

Annual Report for Period:09/2008 - 08/2009

Submitted on: 06/09/2009

Principal Investigator: Wolz, Ursula C.

Award ID: 0739173

Organization: The College of New Jersey

Submitted By:

Wolz, Ursula - Principal Investigator

Title:

Broadening Participation in Computing via Community Journalism for Middle Schoolers

Project Participants

Senior Personnel

Name: Wolz, Ursula

Worked for more than 160 Hours: Yes

Contribution to Project:

Dr. Wolz's contribution to the project have been as follows:

1. Responsible for coordinating activities between our content management development team (led by Monisha Pulimood, co-PI), our interactive journalism curriculum team (led by Kim Pearson) and our independent evaluator (Meredith Stone), as well as working closely with Mary Switzer our project manager to develop procedures for dealing with all the details of getting the project off the ground.
2. Took primary responsibility for getting the project approved by our Institutional Review Board (IRB). This proved to be a far greater undertaking than expected because the IRB had never been presented with a project of this complexity and magnitude that involved children. Consequently significant renegotiation took place before full approval took place.
3. Work with Meredith Stone and Mary Switzer to assemble and develop pre and post test instruments for both our study group and a comparison group. In particular, with support from Pulimood & Pearson, an instrument was developed to study how middle school children can develop a story given a set of paper construction tools. We anticipate seeking further funding to validate this instrument for application beyond this project.
4. Developed a working relationship with Mitchel Resnick and John Maloney, MIT Media Lab, and creators of the programming environment 'Scratch.' An outcome of this was a co-presentation with Maloney & Pulimood at the ACM SIGCSE conference on Scratch, as well as a 'Birds of a Feather' sessions at SIGCSE 08 & 09.
5. Was also directly involved with the recruitment of two cohorts of TCNJ undergraduate students to participate in this project for 8 weeks in each of the summer 2008 and 2009 as part of a TCNJ Summer Undergraduate Research Program. This included successfully applying for both NSF REU funding and internal TCNJ support for the students.
6. Worked with Mary Switzer and Jill Schwartz (guidance councilor at Fisher Middle School) to recruit middle school teachers who will work with us on this project for two years. Also contributed to the profile development and recruitment documents used by Stone to create the study and comparison group of middle schoolers who will participated in AY 08-09 as well as the new cohort for 09-10.
7. Has been active in dissemination of preliminary results including at the National Academies.

Name: Pearson, Kim

Worked for more than 160 Hours: Yes

Contribution to Project:

Since the award period, Pearson created a wiki to facilitate project management, contributed to the completion of the IRB application for the project, participated in discussions with regard to the selection of the study participants and student staff, and assisted in in the creation of the assessment tools used for the pretest and post-test.

She also participated in the content design for the content management system that houses the work for the project, as well as subsequent refinements. In addition, she developed a journalism curriculum for the summer workshop and lesson plans for that

curriculum. Under her supervision, the college student assistants on the project collected information for the CMS database that will provide some of the research material for the participants in the summer institute and after school program.

Pearson published two peer-reviewed articles and several blog posts about the project in 2008 and 2009. Full citations for these articles are in the publications section.

Pearson has been part of the teaching faculty for the summer institute and school-year afterschool program and coordinates participation by news sources and guest speakers for the program.

Pearson has been part of panel presentations on this project at the New Media Consortium 2008 Summer Conference and the Scratch@MIT annual conference. She has also given presentations on the project at the University of Colorado-Colorado Springs and The College of New Jersey. She also assisted in the planning and implementation of Scratch Day@TCNJ on June 6, 2009.

Pearson's involvement in BPC during the Spring, 2008 semester was supported by one course release funded under the BPC grant. During the summer, 2008, she received the summer stipend designated by the grant. She will receive a summer stipend under the grant in 2009. In 2008, is also receiving a small stipend given to faculty mentors of undergraduate researchers participating in TCNJ's summer research program. In addition, Pearson is received travel support her participation in panels at the New Media Consortium 2008 Summer Conference at Princeton University (June 2008) and the Scratch@MIT conference (July, 2008). Both panel presentations are devoted to the BPC project.

Name: Pulimood, Sarah

Worked for more than 160 Hours: Yes

Contribution to Project:

During the past two years Pulimood's contribution to the project have been as follows:

1. Has primary responsibility for guiding student researchers through the design and implementation of the CAFE (Collaboration and Facilitation Environment), our content management system, in collaboration with Pearson and Wolz.
2. Contributed to development of the software engineering aspect of the curriculum for the summer interactive journalism institute.
3. Participated in discussions on the selection of the study participants and student staff, and creation of the assessment tools used for the pretest.
4. Co-presented a special session, a 'Birds of a Feather' session, and a poster at the ACM SIGCSE conferences in March 2008 and March 2009.
5. Co-presented this project with the other PIs at (a) The New Media Consortium Conference, June 12-14, 2008, Princeton NJ, (b) Scratch@MIT, July 24-26, Cambridge MA.
6. Contributed to development of grant proposals that extend the goals of this one, submitted to NSF ITEST in February 2009 and BPC (LSA) in May 2009.
7. Invited to lead a day-long session on Scratch as part of a larger summer workshop for high school teachers at Haverford College, Pennsylvania in June 2008, and to participate in a panel discussion for high school teachers in January 2009.
8. Invited to present CAFE at the PostgreSQL Conference in April 2009.
9. Took the lead in applying for NSF Supplemental REU funding and internal TCNJ support for TCNJ undergraduate students to participate in this project in Summers 2008 and 2009. Was directly involved with the recruitment of the students.
10. Submitted an application to the Multi-disciplinary Collaborative Research Experiences for Undergraduates program to support undergraduate students as they continue to develop CAFE.

During Summer 2009, she is receiving the summer stipend designated by the grant.

Graduate Student**Undergraduate Student****Name:** Sai, Nancy**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Sai, a TCNJ Journalism major, worked in Summer 2008. She contributed to development of materials for the summer institute and after school IJIMS club.

Name: Kieffer, Scott**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Kieffer, a TCNJ Interactive Multimedia and Journalism major, worked in Summer 2008. He contributed to development of materials for the summer institute and after school IJIMS club. He also assisted in organizing and running the summer institute for the Fisher Middle School faculty and students.

Name: Bernot, Rebecca**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Bernot, a TCNJ Interactive Multimedia and Journalism major, worked in Summer 2008. She contributed to development of materials for the summer institute and after school IJIMS club. She also assisted in organizing and running the summer institute for the Fisher Middle School faculty and students.

Name: Taylor, Brett**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Taylor, a TCNJ Interactive Multimedia major, worked in Summer 2008 and is continuing in Summer 2009. He contributed to development of materials for the 2008 summer institute and after school IJIMS club. He also assisted in organizing and running the 2008 summer institute for the Fisher Middle School faculty and students. In summer 2009 he will continue to contribute to development of materials and supporting tools for the summer institute as well as organizing and running it.

Name: Babu, James**Worked for more than 160 Hours:** No**Contribution to Project:**

Babu extended some functionality of CAFE and redesigned the user interface to make it accessible for persons with visual impairments. This work was part of his senior thesis and was not funded through the grant award.

Name: Hallberg, Christopher**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Chris is a TCNJ Computer Science and Interactive Multimedia major who worked on the project during the academic year 2008-2009. He is continuing to work with us during Summer 2009. He will contribute to the development of CAFE and other supporting tools and materials for IJIMS and assist in organizing and running the summer institute.

Name: Sanders, Timothy**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Sanders is a computer science major who is working with us during summer 2009. He will contribute to development of materials and supporting tools for the summer institute. He will also assist in organizing and running the 2009 summer institute for the Fisher Middle School faculty and students.

Name: Reyes, Julius**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Reyes is a computer science major who is working with us during summer 2009. He will contribute to development of materials and supporting tools for the summer institute. He will also assist in organizing and running the 2009 summer institute for the Fisher

Middle School faculty and students.

Name: Plasket, Kelli

Worked for more than 160 Hours: Yes

Contribution to Project:

Plasket is a journalism and interactive multimedia major who is working with us during summer 2009. She will contribute to development of materials and supporting tools for the summer institute. She will also assist in organizing and running the 2009 summer institute for the Fisher Middle School faculty and students.

Name: Milazzo, Michael

Worked for more than 160 Hours: Yes

Contribution to Project:

Milazzo is an interactive multimedia major who is working with us during summer 2009. He will contribute to development of materials and supporting tools for the summer institute. He will also assist in organizing and running the 2009 summer institute for the Fisher Middle School faculty and students.

Technician, Programmer

Name: Switzer, Mary

Worked for more than 160 Hours: Yes

Contribution to Project:

Ms. Switzer is a gender equity specialist and Program Manager on the BPC project, working directly with grant personnel and Fisher middle school faculty, administration, middle school students and TCNJ college students on the grant.

Demographic data: female, caucasian, US citizen

Other Participant

Name: Alicea, Jeanette

Worked for more than 160 Hours: No

Contribution to Project:

Ms. Alicea works on the budgetary details of the BPC project and is the liaison with TCNJ's budget and finance department.

Demographic data: female, hispanic, US citizen

Name: Stone, Meredith

Worked for more than 160 Hours: Yes

Contribution to Project:

Dr. Stone is a Learning and Evaluation consultant with more than 20 years experience in educational research and evaluation, who over the past two years has served as an independent evaluator for the project.

Demographic data: female, caucasian, US citizen

Name: Schwarz, Jill

Worked for more than 160 Hours: Yes

Contribution to Project:

Ms. Schwarz, Guidance Counselor, guidance mentor, is working with the Fisher Middle School faculty and students and their parents/guardians in collaboration with TCNJ faculty/staff, and the project external evaluator.

Demographic data: female, caucasian, US citizen

Name: Brower, Barbara

Worked for more than 160 Hours: No

Contribution to Project:

Ms. Brower, Principal, Fisher Middle School, is an administration collaborator with the TCNJ faculty/staff and external evaluator, and mentor for Fisher Middle School teachers and students.

Demographic data: female, caucasian, US citizen

Name: Broach, Raymond

Worked for more than 160 Hours: No

Contribution to Project:

Mr. Broach, Superintendent, Ewing Public Schools, is administration collaborator with TCNJ faculty/staff and the faculty/staff and students at Fisher Middle School.

Demographic data: male, African American, US citizen

Research Experience for Undergraduates

Name: Chiusano, Andrew

Worked for more than 160 Hours: Yes

Contribution to Project:

Chiusano, a TCNJ Computer Science major, worked on the project during Summer 2008 and the academic year 2008-2009 funded through the grant award and REU. He was primarily responsible for the development of the first version of CAFE that was used in summer 2008 and through the academic year 2008-2009. He also assisted in organizing and running the the 2008 summer institute.

Years of schooling completed: Other

Home Institution: Same as Research Site

Home Institution if Other:

Home Institution Highest Degree Granted(in fields supported by NSF): Master's Degree

Fiscal year(s) REU Participant supported: 2008

REU Funding: REU supplement

Name: Gill, Daniel

Worked for more than 160 Hours: Yes

Contribution to Project:

Gill, a TCNJ Computer Science major, worked on the project in Summer 2008. He contributed to developing the materials and tools in support of the IJIMS program. He also assisted with organizing and running the summer institute.

Years of schooling completed: Other

Home Institution: Same as Research Site

Home Institution if Other:

Home Institution Highest Degree Granted(in fields supported by NSF): Master's Degree

Fiscal year(s) REU Participant supported: 2008

REU Funding: REU supplement

Organizational Partners

MA Inst. of Technology Media Labs

We have been collaborating with the MIT Media Labs in the following ways:

1. Our initial proposal received feedback and support from Mitch Resnick, John Maloney and Karen Brennan. Resnick wrote one of the support letters for our BPC proposal.
2. In October 2007, we presented our work at a meeting of the MIT Center for Future Civic Media, which is a joint project of the Media Labs and the MIT Comparative Media Studies program.
3. Our study employs the MIT's Scratch programming language as a key tool for teaching computational thinking.

4. We presented our work at the 2008 Scratch@MIT conference, and we ran a Scratch Day event at TCNJ on June 6, 2009.

Ewing Public Schools

The administration and teaching staff of the Ewing, NJ public schools have collaborated with us on the design and implementation of our study, including: the recruitment of study participants, recruitment of participating teachers and providing facilities for the afterschool program. The Fisher teachers have gradually taken over the after-school club, and have committed to sustaining it after the end of the grant period. In addition, the teachers have incorporated the tools and methods of our institute into their classes, and their action research on that work is becoming an important source of information for our project.

Fisher Middle School in the Ewing Public School District in Ewing, NJ is an urban fringe school with a highly diverse population of students, with a group of their 8th grade students, which includes underrepresented populations, including minorities and females who are participating in the BPC IJIMS project.

Other Collaborators or Contacts

Joshua Drake: Lead Consultant for Command Prompt, Inc; Director Software in the Public Interest, Director United States PostgreSQL Association, contributes to docs, submits (accepted) patches to core, jabber.postgresql.org administrator, recognized PostgreSQL writer including Practical PostgreSQL and many trade articles.

Donates hosting service for CAFE the Collaboration and Facilitation Environment that was designed to support IJIMS (Interactive Journalism Institute for Middle Schoolers).

Activities and Findings

Research and Education Activities:

The Interactive Journalism Institute for Middle Schoolers (IJIMS) project was designed to teach computational thinking skills through a summer institute and twice-monthly after-school sessions. Our pilot occurred July 2008- June 2009. We are beginning our revised program in July 2009 - June 2010. Throughout, our independent evaluator, Dr. Meredith Stone, developed and administered (a) tests of computer efficacy, (b) attitudinal surveys, (c) a non-computer-based media construction assignment. We recruited a study group and a comparison group of middle schoolers.

Our project began in September, 2007, and our focus in the first year was primarily organizational. We designed our research study, obtained IRB approval, selected subjects for both the control group and experimental group, developed our assessment criteria, and conducted a pretest to assess our subjects' baseline grasp of skills related to interactive storytelling. We created and implemented a curriculum plan for our summer program (2008) for teachers and students. We also designed the after-school program that was intended as follow up to the summer experience.

In July 2008 we held a two-week summer institute at TCNJ where faculty, undergraduates, and Fisher teachers (all white women, three language arts, one technology and one guidance counselor) spent a week experiencing the newsroom of the future in preparation for the following week in which they would collaborate with 16 of Fisher's rising 8th graders. The demographics of the middle school students naturally comprised 2/1 female/male, with almost half identified as Latina/o or black. (7th grade teachers nominated students, all were invited, and a subset chose to attend.) During the second week, teams consisting of 3 or 4 young people, a middle school teacher and an undergraduate, planned for and conducted interviews, wrote prose, edited video, selected still images, and created procedural animations in Scratch. Five feature stories appeared in the first edition of F.I.S.H. (Fisher's Interesting Stories Here) <http://highered.commandprompt.com/fish/> launched on the last day. F.I.S.H. was published using CAFE the collaboration system we are building (<http://highered.commandprompt.com/cafe/>.)

Our second year has focused on adjusting to the overwhelmingly positive results of the initial summer experience, and how it impacted the second year. Our goal over two years was to hand responsibility for the after-school program to the middle school teachers. Instead they effectively took control in mid-year, changing our schedule from twice monthly, to weekly, and reorganizing the magazine production process so that they would be the editorial staff. Of more significance, we had hoped to see migration of our curriculum and methods into classrooms by Spring 2010. Instead one language arts teacher began to incorporate programming via Scratch into her writing curriculum as early as December 2008. Our technology teacher began tying Scratch and Alice to her 'Presentation' curriculum.

Our results from the first 18 months were so overwhelmingly positive that it became necessary to re-design our formal study. Our program director, Janice Cuny, approved this, and we received supplemental funding in February 2009 to enhance and extend our outcomes. We invited the comparison group students to join the after-school club. Starting in February 2009, the four teachers took over the after-school club and it started meeting weekly. Six comparison students attended at least two meetings and four of them signed onto news teams and attended regularly for the rest of the year. Although the number of students each week is small (10-12) due to competing sports and clubs, the students are ready to publish a third edition of FISH in early June (<http://highered.commandprompt.com/FISH/>).

In February, we designed and administered an All School Survey to 900+ Fisher Middle School students to gather baseline data with respect to computer usage and knowledge of programming and to start tracking how knowledge of the Scratch, CAFE, and F.I.S.H. were spread within the school. That data will be tallied and analyzed by the 2009 summer undergraduate researchers who began work on June 1, 2009. The survey will be administered at least twice next year.

Two of the five teachers brought the interactive media into their classrooms this spring. Laura Fay incorporated a Scratch element into the eighth-grade report for 70 of her students. Suzanne Gallagher included a Scratch element as part of a poetry project for approximately 100 of her seventh-grade students. Both teachers are keeping journals and plan to write about their experience via the supplemental funding and an NSF RET award.

We will analyze the Scratch elements produced and look at the correlation of their writing skills to the complexity of their Scratch programs. Mary DeSimone is taking an active role in bringing 'Moodle' to teachers outside our project. She is taking responsibility to develop curriculum revision based on changed NJ state standards in technology and language arts that embrace our approach and is particularly interested in the impact of technology on empowering special education students. Jean Gardener, our fourth teacher has withdrawn from the program. During Academic Year 2009-2010 she began a leadership role in mainstreaming special education that has a summer schedule in conflict with ours. Jill Schwartz, guidance counselor will return as a mentor this summer. Marcy Tucker, Language Arts, and Robert Kohurt, Math, will join us in the second year.

In April 2009 we recruited Summer 2009 IJIMS middle school participants. At the urging of the teachers we included rising 7th-grade students as well as rising 8th-grade students - our sample includes 14 of the former and 18 of the latter. We administered the pre-tests to the new students as well as the post-tests to the current students on May 27th. We held an evening information meeting for the 2009-2010 parents and students on May 27th. Demographics on 2009-10 student group have yet to be tabulated.

We held a SCRATCH DAY event (<http://day.scratch.mit.edu/>) on June 6th to which we invited both this year's and next year's students and parents. Formal presentations from industrial colleagues in media and journalism were followed by a showcase of Fisher students presenting their work. The afternoon ended with workshops on Scratch, video editing and college admissions for both parents and students. Also, in June, our external evaluator will be conducting final interviews with all students who participated in either the summer institute or the after-school program. The summer undergraduates will be enhancing CAFE, preparing materials for the summer institute and assisting with data analysis. We anticipate submitting results of the first year for publication in September 2009.

We will hold a second summer institute during the week of July 13, 2009. During meetings prior to that event we will work with our Fisher partners to revise both the summer and year-long after school program. Data collection will continue throughout.

Findings:

The year-long after school program officially closes on June 17, 2009. We have completed all but one of our data collection activities and are in the second week of formal data coding and analysis. We anticipate completing formal analysis of our results by July 24, 2009. Preliminary results are reported here.

At the close of the two-week institute in July 2008, both the Fisher students and teachers were interviewed as part of our formal study. The students reported that they had had FUN and 1) learned to program animations; 2) learned and applied good interviewing techniques; 3) learned and applied good writing techniques; 4) learned and successfully used CAFE, and 5) many also reported that they learned to make videos and use computer software to edit the videos. Their product, the F.I.S.H. online magazine, verifies the student self-reports. The majority of students thought the most important things they learned were programming animation and video editing. Half of the students reported that their best work was programming the animation, and half reported their best work was interviewing and/or writing their news article. Polled on self-assessment of what they accomplished, their sense of accomplishment increased each day. On Friday, having filed their stories on F.I.S.H., their average rating was 4.63 on a five point scale, where '5' designated 'an amazing amount'. Additionally we have evidence that we changed their thinking about computing from two other end-of-the week surveys. They agree that computing is fun and that they will use the skills they learned in whatever career they pursue. More significantly they were able to express agreement that computing activities allow them to be creative in collaborative settings.

Starting in October, we held twice monthly after-school sessions that were attended by approximately 75% of the summer institute students. There were always competing after-school activities, in particular, sports. During the after-school sessions from October to January, the students published a second issue of F.I.S.H. In February, the students welcomed the comparison students (control group) to the after-school program and included them in their news teams. The Fisher teachers lobbied for weekly sessions and these commenced in February as well.

As of February, three teachers are adapting interactive journalism & graphic design into their curricula, two years ahead of our anticipated schedule. It was therefore necessary to further change our study and we have obtained baseline data on computer usage from all 900+ Fisher students. Three of the teachers who participated in last summer's program took ownership of the after-school program and are providing mentorship during their free periods during the school day. A new language arts teacher joined them in April. She will participate in the July 2009 summer institute as well.

Our major objective with regard to the teachers was to bring computational thinking into the curriculum at Fisher Middle School within three years. We attained this at the end of the initial two weeks. One language arts teacher petitioned for formal change in the 8th grade report requirement that mandated using PowerPoint, to enrich the experience with Scratch animations. Another initiated a procedural animation component to her poetry curriculum modeled on our news articles mixed media, including Scratch animations. The technology teacher became an advocate for bringing 'Moodle' into the school. The teachers, interviewed at the end of the summer, consistently reported that computational thinking must be integrated into the experience of all Fisher students.

A secondary objective was to reach the parents. On June 6, 2009 we held a day-long workshop for Fisher students and parents, both the AY 08-09 cohort and the newly recruited AY 09-10 cohort. Forty guests attended. Feedback forms were distributed and are being analyzed. Through parent contacts, anticipated outcomes achieved include (1) establishing a connection with the NJ Department of Education to present IJIMs at a meeting of NJ school superintendents, (2) discussion with an active member of our regional Girl Scout Council regarding preparing Girl Scout leaders to implement computing and civic media, (3) establishing a closer tie to our admissions office to promote computer science more effectively in college recruitment. All three contacts are Fisher parents.

Overall preliminary impressions from feedback forms indicate that the parents fully appreciated our goals and said repeatedly 'this is really important for my child to know'. We found that the single most critical element in working with a middle school is to adapt to their specific school culture. When you do that and support the teachers involved, amazing things can happen. Engaging members of the community, parents, school administrators and civic leaders is equally crucial and happens best through proactive long-range networking.

Training and Development:

We are a multidisciplinary group and have thus learned significantly from each other. Wolz and Pulimood are computer scientists by training, and have learned the process of news reporting. Pearson is a journalist and has learned programming and software engineering. The result of this mutual learning exercise has been a deeper understanding of the isomorphism of computing (specifically programming and software engineering) and expository writing.

All of the PIs have learned about educational research from our evaluator Dr. Meredith Stone. We have also been given both formal and informal training in gender and racial diversity sensitivity by Mary Switzer, our project manager and equity specialist. Stone and Switzer, in turn, have developed a deep appreciation for news reporting and computational thinking.

Our undergraduate research assistants, in Summer 2008, during Academic Year 08-09, and now in Summer 2009, are also a diverse group ranging from an English/Interactive Multimedia double major to Interactive Multimedia/Computer Science double major to pure Computer Science majors. These students bring interests and talents to the table in writing, design, graphics, video, programming and music composition. Those who participated last year worked closely with the Fisher Middle School teachers and taught the Fisher teachers about news reporting, Scratch programming, software engineering, video and sound editing, graphic design, software engineering and database architecture. The Fisher teachers reciprocated by teaching our undergraduates about teaching, about how to motivate young people, about how to respect learning differences and how to gently steer someone in a more positive direction, rather than imposing discipline through punitive means.

Of note is the impact of the middle school teachers. We invited them in as partners and they more than met that challenge. Through our first week together they taught all of us volumes regarding how to broaden participation in computing in middle school. They taught us how to negotiate needs in a quiet, yet forceful way. They taught us how to critique each other's work proactively. They learned how to program, how to edit video, and how to build an online news magazine. They took that knowledge and applied it to their classroom teaching two years ahead of our proposed schedule.

This reinforces our position that we cannot deliver an instructional package from on high. Instead, we must continue to be sensitive to the

complex culture that exists in the school. The TCNJ team genuinely feels it is 'our' school because we have been graciously invited in, politely informed of problems, given insightful suggestions for improvement, and embraced as colleagues. In return, we provide what appear to be desperately needed knowledge of computing and 21st century expository skill. We also give validation that the Fisher teachers are not alone in their struggles to make meaningful use of the technology in their school and more importantly to teach their students 21st century workforce skills. Their sense of urgency is palpable and our collective goal is to scale up our approach.

Outreach Activities:

Presentations:

Pearson, K. *Scratching Across the Curriculum: A Tool for Fostering Varied Literacies*. Sigma Tau Delta English Honors Society, TCNJ, April 16, 2009 and *Culturally Responsive Teaching, Learning, and Counseling Symposium*, University of Colorado, Colorado-Springs, January 24, 2009.

Pulimood, S.M. *Building A Collaborative Environment With PostgreSQL To Enhance The Learning Experience*. PostgreSQL Conference: East 09. Philadelphia, PA. April 4, 2009.

Pearson, K., Pulimood, S.M., Stone, M., Switzer, M. and Wolz, U. *Scratch in the Interactive Journalism Institute for Middle School*. Scratch@MIT conference. MIT Media Lab, July 25, 2008

Pearson, K., Pulimood, S.M., Stone, M., Switzer, M. and Wolz, U. *Broadening Participation in Computing via Community Journalism*. New Media Consortium Summer Conference. Princeton, NJ. June 11-14, 2008

Pulimood, S.M., Shaw, D., and Pearson, K. *Content Management Systems for Journalism*. New Media Consortium Summer Conference. Princeton, NJ. June 11-14, 2008

Wolz, U., *Scratch and Writing*. Second Stevens Workshop on High School Computer Science, May 15, 2008 (keynote).

K. Pearson. *Journalism Across the Curriculum: Build Skills and Empower Learners as Citizens*. Culturally Responsive Teaching and Counseling Symposium. University of Colorado, Colorado Springs, January 26, 2008.

Workshops:

Wolz, U. *Interactive Journalism Institute Report*, at the Computational Thinking for Everyone workshop. National Academies, February 19-20, 2009.

Pulimood, S.M. and Wolz, U. *Gladiator Worms*. TECS/Teentech 2009: Connecting Girls and Technology, Engineering, and Computer Science. April 1, 2009.

Pulimood, S.M. and Wolz, U. *Robot Choreography*. TECS/Teentech 2009: Connecting Girls and Technology, Engineering, and Computer Science. April 1, 2009.

Wolz, U., *Scratch and Social Computing*. TCNJ Bonner Center Community Day, November 17, 2008.

Pulimood, S.M. *Scratch*. Computer Science Education Summer Institute 2008. Haverford College, June 24, 2008.

Panel Session:

Wolz, U. and Fay, L. *Introducing Programming*. BPC/NCWIT K-12 Outreach Practices Workshop, June 11, 2009.

Wolz, U. and Fay, L. *Working with Curriculum & Schools*. BPC/NCWIT K-12 Outreach Practices Workshop, June 11, 2009.

Pulimood, S.M. *CS Pedagogy in K-12*. Third Stevens Workshop on High School Computer Science. January 30, 2009

Journal Publications

Pearson, Kim, "Afterword", Black History Bulletin, p. 34, vol. 72, (2009). Published,

Kieffer, Scott, "Journalistic Scavenger Hunts: Fun Teaching Tool", Poynter.Org, p. <http://po>, vol. Decembe, (2008). Published,

Pearson, Kim, "How Computational Thinking is Changing Journalism & What's Next", Poynter.org, p. <http://po>, vol. May 21, (2009). Published,

Pearson, Kim, "From Civil Rights to Computational Thinking: Thoughts on the 100th Anniversary of the NAACP", Blogher.com, p. <http://ww>, vol. Feb. 13, (2009). Published,

Pulimood, S. M., Wolz, U., Pearson, K. and Chiusano, A., "CAFE: A Collaboration and Facilitation Environment for Engaging Students in Computer Science", In Proceedings of the 40th ACM Technical Symposium on Computer Science Education (Chattanooga, TN, USA, March 04 - 07, 2009). SIGCSE '09. ACM, New York, NY, 4-8., p. 570, vol. , (2009). Published, <http://doi.acm.org/10.1145/1508865.1508871>

Pearson, Kim, "The Changing Newsroom", Blogher.com, p. <http://ww>, vol. July 22, (2008). Published,

Pearson, Kim, "Report From the Scratch@MIT Conference: Empowering Everyone With Technology and Media", Blogher.com, p. <http://ww>, vol. July 27, (2008). Published,

Wolz, U., Leitner, H. H., Malan, D. J., and Maloney, J., "Starting with scratch in CS 1", In Proceedings of the 40th ACM Technical Symposium on Computer Science Education (Chattanooga, TN, USA, March 04 - 07, 2009). SIGCSE '09. ACM, New York, NY., p. 2, vol. , (2009). Published, <http://doi.acm.org/10.1145/1508865.1508869>

Wolz, U., Maloney, J., and Pulimood, S. M., "'Scratch' your way to introductory cs", Proceedings of the 39th SIGCSE Technical Symposium on Computer Science Education (Portland, OR, USA, March 12 - 15, 2008). SIGCSE '08. ACM, New York, NY, p. 298, vol. , (2008). Published, <http://doi.acm.org/10.1145/1352135.1352239>

Books or Other One-time Publications

Web/Internet Site

URL(s):

<http://www.tcnj.edu/~ijims>

Description:

IJIMS (Interactive Journalism Institute for Middle School) is the main resource site for this project.

Other Specific Products

Product Type:

Software (or netware)

Product Description:

We are developing CAF?, an innovative Collaboration and Facilitation Environment that includes a content management system, submission process control workflow, and feedback mechanisms. CAF? was a key factor in the success of the Summer 2008 Interactive Journalism Institute, by providing a safe and supportive environment where students could collaborate to write news reports, and create multimedia artifacts and programs in Scratch. Participants were able to also provide instant online feedback on their peers? work, while obtaining the same from their teachers, mentors, and peers. This in particular contributed significantly to the students? level of engagement, and learning. This model is easily adapted for the undergraduate classroom, particularly to support

technical writing. The security and privacy mechanisms we have incorporated make CAF? a particularly safe environment for even the K-12 or non-computer science classroom providing students with a positive experience of how technology can enhance learning and collaboration.

Sharing Information:

We are continuing to develop CAFE, adding functionality and making it more accessible to persons with disabilities. During Summer 2009 we plan to 'package' CAFE so that it can be easily downloaded and used by other institutions or groups. It is available for download through the IJIMS website at www.tcnj.edu/~ijims.

Contributions

Contributions within Discipline:

The primary objective of this project was to broaden participation in computing, which directly impacts the field as a whole. Our goal, projected to require two years was to use gentle modeling and persuasion to support language arts teachers in introducing programming in their classrooms. We accomplished this in our first three months. Over the academic year 2008-2009 we exposed approximately 175 students in the 7th and 8th grade to Scratch, and have approximately 200 programs that they have written.

A preliminary finding for the field of computer science is that middle school language arts teachers can provide instruction in programming via 'syntax-free' languages such as Scratch. An object for summer 2009 is to develop an analysis protocol to determine the sophistication of the code written by the students in the Fisher language arts classes, and to thoroughly define and document the degree of sophistication of such projects.

A definitive outcome is that our attempt to broaden participation via 'cultural diffusion' was successful. First, we focused on language arts teachers; they are not the traditional entry point for computing in the K-12 curriculum. In the words of Laura Fay, 8th grade reading teacher, she is actively 'infecting' as many teachers as she can. We have recruited a math teacher for our next session, Laura is working with two other language arts teachers, and another math teacher as well. She is also proactively establishing connection with the Ewing High School staff so that our approach can be infused there as well. This has the support of both the outgoing school superintendent, Raymond Broach, as well as the incoming superintended, Michael Nittie.

Contributions to Other Disciplines:

With regard to science, there is nothing significant yet, however please 'beyond science/engineering below.' We have recruited our first math teacher for AY 09-10. Laura Fay, middle school 8th grade reading teacher has also begun an informal collaboration with Ursula Wolz and Fay's team's math teacher, Barbara Fischer.

Contributions to Human Resource Development:

Our project has contributed to human resource development in computing by providing opportunities for 11 undergraduates over two summers to integrate computing, user interface and educational research methodologies. They have learned first hand how critical 'soft skills' are to the computing professions. This experience is funded directly through this project and via REU grants in summer 2008 and 2009. Similarly, we have broken ground on expanding opportunities and experiences for 'under-represented' groups, namely female language arts teachers, who have developed expertise in computing skills, as well as pedagogical skills in teaching computing. These experiences are funded directly by this project, a supplement to this project and and NSF RET grant.

The focus of our project is to expose pre-college teachers, young people and other non-scientists (e.g. parents and school administrators) to computing, particularly programming, software engineering and data base design. Our demographics for young people are over half female, and black/Hispanic.

Contributions to Resources for Research and Education:

The thinking behind our project, along with its exciting early results, have attracted significant interest from colleagues in the TCNJ English department, particularly those involved in English and secondary education. Our work has special relevance to the English teaching curriculum, because the major accreditation agency, NCATE, calls upon leaders of teacher education programs to be leaders in fostering digital literacy among pre-service teachers. As a result of this excitement, several members of the department wrote support letters for our BPC-LSA proposal, and two faculty members have agreed to participate in our scale-up project.

We have also attracted similar support and interest from journalism faculty outside of TCNJ and news industry professionals. For example, our co-PI Kim Pearson published an invited essay, 'How Computational Thinking is Changing Journalism and What's Next' at Poynter.org, the website of one of the leading professional development centers for journalists. Dr. Barbara Iverson, a journalism professor at Columbia College

Chicago, is sufficiently impressed with our work that she committed to working with us on our scale-up project. In her support letter, she wrote, 'Addressing and integrating computational literacy into K-12 curricula is the most effective way to make sure that college-age students and adults in our society are educated so that they can be competent and effective citizens, and function in the world of work in the 21st century.'

The project has also motivated increased use of web-based tools, such as wikis and CAFE, as information sources in the undergraduate classroom. For example, Pulimood teaches the CS 3 course which is our introduction to both software engineering and a second programming language (C++, following Java in CS 1 and CS 2). This course is also a writing intensive course since students are required to produce documents and technical reports that support their projects. A glaring weakness has been a lack of integrated support for online submission and collaboration, as well as peer feedback. This is now being facilitated through CAFE. CAFE will provide similar support for Pearson's course on interactive journalism, enabling her students to become more comfortable with using the technology that they will need in their careers.

Contributions Beyond Science and Engineering:

Conference Proceedings

Wolz, U;Maloney, J;Pulimood, SM, 'Scratch' Your Way to Introductory CS, "MAR 12-15, 2008", SIGCSE'08: PROCEEDINGS OF THE 39TH ACM TECHNICAL SYMPOSIUM ON COMPUTER SCIENCE EDUCATION, : 298-299 2008

Special Requirements

Special reporting requirements: None

Change in Objectives or Scope: None

Animal, Human Subjects, Biohazards: None

Categories for which nothing is reported:

Any Book

Contributions: To Any Beyond Science and Engineering