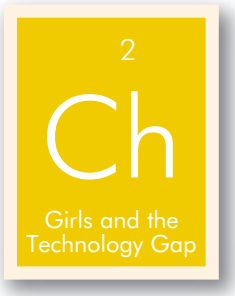


CHAPTER TWO · GIRLS AND THE TECHNOLOGY GAP

MORE THAN ANY OTHER GENERATION BEFORE THEM, TODAY'S TEENAGERS ARE COMFORTABLE WITH RAPID TECHNOLOGICAL CHANGE. THERE IS NO LONGER A GENDER GAP IN WHO USES TECHNOLOGY, THANKS ESPECIALLY TO THE INTERNET. HOWEVER, GIRLS AND WOMEN ARE STILL LESS LIKELY TO PARTICIPATE IN THE *CREATION* OF TECHNOLOGY. TO KEEP PACE WITH RAPID CHANGES IN INFORMATION TECHNOLOGY, IT IS NO LONGER SUFFICIENT FOR A PERSON TO BE COMPUTER LITERATE; PEOPLE MUST BECOME FLUENT WITH INFORMATION TECHNOLOGY (PER THE NATIONAL RESEARCH COUNCIL). *FLUENCY* INCLUDES LITERACY SKILLS, BUT IT ALSO INCLUDES A CONCEPTUAL KNOWLEDGE ABOUT WHEN AND HOW TO USE INFORMATION TECHNOLOGY, AND THE CAPABILITY TO APPLY THAT KNOWLEDGE TO NEW SITUATIONS AND TO MANAGE THE INEVITABLE PROBLEMS THAT OCCUR WHEN NEW APPROACHES ARE INTRODUCED.

THE RECENT EXPERIMENTAL EDUCATION PROJECTS DESCRIBED IN THIS CHAPTER ENGAGE GIRLS BY EMPHASIZING THE POTENTIAL OF INFORMATION TECHNOLOGY. THE PROJECTS TEND TO TARGET GIRLS IN MIDDLE OR HIGH SCHOOL. THEY PLACE GIRLS IN THE ROLE OF *CREATOR,* RATHER THAN *CONSUMER* OF TECHNOLOGY. THEY CREATE NEW PROGRAMMING ENVIRONMENTS, HAVING GIRLS DESIGN AND CREATE GAMES, BUILD WEB SITES, AND PROGRAM ROBOTS. SOME WILL PUT GIRLS INTO TEAMS AND MAKE THEM PARTNERS IN DESIGNING GAMES. OTHER PROJECTS ENABLE GIRLS TO USE THEIR OWN EXPERIENCES AS CAREER-PLANNING RESOURCES.

MANY OF THESE PROJECTS HAVE A LONG-TERM VISION. THEY CREATE SUPPORTIVE SOCIAL ENVIRONMENTS AND LINK GIRLS TO BOTH REAL AND VIRTUAL ROLE MODELS, MENTORS, AND TUTORS. MANY PROJECTS TRAIN PEOPLE AND PROVIDE RESOURCES TO THOSE WHO HAVE LONG-TERM RELATIONSHIPS WITH THE GIRLS—SUCH AS PARENTS AND TEACHERS. THESE SOCIAL SUPPORTS WILL EXIST LONG AFTER THE ACTUAL PROGRAMS HAVE ENDED. MANY OF THE PROJECTS ALSO CREATE PRODUCTS THAT ARE DESIGNED TO INCREASE THE GIRLS' PARTICIPATION IN INFORMATION TECHNOLOGY OUTSIDE THE GIVEN PROGRAM, INCLUDING THROUGH VIDEOS, COMPUTER GAMES, SAMPLE LESSONS, AND GIRL- AND KID-FRIENDLY PROGRAMMING LANGUAGES.

THESE INNOVATIVE STRATEGIES ARE MEANT TO INCREASE THE NUMBER OF GIRLS AND WOMEN WHO ARE PRODUCERS, AND NOT SIMPLY USERS, OF TECHNOLOGY. THE PROJECTS REACH BEYOND THE GIRLS AND WOMEN WHO ARE PARTICIPATING DIRECTLY. THEY PROMOTE THE VALUES THAT OUR WORKFORCE MUST BE DIVERSE AND THAT WE NEED TO ACTIVELY RECRUIT GIRLS NOW WHEN IT COMES TO TECHNOLOGY. IN ADDITION TO TESTING NEW EDUCATIONAL APPROACHES, MANY OF THE PROJECTS INVOLVE CONDUCTING A STUDY AT THE SAME TIME, COLLECTING DATA FROM AND ABOUT THE PARTICIPANTS. THE RESEARCH FINDINGS WILL BUILD OUR KNOWLEDGE OF HOW TO GET STUDENTS ENGAGED IN TECHNOLOGY, AND ESPECIALLY HOW TO GET AND KEEP GIRLS PARTICIPATING FULLY IN THE DESIGN AND DEVELOPMENT OF OUR TECHNOLOGY-BASED WORLD.

JILL DENNER, PH.D., SENIOR RESEARCH ASSOCIATE, ETR ASSOCIATES (EDUCATION, TRAINING, RESEARCH)

COMPUTER SCIENCE COMPUTING AND MENTORING PARTNERSHIP

EVEN THOUGH WOMEN ARE MAKING STRIDES IN SOME AREAS OF SCIENCE, THEIR PARTICIPATION IN COMPUTER SCIENCE IS DECLINING. FOR EXAMPLE, GIRLS TEND TO OPT OUT OF ADVANCED HIGH SCHOOL COMPUTING COURSES. RICE UNIVERSITY, IN COLLABORATION WITH THE HOUSTON INDEPENDENT SCHOOL DISTRICT, HAS ESTABLISHED THE COMPUTER SCIENCE COMPUTING AND MENTORING PARTNERSHIP (CS-CAMP) TO KEEP FEMALE STUDENTS INTERESTED AND INVOLVED IN PRECOLLEGE COMPUTER SCIENCE.

CS-CAMP gives high school girls the opportunity to learn computing in an all-girl environment outside school. It also encourages girls to enroll in advanced computer science classes in their high schools. Researchers hope the exposure to high-quality computing courses and mentors will help more girls make informed decisions about whether to pursue computer science as a college major and a life career.

The program targets eight high schools in the Houston area with strong, long-term commitments to improve their schools' computer science programs. CS-CAMP consists of a two-week summer computer camp and follow-up sessions. Computer camp concentrates on community building, computing-career awareness, mentoring, introductory computing courses, and fun activities for girls. In addition, the students attend monthly meetings at Rice to work on programming projects that reinforce what they learned in the summer.

CS-CAMP also provides professional development on gender diversity in technology. Each school has a counselor, administrator, and computer science teacher who meet bimonthly at Rice with the other schools' teams and CS-CAMP organizers to develop an action plan for their schools. Under the tutelage of master teachers, the participating computer science teachers facilitate the girls' computer camp, which gives them

- A solid knowledge of computer science content and curriculum
- Skill in a variety of approaches to instruction
- The opportunity to plan and reflect on instruction with other teachers

The CS-CAMP Web site (http://ceee.rice.edu/cs-camp//index.html) includes samples of participants' computer design work, links to computer games for girls, links to science sites with activities, and perspectives on the field of computer science.

GRADE LEVEL: HIGH SCHOOL	
RICE UNIVERSITY AND HOUSTON INDEPENDENT SCHOOL DISTRICT (TEXAS)	
RICHARD TAPIA (MSIROIS@RICE.EDU)	
HTTP://CEEE.RICE.EDU/CS-CAMP/STUDENTS/INDEX.HTML	02-25023
KEYWORDS: EDUCATION PROJECT, PROFESSIONAL DEVELOPMENT, COMPUTER SKILLS, RECRUITMENT, ENGAGEMENT, RETENTION, GENDER-DIVERSITY AWARENESS, CAREER AWARENESS, CURRICULUM MATERIALS, SUMMER, AFTER-SCHOOL, TEACHER TRAINING, LEARNING COMMUNITY, SUMMER CAMP, HANDS-ON, ACTIVITY-BASED, MENTORING, URBAN, COMPUTER SCIENCE, GIRLS AND TECHNOLOGY	

CAN ROBOTICS KEEP GIRLS IN SCIENCE?

THE KISS INSTITUTE FOR PRACTICAL ROBOTICS' BOTBALL PROGRAM IS A TEAM-BASED ACTIVITY THAT ENGAGES THOUSANDS OF MIDDLE AND HIGH SCHOOL STUDENTS IN REGIONAL AND NATIONAL ROBOTICS COMPETITIONS AND EXHIBITIONS. SOUTHERN ILLINOIS UNIVERSITY–EDWARDSVILLE IS STUDYING PARTICIPANTS TO DETERMINE HOW THE PROGRAM AFFECTS SEVENTH-GRADE GIRLS' PERCEPTIONS OF THEIR ACHIEVEMENT IN STEM. THE RESEARCH IS A COLLABORATION BETWEEN FACULTY OF THE COMPUTER SCIENCE AND PSYCHOLOGY DEPARTMENTS.

Researchers will recruit teams for the Botball competition, supply them with robotics kits, and provide teachers with training, a stipend, and money to help cover the cost of materials. Then they will conduct interviews with the participants and survey them at three different times to determine their attitudes about and expectations of performance in STEM. They hope to learn whether participation in a robotics competition has an immediate effect on a girl's perception of her STEM abilities, and if so, whether this has long-term effects on study and career choices. If the effects are long lasting, the study will assess what factors sustain or strengthen her motivations. Researchers will also examine how a girl's perceptions of her abilities, expectations of success, and STEM-related choices are shaped by the gender makeup of her team and her motivations for participating in the program.

Results will show the creators of Botball and similar programs which of their educational elements actually affect girls' STEM-related choices. Results will be disseminated to educators, educational researchers, and developmental psychologists.

GRADE LEVEL: MIDDLE SCHOOL	
Southern Illinois University–Edwardsville	
Jerry Weinberg (jweinbe@siue.edu)	
http://www.botball.org/	05-22400
Keywords: research project, computer skills, self-confidence, retention, extracurricular, teacher training, peer groups, hands-on, activity-based, project-based, teamwork approach, survey, computer science, computer hardware, robotics, psychology, informal education, after-school, girls and technology	

GIRLS CREATING GAMES: INCREASING MIDDLE SCHOOL GIRLS' INTEREST IN TECHNOLOGY

COMPUTER GAMING IS TYPICALLY CONSIDERED A BOY'S ACTIVITY—AND A SOCIALLY ISOLATING ONE. THE GIRLS CREATING GAMES (GCG) PROGRAM IS A DEMONSTRATION AND RESEARCH PROJECT OF EDUCATION, TRAINING, AND RESEARCH ASSOCIATES THAT AIMS TO CHALLENGE THAT STEREOTYPE BY TEACHING GIRLS TO DESIGN AND PROGRAM THEIR OWN COMPUTER GAMES.

GCG meets for 23 sessions and is organized around four elements, each designed to help girls acquire competence in technological pursuits:

- *Learning by design*. Girls develop and produce their own original, narrative-based computer games using Flash MX software.
- *Scaffolding and modeling*. The use of hands-on, project-based learning, with support from peers, adults, and written materials, minimizes lecturing and helps girls gain a better understanding of concepts and a firmer grasp of concrete skills.
- *Collaborative learning*. Girls work in pairs on the computer, periodically exchanging roles as "driver" and "navigator."
- *Identity formation*. Fun interactive games (both on and off the computer) encourage career exploration and help girls discover what they like to do. Sessions are attended by female information technology students and professionals who demonstrate that women can be skilled and comfortable with computers. These role models strike a balance between helping the girls and encouraging them to solve problems independently.

Researchers analyzed data from 126 different middle school girls and found significant increases in participants' computer skills, confidence in working with computers, and independent problem-solving skills. There was also a decrease in girls' belief in the stereotype that boys do better than girls on computers. The project team has disseminated its findings at conferences, in book chapters, and in journal publications, and is currently preparing program guides so that others can use its activities.

GCG participants designed and programmed 48 games that deal with issues important to middle school girls, including negotiating peer pressure, doing well in school, and making friends. These games can be viewed and played at the project Web site.

GRADE LEVEL: MIDDLE SCHOOL
Education, Training, and Research Associates (California)
Jill Denner (Jilld@etr.org)
02-17221
http://webtecc.etr.org/gcgweb/protected/login/splash.cfm
Keywords: demonstration project, after-school, summer, self-confidence, self-efficacy, technology, informal education, research study, gender identity, real-life applications, evaluation, intervention, computer science, computer programming, computer games, intervention, urban, constructivism, role models, barriers, software, interactive, skills, teacher training, mentor training, peer groups, activity-based, cooperative learning, teamwork approach, Web site, data collection, girls and technology

2

Tch+

Tech Team

TECH TEAM

THE EDUCATIONAL TELEVISION ENDOWMENT OF SOUTH CAROLINA WORKED WITH THE SOUTH CAROLINA EDUCATIONAL TELEVISION NETWORK (SCETV) TO INCREASE MIDDLE SCHOOL GIRLS' ENTHUSIASM FOR TECHNOLOGY, TO IMPROVE THEIR UNDERSTANDING OF INFORMATION TECHNOLOGY, AND TO INTRODUCE THEM TO WOMEN WHO WORK IN SCIENCE AND TECHNOLOGY. TECH TEAM, WHICH WAS PRESENT IN THREE SOUTH CAROLINA SCHOOL DISTRICTS, INVOLVED AFTER-SCHOOL TECHNOLOGY CLUBS, WORKSHOPS IN COMPUTER APPLICATIONS AT SCETV, AND SUMMER TECHNOLOGY DAY CAMPS. PARTNERS INCLUDED LOCAL GIRL SCOUT TROOPS AND THE COLLEGE OF EDUCATION OF THE UNIVERSITY OF SOUTH CAROLINA.

In Tech Team's first year (2002–03), the girls used both informal and Internet-based research to identify local women in STEM fields, then conducted videotaped interviews with them, used a computer-based editing program to edit their interviews, and aired them via closed-circuit television to schools across South Carolina. They hosted two-way call-in shows, allowing students anywhere in the state to ask the girls questions.

In the second year of the project, the girls created a Web site about Tech Team, which was integrated into http://www.knowitall.org, SCETV's Web portal for teachers and students. In the third year, the girls created Flash-based educational animations that required them to learn computer codes. These were also posted on the Tech Team Web site. Each summer, the girls attended summer technology day camp at SCETV's Telecommunications Center in Columbia, where they worked in SCETV's computer labs and presented their work to an invited audience.

All along, a video crew documented Tech Team's progress and interviewed the participants. This material will form the basis of a CD-ROM to be produced for teachers' professional development. The CD-ROM will be mailed free of charge to every middle school in South Carolina and will be made available nationwide through SCETV's marketing division.

In partnership with TeacherLine (a Public Broadcasting System series of online professional development courses), Tech Team expanded its training to reach 150 more middle school teachers in South Carolina, North Carolina, and Georgia. The effort included Web conferences and on-site training opportunities to help teachers develop appropriate versions of Tech Team programs in their area. Each year of the two-year partnership culminated in a summer camp, where participating teachers addressed issues of program implementation and showcased their projects. The program offered 21 grants of $2,200, helping teachers who completed the first year of the program set up their own Tech Team after-school programs.

The Tech Team program received the 2005 Regional Innovator Award at the Summit on the Rural South conference, the 2005 Technology Innovative Programs Award at the South Carolina ED Tech Conference, and the 2004–05 Rural Education Program of the Year award from the South Carolina Association for Rural Education. It has also been cited as a model program by the National Alliance for Media Arts and Culture and the Department of Education's National Education Technology Plan. For more information about Tech Team, as well as resources for teachers and how to start a Tech Team, go to http://www.knowitall.org/techteam.

GRADE LEVEL: MIDDLE SCHOOL	
Educational Television Endowment of South Carolina, South Carolina Educational Television Network, Girl Scouts, and the College of Education of the University of South Carolina	
Betsy Newman (bnewman@scetv.org)	
http://www.knowitall.org/techteam	05-33585 and 02-17199
Keywords: education project, professional development, computer skills, communication skills, curriculum materials, career awareness, gender diversity awareness, summer, Saturday program, after-school, teacher training, workshops, clubs, summer camp, hands-on, project-based, inquiry-based, role models, real-life applications, Web site, television, broadcasting, school-based, computer technology, Girl Scouts, public television, mini-grant, informal education, girls and technology	

2
sDn
Girls as Education Software Designers

GIRLS AS EDUCATION SOFTWARE DESIGNERS

COMPUTER GAMES CAN BE USEFUL TOOLS FOR TEACHING SCIENCE, BUT ARE THEY FRIENDLY TO GIRLS? EXPERTS URGE MORE WOMEN AND GIRLS TO BECOME INVOLVED IN SOFTWARE AND HARDWARE DESIGN SO THEY CAN BEGIN TO TRANSFORM COMPUTER CULTURE.

The Involving Girls as Designers project at Michigan State University allowed girls to envision their own technology-enhanced science learning experiences. Researchers sought to learn whether girls and boys approach the design process differently and, if so, what makes the process "girl friendly."

IGD invited fifth-grade and eighth-grade boys and girls to work in small, gender-segregated teams to design their ideal science learning experience. Professional software developers then created "promos" of the designs, as if the games actually existed. These promos were analyzed, and all-girl and all-boy team designs were compared. The researchers compared fifth-grade girls (an age when enthusiasm for have science parallels that of boys) with eighth-grade girls (an age when enthusiasm for and a self-confidence in science have declined), looking for similarities and differences in attitudes.

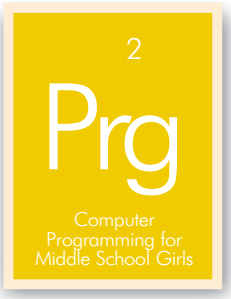
The promos were shown to 575 children in grades five through eight, without telling the respondents which gender created which games. Boys liked the game promos significantly better overall than did girls. Fifth- and sixth-graders rated the games significantly more fun overall than did seventh- and eighth-graders. Boys and girls did not differ significantly in their liking of the promos for all-girl-designed games. Boys rated the all-boy-designed games as significantly more fun than did girls. More gender differences emerged when researchers looked at how the children ranked the games. Girls ranked all-girl-designed games significantly higher than did boys. Boys ranked the all-boy-designed games significantly higher than did girls.

Research findings also showed that games designed by all-girl teams were perceived as being better for learning. Games designed by girls tended to emphasize storylines, multiple levels of difficulty, and sufficient instructions, while those designed by boys emphasized action, weapons, and challenging levels of difficulty.

Games are still a male-oriented medium. Students perceive games as being either for everyone or more for boys; none of the games was thought to be for girls only. The researchers hope the project will provide compelling evidence to software developers about the importance of involving girls as designers.

Current research findings and related papers are available at http://aliengames.org/. These findings are being applied in two follow-up projects. The research team designed a learning game that accommodates and collects information about male and female styles of play; it is being used in a large-scale research project to study the relationships between gender, learning, and style of play, and can be found at http://gel.msu.edu/lifepreservers/.

GRADE LEVEL: ELEMENTARY SCHOOL, MIDDLE SCHOOL
MICHIGAN STATE UNIVERSITY
CARRIE HEETER (HEETER@MSU.EDU)
02-17197
HTTP://ALIENGAMES.ORG/ AND HTTP://GEL.MSU.EDU/LIFEPRESERVERS/
KEYWORDS: RESEARCH PROJECT, DEMONSTRATION, ENGAGEMENT, COMPUTER SKILLS, GENDER DIFFERENCES, GENDER DYNAMICS, EXTRACURRICULAR, WORKSHOP, PEER GROUPS, HANDS-ON, PROJECT-BASED, TEAMWORK APPROACH, COMPUTER GAMES, MIXED GENDER, GIRLS AND TECHNOLOGY, PSYCHOLOGY, INFORMAL EDUCATION, AFTER-SCHOOL, GIRLS AND TECHNOLOGY



COMPUTER PROGRAMMING FOR MIDDLE SCHOOL GIRLS

TO ADDRESS THE SERIOUS SHORTAGE OF WOMEN IN COMPUTER SCIENCE, RESEARCHERS AT NEW YORK UNIVERSITY, HUNTER COLLEGE, AND THE UNIVERSITY OF SOUTHERN CALIFORNIA ARE DEVELOPING A SOFTWARE ENVIRONMENT FOR "REAL-TIME APPLIED PROGRAMMING FOR UNDERREPRESENTED STUDENTS' EARLY LITERACY" (RAPUNSEL). THE PROJECT, AIMED SPECIFICALLY AT TEACHING COMPUTER PROGRAMMING TO MIDDLE SCHOOL GIRLS, INVOLVES A SIMULATION GAME IN WHICH GIRLS CREATE AND MANIPULATE ON-SCREEN "CHARACTER AGENTS."

The RAPUNSEL environment offers an error-reducing code editor environment in which players can write code for dances and receive immediate feedback by observing changes in the way their characters move. Each time a player's code is viewed by another player, the author receives several points; when the code is actually borrowed and used by another player (and travels throughout the game-world), the originator receives many more points. This encourages players not only to concoct interesting and inventive dance sequences, but also to share them with their peers.

In designing, testing, and using RAPUNSEL projects, a team of scientists, artists, designers, and educators is working with small groups of girls as design partners. Education consultants include teachers from middle schools in New York City and the Los Angeles metropolitan area. These middle schools also serve as the locations for the large-scale assessment phase of the program.

GRADE LEVEL: MIDDLE SCHOOL	
NEW YORK UNIVERSITY, HUNTER COLLEGE, AND UNIVERSITY OF SOUTHERN CALIFORNIA	
KENNETH PERLIN (PERLIN@MRL.NYU.EDU)	
HTTP://WWW.RAPUNSEL.ORG/	03-32898
KEYWORDS: RESEARCH PROJECT, SELF-CONFIDENCE, SELF-EFFICACY, SELF-AUTHORSHIP, ENGAGEMENT, SKILLS (PROBLEM-SOLVING, COMPUTER, SPATIAL), GENDER DIFFERENCES, ACHIEVEMENT, CO-CURRICULAR, ALL-YEAR, LONGITUDINAL STUDY, TEACHER TRAINING, PEER GROUPS, HANDS-ON, ENGAGED LEARNING, PROJECT-BASED, ACTIVITY-BASED, PROBLEM-BASED, EXPLORATION-BASED, COOPERATIVE LEARNING, COLLABORATIVE LEARNING, MENTORING, INTERACTIVE, SOFTWARE, COMPUTER GAMES, DISSEMINATION PLAN, DESIGN-BASED, WEB SITE, ONLINE TUTORIALS, SCHOOL-BASED, COMPUTER PROGRAMMING, COMPUTER TECHNOLOGY, COMPUTER SCIENCE, INDUSTRY PARTNERS, INFORMAL EDUCATION, TOOLS, CONNECTIONS, CARTOONS, ANIMATIONS, GIRLS AND TECHNOLOGY	

HEAR OUR VOICES AND THE COMPUTER CLUBHOUSE

IN 1993 THE COMPUTER CLUBHOUSE OPENED ITS DOORS AT THE COMPUTER MUSEUM IN BOSTON AS AN AFTER-SCHOOL RESOURCE FOR YOUNG PEOPLE AGED 8 THROUGH 18 TO EXPLORE THEIR OWN IDEAS AND INTERESTS THROUGH TECHNOLOGY. GUIDED BY ADULT MENTORS WHO SERVE AS ROLE MODELS. AS OF MAY 2005, A NETWORK OF 100 CLUBHOUSES WAS OPERATING IN SEVERAL STATES AND WASHINGTON, D.C., AS WELL AS AROUND THE WORLD. THIS NETWORK SERVES THOUSANDS OF YOUNG PEOPLE.

For girls specifically, the flagship Computer Clubhouse (which moved to the Boston Museum of Science in 1999) has offered access to technology resources, female mentors, a community of peers, and a supportive learning environment since 1995. The Hear Our Voices program, created in 2002, expands these services in the following ways:

- Nearly 20 Computer Clubhouses in the United States receive funding and support to hire and train staff dedicated to gender diversity and girls' programming.

- Network staff from the Museum of Science provide local Clubhouse coordinators with professional development and assistance for girls' programming.
- A secure Intranet-based program called Clubhouse Village supports both real and virtual Clubhouse communities. The Village's tools allow young people to communicate with one another and collaborate on projects, with one site area designated specifically for girls' activities. The Village also allows staff to share ideas and "best practices" across the Clubhouse network.
- In 2004 a Computer Clubhouse Youth Summit took place, allowing young people and staff in the virtual community to meet in person.

Clubhouses are usually located in Boys and Girls Clubs, Urban League centers, and other youth-oriented venues. With support from the Intel Corporation and other corporate sponsors, the Clubhouse Network is expected to continue serving youth across the country.

GRADE LEVEL: ELEMENTARY SCHOOL, MIDDLE SCHOOL, HIGH SCHOOL	
COMPUTER CLUBHOUSE, BOSTON MUSEUM OF SCIENCE (MASSACHUSETTS)	
GAIL BRESLOW (GBRESLOW@MOS.ORG)	
HTTP://WWW.COMPUTERCLUBHOUSE.ORG/PROGRAMS/HOV/INDEX.HTM	02-17138
KEYWORDS: DEMONSTRATION PROJECT, SELF-CONFIDENCE, SELF-EFFICACY, RECRUITMENT, ENGAGEMENT, SKILLS (COMPUTER), GENDER-DIVERSITY AWARENESS, BARRIERS, CAREER AWARENESS, ADVANCEMENT, ACHIEVEMENT, ENVIRONMENTAL FACTORS, AFTER-SCHOOL, EXTRACURRICULAR, ALL-YEAR, LEARNING COMMUNITY, PEER GROUPS, STUDY GROUPS, CLUB, RESOURCE CENTER, ENGAGED LEARNING, ACTIVITY-BASED, EXPLORATION-BASED, COOPERATIVE LEARNING, COLLABORATIVE LEARNING, MENTORING, SUPPORT SYSTEM, SOFTWARE, WEB SITE, COMMUNITY-BASED SITE, MINORITIES, UNDERPRIVILEGED, LATINA, NATIVE AMERICAN, AFRICAN AMERICAN, ASIAN AMERICAN, COMPUTER TECHNOLOGY, COMPUTER SCIENCE, TECHNOLOGY, INDUSTRY PARTNERS, MUSEUM, BOYS AND GIRLS CLUBS, INFORMAL EDUCATION, GIRLS AND TECHNOLOGY	

GIRLS AND INFORMATION TECHNOLOGY: A PROMOTIONAL VIDEO

THE CENTER FOR WOMEN AND INFORMATION TECHNOLOGY AT THE UNIVERSITY OF MARYLAND–BALTIMORE COUNTY HAS DEVELOPED AND DISSEMINATED A SHORT VIDEO ABOUT WOMEN'S ABILITY TO SUCCEED IN CAREERS. THE VIDEO USES POP MUSIC, STRIKING COLORS, AND FLASH ANIMATION TO CAPTURE THE ATTENTION OF YOUNG VIEWERS GATHERED AT CAREER FAIRS, SCHOOL ASSEMBLIES AND CLASSROOMS, AND OTHER EVENTS WHERE OPPORTUNITIES FOR WOMEN IN INFORMATION TECHNOLOGY ARE DISCUSSED AND PROMOTED.

Video Press, a small for-profit arm of the University of Maryland–Baltimore County, collaborated with a committee of UMBC faculty and staff to create a four-minute video titled "You Can Be Anything," aimed at girls and young women aged 12 through 20. The executive producer modeled the video on one developed by General Motors. The Women and IT Video Project (WITVP) also developed a speakers' program to train female students and faculty from UMBC, along with representatives from the local business community, to use the video to promote awareness of women in information technology.

WITVP used information gathered from the speakers program to formulate guidelines for integration of the video into any speaking event. These guidelines were included in a booklet initially distributed with the videos to institutions throughout Maryland. Currently, the information is hosted on the Center For Women and Information Technology Web site (http://www.umbc.edu/cwit/video.html), along with a lesson plan for using the video to educate eighth-graders about information technology career opportunities. In addition to its Web site, WITVP disseminates materials nationally through journals, conferences, public school systems, electronic discussion lists, radio and television, and community and four-year colleges and universities.

Partners in this project included Meade Middle School; Pine Grove Middle School; Parkville High School and Center for Science, Mathematics, and Computer Science; the Community College of Baltimore County; and a number of local and national businesses. The project had been expected to disseminate 100 copies of the DVD but ended up distributing 819 by

the conclusion of the grant; many were used to make additional copies for national and international distribution. Following the release of the video, Web site visitation increased by an average of 20,000 hits per month. The video also won two awards, a silver and a gold, at the International Film and Video Festival in New York City in 2004.

The project team worked with an external evaluator to assess whether the video helped speakers educate students about career opportunities for women in information technology fields. Reported outcomes of the evaluation were as follows:

- Females were significantly more appreciative of the video than males and gave a higher rating to the video's impact on their understanding of technology.
- Females reported more often than males that the video made them more confident in choosing a technology career.

GRADE LEVEL: MIDDLE SCHOOL, HIGH SCHOOL, UNDERGRADUATE	
University of Maryland–Baltimore County and Video Press	
Claudia Morrell (cmorrell@umbc.edu)	
http://www.umbc.edu/cwit/video.html	02-25079
Keywords: dissemination project, self-confidence, engagement, career awareness, extracurricular, mentor training, field-trip, science clubs, dissemination plan, Web site, video, booklet, community-based site, computer technology, computer science, information technology, technology, industry partners, television, girls and technology	

TECH SAVVY

IN 2000, THE AMERICAN ASSOCIATION OF UNIVERSITY WOMEN (AAUW) PRODUCED A REPORT TITLED *TECH SAVVY: EDUCATING GIRLS IN THE NEW COMPUTER AGE*. THE REPORT SUMMARIZED RESEARCH INTO GIRLS' LACK OF INTEREST IN TECHNOLOGY BOTH AS A SUBJECT AND AS A POTENTIAL LINE OF WORK. IT SUGGESTED THAT IF GIRLS ARE TO DEVELOP A STRONGER INTEREST IN TECHNOLOGY FIELDS, EDUCATIONAL APPROACHES TO THE SUBJECT FROM EARLY CHILDHOOD THROUGH HIGH SCHOOL MUST CHANGE.

To help prompt the needed reforms, AAUW created a Tech Savvy video and resource guide for educators, parents, and community-oriented professionals. Using its national network of 100,000 members (including parents, educators, and students), 1,300 branches, and 600 college and university member institutions, the AAUW Educational Foundation distributed copies of the video and guide along with the original report. In addition, the video was broadcast over the Fairfax County, Virginia, Public Schools satellite television network and similar networks.

GRADE LEVEL: ELEMENTARY SCHOOL, MIDDLE SCHOOL, HIGH SCHOOL
American Association of University Women (District of Columbia)
Nancy Eynon Lark (foundation@aauw.org)
03-32841
Keywords: dissemination project, engagement, skills (computer), gender-diversity awareness, barriers, career awareness, curriculum materials, gender differences, gender identity, intervention, systemic reform, departmental climate, environmental factors, teacher training, staff training, mentor training, counselor training, role models, mentoring, support system, real-life applications, dissemination plan, television, broadcasting, manual, video, computer technology, computer science, computer hardware, information technology, industry partners, informal education, transition points, tools, connections, girls and technology

2

PrP

Programming With a Purpose

PROGRAMMING WITH A PURPOSE

ACCORDING TO RESEARCH, COMPUTER PROGRAMMING IS NOT INTRINSICALLY INTERESTING TO MANY GIRLS. THEY ARE MORE LIKELY TO BE ATTRACTED TO LEARNING THAT INVOLVES A MEANINGFUL CONTEXT, ESPECIALLY AS A WAY TO SOLVE A GENUINE SOCIAL, PERSONAL, OR ENVIRONMENTAL PROBLEM. OBJECT-ORIENTED PROGRAMMING LANGUAGES (SUCH AS JAVA) ALLOW ONE TO PROGRAM BY MANIPULATING THE RELATIONSHIPS BETWEEN OBJECTS IN A NARRATIVE CONTEXT RATHER THAN EXECUTING ABSTRACT LINEAR CODE. THE CENTER FOR CHILDREN AND TECHNOLOGY AT THE EDUCATION DEVELOPMENT CENTER IN NEW YORK IS INVESTIGATING WHETHER THIS APPROACH DOES, IN FACT, MAKE PROGRAMMING MORE ACCESSIBLE TO GIRLS.

In this experimental research project, ninth-grade girls in an introductory computer programming class at a predominantly Latino urban high school (Union Hill High School in New Jersey) are learning to use flexible "drag and drop" software to choreograph ice-skating routines. The treatment group is designing ice-skating performances by combining and shaping various routine elements into an executable, cohesive program. The control group is using the same research tool to assemble subroutines identical to those of the treatment group, but instead of a graphic interface that shows skaters dancing in a rink, students in the control group work with abstract shapes moving across the screen (as in a screen saver).

The investigators are conducting surveys before and after the class, as well as interviews, to determine whether girls' understanding of core programming skills and concepts (e.g., sequential thinking, understanding parameters and variables, and the structure of code) improves when they learn programming within a rich narrative context.

GRADE LEVEL: HIGH SCHOOL
EDUCATION DEVELOPMENT CENTER (NEW YORK)
CORNELIA BRUNNER (CBRUNNER@EDC.ORG)
03-32862
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