students complain about the exercises and there were a number of students who would not pay attention while the activities were going on. In order to fix this I would recommend reducing the number of math activities or make adapting the exercises to be more exciting and engaging for the students. The other thing that did not work was when the students were given a lecture about Flash and then given instructions on what they needed to accomplish. To fix that we could provide more of a guided demonstration and have the students do work simultaneously with the leading teacher."

Positive changes:

To help students relate to one another and remember what was covered in the last Launch-IT session the Fuego Flash team used short ten-minute highlight films to be viewed at the beginning of each session. The students enjoyed seeing themselves and their peers on the "big screen" and it served as a beneficial way to start the day by building a team atmosphere.

Retention process and activities:

We not incorporate any specific activities to make sure that the students came back month after month. Our focus was to ensure that the activities we were doing, as it related to Flash programming, were exciting and engaging to the students. We also showed them examples of what they could do with Flash, as well as provided sneak peeks of the next session and what they would be working on so they would be excited to come back. The other thing successful classroom decision was to chose activities that would require more than one day to complete in order to retain the interests of the students as most wanted to work until their project was done.

2007 Summer session Fuego Flash team accomplishments

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 (10th, 11th, & 12th grade students)

- **Learning object-oriented design and Java for AP credit with emphasis on SAT prep**

Accomplishments:

The Java team was comprised of 10th, 11th, and 12th grade students working with Java programming. The Java team has been expanding their skills, not just in the area of Java programming, but also in the areas of critical thinking and questioning, media analysis, ethics, writing and presentation. During the academic session students were working at multiple Java programming skill levels. As a result the team was divided into advanced and novice groups. The advanced group developed a spelling game that included integration of dictionary database. The novice group developed an ATM machine. In addition to Java that students learned basic Flash and web design.

The Java team began learning and reviewing Java with terminology and syntax. After defining class, attributes, methods, parameters, constructor, data types, and syntax students created, moved and changed the appearance of objects. Next students had to create a picture using the Picture class in Eclipse. Students were asked to add attributes for new objects, write code to change the default objects, and test the changed code by creating an instance of the class and using the draw method. The Java team worked on a media analysis project investigating websites to determine if the information presented is valid or biased. Students also learned that importance of using multiple sources to defend the information found on websites.

The Java team was very motivated and excited about the Launch-IT program and on their own time they created a short film expressing the benefits of Launch-IT. The script was written and directed by a student on the Java team. All the members of the Java team appeared in the short and the teaching team helped edit the video. Here are some excerpts from the Java script:

Ayesha	We are the Java team and we have something to say
Monique	Once a month on a Saturday We wake up early and start our days To get our brains going we play a game Then we all break up and go our separate ways
Luis	We don't fill our brains with trash
Harpreet	We get help with our homework like science and math We work with Java and we work with Flash That's more than you'll learn in your average class

Cathy	Here we can be creative in a positive way Instead of laying around bugging our moms all day
Carlos	Java team is doing big things And Lehigh encourages us to follow our dreams
Group	So follow your dreams and reach for the stars Come to Launch-IT and you'll go far Thank you Lehigh!

Things that did not work:

From a Launch-IT graduate fellow: "Although the Java projects generally worked they were rather sterile for the students. I would like to see the students participate more in the design process from concept to assignment of classes, attributes, and methods. We should incorporate a bit of the design concepts. Maybe have the students choose from some choices. I did like a part of Dr. Blank's process that we used in the summer session of 2007. We used a paragraph (story) about a machine. The students grammatically analyzed it to determine the programming components. Maybe the students could write their own description of a machine/ program they would like to create then design the program around that. There would need to be some limits based on skill but it would be the students' ideas not something prescribed by the teaching team."

It was hard to travel between the two classrooms to teach both the novice and advanced group. In addition, the time we spent in between sessions was too drastic; an average of three weeks, and students would forget what was taught in the previous month. Another graduate teaching fellow commented that in future academic year sessions, we should perhaps stop concentrating on teaching programming languages, and more provide episodic activities and workshops which should spur student interest in technology. Students may not come out with a concrete skill, but that can be addressed in the summer as there are three weeks in a row of Launch-IT sessions.

Retention process and activities:

The Java teaching team brought a lot of outside application knowledge. Applications that the students know are relevant, such as Photoshop, flash and movie editing software, added to gaining and retaining student interest. Java is important and relevant but the main vision is that the students become interested in computer applications and are able to produce working results. Launch-IT students continuing with the program are preparing to take the Java AP exam in the spring of 2009.

In addition, the Java team incorporated multiple levels of java programming with the possibility of continued advancement. Classroom activities also included writing a short film script, acting, filming, video editing, web site design, Flash animation, web research, and oral presentations.

2007 Summer session Java team accomplishments

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 Dream Weaver 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 had to problem solve. The problem solving activity was grounded in grammar, and programming, as students had to first dissect the word problems, identify the limitations of the design, and then brainstorm and execute possible solutions. The ticket machine project was designed to help Launch-IT students learn and retain knowledge about programming and software, skills that can be built upon as they continue to participate in Launch-IT.

In addition to problem solving skills and programming knowledge, 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.

(b) Processes used and materials developed including field-testing and acceptance by target communities (e.g., Informal institutions, school districts)

PI Glenn D. Blank and Launch-IT Graduate Fellow Tamara Peffer organized the first chapter meeting of the Lehigh Valley Computer Science Teachers Association on May 15, 2008. Eighteen teachers participated. Prof. Blank gave an overview of innovations in the Launch-IT program, then Isaac Rieksts introduced the Mars Rovers curricula and simulation program, Nick Moukhine introduced the Flash curricula, and Mike Sands introduced a new Debugging Tutor. Two other local teachers made presentations about an instructional video collection website and using Alice to introduce programming. Plans were made for future workshops and meetings.

(c) Impact information on students, teachers, parents, staff/faculty, communities, and institutions, including numbers (i.e., include information on how students, teachers, parents, staff/faculty, communities, and institutions have changed and how many of each were impacted).

Please refer to attached evaluation by external evaluator, Jean Russo, for student impact data.

(d) Processes used for participant (Youth-based) recruitment and retention (include parental involvement, if appropriate).

Launch-IT made an effort to establish and maintain parental investment in the program by creating an Opening Ceremony orientation and question and answer for parents and guardians. Throughout the year parents were invited to attend college preparation presentations by representatives from the Admissions Office and Diversity Recruitment Office and the Office of Financial Aid. The Closing Explosion is the end of the year student presentation and reception for parents to experience a taste of what their children have accomplished during the program. At the

Closing Explosion each team had a chance to share all of their IT projects completed during the year. The team presentations are a fun way to get other students interested in the projects of the other teams, reinforcing the benefits of remaining in the program and graduating to the next team.

Student Recruitment for summer session conducted in May and June of 2008

Student recruitment is an essential aspect of the Launch-IT program and provides certain challenges as in comparison to other established youth programs as Launch-IT is only in our second year of carnation. Last year there was some difficulty recruiting students as the 'at risk' qualifications were not clearly defined. This year, interim Launch-IT Program Director, Teniece Divya Johnson, developed more detailed marketing materials to be distributed to school guidance counselors, math, and science teachers. This spring she visited four local high schools, Dieruff High School, William Allen High School, Liberty High School and Wilson Area High School. One of the most beneficial meetings was at Wilson Area High School as their guidance counselor had worked to identify a group of eligible students and invited the potential Launch-IT students in addition to three returning Launch-IT students from Wilson Area HS to the recruiting meeting. Out of the seven new students that attended the recruiting meeting, two students applied and were accepted to the summer program.

In addition to visiting local high schools, the Launch-IT Program Director visited five middle schools including Raub Middle School, Trexler Middle School, Harrison-Morton Middle School, Broughal Middle School and East Area Middle School. Those schools that were familiar with the Launch-IT program from Spring recruitment from last year, East Hills Middle School, Nitschman Middle School, Philip F. Lauer Middle School, and Salisbury Middle School, received updated Launch-IT promotional materials and Launch-IT applications. Last year the program was altered to accept 6th grade students, however there was no effort put towards recruiting 5th grade students that would be 6th graders come fall. To ensure that local elementary schools were aware of the many opportunities being provided by Launch-IT, recruiting visits were scheduled for five elementary schools this Spring consisting of McKinley Elementary, Jefferson Elementary, Central Elementary, Governor Wolf Elementary, and Spring Garden Elementary. Guidance counselors across the board were eager to encourage their students to attend the Launch-IT program due to the free admission into the program and free transportation provided for students to and from the Launch-IT. Many counselors noted that the 'at-risk' population targeted by the Launch-IT program, has a difficult time taking advantage of the summer school opportunities as school districts are unable to provide transportation or student meals due to lack of funding available, but these are the students that need to be enhancing their academic confidence during their summer vacation.

In addition to reaching out to local schools for student recruitment throughout the Lehigh Valley, connections were made with local service organizations and after-school programs. Launch-IT promotional materials were sent to the Boys and Girls Clubs of Allentown, Bethlehem, and Easton. Other organizations included Casa Guadalupe in Allentown, Kidspace in Bethlehem, Techgyrls in Bethlehem, and the Southside Initiative in Bethlehem, PA.

(e) Evaluation activities (include collaborations with the EDC ITEST Learning Resource Center) (see attachment from our evaluator, Jean Russo)

(f) Cost Sharing sources and amounts (per award letter) if this is applicable.

The Pennsylvania Infrastructure Technology Alliance (PITA) has provided funds for three projects closely related to Launch-IT, all of which ran through June 2008. PITA requires two for one matching from other sources: NSF ITEST has supplied most of the leveraging for the following three projects:

- 1) "Support For The Launch-It (Information Technology) Outreach Program," G. Blank, PI and H. Odi, Co-PI, \$55,134, for graduate student tuition and technology fees, Launch-IT student bus transportation and meals, materials supplies, travel, and student hourly wages.
 - 2) "Tlc (Technology Literacy Curriculum) Development In Harris-Morton Middle School In Support Of The Launch-It Outreach Program," G. Blank, PI, and H. Odi, Co-PIs, \$67,501, three Martian Rover mobile robots and multimedia display wall for the Mars Mission Control Center.
 - 3) "Enhancing First In Math™ Online With Teacher's Guides, Multimedia And Intelligent Tutoring," \$52,789, for graduate student tuition, student hourly wages and consultant fees.
- All three projects were funded in the spring of 2007 and have commenced.

The Rossin College of Engineering and Applied Science has awarded a Dean's Assistantship to a new Launch-IT graduate student, James Evans, matching the stipend support from NSF ITEST.

(g) Additional support from sources other than NSF (e.g., industry, academic, government)

Academic Outreach at Lehigh University

(h) Aspects where the project is either on schedule or ahead of schedule.

(i) Small additions or small changes to project.

Students in sixth grade were added to our youngest team, the Robotics teams due to difficulties in recruitment during the summer session. The sixth grade students were a great addition to the Launch-IT program providing fun and energetic energy that was contagious to our oldest students.

(j) Difficulties in achieving milestones and potential solutions. (I will do this tomorrow)

This past year was the first full academic year of the Launch-IT program running October through May and there was difficulty maintaining consistency in the attendance of volunteer tutors and IT assistants to each session.

Another challenge was that our first Program Director, Melodie Kent, decided to take another position (with IBM) so we had to recruit a new Project Director, Teniece Divya Johnson. Melodie helped us recruit Teniece, as an IT assistant during the summer of 2007, and recommended her for the Launch-IT project director. Teniece brought her own talents in drama, art and business administration to the project. Both Ms. Kent and Ms. Johnson are African American women and are also excellent role models for the Launch-IT students.

3. Describe the opportunities for training and development.

Recruitment for volunteers may change for the better if there was more of an effort put into the creation of promotional materials for the Launch-IT camp. Launch-IT is an ambitious program and because we are a new organization it is important to provide as much detailed information as possible.

All Launch-IT volunteers and IT assistants attended a training session before beginning to work for the Launch-IT program. The workshop reviewed all expectations and responsibilities and provided staff a chance to meet and greet. This past year was the first full academic year of the Launch-IT program running October through May and there was difficulty maintaining consistency in the attendance of volunteer tutors and IT assistants to each session. In the future we plan to develop a more intense training for our IT assistants and providing teaching aids with more classroom responsibility to create buy in and investment in the Launch-IT program. The new structure will involve IT assistants engaging in team building activities, preparing interactive learning exercises, teaching lessons to focus groups to prepare for classroom teaching, and receiving information on classroom management and low level behavior modification.

4. Describe the Outreach/Research activities your project has undertaken.

During the holiday season Launch-IT students worked together to create over 150 hand crafted inspirational bookmarks for the students in local after school programs at the Boys and Girls Club of Bethlehem, Casa Guadalupe in Allentown, and a TechGyrls a program educating and exposing 4th and 5th grade female students to information technology. Students were educated on the different organizations and what their mission is to accomplish with their youth programs. Volunteers from Cedar Crest College guided the students through the bookmark craft. Upon completion the bookmarks were wrapped and delivered to the three featured organizations as a New's Year's gift. It is important that our Launch-IT students understand the gift of giving and have an attitude of gratitude and a sense of pride for the opportunity to participate in a program such as Launch-IT. By educating our Launch-IT students that there are other students like them spending time to improve upon their study skills preparing for their future academic careers, and decreasing attitudes of anti-intellectualism (that learning isn't 'cool').

Publications and Products:

Parvez, S. and Blank, G. (2008). Individualizing Tutoring with Learning Style Based Feedback, *9th International Conference on Intelligent Tutoring Systems*, June, Montreal.

Rieksts, I. and Blank, G. (2008). Inspiring Future IT Professionals with Mars Rovers, *Consortium for Computer Science Education*, April, Wagner College, New York. [Available online.](#)

Sands, M., Moukhine, N. and Blank, G. (2008). Widening the Pipeline of K-12 Students with Flash, *Consortium for Computer Science Education*, April, Wagner College, New York. [Available online.](#)

Blank, G. (2008). Launch-IT, *Society for Technology Education (SITE 2008) Conference*, March, Las Vegas. [Available online.](#)

Rieksts, I. and Blank, G. (2008). Mars Rovers in Middle School, *Society for Technology Education (SITE 2008) Conference*, March, Las Vegas.

Contributions:

PI Glenn Blank presented the Design-First curriculum and tools at a workshop called “Novel Curricula and Tools for Java in CS1 Courses,” at the *Eastern Conference for Computing at Small Colleges*, St. Joseph’s College, Patchogue, NY, October 19-20, 2007.

PI Glenn Blank presented the Launch-IT (and related LV STEM) program goals, curricula and tools at a PACISE workshop for Computer Science instructors and students from Pennsylvania state colleges, at Kutztown University, April 4, 2008.

PI Glenn Blank supervised the development of a prototype Fractions Tutor, an intelligent tutoring system which helps students who struggle to perform operations on fractions, with support from a PITA grant. Launch-IT graduate fellows Tamara Peffer and Isaac Rieksts developed the first prototype in an intelligent tutoring systems course that Prof. Blank taught in the fall of 2007, then Ms. Peffer assisted graduate students Yu Yang and James Evans continue development. An improved prototype was tested with Launch-IT middle school students in April 2007. The results were positive and provided feedback for the developers. This same prototype was shown as a demo to the President and Chief Technology Officer of SunTex International, the creators of the FirstInMath web-based game that Launch-IT and LV STEM middle school students have used to improve their math skills. Development of the Fractions tutor will continue through the summer and fall of 2008, with the goal of creating a rich tutoring and multimedia environment that can supplement the FirstInMath.com web site.

PI Glenn Blank also supervised the development of a prototype Debugging Tutor, an intelligent tutoring system which helps students learn how to diagnose and correct bugs in Java programs. Debugging is a crucial problem solving skill for successful computer science students and software developers and a potential stumbling block for novices. Debugging is difficult to teach in a classroom setting, since it is primarily learned through practice. The Debugging Tutor presents students with snippets of Java code, which students can edit and compile (within the tutor). They can also request hints from the tutor, which it gives in increasing levels of detail upon request. The tutor monitors each student’s progress in a dynamic student model, selecting problems based on the success students have had thus far with problems covering a range of concepts. Launch-IT graduate fellows Mike Sands and Nick Moukhine developed the first prototype of the Debugging Tutor in Prof. Blank’s Intelligent Tutoring Systems class in the fall of 2007, and continued to develop it in the spring. Undergraduate Launch-IT assistant Mike Williams, from Kutztown University, is assisting Mr. Moukhine in further enhancements which will lead to an evaluation of the tutor in the Launch-IT program this summer.

Special Requirements:**Addenda**

As noted above, Dr. M. Jean Russo’s evaluation report is a separate addendum.