Lehigh University
Launch-IT

"Launching at risk middle and high school students in the greater Lehigh Valley toward college and careers in Information Technology"

Annual Report
June 23, 2007

Participants

What people have worked on your project?

PI/Co-PIs

Dr. Glenn Blank. As Principal Investigator and Launch-IT Co-Director, Dr. Blank oversaw the overall management and vision of the project, recruited the two Launch-IT graduate fellows in Computer Science and helped recruit the Launch-IT program manager. As faculty team leader for the Java team, he led the curriculum planning for the team and assisted with lesson planning and teaching. He also led the planning for a multimedia e-learning and intelligent tutoring system designed to help students who get stuck playing the "24" game on the FirstInMath.com web site.
Dr. Henry Odi. As Launch-IT Co-Director, Dr. Odi oversaw the administration of the project, including the recruiting of the Launch-IT program manager as a staff member as well as the administrative assistant, both housed in the Academic Outreach Office and Special Projects, and also led the effort of engaging local school districts and corporations in support of the project.
Dr. H. Lynn Columba led the Fuego Flash team, helping to develop and implement the curriculum and lesson plans. She also recruited the Launch-IT graduate fellow in Learning Science and Technology. Based on videotaped observations of Launch-IT student playing the "24" game on the FirstInMath.com web site, she also created lesson plans designed to intervene and tutor students who lack fundamental understanding of fractions.
Dr. William M. Pottenger, leader of the Robotics team, oversaw the development of curriculum. Note: over the summer, Dr. Pottenger, who left Lehigh University, withdrew from the Launch-IT project and Dr. N. Duke Perreira of the Department of Mechanical Engineering, agreed to replace him as leader of the Robotics team.

Launch-IT Program Director:

Ms. Melodie Kent, Launch-IT Program Director, coordinated recruiting of Launch-IT students and undergraduate IT assistants, planned the details of transportation and meals (including field trips and guest presentations), planned a novel roller coaster design curriculum for the summer program), coordinated parental involvement and implementation of the Launch-IT curriculum, and wrote the first draft of this annual report.

Teachers

Donald Stahl, a technology teacher at Harrison Morton Middle School in Allentown, helped develop the details of the curriculum and lesson plans for the Robotics team taught and tutored students one-on-one.
Jane Carr, a technology teacher at Broughal Middle School in Bethlehem, helped develop the details of the curriculum and lesson plans for the Fuego Flash team taught and tutored students one-on-one.
Chad Neff, a mathematics teacher at Dieruff High School in Allentown, helped develop the details of the curriculum and lesson plans for the Java team taught and tutored students one-on-one. Mr. Neff also taught and led PSAT/SAT prep activities.

Graduate IT Assistants

Chris Janneck, Graduate Teaching Fellow with the Robotics team, helped develop the details of the curriculum and lesson plans for the Robotics team taught and tutored students one-on-one. Mr. Janneck also began work on a stand-alone version of the UML tool for the DesignFirst-ITS, which the Java team used and evaluated.
Shahida Parvez, Graduate Teaching Fellow with the Fuego Flash team, helped develop the details of the curriculum and lesson plans for the Fuego Flash team taught and tutored students one-on-one. Ms. Parvez also developed the Pedagogical Advisor for the DesignFirst-ITS, which the Java team used and evaluated, and supported the demonstration of the design first curriculum at Whitehall High School in Whitehall, PA.
Fang Wei (Sophia), Graduate Teaching Fellow with the Java team, helped develop the details of the curriculum and lesson plans for the Java team taught and tutored students one-on-one. Ms. Wei also developed the Student Model for the DesignFirst-ITS, which the Java team used and evaluated, and supported the demonstration of the design first curriculum at Whitehall High School in Whitehall, PA and the East Career and Technology Center in Memphis TN. Ms. Wei completed her dissertation in August 2007.

Undergraduate IT Assistants Tyagi Hemant, Joyce Pan, Eric Rosenberg, Stanislav Tsanev and Allison White tutored Launch-IT students one-on-one, provided role models for the Launch-IT students, and worked on software related to the project (such as Flash multimedia lessons helping students learn concepts about Fractions and related operations).

Priyani Jayetileke, administrative assistant, helped plan staff and Launch-IT meetings, recruit students, create internal and annual reports, etc.

What other organizations have been involved as partners?

The Pennsylvania Infrastructure Technology Alliance (PITA) has provided funds for three projects closely related to Launch-IT. 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, Michael Sands, matching the stipend support from NSF ITEST.

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

S.T.A.R. Academies
Launch-IT is based on the model of the S.T.A.R. program. Students in the S.T.A.R. program served as a comparison group for the Launch-IT participants. Since 1989, Lehigh University has conducted the S.T.A.R. (Students That Are Ready) Academy, a year round intervention academy to promote academic achievement in STEM for at-risk middle and high school students in Allentown, Bethlehem, and surrounding communities. S.T.A.R.’s goals is to recruit and retain minority students in the college-bound STEM pipeline, giving them the incentives, skills, and support systems they need to succeed in school and pursue higher education. Its primary features are: intensive tutoring and mentoring by Lehigh students, hands-on STEM laboratory experiences by faculty, a parent program with strong involvement, positive role models, career and college counseling, study skills, and internships in STEM fields for high school juniors and seniors. Co-PI Henry Odi is the Director of the S.T.A.R. Academies and the other co-PIs are actively involved with S.T.A.R. The Launch-IT project shared facilities and staff of the Office of Academic Outreach with S.T.A.R. and other outreach programs.

LV STEM Project (www.lehigh.edu/stem)
The starting point for the curricula offered in Launch-IT began were developed through the GK-12 LV STEM project.

Activities and Findings

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

Note: to avoid confusion among participants familiar with the S.T.A.R. Academies, we have renamed our ITEST-supported project to Launch-IT. The vision of Launch-IT is to "launch at risk middle and high school students in the greater Lehigh Valley toward college and careers in Information Technology (IT)."

Activities:

The Launch-IT Project launches at risk Lehigh Valley students towards college and careers in Information Technology (IT). Sponsored by the National Science Foundation (NSF) and the Pennsylvania Infrastructure Technology Alliance (PITA) and hosted at Lehigh University, this project is for middle through high school students who may be considered at-risk and may not be exposed to IT and college. The Launch-IT Project includes a three-week summer program and a monthly Saturday program during the academic year. Summer and year-round curricula will include programming remotely control mobile robots in a simulated Martian landscape (for 6th or 7th graders rising to 7th or 8th grade next fall), creating a web-based music juke box using Flash and Action Script (for 8th or 9th graders rising to 9th or 10th grades next fall), and learning object-oriented design and Java for AP college preparation (for 10th or 11th graders rising to 11th or 12th grades next fall). Math skills will be developed continually with the help of the web-based "24" game and a web-based geometry tutoring system. High school students will get help preparing for the PSAT/SAT exams. A multimedia learning environment and textbook, already under development for a NSF CRCD grant, will be adapted for IT classroom use. IT school teachers, undergraduate mentors and industrial partners will work together to help students learn about the breadth of computer science, web design and object-oriented programming. Self-directed multimedia and mentoring to solve problems will encourage more women and minorities to pursue computer science and enter the IT workforce. Field trips to corporate sponsors eager to hire the software developers of the future, will prepare Launch-IT students for IT career opportunities. Top-notch IT teachers and college students will tutor Launch-IT students in any subjects where they need help in school, launching them to success in college and the IT workforce.

Launch-IT has established collaboration with many other universities and community outreach projects and organizations. We have successfully completed the fall session and are positively looking forward to the summer session. During the spring session, we had four Saturday sessions of which one session included a field trip to the LVI airport to see how information technology is used throughout the airport. Curricula are currently being developed to be approved for district-wide use as curriculum for IT classes.

One of the curricula used the DesignFirst-ITS (Intelligent Tutoring System), which helps novices learn how to design a class in Unified Modeling Language (UML) from a problem description. The system was evaluated at Whitehall High School in Whitehall, PA and the East Career and Technology Center in Memphis, TN, before it was introduced to Launch-IT students in April 2007, to determine whether the learning-styles based feedback is effective in helping them identify and correct errors so that all were able to complete a non-trivial problem.

Findings:
Please see our external evaluator's report, provided as a separate attachment.

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used throughout the airport. Curriculum is currently being developed to be approved for district-wide use as curriculum for IT classes. Through data collected from Launch-IT participants, several publications are being produced to show the effectiveness of multimedia instruction.

The rest of this section summarizes other results of the project's activities:

- Recruited and trained graduate fellows and undergraduate IT assistants. We recruited and trained three graduate teaching fellows and five IT assistants for the program.
- Recruited 80 Launch-IT students from all over the Lehigh Valley, including five school districts involved: Easton Area, Wilson Area, Bethlehem Area, Allentown, and Salisbury Township.
- Recruited and hired the Launch-IT Program Manager, January 2007, Ms. Melodie Kent, former STEM graduate fellow. Ms. Kent completed her M.S. thesis in Mechanical Engineering in the summer of 2007.
- Mentoring Training Session, Tuesday, February 20, 2007: Every volunteer and IT assistant attended a workshop to explain to them their roles as IT assistants and mentors. Students were given a pamphlet of expectations and guidelines for the Launch-IT program.
- Opening Ceremony for Parents and Students, Tuesday, February 27, 2007: served as an information session for parents and Launch-IT students. The expectations of participants and their family were discussed and overall goals of the program explained. Parents were also encouraged to attend sessions and support the program and there was a question and answer session for parents as well.
- Offered four Saturday sessions in Spring 2007 (March 3, March 31, April 14, May 12), featuring exciting IT curriculum, hands-on projects, presentations, and a field trip to learn about applications of IT at the Lehigh Valley International Airport.
- Created Alliances with surrounding established youth outreach groups: We have contacted Boys and Girls Club, YMCA, Children's Home of Easton, church youth groups, and Allentown Arts Center (YEA, Youth Education in Arts) in order to recruit potential students for our program. Many collaborative presentations were planned for the summer session.

- IT industry and college exposure (Summer 2007) : We have scheduled various IT professionals from our industry partners to come in and talk about their career as IT professionals. We have also scheduled lab visits to various technology labs at Lehigh University.

Design-First Tutoring System Evaluation:
Three PhD students (including Fang Wei and Shahida Parvez who are Graduate Fellows for Launch-IT) have developed the DesignFirst-ITS which is an intelligent tutoring system that provides one-on-one tutoring to help beginners in a CS1 course learn object-oriented analysis and design, using elements of UML [1]. DesignFirst-ITS is based on a "design-first" curriculum that teaches students to design a solution and the objects that comprise it before coding. This curriculum enables students to understand and comprehend the problem without getting bogged down with programming language syntax. The Pedagogical Advisor (PA) in DesignFirst-ITS provides learning style based feedback while students work on their solutions. This spring, we conducted studies that examine the effectiveness of learning style based feedback with students participating in the Launch-IT outreach project (www.lehigh.edu/launchit). An experimental

group saw feedback based on their own learning style while a control group saw generic, text-based feedback. . All students took a pretest and posttest before and after the students completed their assignment. The preliminary results show a significant improvement for all students using the tutoring system (mean of 4.6 out of 13 questions, t=.001). For the PA, there was a significantly higher gain for students using the experimental group (mean gain of 4.5, t=.001). We will be gathering and analyzing more data during the summer Launch-IT program.

Training and Development

Every undergraduate IT assistant attended a workshop to explain to them their roles as IT assistants and mentors. Students were given a pamphlet of expectations and guidelines for the Launch-IT program.

Each team created their specific training for the software they would use within their teams. We also provided additional training for curriculum planning and student interaction through the Education Department at Lehigh University.

Participants in the spring semester Launch-IT program:

6th-7th graders:

No. of Students		-	31
Males	-	17	
Females	-	14	
Hispanic/Latino		-	13
African American/Black	-	6	
Caucasian	-	8	
Asian Native/American			
Other	-		

8th-9th graders

No. of Students		-	17
Males	-	9	
Females	-	8	
Hispanic/Latino		-	12
African American/Black	-	1	
Caucasian	-	1	
Asian Native/American		-	2
Other	-	1	

10th-12th graders

No. of Students		-	22
Males	-	10	
Females	-	12	
Hispanic/Latino		-	12
African American/Black	-	7	

Caucasian	-	-	
Asian Native/American		-	2
Other	-	1	

Reports from the three Launch-IT outreach teams:

Team 1 – Robotics (for 6th or 7th graders rising to 7th or 8th grade next fall) - Bill Pottenger (Faculty Team Leader), Don Stahl (Teacher), Chris Janneck (Graduate Student Fellow), and two undergraduate IT assistants: Programming remotely controlled mobile robots in a simulated Martian landscape.

The Robotics Team set a very educationally rigorous schedule of projects to complete during the Spring Session. We incorporated input technology, rocket science, robotics, advisory, tutoring, and podcasting into each session. At the completion of the Spring Session the students in Team One left with an introductory taste from each area and a beginning vocabulary on which to build during the following years. To us this was a major accomplishment that we set out to achieve from the very first day.

What worked / did not work

The same thing worked and did not work for the Robotics Team. That "thing" is the schedule. We managed our time very wisely for each meeting with very little "down" time. The schedule was full of hands-on scenarios, movement, energy, and focus on teamwork. The students loved the busy schedule and thrived in the work environment. However, the schedule is also what did not work. We could not finish everything that we had scheduled because of all of the change. We did not schedule enough prep time to tear down one activity and get ready for the next. The students did not notice any breaks in the schedule, but items were skipped or abbreviated for the sake of time. This is an area that we are improving on for the Summer Session. The web-based "24" game was part of the curriculum for the Robotics team, for about half hour each session.

Major achievements

The desire of the students to be at each session was quite high. Very few students missed any of the sessions. We knew that if the instructors were having fun then the students would be having fun also. We incorporated numerous activities each day that required movement on the students' part and each piece lasted less that 90 minutes so there was constant movement. Students knew that if they did not like one activity that something that interested them was only minutes away.

Retention

We did not put in place a reward system or punishment system for attendance. We just focused on creating fun educationally sound activities that were appropriate for that age level. Activities that had a high success rate and great probability of making a mess were the best. We spent time in the computer lab, but that was split by outdoor activities, team building events, and hands on science experiments. The result was an excellent retention of 89% for the spring.

Team 2—Fuego Flash (Current 8th and 9th graders rising to 9th & 10th grades next fall) - Lynn Columba (Faculty Team Leader), Jane Carr (Teacher), Shaihada Parvez (Graduate Student Fellow), and two undergraduate IT assistants: creating a web-based music juke box using Flash and ActionScript.

The Fuego Flash Team chose a different theme every Saturday and created instructional and technological activities and teaching materials supporting the theme. Our themes for the four sessions were construction, probability and statistics, algebra and measurements. Students were introduced to various mathematical concepts through fun hands-on activities such as constructing geodesic domes, polygons, and bridges using simple materials. They learned to collect and plot data by constructing paper frogs and measuring their leaps. They played various board games and learned to determine which ones were fair. They practiced their basic mathematical concepts such as multiplication, addition, subtraction and division by playing game 24.

Technologically, the Fuego Flash Team was shown an example of an online jukebox that varied slightly in design and motion. As an introduction to Flash students used the toolbar to draw their Coat-of-Arms that they had designed as an icebreaker activity during the first session. These skills were reinforced as students next worked on the design of their jukebox. Buttons were added to control simple processes, such as forward and backward.

All students completed a sunrise animation. Through this activity students were exposed to timeline elements that included how to add and delete layers and key frames, and how to "tween" the movement of an object (a sunrise). Students saved all work on the Flash USB drives provided by Launch-IT. They learned how to connect and safely disconnect the drives, as well as save and read their files from the drives.

In the communication strand, the students worked in teams on many of the hands-on activities. After completing each activity, students from each team were required to present and briefly talk about their projects. All students actively participated in these activities. All students also wrote journal entries after every session recapping their day.

Positive changes:

In the beginning of spring session, most students were stranger to each other. Each session, except the first, started with a ten-minute movie that highlighted student interactions as they worked together and sometimes alone to complete activities shared during the day. The students enjoyed seeing themselves on the "big screen". It was a great way to start the day and help to build a team atmosphere. By end of the spring session, we did not have individual students but a team where everyone knew each other. Initially, students were self conscious and shy and did not like to talk in front of a group. Towards the end of the session, everyone was able to articulate their thoughts and present them in front of the whole team. After four Saturdays, Fuego Flash (student named) emerged as a cohesive team. Also, the hands-on activities actually helped students see

the practical applications of math. They could apply scientific and mathematical principals that they learned at school to understand the underlying concepts.

Things that did not work:

Students did not like to sit for extended period of time. Instructional variety was the key to a successful beginning for our team.

Retention process and activities:

The retention rate was very good, 81%, for a new program. The instructors designed outdoor hands-on activities so that students got a chance to get up and walk around. Gradually we increased the instructional time spent in the lab because students enjoyed learning concepts in Flash Macromedia.

Team 3—Java (current 10th and 11th graders rising to 11th & 12th grades next fall) - Glenn Blank (Faculty Team Leader), Chad Neff (Teacher), Fang Wei (Graduate Student Fellow), and one undergraduate IT assistant: Learning object-oriented design and AP Java prep plus PSAT and SAT prep .

The focus of the Java Team was to introduce students to the design first concept of programming and familiarize them with the Eclipse environment and important programming terms and concepts. All of these items were accomplished in the three spring sessions; the fourth session was a field trip and so no programming lessons were possible. In the first session, students contributed to the design process for a movie ticket machine in a teacher guided group discussion and became familiar with essential programming terminology. In the second session, they learned how to maneuver through the Eclipse environment and write some simple Java code through a multimedia activity. Finally, they completed a guided activity to help determine what attributes and methods were required to write the basic outline for the Ticket Machine class and used UML to set up their plan in Eclipse.

We quickly found that while our goals were to teach students Java provide them with assistance in school work, prepare them for the SAT/PSAT, and familiarize them with important job and career skills and requirements, some of these activities were too school-like and became could become tedious. This was apparent the first day when the Java lesson was mostly discussion and did not include hands-on computer work. It was definitely not a good idea to do tutoring and SAT work in the same day, since these activities were too reminiscent of school. We decided instead to do tutoring during the school sessions and save the SAT work for the summer when we would not be tutoring. Even though some of the computer sessions were long, students were involved and interested in the activities.

Retention process and activities:

In addition to checking to see that students completed computer activities correctly, after each of the three computer sessions, students were asked to write a blog entry as an assessment to check for understanding. The teacher (Chad Neff) led the discussion about how to respond to student concerns in order to improve the curriculum and planning for subsequent activities. Each session started with some review of previous concepts, which were necessary to continue with the project. Since the entire Java curriculum is project based, students will constantly be building on and extending prior knowledge and skills. It was also resolved that to make the program more engaging for the students, we should incorporate some Flash multimedia development, which we began in the spring and continued in the summer. The retention rate for the Java team (82%) was very good, especially for a new program.

Outreach activities:

In efforts to recruit Launch-IT students, first Launch-IT Program Director Melodie Kent sent mailings to provide a short description of the program and then she had an information session, where she invited District superintendents, Principals, Assistant Principals, Guidance Counselors, Technology Teachers and Administrators, Pastors and community youth leaders. At this information session, the program was introduced to the public and there was an open forum for them to give their opinions on how to involve their schools, recruit their students, and explain to the families the benefits of the program. This session was set in order to get the schools and community on-board with our efforts prior to targeting the students. This was a success as we had three districts in attendance (Bethlehem, Allentown, Easton Area). After this initial meeting, we began to send out more mailings and emails to keep the community and schools involved in our efforts. Once they were on board, we began to reach out to the students through our contacts within the schools and community groups. Ms. Kent offered every school an opportunity to actually have her come in personally to present the program, but in the spring, she only attended Roberto Clemente Charter School and Shiloh Baptist Church in person. She did however continue to converse with our contacts via phone and offer any support needed. Throughout the first semester, she continued to mail and e-mail our contacts because we initially had open enrollment to allow all schools the opportunity to respond due to our quick turnover time for getting the program started.

For the summer session, Ms. Kent didn't allow for the schools to give an invitation; instead she told them that she wanted to come and meet with their guidance counselors, so we aggressively set-up meetings with schools and for summer she visited four high schools and two middle schools with a significant at-risk population. The list will be attached to the next e-mail. This meeting was for her to actively try to recruit students in hopes of increasing our summer enrollment. Her biggest concern was with the low numbers fpr the Fuego Flash and Java teams; she therefore visited more high schools than middle schools to address that concern. Due to her personal visits, some schools agreed to do a mass mailing of the application to a group of students that they identified to be a match for the program and many of the counselors handed out applications to the students themselves. With a combination of the Launch-IT program and the schools' recruiting efforts, we expect to attract more students to the program.

Glenn Blank and Melodie Kent, working with web site designers from International Multimedia Resource Center, developed the Launch-IT web site (www.lehigh.edu/launchit) to facilitate recruiting of Launch-IT students as well as undergraduate IT assistants and graduate fellows.

Publications and Products:

Shahida Parvez. and Glenn Blank, A Pedagogical Framework to Integrate Learning Style into Intelligent Tutoring Systems, *Eastern Conference for Computing at Small Colleges*, Mary Washington College, October 20-21, 2006.

Sally Mortiz and Glenn Blank, "A "Design-First" Curriculum And Eclipse Tools," Tutorial, *Eastern Conference for Computing at Small Colleges*, Mary Washington College, October 20-21, 2006.

Fang Wei and Glenn Blank, Atomic Dynamic Bayesian Networks for a Responsive Student Model, *Proceedings of the 13th International Conference on Artificial Intelligence in Education (AIED2007)*, Los Angeles, CA, July 9-13, 2007.

Glenn Blank and Robert Moll, "Novel Curricula and Tools for Java in CS1 Courses," Workshop at *Eastern Conference for Computing at Small Colleges*, St. Joseph's College, Patchogue, NY, October 19-20, 2007.

Contributions:

Professor Blank led a workshop introducing Object-Oriented Programming in Java was held in the East Career and Technology Center in Memphis, TN, March 14-15, 2007. Professor Linda Sherrill helped to make the arrangements and invited students at high schools associated with a GK-12 program at the University of Memphis. Twelve high school students participated in the workshop; the demographics included , six African-Americans and six Caucasian, four females and eight males. Launch-IT fellow Fang Wei helped to set up the workshop, answered students' questions, and gathered and analyzed the data for student modeling research.

The curriculum for the workshop draws from materials developed for the Launch-IT program. Multimedia introduced object oriented concepts and guided them through practice exercises modifying two Java graphics-oriented projects in Eclipse IDE, creating objects and manipulating them with methods, then modifying a constructor and methods to draw scene of a sun setting next to a house. In the second day of the workshop, students a step-by-step procedure for designing a class diagram given an instructor's prose problem description, then designed a class diagram for a Movie Ticket Machine. As they created the class diagram in our novice-oriented LehighUML plug-in, an intelligent tutoring system provided hints based on their actions. All of the students successfully created a valid class diagram for the problem.

In the intelligent tutoring system that helped the student, the student model component used Fang Wei's innovative Atomic Dynamic Bayesian Network (ADBN) schema. ADBNs represent refined prerequisite relationships and diagnoses in real-time students' knowledge structure considering the learning history. The data from the workshop helped to evaluate the student

model. The accuracy of the student model is represented by average correct diagnostic rate. The analysis result from the student data in the work shop showed that the student model has an accuracy of 88%.

Computer Science Department at the University of Memphis
After the Object-Oriented Programming in Java workshop, Professor Blank presented a seminar about the intelligent tutoring system to the Computer Science Department at the University of Memphis. The seminar closed with a discussion about the ITEST Launch-IT and GK-12 LV STEM projects.

Professor Blank has also given similar talks this spring at the University of Massachusetts-Amherst and Worcester Polytechnic Institute (in December 2006) and the University of Pittsburgh and Ramapo College of New Jersey (in April and May 2007).

Contributions to Other Disciplines: Nothing significant (yet)

Contributions to Human Resource Development

Each Launch-IT team is composed of a team leader (professor), certified K-12 teacher, graduate student fellow, undergraduate tutors, and Launch-IT students from grades 6-12. The structure of the program creates an atmosphere geared towards cooperative learning, team collaboration, and self development. In preparation for the arrival of Launch-IT students, each team was given the task of developing exciting and engaging curricula, starting with the outline that Dr. Blank created before the program was funded, with other learning activities designed to aid the student. This experience provided valuable training for the graduate fellows who plan to become faculty members. After this preparation period, all of the planning is put into place to guide the direction of the team. These periods, both planning and implementation enhances the respective individuals and teams' ability to design and execute instructional and effective curriculum, communicate and interact with various types of people, and promote learning beyond the classrooms. This experience enhanced the team building and communication skills of graduate fellows and undergraduate assistants. Launch-IT students are given various tasks that are incorporated in the curriculum. Judging from evaluation results and informal feedback, their individual and team achievements have already had a positively impact on their perception of IT and their outlook on college.

Contributions to Resources for Research and Education:

Professor Blank presented a seminar about the intelligent tutoring system to the Computer Science Department at the University of Memphis. The seminar closed with a discussion about the ITEST Launch-IT and GK-12 LV STEM projects. Professor Blank has gave similar talks at the University of Massachusetts-Amherst, Worcester Polytechnic Institute, the University of Pittsburgh, and Ramapo College of New Jersey.

Contributions Beyond Science and Engineering: Nothing Significant (yet)

Addenda

Dr. Jean Russo’s evaluation report is a separate addendum.