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NSF 07-548 **06/04/07**

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Ewing, NJ. 086280718

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TITLE OF PROPOSED PROJECT **Broadening Participation in Computing via Community Journalism for Middle Schoolers**

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ **391,477**	**24** months	**01/01/08**	

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Department of Computer Science

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CERTIFICATION PAGE

Certification for Authorized Organizational Representative or Individual Applicant:

By signing and submitting this proposal, the Authorized Organizational Representative or Individual Applicant is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding debarment and suspension, drug-free workplace, and lobbying activities (see below), nondiscrimination, and flood hazard insurance (when applicable) as set forth in the NSF Proposal & Award Policies & Procedures Guide, Part I: the Grant Proposal Guide (GPG) (NSF 07-140). Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U. S. Code, Title 18, Section 1001).

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In addition, if the applicant institution employs more than fifty persons, by electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative of the applicant institution is certifying that the institution has implemented a written and enforced conflict of interest policy that is consistent with the provisions of the NSF Proposal & Award Policies & Procedures Guide, Part II, Award & Administration Guide (AAG) Chapter IV.A; that to the best of his/her knowledge, all financial disclosures required by that conflict of interest policy have been made; and that all identified conflicts of interest will have been satisfactorily managed, reduced or eliminated prior to the institution's expenditure of any funds under the award, in accordance with the institution's conflict of interest policy. Conflicts which cannot be satisfactorily managed, reduced or eliminated must be dislosed to NSF.

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The undersigned certifies, to the best of his or her knowledge and belief, that:

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AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
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COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

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Project Summary

Computer scientists, a journalist and a gender/equity specialist are collaborating on a **demonstration project** to broaden participation in computing through students' exposure to the emerging field of interactive journalism. Research on the computing pipeline and mathematics education inform the position that women and minorities self-select out because they (1) do not see themselves as "computer types", (2) do not successfully navigate the culture of a traditional computing classroom, and (3) are ill-prepared academically for entry into existing undergraduate programs. The profound shift in journalism due to the Internet provides a venue through which to engage these students in computing via writing, information gathering and analysis, as well as a range of digital media from graphics to still images to animation, 3-D graphics and video.

To attract young people into the computing pipeline, this project focuses on the critical point of 8th grade. Students make career-dependent decisions on high school course selection based on preconceptions and misconceptions about computing careers and requisite preparedness for those careers. By the time they reach college, students have segregated themselves into "good writers" or "good mathematicians." Women traditionally will gravitate toward the former. Minority students, especially boys, lack skills in navigating the culture of IT/CS settings. Teachers and parents play an integral role in career path choice. Their perceptions also need to be changed.

In this project, a cohort of 18 demographically appropriate rising 8th graders participate in a weeklong summer Interactive Journalism Institute. Selected teachers from their middle school partner with college undergraduates as Writer/Programmer mentors trained prior to the institute. The mentors extend the institute as an after-school program during the following academic year. The middle school students and teachers are tracked quantitatively and qualitatively and are compared to an identified control group. Predicted outcomes include (1) increased skill in core computing concepts, (2) increased awareness of requisite skills for computing careers and (3) increased enrollment in high school courses that lead to careers in computing.

The project has **intellectual merit**, because the thorough integration of computing and journalism creates a balanced collaboration between two well-established fields, rather than presenting a traditional perspective on computer science through its application to storytelling and multimedia. The project team is highly qualified to present this perspective. Under-represented groups are sufficiently disenfranchised that such balance is critical to invite them in. Foundational concepts of computer science are viewed as inaccessible to a significant portion of the American population. A traditional treatment of these topics is inadequate because it focuses on "what computer science is," rather than the intellectual underpinnings and practical usefulness of computational thinking to careers and to everyday life.

The project has **broad impact** because it will demonstrate how a dramatically different approach to exposing young people to computing can influence career path choice. Journalism is only one of many fields recognized as computing dependent. Evidence is mounting that a 21st century journalist will require a strong computing background and 21st century computing professionals will increasingly apply their skills to information dissemination through an as yet to be imagined collection of venues, processes and media. Underlying both disciplines are foundational principles of information access and dissemination, fact analysis, process description and decision-making for results presentation. Journalists and computer scientists equally embrace these neutral terms to describe how to construct a news item and a software artifact respectively. It is anticipated that this demonstration will lead to an alliance within two years that extends well beyond this small demonstration project.

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For font size and page formatting specifications, see GPG section II.C.

*Proposers may select any numbering mechanism for the proposal. The entire proposal however, must be paginated. Complete both columns only if the proposal is numbered consecutively.

BPC-DP: Broadening Participation in Computing via Community Journalism for Middle Schoolers

Project Description

Faculty from Computer Science and Journalism/Professional Writing propose to collaborate with a gender/equity specialist on a **demonstration project** at our institution to broaden participation in computing through students' exposure to the emerging field of interactive journalism [36, 40]. Research in both the computing pipeline problem [18] and mathematics education [10, 54, 34, 17, 32] inform our position that significant constituencies (notably women and minorities) self-select out because they (1) do not see themselves as "computer types", (2) do not have experience in successfully navigating the culture of a traditional computing classroom, and (3) are ill-prepared academically for entry into existing undergraduate programs. The profound shift in journalism over the past decade due to the Internet provides a venue through which to engage these very students in computing via writing, information gathering and analysis, as well as the full range of digital media from graphics to still images to animation, 3-D graphics and video.

Our approach is unique, and has **intellectual merit**, because we focus on the thorough integration of computing and journalism as a balanced collaboration between two well-established fields, rather than presenting what is essentially a traditional perspective on computer science through its application to storytelling and multimedia. We posit that underrepresented groups are sufficiently disenfranchised that the latter approach is insufficient, and worse, is misguided. Foundational concepts of computer science, and programming in particular, are viewed as inaccessible to a significant portion of the American population. The intrinsic worth is lost on most students. A traditional treatment of these topics, regardless of the application domain, (e.g. robotics, multimedia) is still off the mark because students are focused on "what is" computer science rather than the larger questions of the intellectual underpinnings and practical usefulness of *computational thinking* [57] to careers and to everyday life.

Our approach has the potential to provide **broad impact** because it will demonstrate how a dramatically different approach to exposing young people to computing can influence career path choice. Journalism is only one of many fields recognized as *computing dependent*. We anticipate participating in an alliance within two years that extends this approach to other computing dependent fields. Evidence is mounting that a 21st century journalist will require a strong computing background [33, 37, 24], and 21st century computing professionals will increasingly apply their skills to information dissemination through an as yet to be imagined collection of venues, processes and media. Underlying both disciplines are foundational principles of information access and dissemination, fact analysis, process description and decision-making for results presentation. These neutral terms are equally embraced by journalists and computer scientists to describe how to construct a news item and a software artifact respectively. Consequently, we ascribe to a broad view of computing: one that embraces both the creator of software to support journalism as well as the journalist programmer[1] who can competently embrace emerging digital media. This viewpoint reflects the growing recognition of the importance of computing within the news industry [37]. Journalists are increasingly expected to

[1] This new professional description was first used by Adrian Holovaty [24] The prestigious Medill School of Journalism at Northwestern University announced in late May, 2007 that it is offering a full scholarship for graduate students interested in developing new computing applications for journalism : http://www.medill.northwestern.edu/medill/admissions//programmers.html

create and extract information from databases. They construct social network maps to unearth relationships and patterns of behavior. News presentation is also increasingly computer-driven, whether in the form of content management systems, flash-based animations, and user-customization tools. Fundamentally, as programmer-journalist Adrian Holovaty has observed journalism and computing are both concerned with the gathering, organizing and presenting structured data [24].

To attract young people into such careers we need to start early, because they will need well-established skills in both writing and quantitative reasoning. By the time they reach college, many students have segregated themselves into "good writers" or "good mathematicians." Women traditionally will gravitate toward the former. Keeping them, as well as minority boys in math and science is a national problem [23, 13, 10, 54, 34, 17, 32]. We propose to address the computing pipeline problem by focusing on the critical point of 8th grade, when students make career dependent decisions on high school course selection based on preconceptions and misconceptions about computing careers and requisite preparedness for those careers.

Project Goals

We propose to use interactive journalism as a means of introducing middle school students from underrepresented populations to core skills and career opportunities in the computing sciences. To do this, journalism and computer science faculty and undergraduates at The College of New Jersey will conduct a week-long summer "Interactive Journalism Institute" for rising 8th graders. These middle school students will create an online news publication that incorporates database-driven infographics and interactive animated stories. Formation of an after-school club, advised collaboratively by their own teachers and TCNJ staff and students, will extend and support the institute throughout their 8th grade year. The club advisors will participate in their own week-long training session prior to the institute, and will act as programmer journalist mentors during the institute itself.

Extended exposure that fully integrates their summer experience with their school and home lives is key to success in changing attitudes about careers [18, 13, 23, 10, 54, 34, 17, 32]. Consequently, our goals are distinct because we directly address the relationship between student learning in the rarified context of a summer program and their regular school experience. Research shows that young people rely first on their families and then their school advisors in choosing career paths. In order to influence their decision-making we must fully engage those constituencies. The middle school students, and their club advisors and parents will have opportunities for further exposure to the computing professions through guest speakers, field trips and hands-on learning activities that extend the expertise they developed in the summer program.

We expect that students exposed to this program will demonstrate greater awareness of career opportunities in interactive journalism and the computing professions, as compared to a control group. Our hypothesis is that this immersive experience will serve to remove many of the preconceived notions about computing being "hard" or "nerdy" and about the lack of career potential. Involving middle school guidance counselors and teachers in the summer workshop assures that they gain a better awareness about computing and interactive journalism careers, enabling them to better guide the students. Students will experience for themselves the power of integrating computing and journalism, thus demystifying computer science and mitigating prejudices. We further expect that students will be more likely to choose courses in 9th grade that will prepare them to succeed in traditional computer science courses in college. We will

therefore use their course selections prior to their submission to the high schools to assess and evaluate the demonstration project's impact on their future choices.

This demonstration project is intended to provide us with solid evidence that the combination of an intense summer program focused on interactive journalism in conjunction with a year-long school-based enrichment program successfully places middle school students in the appropriate high school classes in anticipation of careers in the computing disciplines. This, in turn, will allow us to expand our program, and to connect it to existing alliances and initiatives.

A key aspect of our approach is that success in the secondary classroom will require software support that is (a) free (e.g. Alice [16], PostgreSQL [44], PHP [41], Scratch [31, 30][2]) to eliminate the need for budget requests, (b) easy to install and maintain to reduce the reliance upon district technical staff, and (c) sufficiently open source to be supported and enhanced by volunteer TCNJ undergraduates through the college's institutional "community service" requirement.

Expected Outcomes

This pilot is informed by (1) direct experience of two of the PIs with secondary school cohorts of both students and teachers in both journalism and computing, (2) significant support from the TCNJ Center for Mathematics, Science, Technology, and Pre-Engineering (MSTE)[19] in particular through the participation of the center's gender/equity specialist and assessment and evaluation consultant, and (3) the rather significant body of literature in women in computing and mathematics as well as African American participation in math and science [1, 2, 3, 4, 5, 6, 7, 8, 14, 15, 21, 22, 26, 28, 29, 35, 38, 39, 42, 43, 45, 47, 51, 53, 55, 63]. The unifying theme of the three perspectives is that expanding participation in the pipeline will require inquiry-based student engagement that allows them to be innovators rather than simply users of computing technology. The experience must create a supportive, cooperative culture that extends beyond the classroom in which all members develop confidence and competency [10, 54, 34, 17, 32]. Such an immersive experience must be supported by solid information about what is to come in the pipeline. This includes (1) explicit information about what courses in high school are necessary for success, (2) how to be a self-advocate in such courses, (3) how to get necessary cultural support within those courses to maintain confidence and competency, and (4) finally how to choose a college and a major that supports the student's passions, vision, goals, and cultural needs.

As a pilot project we anticipate demonstrating through formal qualitative methods that there is a change in attitude, perception and competency within the student cohort as well as their teachers who participate in the summer sessions and continue to support the students through the academic year program. Furthermore we anticipate that there will be changes in perceptions about computing among the undergraduates who participate, and that their own career aspirations and implementation plans may change as a result. Finally, we expect a significant outcome to be integration of our pilot into existing programs and alliances that broaden participation.

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[2] Alice is a icon-based programming language that produces 3-D graphics. It has gained wide-spread acceptance as an introductory language at the undergraduate level. PostgreSQL and PHP are database and interface tools respectively. Scratch is new icon-based programming language for storytelling, games and animation developed by the Lifelong Kindergarten Group at the MIT Media Lab.

Outcomes targeted toward middle school students

- Evidence that middle school students in our cohort will be able to create computing technology that supports interactive journalism including databases, procedural animations, and dynamic information in a variety of media.
- Increase in real computing skills.
- Increased interest in enrollment in college programs and courses in computing related fields, both at our institution and elsewhere.

Outcomes targeted toward middle school teachers

- Evidence that middle school teachers are able to support basic computing and journalism activities in a school-based enrichment program.
- An increase in awareness of computing careers in publishing and social media, articulated with appropriate short term goals for course selection at the high school level both among the teachers in our cohort and their peers at the school.
- Evidence of advocacy for improved integration of computing technology into language arts using inquiry based-methods that supports students as innovators.

Outcomes targeted toward college undergraduates

- Evidence that college undergraduates in our cohort can articulate in a sophisticated manner the relationship between journalism and the computing disciplines.
- A change in attitude about expectations of who can be successful in both writing and computing careers.
- An increase in real computing, writing and communication skills.

Outcomes targeted toward forging alliances

The purpose of this demonstration project is to create the seed for an alliance of like-minded academic and industrial institutions and organizations to further develop knowledge about, and programs and materials for multidisciplinary approaches to broadening participation in computer science. Our supplemental materials include letters of support for this enterprise from: (1)Mitchel Resnick, Papert Professor of Learning Research at MIT Media Laboratory; (2) Sharon J. Sherman, K-16 Professor of Education,TCNJ, and founder of the Center for Mathematics, Science, Technology, and Pre-Engineering; (3) Charles R. Hardnett, Computer Science Department, Spelman College, Atlanta, GA; (4) Raymond J. Hennessey, Editor, SmartMoney.com; (5) Virginia Teller, Professor and Chair, Hunter College-CUNY.

Implementation Plan

Need

Computer science foundations concepts, as distinguished from technology use concepts and skills, appear absent from state mandated K-12 curricula [9]. There is an educational need to explicitly include the computing sciences in the curriculum. Secondary school students are not exposed to the computing sciences in a way that ignites their interest in pursuing further education in these fields. Enrollment in computing sciences courses and majors at the undergraduate level is critically low [8]. Yet the needs of the global economy dictate that America develop a workforce that focuses on the "creation" not merely the "consumption" of computing technology [25]. This requires a workforce that not only includes highly skilled

programmers, but managers, analysts and designers, who have a firm grounding in essential concepts of computer program design. Jeannette Wing described this as *computational thinking* [57].

Until recently, the computing disciplines were isolated. A technologically elite group created the tools and toys upon which we have become so dependent. However, a significant change is occurring. Skilled professionals in many fields are increasingly being called upon to make informed decisions that are based on core computing concepts. Computational models and paradigms including database management, 3-D modeling, information analysis, and data abstraction are becoming essential skills for professionals in fields as diverse as finance, medicine and dentistry, art, music, and basic scientific research.

The computing sciences are no longer simply for an elite core of future programmers immersed in the technology culture. Igniting excitement requires consideration for gender equity/diversity infusion for all students. It requires meeting the educational needs of students from historically underrepresented groups, including girls, minorities, and the economically disadvantaged. It requires nurturing environments that not only support inclusiveness and diversity, but also enhance and embrace it.

There is evidence [13, 21, 23] that the level of students' motivation affects their levels of engagement with a task, their enjoyment of activities, how and what they learn, and ultimately, their performance. Students, and girls in particular, are more motivated by activities they perceive to be useful, and socially relevant. Further, all students, but minority students in particular benefit from a culture in the classroom that is fun, collaborative, informal and active [54].

There is a conflict between the need to excite a diverse population about computing and the reality of public education. Enrollment in both secondary school and undergraduate computing courses is at an all-time low because of misconceptions of what the computing sciences are, what computer scientists do, and how they do it. Foundational computing concepts include, but are not equivalent to programming fundamentals. However, the misconception among high school students is that computer science is "just programming", and that "programming is hard[3]".

Changing these perceptions is problematic when standards for computer science (which are not the same as the technology literacy standards) are missing from the state mandates. There are long-range movements within NSF and the Association for Computing Machinery to address this through the establishment of standards [20]. However, at the practical level there simply is no more room in the K-12 curriculum to add another focus without taking something from other culturally critical disciplines such as science, fine art, creative writing, or music.

The current disconnect between the rich computer-based culture of secondary school students outside the classroom and the lack of well-integrated computing science curriculum in the secondary schools will only serve to further exacerbate the technology divide, especially for underrepresented student populations. Students choose careers based on local influences, especially their parents, yet most guidance counselors cannot advise a student on a career in the video game industry, in the rapidly expanding web-based journalism field, or in emerging areas such as social computing [23, 13]. We posit that it is insufficient to create secondary curriculum that isolates the computing sciences from the vast array of fields that increasingly depend upon it.

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[3] Over the past year we have informally polled high school students, entering college freshman and high school teachers on "What is computer science" and "What do computer scientists do." These two quotes are the single two most frequent responses.

In this demonstration project we address the question of how to ignite excitement in young people toward the creative computing disciplines to become practitioners in these fields and to appreciate how their anticipated profession requires formal grounding in the computing sciences. We posit that to appreciate the computing sciences students must get experience beyond that of *using* information technology. They must get experience in *being innovators* of information technology. Furthermore, their experience must be *immersive*, extending over a significant period of time, engaging them in information technology in school that is as relevant to them as the technology they use outside of school.

Activities

Four initiatives constitute the activities of this project:

1. An "Interactive Journalism Institute" (IJI) in which a cohort of 18 rising 8th graders will create an online magazine. This one-week session will occur in late June/early July. Directed by our PIs and gender equity specialist, writer/programmer mentors will include middle school teachers/guidance counselors and TCNJ undergraduates.
2. An after school club for this cohort that will continue the production of the online magazine through the school year, as well as provide industry speakers and fields trips for the students, their parents and teachers. The writer/programmer mentors will manage this program.
3. Development of a middle school appropriate online content management system by TCNJ undergraduates. These researchers and volunteers from two campus student organizations will act as writer/programmers. (See letters of support from DelDuca & Shaw.)
4. Writer/Programmer mentor training workshops: A one-week summer session (prior to the IJI) for identified middle school teachers and guidance counselors and undergraduate researchers. A semester "kick-off" workshop each semester for undergraduate volunteers.

The Fisher Middle School in Ewing NJ has been a collaborator on a number of initiatives at TCNJ. A letter of commitment from the school district superintendent (see Broach) is included in the supplemental materials. Those materials also contain evidence of the diversity within Fisher that will provide us with a cohort and control group that meets our demographic needs.

Timeline

Our anticipated timeframe is Spring 2008 – Fall 2009 and includes (1) recruitment activities for the middle school student cohort, their teachers/guidance counselors, (2) undergraduate research and volunteer recruitment, (3) mentor training, (4) student institute/club planning and implementation, (5) assessment instrument development, application and analysis. Evaluation protocols and timeline are elaborated in a later session.

<u>Spring 2008:</u>

- Recruit 18 rising 8th graders, based on the "underrepresented" profile from the computing pipeline literature [18, 17]. We are particularly targeting, but not limiting ourselves to children who are not academically talented in math and science. We will identify children with similar characteristics for our control group. Both groups would be asked to complete a set of surveys and participate in interviews.

- Recruit a guidance counselor, language arts teacher and technology teacher as well as two additional teachers (e.g. social studies, math, science) These teachers will receive stipends

for their participation in the IJI and for mentoring the after school club. Identify a group of teachers with similar profiles as a control group who will be asked to fill out a pre and post survey and submit to at most two interviews over the course of the year.

- Recruit six undergraduate researcher students to develop our middle school appropriate content management system and act as mentors. Recruit student volunteers for Fall '08.

Summer 2008:

- A one week programmer/writer mentorship workshop for Writer/Programmer Mentors.

- Followed by the one week Interactive Journalism Institute. Eighteen students will work with four TCNJ faculty/staff, three – five middle school staff and six undergraduates for a 3/1 student/expert ration and almost 2/1 student/mentor ratio.

Both of these weeks will follow this general outline:

Day 1: Overview of journalism, database workshop, Scratch workshop, organizing the magazine staff.
Day 2: Research stories, design a database, sample editorial art (Scratch). Master chart. Set up of the organizational structure, assign jobs. Production schedule create deadlines.
Day 3: Organizing that research. Choose a medium to tell your story, database query, visualizing data. Writing day.
Day 4: Copy editing & production.
Day 5: Final production showcase and reflection time.

Academic Year 2008-09:

- TCNJ faculty and undergraduate volunteers actively support an after school program led by the middle school teachers. Guests from industry will be arranged, as will field trips. Extensive qualitative data collection will occur as well as surveys of this group (teachers and students) as well as our control groups. Parents will be invited to selected events with their children as well as to parent only events.

- Formal recruitment from industry will occur to sustain the program beyond this pilot year.

- Development of alliance connections for broadening participation will be pursued.

Summer 2009: TCNJ faculty/staff and middle school teachers will meet to review outcomes. Formal qualitative analysis will take place.

Fall 2009: TCNJ faculty/staff complete qualitative analysis and continue to develop alliances.

Creative and Strategic Actions

At TCNJ the Computer Science Department in partnership with the Program in Interactive Multimedia has used the perspective of *students as innovators* to develop college-level curriculum to address specific content needs in computer science [58, 61, 59]. Also at TCNJ, the Center for Mathematics, Science, Technology and Pre-Engineering, promotes inquiry and

design-based learning and acts as a demonstration and professional development center. This project is collaboration between our two groups.

Our primary theme will be to exploit *interactive storytelling* [33] as a vehicle for creating innovation in information technology. Computer games are a subcomponent of this growing information technology field. An interactive story is one that is told through visual graphics, sound, and logic decision-making structures. The implementation of an interactive story requires techniques from database management, graphics, sound production, artificial intelligence, and human-computer interface design. An interactive story may or may not contain an adversarial component. When it does, it is considered a game. When it is primarily a vehicle for reporting information it is *interactive journalism*, a rapidly expanding profession. Interactive stories typically contain video, sound and animation. When that animation is based on scientific and mathematical models of the natural world, the story or game becomes an *immersive world,* a *serious game*, or a *simulation.* We propose to expose students to these genres through primary engagement in interactive journalism. They will also be shown how this field relates to other compelling genres within the interactive storytelling family. This is not simply about letting students tell stories, but rather about teaching them language arts skills of the 21st century.

As of this writing we expect to use Alice [16], Scratch [31, 30] and PostgreSQL [44] /PHP [41] because they are available free on the Internet and are extremely easy to download and install. Furthermore, they provide manipulative vehicles through which students can immediately create novel solutions to information problems. Our intent is to give them solid grounding in principles of design and software engineering, and not just teach them basic programming skills.

To create meaningful experiences for middle school students and their teachers we must take the long broad view. Consequently, our approach is to provide intensive initial training followed by a full year of active participatory support and collaboration. We are firm believers in the power of face-to-face communication to establish and sustain community. However, we are also cognizant of the increasing influence of web-based social communities such as YouTube [64], Second Life [50], and collaborative problem solving environments such as the much maligned "World of Warcraft" [62]. These information technologies are second-nature to middle school and high school students. It is insufficient for college and secondary school faculty to promote computing career paths without direct input from young people. The ubiquitous culture of computing that encompasses video games and online social communities belongs to them. Without young people fully engaged, we cannot develop a thoroughly integrated multidisciplinary curriculum for secondary school. Consequently we are fully committed to engaging undergraduate researchers and volunteers into all facets of our project. We can learn from them and they can learn from the middle school students. We are confident that by nurturing a diverse community in the broadest sense we can create solid role models for our youngest constituents while broadening the perspectives of all of our members.

As part of this demonstration project, we intend to expand an existing content management system designed and built at TCNJ for the online magazine *Unbound* [56]. We anticipate adapting this into a social community called Mid CAFÉ (Middle School Collaboration and Facilitation Environment) that provides a highly interactive medium that goes well beyond the concept of website as resource. The CAFÉ will be implemented by undergraduate researchers at TCNJ based on extensive and successful experience we have had with both summer and school year undergraduate research [27]. The middle school cohort will not only learn how to use this system, but throughout the year will learn about the underlying design and software engineering principles that went into it as well as the specific database and programming techniques that

support the implementation. We should stress that the middle school students will not build the Mid CAFÉ, but that they will provide extensive comment as expert users.

Underlying Principles and Research that Inform this Project

We bring together a journalist, a database specialist, a computer science educator and a gender/equity coach. These perspectives inform the project.

Equity

The touchstone of our approach is that to achieve equity in science, technology, engineering and mathematics (STEM) requires changing preconceptions and biases about these fields by changing the culture of the classroom. This is not simply a public relations problem. Our approach is informed by substantive engagement in formal gender and diversity training. The MSTE [19] incorporates equity into its activities, most notably through the True Colors program. This formal program engages participants in identifying their learning and problem solving styles via four "color types." Participants learn that they have a combination of attributes as risk takers, organizers, and creative thinkers. Through collaborative exercises they learn how to solve problems with others who do not necessarily think the way they do.

Underrepresented groups must feel at home in the STEM culture whether it is the classroom, the research lab or the industrial setting. This is particularly true for information technology and computer science [48]. Jo Sanders, in *Lessons I've Learned in 22 Years of Working with Teachers About Girls in IT* [49], states that educators sincerely believe they consciously mean no harm by lack of enrollments in IT fields by females and minorities, but that "they have no idea that differences in treatment of students are usually below the level of conscious awareness, and they certainly have no idea of the cumulative power of these small differences". In 2000, the American Association of University Women Educational Foundation (AAUW-EF) report *¡Si, Se Puede! Yes, We Can: Latinas in School* [4] found that U.S. schools do not meet the educational needs of America's fastest-growing female minority population—Latinas. According to another AAUW-EF report, *Tech-Savvy: Educating Girls in the New Computer Age* [3], "as violent electronic games and dull programming classes turn off more and more girls to the computer culture, schools need to change the way information technology is used, applied, and taught in the nation's classrooms". The report recommends that adults who directly influence young peoples' lives need to reinforce aspirations to be "designers and producers of software and games, rather than as consumers or end users of games". Themes consistent with other research mandate a consideration for social consciousness.

Our approach resonates precisely with these recommendations. An outreach activity conducted in April 2007 with Fisher Middle School (our proposed student population) corroborated these findings. A summary report appears in the supplemental materials. The students who participated (slightly more girls than boys with a diverse ethnic background) were highly enthusiastic about (rating "excellent") those activities that engaged them as innovators. They were less enthusiastic (mixing "excellent" evenly with "good" rating) about activities that kinesthetically taught them computer processes. The want to "do" computer science, not simply learn concepts about it.

Computer Science Education and Undergraduate Research Mentorship

Curriculum development in computer science is problematic because the field is so new and there are significant controversies as to what should be taught, and when. We take a radical, but

practical approach: tie foundational computing concepts, as articulated in the ACM/IEEE Computing Curriculum document [25, 19] to domains of interest to secondary school students. As demonstrated in current computer science research, game and interactive story design provide examples for a multitude of core concepts such as graphics, sound production, database management, human computer interactivity, networks, and knowledge structure [45]. It is not sufficient for either educators or computer scientists to attempt to proscribe solutions to this problem. Rather, we view multidisciplinary collaboration between computer science faculty, journalism faculty, and equity/diversity experts as key toward successful outcomes. We hold firm to the principle of partnership between secondary teachers, college faculty, and undergraduate researchers. Our proposal is grounded by successful outcomes from previous funded projects at TCNJ, as well as successful models of undergraduate participation in research. A grant from Microsoft Research to create a multidisciplinary upper-level undergraduate video game design course informs our approach to selecting and implementing content for this project. There has been national recognition for this approach [58, 61, 59, 11, 12].

We have extensive experience in mentoring undergraduate research. For example, an internally funded Summer Undergraduate Research Program (SURP) [27], allowed us to bring together an interactive journalist, a database systems designer and an interface designer to construct an environment to support the collaborative construction of an online magazine, Unbound [56, 52]. Through formal courses in "Mentored Research in Computer Science" and "Projects in Interactive Multimedia" students developed online resources to support collaborative environments [60] and multiple storyline feature writing. These projects inform our vision of the "CAFÉ."

The demonstration project will be managed through the Center for Mathematics, Science, Technology and Pre-Engineering at TCNJ (MSTE) [19], whose work is most recently funded through grants from US Department of Education and the NJ Department of Education. The center is devoted to developing successful models of inquiry-based learning. By partnering with faculty engaged in cutting-edge computing we meld state-of-the-art content with state-of-the-art teacher preparation. Through previous grants we have addressed the "teacher gap" between high-poverty and wealthier schools by addressing the resource needs of teachers including professional development, especially in the curriculum content areas. The "Urban Teacher Academy" is a summer program for high school students to engage them to become teachers in inner city schools. Our day-to-day program, our curricular structure, as well as our recruitment model, and project management approach are modeled on this highly successful program.

Critical to this approach is strong, continued collaboration during the school year. TCNJ faculty and their students will use well-established formal mechanisms at the college including "Faculty Mentored Research," and "Community-based Learning" to create strong ties with participating schools. We have ten years of experience in computing sciences undergraduate research (especially in collaborative web-based systems) including over two-dozen refereed student publications. We view the relationship with schools as a genuine collaboration where faculty and undergraduates gain practical experience in issues including the technology divide, interface design, and collaborative systems. We anticipate that enthusiastic participation of teachers and middle school students will foster natural career development opportunities as TCNJ students and faculty promote positive images of "what computing scientists do".

Interactive Journalism, Databases and Computing

A key concern for us is selection of interactive storytelling environments that are easily accessible to middle school students and teachers. Scratch is such an environment. Alice is another, which has gained tremendous popularity as a gateway at the college level. As of this writing we intend to consider Alice, but we have some reservations. Effective, structured story telling in Alice has a steep learning curve, both in terms of using Alice itself and in gaining mastery of the 3-D animation. Given that our week-long institute is tightly packed, we anticipate using Alice during the school year rather than in the initial exposure in the summer.

Scratch, on the other hand is relatively new with little information from the computer science community regarding its effectiveness as a first programming language. However, our own experience suggests that essential concepts are transparent to the new user and the overhead of getting started is very low. This interactive storytelling environment is an example of the kind of environment in which students can sketch out the story they wish to tell, and illustrate the intended special effects via animation. Scratch employs standard two dimensional computer drawing techniques that most high school students have mastered. For example, they are part of the NJ State Standards for both Fine Art and Technology. Constructing an animated story requires manipulating a small set of icons that represent programming constructs or "building blocks." Story construction occurs by assembling these building blocks into scripts. Characters interact by broadcasting information and responding to broadcasts, much as actors act and react on a stage. Combining storytelling elements with sufficiently sophisticated mathematics provides the potential for true simulation. Furthermore, Scratch supports an online social computing network where students can post their own work and study the work of others.

Both Alice and Scratch are intended as introductory environments in which secondary school students can develop skills that can be applied in real-world environments (such as Photoshop, Java, or C++ based environments). A concern of ours was how quickly middle school students can come up to speed on these languages since programming is not the central focus of our summer institute or after school program. As a proof of concept, Co-PI Ursula Wolz recently conducted a two morning interactive story telling workshop with first graders at the Stony Brook School in Pennington NJ. The students were immersed in a "writing to read" program, and were able after four hours to successfully manipulate the Scratch environment to contribute to a full-class collaborative branching story that tied back into their writing/reading curriculum. The lesson plan and a letter of acknowledgement from the teacher, Ms. Kristy Hazlett, appear in the supplemental materials. This recent experience suggests that if 1st graders can successfully and independently manipulate programming constructs in 4 hours to create a story, then older students should be able to use Scratch successfully for journalistic purposes.

We also posit the need to provide exposure to database access and information presentation tools. The importance of database systems has increased dramatically in the last two decades. In a world now dominated by Google, it is imperative that students understand how information propagation is influenced by databases. Almost every facet of our lives is touched by data that we must analyze in some form or another to be able to make informed decisions. As complexity of this data increases it is no longer sufficient to store the data in flat file structures (like spreadsheets). Many secondary school courses include some exposure to spreadsheets. We view this as a severe impediment to students' understanding of information access because it encourages a flat, two dimensional, rather than relational approach to information storage. It is also imperative to be able to retrieve data in interesting ways to answer simple and complex questions, and in a form that is conducive to reasonable analysis. Today, databases are crucial to the efficient management of data whether in commercial organizations, educational institutions,

or non-profit enterprises. They play a central role in almost every aspect of life today, helping people to be more effective and productive in the pursuit of their daily tasks. Report writing, regardless of the discipline will become increasingly dependent upon the results of database access.

Billions of dollars are spent on software application development yet there are serious problems in the cost, timeliness, and quality of many software products. Software engineering aims to integrate the principles of computer science and other disciplines to develop systematic models and reliable techniques for producing high-quality software. In just over a decade, the Internet and the World Wide Web have fundamentally changed the way information is delivered, interpreted and acted upon. Interactive multimedia have, in fact, become so central to so many economic, cultural and political institutions that issues affecting content design and delivery have become vital issues within those entities. Leaders in the news and entertainment industries, for example, see networked interactive multimedia as integral to their business plans. Similarly, artists and storytellers are finding new ways to mine emerging media technologies to create new esthetic experiences.

We will engage students in real creative writing and journalism assignments that incorporate interactive multimedia. At this writing we propose to use PostgreSQL [44] /PHP [41] to introduce eighth graders to the fundamental concepts necessary for designing, implementing, and using a simple database for their journalistic pursuits. We will also introduce preliminary software engineering concepts so that students can learn to design innovative technology-based solutions to problems that are bound to arise. In support of this effort we will adapt the content management system that was designed by our computer science undergraduates for 'Unbound' [56], an online magazine created, and managed by the magazine writing students at TCNJ.

The summer workshop curriculum will employ activities that are fun, collaborative, and kinesthetic. Frequently students may be quite unaware that they are acquiring important life lessons and computer science fundamentals as they complete their journalism assignments. Some of the core concepts the students will learn are:

- *Computer Science Foundations*: use and support for abstraction; concept of a system; human factors; implementation.
- *Database Systems:* database modeling concepts; entity-relationship diagrams; fundamentals of the relational data model; queries in SQL.
- *Software Modeling and Analysis*: modeling principles; behavioral modeling; documentation.
- *Software Design*: fundamental design issues and trade-offs.
- *Group Dynamics and Communication Skills*: dynamics of working in teams/groups; dealing with uncertainty or ambiguity; team and group communication.

Journalists often use databases as a tool for researching, organizing and presenting news. By accessing and creating their own databases, students will be learning about this aspect of journalistic practice, as well as fundamental computing concepts. Creating and linking datasets will help them understand the power of database technology. The process of creating a database will help them think about ways to organize and present information that are useful both to themselves as journalists and to their audiences.

In 1981, Co-PI and journalism professor Kim Pearson served as assistant director of the first Urban Journalism Workshop at New York University, under the direction of former NBC news producer, Elliot Frankel. The Urban Journalism Workshop, founded by the Dow Jones

Newspaper Fund in 1978 as part of the commitment made by the American Society of Newspaper Editors in 1975 to diversify the nation's newsrooms, is run on campuses in New York and New Jersey for two weeks each summer. The camp exposes a select number of high school students (typically 15-20) to professional journalists, newsroom tours, and real news events, such as press conferences. Our summer institute is based on this model.

In 1993, Pearson drew upon these and other experiences in constructivist pedagogy to create and run a magazine workshop with a third-grade class at Wicoff Elementary School in Plainsboro, New Jersey. In a brief period at the end of the school year, she and a class of 36 students and three teachers created a magazine from the ground up. In a few mini-lectures, Pearson taught the children the structure of a magazine, and how to write resumes and application letters. Students then applied for positions ranging from Editor-in-chief to advertising manager. A personnel committee of student volunteers reviewed the applications and placed people in jobs. She worked with the editors to help them plan the work to be done by each group, and helped the teams with their individual work plans. Ultimately, the students created a 36-page magazine with interviews, columns, a survey presented as an infographic, ads and editorials. Based on information Pearson provided about average salaries in the magazine industry, the bookkeeping team created a budget for the project that was incorporated in a report published by the personnel committee.

In 2001, Pearson ran a journalism workshop for high school students participating in TCNJ's Collegebound program. In four one-hour sessions, students from underserved school districts throughout New Jersey learned enough journalism basics to produce solid articles on topics ranging from teacher burnout to the Human Genome project.

Key Staff

Ursula Wolz, TCNJ Associate Professor of Computer Science and Interactive Multimedia, the Principal Investigator for the Microsoft Research project on Multidisciplinary Game Development is a recognized computer science educator with a broad range of publications who has taught students including disabled children, urban teachers, and elite undergraduates.

Monisha Pulimood, TCNJ Assistant Professor of Computer Science is a database and grid computing expert and a collaborator on the "Unbound Collaborative Content Manager" project. She is establishing herself in the computer science education community through publications on undergraduate research, project management, and diversity.

Kim Pearson, TCNJ Associate Professor of English and Interactive Multimedia is a recognized web-journalist, and collaborator on both the "Unbound Collaborative Content Manager" project, and Microsoft Games project. She has experience mentoring journalism students, professional and educators from diverse backgrounds through her activities as member of the National Association of Black Journalists, where she serves on the Digital Journalism Task Force.

Mary Switzer, is a Gender Equity/Diversity Specialist working with educators and students K-16 in urban and suburban high needs districts over the past 18 years. As our project manager she will ensure full integration of equity/diversity training into our program.

Meredith Stone, Ed.D., is a Learning and Evaluation consultant with more than twenty years experience in educational research and evaluation, who, over the past five years has served as an

independent evaluator for projects funded by both federal and state agencies as well as private institutions, including the USDOE, NJDOE, Princeton University and The World Bank.

Evaluation Plan

The evaluation plan provides a framework from which program staff, with the assistance of the external evaluator, will collect, analyze, and interpret evaluation data to monitor and revise immediate objectives and long-term goals. The design will take into account the relatively small number of participants and hierarchical structure of populations in education (students nested in classes). In addition to quantitative and summative analyses, the project will utilize goal-oriented iterative participatory qualitative assessment and feedback processes for formative and process analyses [46]. The project team includes an experienced external qualitative evaluator, who will work closely with the PIs and the project manager-equity/diversity specialist to develop appropriate instruments for each of the four activities and the participants involved. Given the small cohort size of this pilot, qualitative analysis will be used to document changes in attitudes and expectations, while quantitative analysis will be used to document changes in real computing, writing and communication skills.

Formative and summative evaluation will be developed for each of the activities listed in the design: As soon as the grant is awarded, the faculty will meet to determine what the specific curriculum objectives will be for each of the week-long summer institutes. Baseline data on both the student cohort and their teachers will need to be collected in the spring as soon as they are recruited (before they learn much about the program content). Instruments will include pre- and post- open-ended questionnaires to determine perceptions and attitudes concerning computer science curriculum and careers in computer science. Questions will also address equity and diversity and how these are dealt with in their classrooms. A focus group on both topics will be organized for the treatment and control teacher groups separately. Observations will be made during the Interactive Journalism Institute to document what is being taught, how participants react to training, and if their behavior changes in noticeable ways. The two week-long institutes, one for teachers and TCNJ student researchers (Writer/Programmer Mentor Institute) and the second for the students (Interactive Journalism Institute) will be followed by a post-questionnaire on the participants' perceptions and attitudes. The answers to the questionnaires will be qualitatively analyzed to develop a rubric around these attitudes and perceptions. Quantitative measures of knowledge with respect to equity/diversity and computer science will also be administered at the beginning and end of the two institutes. Depending on the findings the objectives for the enrichment sessions and the CAFÉ sessions may be revised.

During the 2008-2009 school year, observations will be made in the participants' enrichment sessions and classrooms. We would expect that the equity/diversity training can be implemented immediately (fall 2008 and spring 2009), although embedding computer training into a standard subject curriculum will take more time. Middle school students' participation in the after school club and TCNJ students' Mid CAFÉ activity will be tracked and documented. An additional component of the data collection will be "exit interviews" with any student, teacher or undergraduate dropping out of (leaving) the program. These observations will form the basis of a qualitative/process analysis that will inform the content extending this pilot into a more extensive program within an envisioned alliance.

Dissemination and Sustainability

Our primary venue for dissemination is the CAFÉ system we will build. We anticipate three other forms of dissemination (1) through traditional scholarly venues, (2) through school network organizations both local and national, (3) through extending our reach by creating computing ambassadors among our teacher cohorts and their students.

Traditional forms of dissemination will occur by publishing results in both educational and computing venues including *Educational Researcher*, *Journal of Research in Science Teaching*, *Journal for Research in Mathematics Education,* and *School Science and Mathematics*. We anticipate presenting at conferences such as the National Educational Computing Conference (NECC), the ACM Symposium on Computer Science Education, Frontier in Education and American Educational Research Association.

As mentioned previously, TCNJ has a well-established network of professional development in the New York, Philadelphia region. We intend to exploit that to the fullest to promote our program. Furthermore, the MSTE staff member Henry Harms is the New Jersey state corporate advisor to the Technology Student Association which serves 150,000 student in 2,000 schools in 48 states. (See Sherman letter).

The primary ancillary material to be developed is a Mid CAFÉ web site. This extends an e-Mentoring system developed by Dr. Sharon J. Sherman and the MSTE center [19]. (See Sherman letter.) The CAFÉ will provide interactive vehicles through which TCNJ faculty and staff, cohort teachers and their students can post their materials and provide commentary, and engage in live chat sessions. Our website design is modeled on two existing systems built by the TCNJ participating computing faculty and their students. The *CEDAR* project is a collaborative tool for curriculum development. *Unbound*, which began as research into online magazine formats is a vibrant student-run web publication. These highly interactive collaborative existing systems will be synthesized into a venue appropriate for the multifaceted collaboration expected in this project. The web team led by Dr. Pulimood will create a design that can be adapted by other groups, but still meets our specialized needs to support student work in variety of multimedia venues.

The materials posted on the CAFÉ will include print-based materials, hyperlink (HTM) documents and multimedia animations, games and video. They will be developed by (1) the middle school students in our cohort, (2) TCNJ faculty, staff and students, (2) teachers in our cohort. They will be made available to the general public after being vetted by a review board comprised of TCNJ faculty and cohort teachers.

We anticipate that having established this program at TCNJ we will be able to sustain at least the summer institute through corporate sponsorship as well as via the TCNJ MSTE. We anticipate that TCNJ computer science students will be able to maintain the CAFÉ with minimal funding beyond the scope of this grant. It is highly likely that as technology evolves, future versions of the CAFÉ will be implemented through other funding sources.

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[59]. Wolz, U., C. Ault and T. M. Nakra, "Teaching Game Design through Cross-Disciplinary Content and Individualized Student Deliverables", 2nd Annual Microsoft Academic Days Conference on Game Development , February 22 - 25, 2007 (extended version invited to submit to The Journal of Game Development).

[60]. Wolz, U., M. Massimi and E. Tarn, r-MUSIC: A Collaborative Music DJ for Ad Hoc Networks, 4th International Conference on Web Delivering of Music, September13-15, 2005, Barcelona, Spain

[61]. Wolz, U. and Pulimood, S.M. An Integrated Approach to Project Management through Classic CS III and Video Game Development, in Proceedings of the 38th Technical Symposium on Computer Science Education (ACM SIGCSE), Covington, Kentucky, March 7 – 10, 2007.

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Ursula C. Wolz

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Professional Preparation

Institution	Major	Degree	Year Completed
Massachussets Institute of Technology	Linguistics, Psychology and Philosophy	B.S.	1978
Teachers College, Columbia University	Computing in Education	M.A.	1982
Columbia University	Computer Science	M.S.	1985
Columbia University	Computer Science	Ph.D.	1991

Appointments

Title	Employer	Time Period
Chair, Department of Computer Science	The College of New Jersey	May 1994 – August 1996, January 1999 – August 2002, September 2006 – June 2007.
Associate Professor of Computer Science and Interactive Multimedia	The College of New Jersey	1990 - present
Visiting Faculty	Department of Computing Sciences, Villanova University	1996 - 1997
Summer Intern/Consultant	Schlumberger Laboratory for Computer Science, Austin, Texas	Summer 1988 - 1994
Research Fellow	Department of Computer Science, Columbia University	1983 – 1990
Instructor and Teaching Assistant	Department of Computer Science, Columbia University	1983 – 1987
Instructor	Department of Communication, Computing and Technology in Education, Teachers College, Columbia University	1979 - 1985

Publications

Closely Related to Proposed Project, Selected

- Wolz, U. and S. M. Pulimood, "An Integrated Approach to Project Management through Classic CS III and Video Game Development", SIGCSE 07, March 2006, Covington KY
- Wolz, U., C. Ault and T. M. Nakra, "Teaching Game Design through Cross-Disciplinary Content and Individualized Student Deliverables", 2nd Annual Microsoft Academic Days Conference on Game Development , February 22 - 25, 2007 (extended version invited to

submit to *The Journal of Game Development*)

- Ault, C., T. Nakra, K. Pearson, P. Sanders, and U. Wolz, "Collaborative Learning via 3-D Game Development", (Panel), SIGGRAPH 06,. August 2006, Boston MA
- Ault, C., T. Nakra, K. Pearson, P. Sanders, and U. Wolz, "Video Game Design as a Vehicle for Multidisciplinary Collaboration"", The 2006 NMC Summer Conference June 7-10 Cleveland, Ohio
- Wolz, U, T. Barnes, I. Parberry, M. Wick, "Digital Gaming as a Vehicle for Learning", (Panel) SIGCSE 06, March 2006, Houston, TX.

Other Publications, Selected

- Cassel, L.N., U. Wolz, S. Banerjee, "Client Side Personalization of Web Search, " 30th Annual Conference of the German Classification Society, March 8-10, 2006, Berlin, Germany. (Supported from a grant by the National Science Foundation)
- Cassel, L. N., S. Banerjee, A. Narayana, U. Wolz "The Web host Access Tools (WHAT): Exploring Context Sensitive Information Access", 2nd International Conference on E-Business and Telecommunication Networks, October 5-7, 2005, Reading U.K.
- Wolz, U., M. Massimi and E. Tarn, r-MUSIC, "A Collaborative Music DJ for Ad Hoc Networks", 4th International Conference on Web Delivering of Music, September13-15, 2005, Barcelona, Spain,
- Wolz, U., M. Massimi, E. Tarn, P. Babinski, S. Weinman "Two Examples of Credibility in Collaborative Decision-Making: Constructing a Media Event, Annotating A Formally Approved Document", NMC (New Media Consortium) Online Conference on Social Computing, November 16-19, 2004, via the Internet
- Wolz, U., S. Weinman, S. and S. Cochrane,. "An Information Retrieval System for Curriculum Mapping", National Educational Computing Conference, June 20-24, 2004, New Orleans, LA.

Synergistic Activities

- Full day workshop leader on "Math, Art, Computing: Blending Middle School Curriculum through Storytelling", National Educational Computing Conference, 2007.
- Principal Investigator, "Advanced Interdisciplinary Game Design and Architecture Courses", 2005-present unrestricted gift from Microsoft Research to develop model curriculum for teaching game design to undergraduate students in a cross-disciplinary setting.
- Invited member of the Computer Science Advanced Placement (CS AP) Ad Hoc committee charged with determining how the exam should be made current, ETS 1991 – 2001.
- Co-author and steering committee member, ACM Computing Curricula 2001 (CC2001)
- Koffman, E.B. and Wolz, U., "Problem Solving with Java." Addison-Wesley, Readng, MA. First edition, 1999, second edition 2002.

Collaborators and Other Affiliations

Collaborators and Co-Editors

Coauthors listed above.

Graduate and Postdoctoral Advisors

Gail E. Kaiser, Columbia University
Kathleen R. McKeown, Columbia University

Kim Pearson

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Professional Preparation

Institution	Major	Degree	Year Completed
Princeton University	Politics	AB	1978
New York University	Journalism	MA	1992

Appointments

Title	Employer	Time Period
Associate Professor	The College of New Jersey	2005 – present
Assistant Professor	The College of New Jersey	1990 - 2005

Publications

Closely Related to Proposed Project, Selected

- (Forthcoming)"Start Earlier. Expand the Mission. Integrate Technology." *Nieman Reports.* Spring, 2007

Other Publications, Selected

- "Small Murders: Rethinking the Coverage of Hate Crimes Against GLBT People," *News and Sexuality: Media Portraits of Diversity.* Editors: Laura Casteñada and Shannon Campbell. NY: Sage Publishers, 2005. pp. 159-88

Synergistic Activities

- Fashioned by Love: The Life of Nancybelle Valentine: an interactive multimedia documentary utilizing an innovative design strategy for producing multilinear stories. (current research)
- "Weblogs, Podcasts and Virtual Worlds," WSTU Professional Development Day, Millersville State University, Jan. 11, 2007
- Ault, C., Nakra, T., Pearson, K., Sanders, P., Wolz, U., "Collaborative Learning via 3-D Game Development" SIGGRAPH Educators Panel, Aug. 2, 2006,
- Ault, C. Pearson, K., Sanders, P. Wolz, U., "Videogame Design as a Vehicle for Multidisciplinary Collaboration," New Media Consortium 2006 Summer Conference, June 7, 2006.
- "Blogging While Black In Africana Studies." Best Practices in Digital Pedagogy Panel. Association for the Study of African American Life and History annual convention. October 7, 2005

Collaborators and Other Affiliations

Collaborators and Co-Editors

- Collins, Ross. Associate Professor, Department of Communications, North Dakota State University Co-editor, *Jhistory* listserve (http://hnet.msu.edu/~jhistory)
- Dickinson, Gloria. Associate Professor, Department of African American Studies. The College of New Jersey (collaborator on "*Souls of Black Folk"* CD-ROM, January, 2003 and *Before Brown Beyond Boundaries* CD-ROM, 2004. Both CDs published by the Association for the Study of African American Life and History.
- Harrington-Leuker, Donna. Associate Professor, English Department, Salve Regina University, Co-editor, *Jhistory* listserve (http://hnet.msu.edu/~jhistory)
- Mindich, David. Professor, Journalism Department, St. Michaels College, Co-editor, *Jhistory* listserve (http://hnet.msu.edu/~jhistory)
- Rushing, Kittrell. Professor, Communications Department. University of Tennessee at Chattanooga, Co-editor, *Jhistory* listserve (http://hnet.msu.edu/~jhistory)
- Sims-Wood, Janet. Manuscript Librarian, Howard University (retired). Editor, *Before Brown, Beyond Boundaries.* CD-ROM
- Tucher, Andie,. Professor, Columbia University Graduate School of Journalism. Co-editor, *Jhistory* listserve (http://hnet.msu.edu/~jhistory)
- Weis, Tracey. Professor, Departments of History and Women's Studies, Millersville State University. Co-contributor, *Before Brown, Beyond Boundaries* CD-ROM for ASALH.
- Wolz, Ursula. Associate Professor, Department of Computer Science, The College of New Jersey (collaborator on Nancybelle Valentine project)

Graduate and Postdoctoral Advisors

Quigley, Mary. Professor, Journalism. Graduate School of Arts and Sciences, New York University.

Sarah Monisha Pulimood

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Professional Preparation

Degree	Institution	Major	Year
Bachelor of Computer Science	University of Pune, Pune, India	Computer Science	1990
Master of Science	Tulane University, New Orleans, LA	Computer Science	2001
Ph.D.	Tulane University, New Orleans, LA	Computer Science	2003

Appointments

Title	Employer	Time Period
Assistant Professor	Department of Computer Science The College of New Jersey, Ewing, NJ	2004 – present
Visiting Assistant Professor	Department of Electrical Engineering and Computer Science Tulane University, New Orleans, LA	2003 – 2004
Research Assistant	Department of Electrical Engineering and Computer Science Tulane University, New Orleans, LA	Summers of 2000, 2001, 2002
Teaching Assistant	Department of Electrical Engineering and Computer Science Tulane University, New Orleans, LA	1994 – 1995, 1999 – 2002
Engineering Manager	MM Imagine Technologies, Chennai, India	Aug. 1998 – July 1999
Vice President (MIS)	Macedon Indo Austrian Ventures (P) Ltd, Orissa, India	Apr. 1996 – Mar. 1998
Business Development Executive	CMC Ltd., Mumbai, India	July 1991 – July 1993

Publications

Closely Related to Proposed Project, Selected

[1]. Ursula Wolz and Sarah Monisha Pulimood. "An Integrated Approach to Project Management through Classic CS III and Video Game Development". In Proceedings of the 38th Technical Symposium on Computer Science Education (ACM SIGCSE), Covington, Kentucky, March 7 – 10, 2007.

[2]. Deborah L. Knox, Peter J. DePasquale, and Sarah M. Pulimood. "A Model for Summer Undergraduate Research Experiences In Emerging Technologies". In Proceedings of the 37th Technical Symposium on Computer Science Education (ACM SIGCSE), pages 214 – 218, Houston, Texas, USA, March 2005.

[3]. Sarah Monisha Pulimood, Gregory Adkins, Elizabeth Carter, and Amanda Micai. "Extensions to and Optimization of a Mobile Computational System for Internet Programming". In Proceedings of the 44th Annual ACM Southeast Conference, pages 782 – 783, Melbourne, Florida, USA, March 2006.

Other Publications, Selected

[1]. Sarah Monisha Pulimood. "Using An XML Database To Coordinate Communication Between Mobile Computations On The Internet". In Proceedings of the 2006 International Conference on Internet Computing (ICOMP 2006) held in conjunction with The 2006 World Congress in Computer Science, Computer Engineering, and Applied Computing, Las Vegas, USA, June 2006.

[2]. Sarah Monisha Pulimood and Boumediene Belkhouche. "A Mobile Computational Model for Internet Programming". In Proceedings of the 42nd Annual ACM Southeast Conference, pages 347 – 352, Huntsville, Alabama, USA, April 2004.
[3]. Sarah Monisha Pulimood and Boumediene Belkhouche. "Efficient Support for Mobile Computations on the Internet". In Proceedings of the 3rd International Conference on Internet Computing (IC 2002) held in conjunction with The 2002 International Multiconferences in Computer Science, pages 187 – 192, Las Vegas, USA, June 2002.
[4]. Sarah Monisha Pulimood, Boumediene Belkhouche, and Adnan Yazici. "Mobile Computation of Queries in an Uncertain Environment". Proceedings of the First International Conference on Intelligent Computing and Information Systems (ICICIS 2002), pages 68 – 76, Cairo, Egypt, June 2002.
[5]. Elizabeth Carter. "Optimization of a RISC-based Virtual Machine for Mobile Computations". To be published in Proceedings of the 38th Technical Symposium on Computer Science Education (ACM SIGCSE), Covington, Kentucky, March 7 – 10, 2007. Faculty adviser Sarah Monisha Pulimood.

Synergistic Activities

[1]. Co-founder and faculty coordinator of the "Women in Computing and Sciences" group that was born in response to a growing need for mentoring and support for female undergraduate students in the sciences.
[2]. Recipient of Research Award for Collaborative Research Experiences for Undergraduates (CREU) from Computing Research Association Committee on the Status of Women in Computer Science and Engineering (CRA-W). Academic Year 2005 – 2006.
[3]. Recipient of course release time from the College for the academic year 2006 – 2007 to support interdisciplinary scholarly activities. Academic Year 2006 – 2007.
[4]. Recipient of grants to support summer undergraduate interdisciplinary research programs. 2005 – 2006.
[5]. Book Reviewer, Noushin and Hessam Ashrafi's Object-Oriented System Analysis and Design with UML. To be published by Prentice Hall.

Collaborators and Other Affiliations

Collaborators and Co-Editors

Gregory Adkins, Student, The College of New Jersey
Boumediene Belkhouche, Faculty, Tulane University, New Orleans
Elizabeth Carter, Student, The College of New Jersey
Peter DePasquale, Faculty, The College of New Jersey
Deborah Knox, Faculty, The College of New Jersey
Amanda Micai, Student, The College of New Jersey
Ursula Wolz, Faculty, The College of New Jersey
Adnan Yazici, Faculty, Middle East Technical University, Turkey

Graduate and Postdoctoral Advisors

Boumediene Belkhouche, Faculty, Tulane University, New Orleans
Fred Petry, Faculty, Tulane University, New Orleans
Bill Buckles, Faculty, Tulane University, New Orleans

Thesis Advisor and Postgraduate-Scholar Sponsor

Dr. Boumediene Belkhouche, Faculty, Tulane University, New Orleans

The Media Laboratory

Mitchel Resnick
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May 14, 2007

Prof. Ursula Wolz
The College of New Jersey

Dear Ursula,

I am delighted to write a letter in support of your NSF proposal *Broadening Participation in Computing via Community Journalism for Middle Schoolers*.

As you know, my research group at the MIT Media Lab has been dedicated to developing new ways to engage young people in computing. It would be exciting to collaborate with you to explore new applications for our Scratch programming language, which we developed under NSF grant ITR-0325828. I am especially interested in further exploring the use of Scratch as a "storytelling tool," as you plan to do in your project.

You might not know that I began my career as a journalist, working for five years as a science/technology writer for Business Week magazine before starting graduate school in computer science. So your idea of "interactive journalism" is especially appealing to me.

I look forward to working with you on this exciting project. Please let me know if there is anything else that I can do to help.

Sincerely,

Mitchel Resnick

Prof. Mitchel Resnick
MIT Media Laboratory
mres@media.mit.edu

Teacher Quality
TQE
Enhancement

May 24, 2007

Dr. Ursula C. Wolz, Associate Professor and Chair
Department of Computer Science
The College of New Jersey
Armstrong 103
P. O. Box 7718
Ewing, NJ 08628-0718

Dear Professor Wolz:

In support of your proposal submission to the National Science Foundation, "Broadening Participation in Computers via Community Journalism for Middle Schoolers," the Teacher Quality Enhancement-Recruitment Program staff at the Center for Mathematics, Science, Technology, and Pre-Engineering here at The College of New Jersey looks forward to working with you and the students and teachers at Fisher Middle School.

As education specialists in the K-16 curriculum, with emphasis on elementary, middle, and high school populations, we are encouraged by your proposal aimed at addressing the need for computer science, science, mathematics, and technology education efforts. Your project addresses the needs of underrepresented populations, including girls and minorities, who will be able to gain direct experience in the innovative design of computing systems through journalism. The hands-on experience in design and inquiry and creation of an of an online magazine for young people via a summer week-long experience at TCNJ as well as after-school club sessions at Fisher with educators and TCNJ college students will enable students and parents/guardians to make more informed course selection choices in these high-demand, underserved career fields as they prepare to enter high school.

We look forward to working with you and our education center in this endeavor.

Sincerely,

Sharon J. Sherman, Ed.D.
Professor
Elementary and Early Childhood Education

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BOARD OF EDUCATION

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May 21, 2007

Dr. Ursula C. Wolz, Associate Professor and Chair
Department of Computer Science
The College of New Jersey
Armstrong 103
P. O. Box 7718
Ewing, NJ 08628-0718

Dear Dr. Wolz,

The Ewing Public School District is pleased to offer our support and collaboration for the "Broadening Participation in Computing via Community Journalism for Middle Schoolers" National Science Foundation proposal. We look forward to participation from our students and teachers at Fisher Middle School from the Spring of 2008 through the Fall of 2009.

Our long-established partnerships with The College of New Jersey (TCNJ) and our district will provide opportunities for our middle school teachers and counselors along with cohorts of our underrepresented girls and minority students at Fisher Middle School. These students and faculty will participate in design and inquiry based activities centered on creating an online magazine for young people via a summer week-long experience at TCNJ and after-school club sessions at Fisher.

Working with you and TCNJ's undergraduate student will enable our middle school students to gain direct experience in innovative design of computing systems and inspire them to Computer Science and Information Technology career paths.

I extend my best wishes to you as you complete your application with the National Science Foundation, and look forward to working with you in the Broadening Participation in Computing program.

Sincerely,

Raymond Broach

Raymond Broach
Superintendent

May 22, 2007

Professor Monisha Pulimood
The College of New Jersey

Dear Professor Pulimood,

I am pleased to write a letter in support of your NSF proposal *Broadening Participation in Computing via Community Journalism for Middle Schoolers.*

As you know, I am President of Upsilon Pi Epsilon, the Computer Science Honors Society. My organization is interested in promoting Computer Science and furthering achievements and excellence in this field. Your proposed program would be a wonderful way to reach this goal by exploring new ways to engage young people in computing.

I look forward to working with you on this exciting project. If there is anything else that I can do to help, please let me know.

Sincerely,

Karen DelDuca
President of Upsilon Pi Epsilon, TCNJ chapter

Spelman College
COMPUTER AND INFORMATION SCIENCES

Charles R. Hardnett
Computer Science Department
Spelman College
350 Spelman Lane Box #1257
Atlanta, GA 30314
hardnett@spelman.edu

May 29, 2007

Prof. Kim Pearson
The College of New Jersey

Dear Kim,

I am delighted to write a letter in support of your NSF proposal *Broadening Participation in Computing via Community Journalism for Middle Schoolers*. The proposal sounds like it will explore an exciting new interdisciplinary area involving computing.

At Spelman College, our department has been actively engaged in outreach programs to promote Computer Science and diversity within the discipline. We currently have the CARE Program that is funded as a NSF BPC demonstration project. Our goals for middle school students have revolved around early introduction to computer programming and problem solving via computer graphics and animation and robotics. We have experienced great success with our program and I am sure you will experience the same level of success.

Although we are not directly funded under your project, I look forward to interacting with you during the development of your program as we look for viable avenues for future collaboration on BPC and other important activities.

Best Regards,

Prof. Charles R. Hardnett
Computer Science Department
hardnett@spelman.edu

SmartMoney.com

Raymond J. Hennessey
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May 25, 2007

Kim Pearson
Associate Professor of English
The College of New Jersey
2000 Pennington Road
Ewing, NJ 08628-0718

Kim,

It's my pleasure to write a letter of support for your NSF application, "Broadening Participation in Computing via Community Journalism for Middle Schoolers."

As an employer who looks for a melding of technology and journalistic skills, this program looks to be a great way to use the craft of reporting to generate both and interest in and, more importantly, a long-term commitment to the computer sciences. As journalism switches from the page to the screen to the mobile device, the types of skills developed in a program like this will be invaluable.

The resources and experience of the journalists and editors at SmartMoney.com are at your disposal as the program develops. I look forward to helping you in any way I can.

Sincerely,

Raymond J. Hennessey
Editor

HUNTER

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Fax (212) 772-5219

30 May 2007

Dr. Ursula Wolz
Department of Computer Science
The College of New Jersey
Ewing, New Jersey 08628

Dear Ursula:

As principal investigator on Hunter's NSF grant entitled "CRI: Planning SWAMI – A Model of Support for a Women and Minority PhD Pipeline," I enthusiastically support your proposed project for NSF's Broadening Participation in Computing program. Your plan to introduce middle school students to computing and information technology using interactive journalism and media is an important and necessary precursor to a project like SWAMI (**S**upport for **W**omen **a**nd **Mi**norities), whose long term goal is to create a PhD pipeline in computer science for women and minorities at Hunter College.

If we want to draw women and minorities into a PhD pipeline as undergraduate computer science majors, these students must first arrive at college interested in science and technology and confident of their abilities to succeed. Waiting until high school to nurture such attitudes is too late; middle school is the ideal place to start.

My SWAMI co-principal investigator Mary Flanagan is a co-PI on an NSF research project called RAPUNSEL (Realtime, Applied Programming for Underrepresented Students' Early Literacy). The RAPUNSEL group taught introductory Java programming to middle school girls using an online game. In the course of playing the game the girls learned progressively more advanced programming concepts as they manipulated objects, for example, teaching animated characters to dance. The assessment results showed that girls who participated in the RAPUNSEL study benefited from this exposure to computer science and technology in terms of more positive attitudes, greater interest, increased motivation and enhanced self-confidence. Your project has the potential to produce a similar outcome based on engaging middle schoolers in community journalism.

I would welcome an opportunity to continue our collaboration by participating in this new project at The College of New Jersey. One possibility is that women and minorities in Hunter's undergraduate computer science program could serve as role models by engaging in various project-related activities with the students at Fisher Middle School.

Cordially,

Virginia Teller

Virginia Teller, PhD
Professor and Chair

GILMORE J FISHER MIDDLE 2005-06 SCHOOL REPORT CARD

COUNTY: MERCER
DISTRICT: EWING TWP

School Environment

Length of School Day	
Amount of time school is in session on a normal school day.	
School	6 hours: 40 minutes
State Average	6 hours: 29 minutes

Instructional Time	
Amount of time per day students are engaged in instructional activities.	
School	6 hours: 10 minutes
State Average	5 hours: 40 minutes

Average Class Size	2005-2006	
	School	**State**
Grade 6	20.2	21.0
Grade 7	18.9	20.9
Grade 8	19.5	20.7
Special Ed. (ungraded)	7.4	8.4
Total School	16.4	19.2

Student/Computer Ratio		
Numbers of students per computer available for the purposes of supervised instruction.		
	School	**State Average**
2005-06	4.4	3.7
2004-05	4.6	3.9
2003-04	4.5	4.2

Internet Connectivity

Percents of room locations in the school that have access to the Internet.

Locations	**2005-06**		**2004-05**		**2003-04**	
	School	State Average	School	State Average	School	State Average
Classroom/ Instructional	100.0%	98.4%	100.0%	97.6%	100.0%	95.9%
Library/ Media Centers	100.0%	99.1%	100.0%	99.2%	100.0%	98.3%
Computer Labs	100.0%	99.9%	100.0%	99.6%	100.0%	99.3%
All Locations	100.0%	98.7%	100.0%	97.9%	100.0%	96.4%

Student Information

Enrollment by Grade				
Counts of students "on-roll" by grade in October of each school year.				
Grade	**2005-2006**	**2004-2005**	**2003-2004**	**2002-2003**

Students with Disabilities	
Percentage of students with IEPs (Individualized Education Program) regardless of placement/programs	16.8%

Grade 6	262.0	284.0	288.0	253.0
Grade 7	284.0	305.0	269.0	272.0
Grade 8	292.0	288.5	296.0	299.0
Special Ed. (ungraded)	111.0	124.5	123.0	114.0
Total School	949.0	1002	976.0	938.0

Language Diversity

First language spoken at home in order of frequency.

Language	Percent
English	95.4%
Spanish	2.8%
Creole	0.5%
Mongolian	0.4%
Creole	0.4%
Tagalog	0.2%
Urdu	0.2%

Student Mobility Rate

Percentage of students who entered and left during the school year.

	School	State Average
2005-06	23.8%	11.9%
2004-05	11.4%	12.3%
2003-04	6.5%	12.8%

Limited English Proficient (LEP)

Percentage of LEP students	2.7%

Student Performance Indicators

ASSESSMENTS

New Jersey Assessment of Skills and Knowledge (NJASK6) LANGUAGE ARTS LITERACY		Year	Number Tested	Proficiency Percentages		
				Partial	Proficient	Advanced
All Students	School	2005-06	300	28.7%	64.7%	6.7%
»details for subgroups for Language Arts Literacy	District	2005-06	300	28.7%	64.7%	6.7%
	DFG	2005-06	13494	21.6%	71.2%	7.2%
	State	2005-06	104047	25%	65.8%	9.2%

*To protect the privacy of students, the Department of Education suppresses sufficient information to eliminate the possibility that personally identifiable information will be disclosed.

New Jersey Assessment of Skills and Knowledge (NJASK6) MATHEMATICS		Year	Number Tested	Proficiency Percentages		
				Partial	Proficient	Advanced
All Students	School	2005-06	299	47.8%	43.1%	9%
»details for subgroups for Mathematics	District	2005-06	299	47.8%	43.1%	9%
	DFG	2005-06	13528	27.6%	58.5%	13.9%
	State	2005-06	104573	29.2%	53.5%	17.3%

*To protect the privacy of students, the Department of Education suppresses sufficient information to eliminate the possibility that personally identifiable information will be disclosed.

New Jersey Assessment of Skills and Knowledge (NJASK7) LANGUAGE ARTS LITERACY		Year	Number Tested	Proficiency Percentages		
				Partial	Proficient	Advanced
All Students	School	2005-06	319	18.8%	75.5%	5.6%

Language Arts Literacy	DFG	2005-06	13854	16.5%	75.1%	8.4%
	State	2005-06	106962	19.8%	70.3%	9.9%

*To protect the privacy of students, the Department of Education suppresses sufficient information to eliminate the possibility that personally identifiable information will be disclosed.

New Jersey Assessment of Skills and Knowledge (NJASK7) MATHEMATICS		Year	Number Tested	Proficiency Percentages		
				Partial	Proficient	Advanced
All Students	School	2005-06	319	50.2%	46.4%	3.4%
»details for subgroups for Mathematics	District	2005-06	319	50.2%	46.4%	3.4%
	DFG	2005-06	13834	36.2%	52.7%	11.1%
	State	2005-06	107362	35.7%	49.8%	14.4%

*To protect the privacy of students, the Department of Education suppresses sufficient information to eliminate the possibility that personally identifiable information will be disclosed.

Grade Eight Proficiency Assessment (GEPA) LANGUAGE ARTS LITERACY		Year	Number Tested	Proficiency Percentages		
				Partial	Proficient	Advanced
All Students	School	2005-06	338	24.6%	62.1%	13.3%
»details for subgroups for Language Arts Literacy		2004-05	315	27.6%	64.1%	8.3%
	District	2005-06	338	24.6%	62.1%	13.3%
		2004-05	315	27.6%	64.1%	8.3%
	DFG	2005-06	13861	22.7%	70.8%	6.5%
		2004-05	14189	25.0%	69.0%	6.1%
	State	2005-06	106447	25.7%	65.7%	8.5%
		2004-05	107410	27.7%	64.3%	8.0%

*To protect the privacy of students, the Department of Education suppresses sufficient information to eliminate the possibility that personally identifiable information will be disclosed.

Grade Eight Proficiency Assessment (GEPA) MATHEMATICS		Year	Number Tested	Proficiency Percentages		
				Partial	Proficient	Advanced
All Students	School	2005-06	339	50.7%	33.3%	15.9%
»details for subgroups for Mathematics		2004-05	316	49.4%	42.4%	8.2%
	District	2005-06	339	50.7%	33.3%	15.9%
		2004-05	316	49.4%	42.4%	8.2%
	DFG	2005-06	13938	33.5%	48.1%	18.4%
		2004-05	14276	36.4%	48.2%	15.4%
	State	2005-06	107530	35.5%	43.6%	20.9%
		2004-05	108519	37.6%	43.7%	18.7%

*To protect the privacy of students, the Department of Education suppresses sufficient information to eliminate the possibility that personally identifiable information will be disclosed.

Grade Eight Proficiency Assessment (GEPA) SCIENCE		Year	Number Tested	Proficiency Percentages		
				Partial	Proficient	Advanced
All Students	School	2005-06	338	18%	58.9%	23.1%
»details for subgroups for Science		2004-05	316	24.1%	56.3%	19.6%
	District	2005-06	338	18%	58.9%	23.1%
		2004-05	316	24.1%	56.3%	19.6%

	DFG	2005-06	13955	16.7%	63.5%	19.9%
		2004-05	14287	18.2%	59.9%	21.8%
	State	2005-06	107600	21%	58.5%	20.5%
		2004-05	108512	23.2%	53.3%	23.5%

*To protect the privacy of students, the Department of Education suppresses sufficient information to eliminate the possibility that personally identifiable information will be disclosed.

OTHER PERFORMANCE MEASURES

Attendance Rates	2005-2006		2004-2005	
Percentage of students present on average each day.	School	State	School	State
Grade 6	95.6%	95.4%	95.8%	95.3%
Grade 7	96.1%	95.0%	95.3%	94.9%
Grade 8	95.1%	94.7%	94.7%	94.6%
Special Ed. (ungraded)	94.3%	91.6%	92.9%	91.3%
Total School	95.4%	94.5%	95.0%	94.4%

Student Suspensions

Percentage of students who were suspended from the school during the school year.

	School	State Average
2005-06	10.1%	4.4%
2004-05	15.3%	4.1%
2003-04	10.6%	4.5%

Student Expulsions

The number of students who were expelled during the school year.

	School	State Total
2005-06	0	78
2004-05	0	69
2003-04	0	101

Staff Information

Student/Administrator Ratio

Numbers of students per administrator.

	School	State Average
2005-06	474.5	280.9
2004-05	501.0	284.8
2003-04	325.3	310.7

Student/Faculty Ratio

Numbers of students per faculty member.

	School	State Average
2005-06	10.4	11.1
2004-05	10.6	11.3
2003-04	10.0	12.0

There are three essential components of a highly qualified teacher in accordance with the *No Child Left Behind (NCLB) Act*:

- Hold at least a bachelor's degree;
- Be fully certified/licensed by New Jersey; and
- Demonstrate competence in each of the core academic subjects in which the teacher teaches.

Teachers can demonstrate competence in the subject(s) they teach by either:

- Passing a rigorous state test or completing an academic major, graduate

degree, coursework equivalent to an undergraduate academic major, or national certification or credentialing; OR

- Meeting the requirements of the NJ High, Objective Uniform State Evaluation (HOUSE) Standard.

Faculty Attendance Rate		
Percentage of faculty present on average each day.		
	School	**State Average**
2005-06	97.1%	96.5%
2004-05	96.8%	96.1%
2003-04	96.7%	96.5%

Faculty Mobility Rate		
Percentage of faculty who entered and left the school during the school year.		
	School	**State Average**
2005-06	2.2%	6.7%
2004-05	3.2%	7.0%

Teacher Information			
Percentage of teachers teaching with emergency or conditional certificates.			
	School	**District**	**State**
2005-06	0.0%	0.0%	1.5%

Faculty and Administrator Credentials			
Percentage of faculty and administrators possessing a bachelor's, master's, or doctoral degree.			
	BA/BS	**MA/MS**	**PhD/EdD**
2005-06	60.2%	39.8%	0.0%
2004-05	61.3%	38.7%	0.0%
2003-04	59.4%	39.6%	1.0%

National Board Certification			
Number of teachers who have been certified by the National Board for Professional Teaching Standards.			
	School	**District**	**State**
2005-06	0	0	116
2004-05	0	0	98
2003-04	0	1	63

District Financial Data

Administrative and Faculty Personnel								
In FTE (Full-time Equivalents).								
	# of Administrators		**# of Schools**		**# of Students per Administrator**		**# of Faculty per Administrator**	
	District	State Average	District	State Average	District	State Average	District	State Average
2005-06	23	28	5.0	7.5	171.6	163.7	15.4	15.2
2004-05	23	28	5.0	7.5	188.7	165.4	16.1	15.1
2003-04	25	27	5.0	7.5	157.1	168.5	15.2	15.2

Median Salary and Years of Experience of Administrative and Faculty Personnel

	2005-06	2004-05	2003-04
Administrators			
Salary - District	$104,662	$112,309	$107,216
Salary - State	$105,960	$102,755	$99,483
Years of Experience - District	19	24	27
Years of Experience - State	25	26	26
Faculty			
Salary - District	$53,400	$49,400	$50,700
Salary - State	$53,871	$52,563	$51,809
Years of Experience - District	9	8	10
Years of Experience - State	9	10	10

Teacher Salaries and Benefits

Percents of teacher salaries and benefits of the total comparative expenditures. The percent increase or decrease represents the expenditure change in teacher salaries/benefits from one year to the next.

	% for Teachers Salaries/Benefits		% Change - Increase/Decrease (+/-)	
	District	State Average	District	State Average
2005-06	56%	55%	7%	7%
2004-05	58%	55%	-5%	6%
2003-04	59%	55%	9%	4%

Administrative Salaries and Benefits

Percents of administrative salaries and benefits of the total comparative expenditures. The percent increase or decrease represents the expenditure change in administrative salaries/benefits from one year to the next.

	% for Administrative Salaries/Benefits		% Change - Increase/Decrease (+/-)	
	District	State Average	District	State Average
2005-06	10%	8%	3%	4%
2004-05	11%	9%	8%	7%
2003-04	9%	9%	7%	6%

Revenues

Percents of total revenues from various sources.

	2005-2006		2004-2005		2003-2004	
	District	State Average	District	State Average	District	State Average
Local	82%	51%	80%	50%	78%	51%
State	15%	41%	15%	41%	16%	42%
Federal	3%	3%	2%	4%	3%	4%
Other	0%	5%	3%	5%	3%	3%

Per Pupil Expenditures

Two calculations of the average cost per pupil in the district.
(See #1 and #2 below).

	2005-2006		2004-2005		2003-2004	
	District Budget	State Average	District Actual	State Average	District Actual	State Average
Classroom - Salaries and Benefits	$6,259	$6,417	$5,855	$6,182	$6,360	$5,854
Classroom - General Supplies/Textbooks	$155	$283	$129	$290	$163	$271
Classroom - Purchased Services and Other	$331	$179	$324	$179	$311	$179
Total Classroom Instruction	$6,746	$6,878	$6,307	$6,652	$6,835	$6,305

Support Services - Salaries and Benefits	$1,179	$1,598	$1,097	$1,475	$1,149	$1,371
Support Services - other	$109	$222	$89	$236	$120	$306
Total Support Services	$1,288	$1,820	$1,186	$1,711	$1,269	$1,677
Administration - Salaries and Benefits	$1,093	$991	$1,058	$982	$1,005	$929
Administration - other	$207	$266	$182	$256	$185	$242
Total Administration Costs	$1,300	$1,257	$1,240	$1,238	$1,190	$1,171
Op./Maint. of Plant - Salaries and Benefits	$513	$747	$481	$721	$563	$678
Op./Maint. of Plant - other	$579	$626	$551	$616	$559	$574
Total Operations and Maintenance of Plant	$1,092	$1,373	$1,032	$1,337	$1,122	$1,252
Total Food Services Costs	$0	$16	$0	$26	$0	$28
Total Extracurricular Costs	$275	$211	$250	$196	$266	$183
(1)TOTAL COMPARATIVE COST PER PUPIL	$11,135	$11,628	$10,040	$10,952	$10,693	$10,411
(2)TOTAL COST PER PUPIL	$12,453	$13,169	$12,068	$13,050	$12,744	$12,221

(1) The Comparative Cost Per Pupil represents comparisons with districts of similar budget type. The components that comprise the comparative cost per pupil are as follows: classroom instructional costs; support services (attendance and social work, health services, guidance office, child study team, library and other educational media); administrative costs (general administration, school administration, business administration, and improvement of instruction); operations/maintenance of plant; food services, and extracurricular costs. The total of these expenditures is divided by the average daily enrollment to calculate a total comparative cost per pupil.

(2) Total Cost Per Pupil, in addition to all of the costs listed above for the comparative cost, includes costs for tuition expenditures; transportation; other current expenses (lease purchase interest, residential costs, and judgments against schools); equipment; facilities/acquisition; and restricted expenses less nonpublic services and adult schools, as well as students sent out of district. The total of all these expenditures is divided by the average daily enrollment to calculate a total cost per pupil.

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May 23, 2007

Professor Kim Pearson
The College of New Jersey

Dear Kim,

Please add my name to the chorus of people who support your NSF application, *"Broadening Participation in Computing via Community Journalism for Middle Schoolers."* It is a most worthy and exciting project that will introduce cutting-edge storytelling techniques to a new generation.

As you and I have discussed many times, the journalism industry must find innovative ways to engage younger readers, who see newspapers as something only their parents and grandparents read. As a result of this trend, media companies are investing heavily in ever more sophisticated, online and interactive storytelling. News heavyweights such as Gannett Co., the Washington Post Co. and many others are spending millions of dollars, for example, to build community journalism Web sites that cater to readers in their coverage areas. These media companies see computer-assisted reporting as the backbone of their efforts. Your demonstration project offers an opportunity to advance that cause in a meaningful and substantive way, in that it will introduce middle schoolers to the very skills that are needed by these companies.

My 25 years as a journalist (including 17 years at the Philadelphia Inquirer, my subsequent work at WebMD and my current position as a staff writer for American Journalism Review) convince me that you are on the right track with this project. I look forward to helping you with this effort in any way I can.

Sincerely,

Donna Shaw

Donna Shaw
Assistant Professor of Journalism
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May 30, 2007

Dr. Ursula C. Wolz, Associate Professor and Chair
Department of Computer Science
The College of New Jersey
Armstrong 103
P. O. Box 7718
Ewing, NJ 08628-0718

Dear Professor Wolz:

I am pleased to send you this letter of support and collaboration regarding your submission of the **Broadening Participation on Computers via Community Journalism for Middle Schoolers** proposal to the National Science Foundation.

This pilot demonstration project collaboration with the School of Computer Science and School of Education at The College of New Jersey will provide hands-on experiences geared to the many underrepresented student populations at Fisher Middle School and their teachers and guidance counselors. They will work with computer science, education and gender equity/diversity specialists and college students and will gain knowledge and experience in computing with emphasis on innovative design through journalism. The summer institute and after-school year-long sessions will enhance the students' ability to make more informed course choices geared towards these high-demand computing fields.

I look forward to working with you in the evaluation of this effort.

Sincerely,

Meredith K. Stone

Meredith K. Stone, Ed.D.
External Evaluator

Mary E. Switzer

Contact Information

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e-mail: switzer@tcnj.edu

Phone: 609-771-2714
Fax: 609-771-3330

Professional Preparation

Institution	Major	Degree	Year Completed
University of Maryland (Japan)	Business and Management	B.S.	1985
University of Maryland (Japan)	Counseling & Personnel Services	M.Ed.	1987
Rowan University *(formerly Glassboro State College)*	Post-Baccalaureate Teaching Certification (Business)		1993

Appointments

Title	Employer	Time Period
	The College of New Jersey:	
Gender Equity/Diversity Coach and Family Tools and Technology Program Director	The Center for Mathematics, Science, Technology, and Pre-Engineering	9/2006 – Present
Project Director	Teachers As Leaders and Learners (TaLL) Program	9/2003 – 8/2006
Director	Statewide Nontraditional Career Center	7/2000 – 8/2003
Director	Career Equity Assistance Center	7/1995 – 6/2000
Director	Project TIDE (Toward Individual Development Through Equity)	1/1991 – 6/1995
Student Teacher	Cherokee High School	9/1993 – 12/93
Post-Baccalaureate Teaching Certification Student	Rowan University *(formerly Glassboro State College)*	1990-1993
Project Coordinator	South Jersey Outreach Project Rowan University	1/1988 – 6/1991
Field Representative	University of Maryland (Japan)	9/1984 – 5/1987

Publications

Articles:

- Switzer, M. E., "The Positive Impact in Promoting Gender Equity and Nontraditional Career Awareness in New Jersey," AGELE *News*, Winter 2003, vol. 02-03 No. 2, pp.4-5
- Switzer, M. E., "Equity in Technology Career Institute 2002," AGELE *News*, Spring 2003, vol. 02-03 No. 2, p. 7.
- Switzer, M. E., "Leadership," AGELE *News*, Spring 2003, vol. 02-03 No. 2, p. 8.
- Switzer, M. E., "SNCAC Promotes Gender Equity and Nontraditional Career Awareness, *Women's and Gender Studies Newsletter* (The College of New Jersey), March 2002, pp. 1-2.
- Switzer, M. E., Wrote copy for *The Equity Exchange* (educator) and ASETS Exchange (student) newsletters (16-page issues, produced quarterly), 1993 – 2003.

Certifications and Other Training:

1995-Present Teasing, Bullying, Sexual Harassment/Gender Equity/Nontraditional Careers (K-16).

1998-Present	Family Tools and Technology Trainer (after-school parental involvement program focused around STEM for underrepresented girls and boys and their families).
1996-Present	Careers Facilitator Trainer – certified trainer. Turnkey train educators for middle high school students in career options and nontraditional careers.
1995	Commonwealth of Virginia – post-graduate teaching certificate (Business Ed.).
1995-Present	*True Colors*© (equity/diversity) trainer and master trainer certification.
1994	Teaching: State of New Jersey issued – CE w/advanced standing (Business).
1993-Present	The Equitable School – educator training on equity issues.
1993-Present	Total Quality Management training.
1993-2006	Association of Gender Equity Leadership in Education national equity presenter.
1992-2005	National Alliance for Partnerships in Equity – national presenter on equity/ diversity, nontraditional careers topics at annual PDI institutes.
1992-Present	Generating Expectations and Student Achievement (GESA) – certified trainer through GrayMill Institute. Train educators and other professionals to identify biases and stereotypes and how to eliminate it.
1992-Present	Achieving Sex Equity Through Students (ASETS) – certified trainer. Train educators to train NJ middle and high school students in leadership skills to over-come the effects of sex-role stereotyping on career choice (trained 14,000 students).
1992	Equity Leadership Institute training at the University of Hartford, Hartford, CT.
1992	GESA for Parents certificate – offer training for Parents (based on GESA model).
1992-Present	Sexual Harassment training – offer training to educators and students (K-16).
1991-Present	Assertiveness Trainer – certified trainer.
1991-Present	Curriculum development for ASETS, Careers, GESA, Equitable School, and other trainings. Field test; evaluate results; make recommendations; implement changes; re-evaluate on a regular basis.

Awards:

2004	Friend of Equity Achievement Award from the National Alliance for Partnerships for outstanding contributions in gender equity/nontraditional career initiatives.
2001	Best Practices for Gender Equity Leadership in Education from the American Association of Colleges for Teacher Education awarded to The College of New Jersey for the NJ Statewide Nontraditional Career Assistance Center's comprehensive equity center.
1998-99	The College of New Jersey, Board of Trustees, resolution honoring faculty institutional research awardees and external grant recipients.
1997	NJAWBO (NJ Association of Women Business Owners) – honored as a woman leader in NJ.

Affiliations: American Association of University Women (1993-present)--national, state [formerly Executive VP 2002-2006], local member; **Association for Gender Equity Leadership in Education** (AGELE) (Planning & Development Chair, 2002-2006; **National Alliance for Partnerships in Equity** (NAPE); **NJ Department of Education, Gender Equity Advisory Committee** (GEAC) (1993-present),currently Vice Chair; **GEAC Conference Planning Committee**, 2000-2004; host organization 2000-2003; **National Coalition for Sex Equity in Education** Conference Planning Committee, NJ, 1996.

Graduate Advisors

Kevin Flanagan, Ph.D, University of Maryland
Robert Tomory, Ph.D.,University of Maryland

Meredith K. Stone, Ed.D.

Contact Information

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Professional Preparation

Degree	Institution	Major	Year Completed
Ed.D..	Columbia University	Curriculum & Teaching	1981
M.Ed.	Rutgers Grad.Sch.Ed.	Educational Psychology	1974
A.B.	Brown University	Psychology	1966

Appointments

Title	Employer	Time Period
External Evaluator	The College of New Jersey	2007-
Project Director	The College of New Jersey	2003-2006
External Evaluator	The College of New Jersey	2003
Research Writer/Editor	Princeton University	2002-2003
Evaluation Consultant	The World Bank	2002-2003
Manager, PRI Learning Services	Bristol-Myers Squibb	2001-2002
Manager, PRI Technical Training	Bristol-Myers Squibb	1999-2001
Senior Advisor, Technical Training	Bristol-Myers Squibb	1995-1999
Computer Training Consultant	Self-Employed	1986-1995
Adjunct Professor	Mercer County Com. College	1986-1989
Manager, Technical Support	Martin Marietta Data Systems	1984-1986
Director	Clancy-Paul Computer Training	1982-1984
Associate Research Scientist	Educational Testing Service	1981-1982
Research Project Manager	Educational Testing Service	1975-1981
Senior Research Assistant	Educational Testing Service	1972-1975

Publications/Research Reports

Teacher Quality Enhancement Grant Evaluation
Final Report to USDOE, September 2006

Networking Thru Computing

"Computer Scientists Play Games Too!"

Who: 7th Graders

When: Wednesday, April 18, 2007

at The College of New Jersey

Time: 9:30am to 2:30pm

What do computer scientists do? There is a lot more to computer science than programming. Computer scientists do more than take care of computers for other people. Computer Scientists work on projects ranging from financial to climate analysis. They create tools for Art and Music, and yes for Video Games! They design phone technology and bio-technology. Almost everything you use everyday had a computer scientist as part of the design team.

9:30-11:30am participants will meet with Mary Switzer, Gender Equity Specialist, and participate in a True Colors© Training Session. Students will learn about working with different personalities (their individual colors) and how they are necessary to help function in everyday situations.

12:30-2:30pm participants will meet with students and faculty in the computing sciences program learning about what a computer scientist does through hands-on activities on and off computers.

To Register: Please complete this portion of the form and return it to Ms. Schwarz in the guidance office by April 4, 2007.

By signing this form I give my child permission to participate in the above mentioned program and be recorded or photographed for documentation purposes:

Students Name: ____

Team: ____

Parents Signature: _______________________ Date: ______________

The College of New Jersey—Fisher Middle School Workshop

Schedule—4/18/07

Games Computer Scientists Play

12:30 - 12:45 - Introduction and forming groups.
12:45 - 1:10 - Codes, playing with cryptography program (group A) - led by Elizabeth
- Web script (group B) - led by Jaclyn
- Sorting Dance (group C) - led by Dr Wolz

1:10 - 1:35 - rotate above
1:35 - 2:00 - rotate above
2:00 - 2:30 - What do Computer Scientists Do? - contest and discussion on technology in the world around us - led by Dr Pulimood
- Wrap-up - led by Dr Wolz

What Do Computer Scientists Do?

- They ***code*** data.
- They ***check*** their data.
- They *search* for things.
- They ***sort*** things.

Coding Data Secret Codes

Computer Scientists code in a secret language called *binary*. They only use "0" and "1". The trick is the position of the "0" or "1" in a list. We can use playing cards. A "face up" card is a "1", a "face down" card is a "0". If you know the secret numbers its easy. The numbers are all doubles: 2, 4, 8, 16, 32, 64, etc.

Searching: A Card Trick

Computer scientists use lots of clever tricks to figure out how to find data **FAST**. The most often used trick is "divide and conquer" which means taking a big problem and

breaking it down into smaller problems. Like knowing that card is a small pile rather than the whole card deck. Creatively reorganizing data is essential to sorting and searching.

Check Sum Card Trick

When data gets passed around sometimes it gets mangled or broken. But since data is just “0” and “1” it is always easy to figure out whether the data is “good” or the data is “bad” by checking the “oddness” of the data. That’s how the columns card trick does it. We checked the column and row to find the card that was corrupted.

Sorting Dance

Computer Scientists are very cooperative people. They know that doing a puzzle by yourself takes longer than getting help from your friends. The sorting list show that if a bunch of helpers do the job with you it goes very quickly. In computer science this is call ***concurrent processing.***

Computer Science is EVERYWHERE

Think about everything in your life that is works because of computer science. Please add something to either the "requires Computer Science" list, or "does not require" list. Be careful!

Stuff that Requires Computer Science

Stuff that does not Require Computer Science

What DO Computer Scientists DO?

- They play with computers
- They solve hard problems
- They define *algorithms* to make life easier
- They help others do their work
- They design video games
- They create computer art
- They make it easier for people to communicate

Computer Scientists Play Games Too!

1. Describe the overall effectiveness of this workshop.

Excellent Good Average Fair

2. From this workshop, I learned…

3. Please rate the sessions you attended:

Codes: Playing with Cryptography

Excellent Good Average Fair

Web Scripting:

Excellent Good Average Fair

Sorting Dance

Excellent Good Average Fair

Sorting Race

Excellent Good Average Fair

Computers in Your Life Challenge

Excellent Good Average Fair

4. What one thing will you tell your friends about computer science:

Feedback on the Middle School Outreach Workshop

There were 28 responses. Of these 20 thought the workshop overall was 'excellent' while the rest rated it as 'good'. The feedback on the codes and webscripting activities was 'excellent', while for the rest the feedback was split almost halfway between 'excellent' and 'good'. In general the kids seem to have had fun. The codes activity appears to have made the greatest impression.

Some interesting comments:

I learned that almost everything has a computer involved with it.
Computer Science is cool and doesn't make you a nerd.
Things may seem easy on the computer but the real thing has lots of things to figure out.
Almost all things in life have a computer involved with them.
It can be fun.
Computers are confusing.

The entire set of comments is below.

1. **From this workshop I learned…**
   How to make a website and how to make codes. I also learned how computers organize data.
   How computers work, codes.
   How to decode and make stories using databases.
   How to decode different things.
   About how editing and databases really work.
   How codes are used on computers.
   All about computers and decoding different codes
   How computer programs work.
   How to use and decrypt computer codes.
   That I can use codes to pass notes in class.
   About how programming works.
   More about computer programming.
   More about computers.
   That almost everything has a computer involved with it.
   A lot about computers.
   How to cipher codes. I also learned complicated computers are.
   That I can use codes to pass notes in class.
   About computers.
   How to sort. How codes work.
   How to work the computer. How to sort.
   About computers and their codes.
   How to break codes and make up websites.
   About computers, myself and others.
   About computer codes, how computers used the codes, and how it can be fun to work with them.
   How to make codes and how computers work.
   What different things you can do on a computer.

2. **One thing you will tell your friends about computer science:**
   It's cool and doesn't make you a nerd.
   This was so fun and worth the walk from school to here and back.
   You can decode notes using computer programs.

Things may seem easy on the computer but the real thing has lots of things to figure out.
Codes are used in computer science.
To try and figure things out on the computer more, like codes.
Almost all things in life have a computer involved with them.
It can be fun.
Computers are confusing.
What cipher code is.
Many things. First I'll tell them how much I learned here.
That almost everyone will use a computer and that computers have codes.
How computers can use codes by using the alphabets and 0s and 1s. I will tell them how people used to put the database in order.
About secret codes.
How sorting works in computers.

3. Please rate the sessions you attended:

	Excellent	Good	Average	Fair
Describe the overall effectiveness of this workshop This was an excellent experience. It was very fun and I learned many things It was great and fun!	**19**	**8**		
Codes: Playing with cryptography Very fun	**24**	**3**	**1**	
Webscripting Awesome	**22**	**5**		**1**
Sorting dance It was fun	**14**	**13**		**1**
Sorting race Fun It was fun	**13**	**13**	**1**	**1**
Computers in your life challenge	**12**	**14**	**2**	

Scratching with 1st Graders to Create A Single Interactive Story

Overview:
As a group the children will construct an interactive, computer-based story. The children will be assigned supporting characters to a main character who moves through a set of scenes to find a hidden object. As a group the arrangement of seven scenes (as a traditional binary branching story) is determined with scene exits identified by the group. Each child is assigned a character whose residence in a scene is predetermined before the sessions. That character is identified as "helpful" or "not helpful." Story elaboration for the children is a matter of animating their personal character via text, motion and sound to fulfill that assigned role. When all of the individual characters have been completed, after the sessions, the facilitators (Ursula Wolz and Jim Dunne) will import the characters into the full story environment and hook the scenes together so that the children can interact with the story in their classroom or with their family and friends via the internet.

Lesson Goal:
- To introduce children who have been writing "books" all year to the notion of storytelling in an interactive computing environment. Video games are a kind of interactive story.
- To give children an opportunity to construct an interactive story collaboratively. (As a group they will construct one story).
- To introduce children to the fundamental building blocks of computer programming and software design via the new language/environment "Scratch" (available free for download from http://scratch.mit.edu/)

Outcomes as Artifacts:
- As a group, students will design and implement a seven scene interactive story based on a provided template with characters.
- Each student will contribute attributes to an assigned character, including attributes that allow that character to either facilitate or thwart progress by our story's protagonist (hero).
- Individual work will be assembled into a single story that children can share with their families and friends via the Scratch web site.

Content/Learning Outcomes:
Students will:
- identify the main components of a story: (beginning, middle,end)
- character roles in a story (hero, helper, bad guy)
- understand the difference between a linear (book) story and an interactive (branching) story.
- create character attributes via simple programming constructs in Scratch

Time frame: Two mornings consisting of a double period each morning.

Materials/Software: (Pat Fengler will work with Ursula Wolz to have machines ready and loaded – Scratch is already loaded onto lab machines.) Items 2 and 3 will be delivered via CD from Ursula to Pat prior to the session in a folder that can be loaded into the appropriate folder on the "share" drive.

1. Scratch available on all lab machines. Students have access to a "shared" drive from with to load a template and save their work.

2. A scratch environment labeled with each child's name. Environment stage scene and character (sprite) element will be assigned based on Kristie Hazlett's grouping of her class into six teams of three to four students, distributing strong leaders, readers and writers between the groups.

3. A scratch environment that includes all of seven of the stage scenes necessary for the activity, with the starting scene (Scene 0) fleshed out.

4. Paper versions of the seven scenes that make up our story without characters present for the group discussion of scene order.

5. Paper character "specs" for each child.

6. Scratch "activity cards" that illustrate how to animate a character, including (1) speaking and thought bubbles, (2) simple movement, (3) sound, (4) mouse/keyboard event handling. (Ursula Wolz will bring these)

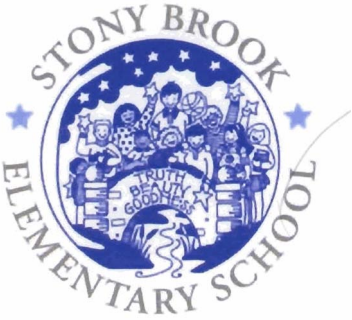
<u>Day 1:</u>

- Off the computer:
  - Review the idea of the parts of a story: beginning, middle and end.
  - Review what characters do for a story, who is the hero or main character, who are helpful or unhelpful to the main character.
  - Review how scenes can move a story along.
  - The idea of a story with more than one ending is discussed. These are "interactive stories." Typically there is one "happy" ending and other "sad" endings.
  - The idea of how a computer game is a kind of interactive story is also discussed including how sound, motion and text can be used to tell a story.
  - The children are informed that they are going to help build an interactive story, but no one is going to know what the different endings are until all the pieces are constructed and assembled. Each child is going to be responsible for a character who is either helpful or not. We'll keep secret who each character is, which scene they live in and whether they are helpful or unhelpful.
  - The starting scene of our story is introduced on paper, along with a main character who has to find her way to another place to find a particular object. The students as a group will decide where "portals" in the scene lead to two other scenes. We will mark these spots on the paper.
  - The other possible scenes will also be presented on paper. The group will select the two "middle scenes" and an ending scene where the hidden object can be found. We will identify exits from the middle scenes and the spot on the ending scene where the object can be found. The three remaining scenes are "sad endings." We are going to keep secret how the scenes are hooked together.
- Demonstration on the computer:
  - The starting scene will be shown as Scratch environment. We will show students how to fetch their personal Scratch environment.
  - The demo environment will contain the start scene with the main character and a helpful and an unhelpful character. The children will be shown how Scratch building blocks are

used to animate (add text, sound and motion) to a scene. As a group we will modify existing animation and add a new animation.
    - A quick demonstration will show students how to save their environment back onto the share server.
- Computer work:
    - Each child will bring up her personal character (in one of the existing scenes) and experiment with animating it. If all a child gets to in this session is experimenting a bit that is enough
    - Each child will also be given a personal "spec sheet" that identifies whether their character is helpful or unhelpful. Referring back to the group work on six scenes students should mark their sheet with the location of exits as necessary, or weather the scene is a happy or sad ending.
    - Homework: plan how your character is going to be helpful or unhelpful to the main character who needs to either move to another scene (middle scene), find the object (happy ending), figure out that this is an unhappy ending.

Day 2:

- Off the Computer
    - Each "Scene Team" needs to meet and decide where their portals are. And where their character will sit in the scene. We will do this as a paper exercise.
- Demonstration on Computer
    - Review the idea of a Scratch Scene
    - Remind students that they need to create scripts for their character that either is helpful or unhelpful to main character.
    - Quickly review the ways characters can act: motion (moving to an exit or the object), text (telling the main character something), sound (…. Just for effect?)
    - Explain that their first task is get their character's role complete, then they can add detail (e.g. more movement etc.)
- On the Computer:
    - Keep everyone on task to complete the basics of either moving the story forward or creating an ending.
    - Allow students who complete the basics to elaborate on what their character can do.
    - Or. Support students in helping each other complete the task.
    - Or provide students with a "new" Scratch environment in which to create their own one scene animated story.
    - Make absolutely sure that everyone's work is properly complete and saved regardless of how much individual handholding this will take.
- After the Session:
    - (Frantically) export all of the individual characters and then import them into the master environment.
    - Hook the scenes together as specified by the group (this could actually occur overnight previous to the second day.)
    - Demonstrate the entire story to the students
    - Send them home with a reference to the URL where they can show their parents the story.



June 1, 2007

Ursula Wolz
208 Holman Hall
The College Of New Jersey
Ewing, NJ 08628

Dear Ursula,

I would like to take this opportunity to formally recognize the work that you have done teaching my first grade class to create a branching story in the Scratch program over the past two days. As a teacher of very young students, I often come in contact with people who think that first graders are not capable of much. However, with your knowledge, instruction, and, perhaps most important, confident belief in us, you turned our first grade class into a group of computer programmers.

This was a valuable and successful project in many respects. Computer programming is big work. It may be considered adult work. But when it is presented to children in an appropriate format, with guidance, and when the result is expected to be the work of seven-year-old children, then seven-year-old children can be computer programmers. Your approach, combined with a quality program like Scratch, allowed my students to do the big work of creating an interactive, computer-based story.

Your plan for this project was based on the work my students have been doing during our writing class. We study the work of published authors, notice what they do to make it interesting, then the children attempt to approximate the writing of these published authors as they write themselves. This is exactly how you presented the Scratch story to our group. You connected their work of creating stories on paper to the computer programmer's work of creating stories on the computer. You showed them a completed scene from our Scratch story and asked them what they noticed about the actions of the characters/sprites and how the building blocks worked. This approach provided the children with some familiarity to the work they would be doing and also allowed them to be actively engaged in figuring out how to make it happen on their own.

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I found the Scratch program to be developmentally appropriate for first grade students. With just a small amount of pre-teaching, the children were able to explore the color coded building blocks to make their sprites say words in a speech bubble, move around the scene and do an action such as disappear or change colors. After a short time, all of the students were able to do these things independently. I can imagine how a program like this could be built upon in future grade levels so that young children learn some basics and then gain more and more complex skills as they grow and have continuing experiences with it. My first graders were already beginning to question the numbers of the x and y coordinates and experiment with how they could be used to move their sprites to specific locations within one scene. Which reminds me: this is big work!

I appreciate the work that you did with my class. I know that you have sparked curiosity and enthusiasm in them and that they will now have a deeper understanding of the computer and video games that they play. I hope they will have the opportunity to further their learning and skills with computer programming. Perhaps one or two of them will grow up to create a game of his or her own!

Sincerely,

Kristy Hazlett

Kristy Hazlett
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