Advances in Gender and Education, **1** (2009). Printed in the USA.

Table of Contents

From the Editor **1**

From the Publisher **2**

Original research articles: scholarly articles relevant to gender and education

Caitlin Kelleher, "Barriers to programming engagement" **5**

Jennifer Madigan, "The education of girls and women in the United States: a historical perspective" **11**

Margaret Ferrara, "The student and the teacher: making a match in the single-gender classroom" **14**

Eyewitness Accounts: first-hand reports from educators and administrators

David Chadwell, "South Carolina: lessons from two years of a statewide initiative" **22**

Annette Duncan and Amy Schmidt, "Building Sisterhood and Brotherhood in Gender-Specific Classrooms" **24**

Margaret Ferrara, "From the streets to the classroom: an interview with Roynell Young" **26**

Advances in Gender and Education is a peer-reviewed scholarly journal published by the Montgomery Center for Research in Child & Adolescent Development (MCRCAD) doing business as the National Association for Single Sex Public Education (NASSPE). Additional copies are available for $16.00/copy plus $4.00 shipping ($20 total) from NASSPE, 64 E Uwchlan Avenue, #259, Exton, Pennsylvania 19341, telephone 610 296 2821.

Submissions for future issues should be sent to the Editor:

Professor Margaret Ferrara
College of Education
University of Nevada, Reno
Mail Stop 0280
Reno, Nevada 89557-0280
E-mail: ferrara@unr.edu.

For complete submission guidelines, please go to www.drmmferrara.com, click on "want to publish."

Advances in Gender and Education, **1** (2009), 1. Printed in the USA.

From the Editor

Margaret Ferrara
University of Nevada at Reno

Welcome to the first edition of *Advances in Gender and Education* (A.G.E.), a journal that reviews gender and single-sex learning arrangements with the goal of helping educators broaden educational horizons for girls and boys. The topics in the journal cover a wide range of subjects including educational theory, educational practice, and interactions between gender and race/ethnicity/SES in the classroom. The journal also opens the door for discussions on sex differences in physiology, psychology, sociology, art and culture, and historical perspectives on gender in education. Our hope is that a better understanding of gender influences and practices in our education initiatives will set the stage for expanding educational and cultural horizons, as well as breaking down gender stereotypes.

This first edition would not have been possible without the continuous support of Dr. Leonard Sax, a visionary leader, who continues to be a tenacious fighter for the cause of single-gender schools. To date, there are 542 public schools in the United States that offer single-sex classrooms. Imagine the growth that will take place between now and the next publication of *A.G.E.*

The submissions for this journal have received extensive reviews through the support of a scholarly team. Special thanks to Emily Grace, MA, University of North Carolina at Wilmington; Peter J. Ferrara, EdD, educational consultant and former school superintendent; Jennifer Madigan, EdD, San Jose State University, CA; Cleborne Maddux, PhD, University of Nevada, Reno; and Jim Studer, EdD, Assistant Principal, Washoe County School District, Reno, NV.

This first edition covers a spectrum of topics – beginning with a retrospective from Dr. Sax tracing how the National Association for Single Sex Public Education was founded – with insights he gained by observing how students learn and thrive in these classrooms. Articles such as the study by Caitlin Kelleher show that girls have a unique preference for computer science and engineering, especially if the learning format is in a graphic design setting. Jennifer Madigan brings an interesting historical perspective on the educational experiences of girls and women in the United States beginning in the colonial settlement days. She shows that classrooms are replete with opportunities for scholarly research. The research section concludes with a description of a research instrument that I have designed and validated with elementary and secondary teachers. This instrument helps provide teachers with an insight into their teaching styles to enable them to match the learning style of students in single and mixed gender classrooms.

Other contributions bring insight into what is happening in schools – starting with the success of Roynell Young with Pro-Vision, a Houston-based organization serving boys from low-income neighborhoods. Annette Duncan and Amy Schmidt share their impressions of single-gender classes in an elementary school in Iowa, while David Chadwell concludes this section by sharing insights on the successes of over 200 schools with single-gender classes in South Carolina.

You can see that the journal is filled with a variety of topics that I hope will foster continued discussion and debate. I know you will enjoy and learn from what you read in this journal. You are invited to contribute your writing to this journal. For publication specifications, go to www.drmmferrara.com. I look forward to hearing from you.

Margaret Ferrara PhD
University of Nevada at Reno
Reno, Nevada

Advances in Gender and Education, **1** (2009), 2-4. Printed in the USA.

From the Publisher

Leonard Sax
Montgomery Center for Research in Child & Adolescent Development

The origins of this journal can be traced back almost 15 years, to a day when a little boy named Andrew Phillips came home from school on the brink of tears. The teacher had given each of the children in the class a small box of crayons and a blank sheet of white paper. "Let's have a little creative time. Draw whatever you want," the teacher had said.

Andrew had used his black crayon to draw two stick figures stabbing each other with knives. Other kids in the class (which happened to be mostly girls) had drawn colorful pictures of people and pets and flowers and trees. The people in the girls' pictures had hair on their heads; they had clothes on their bodies. Andrew's stick figures had none of these adornments. The teacher praised the girls' drawings, but not Andrew's.

Andrew came home upset. His mother Janet arranged to speak to the teacher, who was unapologetic. "Actually, I considered making a referral," the teacher said.

"A referral? What do you mean?" Janet asked.

"A referral to mental health. After all, he did draw two people attacking each other with knives."

"But he's a six-year-old *boy*," Janet said.

"Of course he is, and that's why I decided against initiating the referral."

A child's choice of what he or she wants to draw says something important about who that child is. A boy who wants to draw pictures of soldiers fighting, or rocket ships smashing into planets, is a different sort of child from the girl (or boy) who wants to draw children, or pets, or flowers.

Here's an old fable:

> *Nasrudin was the chief keeper of ornamental birds for the king. One day, walking about the royal grounds, he saw a falcon which had alighted on a tree. He took out his scissors and trimmed the claws, the wings, and the beak of the falcon. "That is at least some improvement," he said. "Your keeper had evidently been neglecting you."*
>
> *Moral: You cannot turn a falcon into a robin or a dove. You will merely succeed in ruining the falcon.*

The teacher had said, "Why can't you draw something less violent? Something more like what Melissa drew, or Emily?" But what Andrew heard was *Why do you have to be who you are, why can't you be someone else?* Why do you have to be a falcon? Why can't you be a robin, or a dove?

Gretchen was a bright girl, outgoing and talkative with her friends, but in class she tended to be quiet. One day the teacher asked whether anyone could name the capitol of Australia. Nobody raised their hand. After class, the teacher called Gretchen aside. "Gretchen, you spent a month in Australia last year. You knew the answer to that question, didn't you?"

Gretchen nodded.

"Why didn't you raise your hand?" the teacher asked.

"I was pretty sure I knew," Gretchen said. "But I wasn't 100% sure, maybe just 98% sure."

"Gretchen, 98% is good enough. If you wait until you're 100% sure, you'll never raise your hand."

Gretchen nodded. But she still wouldn't raise her hand.

Address correspondence to: Leonard Sax, MCRCAD / NASSPE, 64 E Uwchlan Ave., #259, Exton PA 19341.
E-mail: nasspe@verizon.net. Telephone: 610 296 2821. Facsimile: 610 993 3139. Website: www.nasspe.org.

Andrew's Mom pulled him out of the well-regarded private coed school he was attending and transferred him to an all-boys school. Before long he was drawing again. The teachers at the boys' schools weren't so insistent on the boys using lots of different colors. Instead, they asked the boys to tell the stories behind the pictures. Andrew loved telling his stories about heroes and dragons and battles. One of his drawings, from 2nd grade, is shown at right. The caption reads "He shook his lance and it shot a lazer and it cilled the dragon. But it was stilt ULIV."

Andrew blossomed at the boys' school. He became not only an artist, but a writer, an actor, and an athlete. And what an athlete. Andrew grew into the most talented athlete I ever saw in my 22 years of medical practice. By the time he graduated from Georgetown Prep (another all-boys school), he was 6'8" tall, 290 pounds of solid muscle. He was recruited by almost every NCAA Division I football program. He chose Stanford because it had the best academics of any program offering him a scholarship. At Stanford he is majoring in the classics, studying Latin and Greek – and he made several crucial plays in Stanford's remarkable upset of #1-ranked USC, a game in which Stanford was a 40-point underdog. Andrew is on his way to being a real celebrity, so he doesn't mind my using his real name here.

His mother, Janet Phillips, has sent all four of her sons through boys' private schools. It's expensive, but Janet and her husband believe it's worth the cost.

Back in the spring of 2002, Janet and I were discussing her four sons. "I shudder to think what would have happened if I hadn't had any other options, if I had to leave Andrew at a coed school," Janet said. "I think he would have become one of those boys who hate school."

"It's lucky you and your husband were able to get him into a good boys' school," I said.

"We've been fortunate," Janet agreed. "But what about parents who aren't so fortunate? What about parents who can't afford boys' private schools, or who don't have access to a boys' school in their city?"

"There are more than 90,000 public schools in the United States, but fewer than a dozen of them offer single-sex classrooms," I said. We both wondered: Why couldn't more schools offer single-sex classrooms, as a *choice,* for parents who want that option?

.Gretchen's parents decided to enroll Gretchen at the Agnes Irwin School, an all-girls school near Philadelphia. The Agnes Irwin School – like many other girls' schools – has programs in place specifically designed to build girls' self-confidence, to help girls take appropriate risks. The photo at right shows a girl from St. Michael's Collegiate, a Tasmanian girls' school I visited in 2008. Their rock-climbing program begins with the basics. The instructors build on that foundation, one step at a time, until it's no big deal to rappel down the sheer cliff at Freycinet over the Tasman Sea. *Every* girl at the school does this.

Programs like these empower girls. If you have rappelled down a cliff over open water, it's no big deal to raise your hand to answer a question in class.

It wasn't long before Gretchen began speaking up in the all-girls classrooms. Ultimately she went to medical school; then she completed a seven-year residency in neurosurgery. Neurosurgery is a specialty which is overwhelmingly dominated by men, but that didn't faze her. "Four years at a girls' school gave me the belief that I can do absolutely anything – or at least it gave me the courage to try. I'm not afraid to try."

The Montgomery Center for Research in Child & Adolescent Development (MCRCAD), doing business as the National Association for Single Sex Public Education (NASSPE), was founded in March 2002. The founders included my friend Janet Phillips, mother of Andrew. At the time, it seemed a very pretentious name.

After all, there were at that time only eleven public schools in all of the United States which offered single-sex classrooms.

As I write this, in 2009, more than 560 public schools in the United States offer single-sex classrooms. About 90 of those schools are completely single-sex campuses: all-girls or all-boys. The remainder are coed schools with single-sex classrooms.

Our founding belief, as expressed by Janet Phillips, is that *every parent in every city or town large enough to have 75 kids in a grade level should have the CHOICE of single-sex education for their children.* We're not saying that every child should be in a single-sex classroom. We're saying that every parent should have the choice. We mention "75 kids in a grade level" because if your school has 75 kids in a grade level, you already have three classrooms. It won't cost you anything more to offer one girls' classroom, one boys' classroom, and one coed classroom for parents who prefer that format.

We have learned a great deal over the past seven years. In particular, we have learned that simply putting girls in one room, and boys in another, does not reliably accomplish very much. In some cases it has led to catastrophe. The teacher who has 20 years' experience under her belt is sometimes dismayed to find that the boys who were reasonably well-behaved in her (coed) classroom last year are now, in the all-boys classroom, jumping up and down and throwing things. "This whole idea of putting the boys all in one room is the craziest, stupidest notion I ever heard of," one teacher wrote to me in an e-mail after her first week in an all-boys classroom. Her 20 years' experience in the coed classroom provided her no clue whatsoever regarding the classroom management techniques she would need in the all-boys classroom. In fact, her experience was a handicap. She kept trying to do things that had worked in the coed classroom. No one had explained to her that best practice for classroom management in the all-boys classroom is fundamentally different.

That's what our Association is here for. We are trying to understand and to document the emerging science of gender difference as it pertains to education, and to share what we have learned. We recognize that "the emerging science of gender difference" refers not only to differences *between* sexes but also to variation *within* each sex: the fact that some girls would rather play football rather than chat with friends; the fact that some boys would rather chat with friends rather than play football. We are learning a great deal about within-sex variations as well as between-sex differences.

The single-sex format facilitates the application of many of the principles we are discovering. As I said, the single-sex format doesn't accomplish much if the classroom is led by a teacher who has no training in how to take advantage of the format. That's what our professional development workshops, and our conferences, are all about. Conversely, teachers in coed classrooms have been successful in broadening educational horizons for both girls and boys when they have had this training.

At our most recent meeting, I and the other members of the NASSPE Advisory Board recognized the need for a journal which would provide an appropriate channel for educators to share what they have learned about what works best for girls, and what works best for boys. That's one key mission for this new publication. We also want *Advances in Gender and Education* to serve as a rigorous, peer-reviewed forum suitable for scholarly publications by full-time academic researchers. And, we thought that the journal should also be home for the occasional reflective essay – such as this one.

I look forward to the journey. I hope you will take part. Please be in touch.

Leonard Sax MD PhD
Executive Director, MCRCAD / NASSPE
Exton, Pennsylvania

The story of the falcon and Nasrudin was adapted from "The Royal Pigeon" in Anthony de Mello, *The Song of the Bird,* New York: Doubleday, 1982.

The photograph of the girl on the cliff at Freycinet is reproduced by permission of St. Michael's Collegiate School, Sandy Bay, Tasmania.

Andrew Phillips' drawing is reproduced by permission of Andrew and his mother.

Advances in Gender and Education, **1** (2009), 5-10. Printed in the USA.

Barriers to Programming Engagement

Caitlin Kelleher
Washington University in St. Louis

In this article, we describe the results of a study comparing middle school aged girls' programming behavior in two programming environments: Storytelling Alice and Generic Alice, designed to enable the creation of animated stores and 3D graphics programs, respectively. The study found that girls who used Storytelling Alice spend 42% more time programming than girls who used Generic Alice and were more than 3 times as likely to sneak extra time to keep programming. We analyze the kinds of programs that girls produce in both systems and identify barriers that keep girls from fully engaging with computer programming.

Keywords: computer science education, programming, middle school, girls, engagement

Computer programming skills are becoming a valuable tool in nearly every career field ranging from medicine and basic science to business and finance. Despite the growing importance of computing, fewer than 20% of computer science students are female (College Board, 2008; Vegso, 2006). Some research indicates that when girls and boys have similar comparable programming experience, they show similar interest in and success at learning basic programming concepts (Harel, 1991; Kafai, 1995; Linn, 1985). In one study of gender and programming achievement within MOOSE Crossing (Bruckman, 1997), a programming environment designed for young students, Bruckman, Jenson, and DeBonte (2002) found that programming performance correlated with users' prior programming experience and the amount of time users spent programming. The study found no significant correlation between gender and programming performance. However, boys who used MOOSE Crossing spent significantly more time programming than girls (Bruckman et al., 2002). One of the keys to increasing the participation of girls in computer science may lie in motivating girls to program.

The middle school years are a critical time during which many girls decide whether or not to seriously pursue the study of math and science based disciplines (Gill, 1994; Zimmer, 1987). While many girls have a strong interest in science during elementary school, their opinions of math and science courses and careers become increasingly negative during middle and high school (AAUW, 1990; Zimmer, 1987). During middle school, girls decreasing interest in math and science is coupled with decreasing confidence (AAUW, 1990; Dossey, Mullis, et al., 2000) and achievement (Fennema & Sherman, 1977) in these subjects. In this article, we describe the results of a study comparing middle school aged girls' programming behavior in two programming environments. In Storytelling Alice, programming is presented as a means to the end of storytelling. The environment was designed to make the kinds of stories that middle school girls envision telling approachable (Kelleher & Pausch, 2006). Generic Alice presents programming as the end goal and enables users to write programs that control the motions of objects in a 3D virtual environment. The study found that girls who used Storytelling Alice spend 42% more time programming than girls who used Generic Alice and are more than 3 times as likely to sneak extra time to keep programming. To provide additional insight into girls' experiences with both systems, we describe the kinds of programs that girls produce in both systems and identify barriers that keep girls from fully engaging.

Address correspondence to: Caitlin Kelleher, Department of Computer Science and Engineering, 1 Brookings Dr., St Louis, MO 63130.
E-mail: ckelleher@cse.wustl.edu.

Two other programming environments for girls are designed to provide a motivating context for learning computer programming: In Virtual Family (Duplantis, MacGregor, Klawe, & Ng, 2002) programming enables users to build comic strips about a family. In RAPUNSEL (Flanagan, Howe, & Nissenbaum, 2005) programming enables girls to create dance animations. To the best of our knowledge, no formal studies demonstrate that either system motivates girls to program.

Methods

The goal of this study was to understand the potential impact of a storytelling focus on middle school girls' interest in and success at learning to program. To investigate the impact of storytelling, we conducted a between-subjects study comparing middle school girls' behavior in two novice programming environments: Storytelling Alice and Generic Alice. Both Storytelling Alice and Generic Alice enable users to construct programs using drag and drop (Kelleher et al., 2002). The drag and drop method of program construction prevents users from making syntax errors, a common source of frustration for beginning programmers (Kelleher et al., 2002).

Storytelling Alice and Generic Alice differ in three ways:

1. Programming Actions: Storytelling Alice provides high-level animations inspired by girls' storytelling goals. In Storytelling Alice, human characters walk, speak, and interact with objects in their environment. Generic Alice provides animations inspired by 3D graphics transformations (Conway et al., 2000). Users can combine basic actions like changing position, rotating or resizing to create complex actions like walking, but this can be time consuming.
2. Tutorial: The tutorials in both Storytelling Alice and Generic Alice introduce the same programming concepts in the same order. In Storytelling Alice, the tutorial users build simple stories. In Generic Alice, tutorial users build programs that move, turn, and resize 3D objects.
3. Gallery of 3D Objects: The characters included with the Storytelling Alice gallery include character-specific animations designed to help users generate story ideas (Kelleher and Pausch, 2006). 3D objects in the Generic Alice gallery do not include custom animations.

Participants

Eighty-eight girls from local Girl Scout troops participated in the study. The participants were randomly assigned to use either Storytelling Alice (43 participants) or Generic Alice (45 participants). The average age for participants was 12.6 years. To encourage the participation of students not drawn to computers, we donated $10 to the Girl Scout troop for each participant.

Workshop Details

During the study, participants were given two hours and fifteen minutes to complete the tutorial and create a program "to show everyone" using the version of Alice to which they were assigned. Next, users took a programming quiz and completed an attitude survey. Then, participants had thirty minutes to try the other version of Alice (Generic Alice participants tried Storytelling Alice and vice versa). At the end of the workshop, participants selected either Storytelling or Generic Alice to take home and chose a program they created to share with other workshop participants.

To avoid bias, we gave the same instructions to the control and experimental groups. We referred to Generic Alice and Storytelling Alice as Alice Green and Alice Blue, respectively.

Quantitative Results

We will consider three types of quantitative data: programming behavior, motivation indicators, and learning outcomes. We provide an overview of results in this section. Additional details can be found in Kelleher, Pausch & Kiesler (2007).

Programming Behavior

There are three high-level activities available within both Generic Alice and Storytelling Alice: scene layout (e.g. adding and arranging 3D objects in the 3D scene), editing programs (e.g. adding, deleting, or modifying lines of code that control the actions of characters in the 3D scene, and running programs (e.g. viewing the animation output of the current program). Based on log data, we found that participants who used Storytelling Alice spent 42% ($p < .001$) more time editing their programs and 54% ($p > .001$) less time on scene layout than users of Generic Alice.

Motivation Indicators

At the conclusion of the workshop, we left a 5-10 minute break. The break was designed to enable us to determine how many participants would keep programming by choice. During this break time, 16% of Generic Alice users and 51% of Storytelling Alice users snuck extra time to continue working on their programs ($\chi^2 = 20.18$, d.o.f. = 2, $p < .001$). The increased tendency among Storytelling Alice users to sneak extra time suggests that the storytelling focus helped to make programming a compelling activity for middle school aged girls. This behavioral evidence is reinforced by the attitude survey: participants who used Storytelling Alice had a stronger interest in using Alice in the future than participants who used Generic Alice ($F[1,86]=3.9$, $p=.05$). Additionally, there was a strong correlation between participants' interest in future Alice use and their interest in pursuing Computer Science ($r = .54$, $p < .0001$).

Learning Outcomes

The focus on creating a more motivating programming environment creates the potential that increased motivation can come at the expense of educational value. We found no significant differences in programming quiz performance between participants who used Storytelling Alice and Generic Alice. Given the evidence that participants using Storytelling Alice spent more time actually programming, the lack of a measurable learning difference may seem initially surprising. The Storytelling Alice participants spent a larger portion of their time programming. However, because of the short duration of the programming session, the percentage difference translates to an average time difference of 12 minutes. We expect that with extended use, we would see the Storytelling Alice users show learning gains commensurate with their additional time on task.

Qualitative Results

Participants created different types of programs in Generic Alice and Storytelling Alice. The kinds of programs they created highlight four barriers to full engagement with programming.

Generic Alice Programs

One of the striking patterns within the programs created with Generic Alice was the lack of apparent intentionality. Only 38% of the Generic Alice participants produced programs which show evidence of intentional animation. We observed four general types: arbitrary motion, character motion, story-like sequences, and choreographed dance routines.

Arbitrary Motion (62%): 28 of the 45 programs participants created using Generic Alice appear to be arbitrary animation: characters and/or their body parts move around the screen without any apparent intentionality. These programs show no evidence that participants had goals they were working towards. Figure 1-1 shows a typical arbitrary motion program in which characters and their body parts rotate around different axes and fly to different positions in space.

Character Motions (16%): After some initial experimentation with Generic Alice animations and constructs, some users began to develop a mental model that may have helped them to create intentional animations. 7 of the 45 Generic Alice programs contained one or two simple character motions (e.g. a cow moving its tail or a bunny jumping up and down) but were otherwise arbitrary motion. These worlds show users beginning to transition from experimentation to building specific animations for their 3D characters. See Figures 1 and 2.

Figure 1 (left): Examples of programs participants created in Generic Alice: 1) an arbitrary motion program; objects and their parts move around in space, 2) a program containing a character motion; a girl waves hello, 3) a choreographed dance routine for penguins, and 4) a story-like program in which a knight kills a dragon.
Figure 2 (right): Examples of programs users created in Storytelling Alice: 1) a romantic relationship story about a boy who is involved with three girls and gets caught, 2) a familial relationship story about a father taking his children on vacation and getting lost, 3) a good vs. evil story about the big bad wolf trying to befriend the three pigs so he can eat them later, and 4) a choreographed cheerleading routine.

The final two groups show evidence that users progressed from experimentation to developed enough Generic Alice animation skill to create fully or nearly fully intentional programs.

Choreographed Dance Routines (7%): 3 of the 45 users created choreographed dance routines for a group of characters. These dance routines consisted primarily of characters performing move and turn animations either in sequence or simultaneously. See Figure 1-3.

Story-Like Sequences (16%): 7 of the 45 users created short story-like sequences. These stories often incorporated simple motions designed to help communicate the action of the story. For example, a character might raise his arms in fear before sliding off the screen or an injured dragon might turn onto its side to suggest a fall. See Figure 1-4.

It is notable that less than a quarter of the Generic Alice users wrote fully intentional programs and more than a half of them wrote programs that demonstrate no intentionality. Users who successfully moved from exploration to intentional control performed better on the programming quiz: the average quiz score for users who built unintentional programs was 3.53 as compared to 4.7 for users who created story-like sequences or choreographed dance routines. There is a positive correlation ($r=0.270$, $p<.1$) between intentionality and quiz performance.

Two barriers may prevent users from achieving full intentional control: 1) users' lack of interest in programming and 2) users' failure to develop a sense of control.

Barrier: Lack of Interest in Programming: As programming environments, Generic Alice and Storytelling Alice only succeed if users actually spend time programming. 11 of the 12 Generic Alice participants who spent more than 50% of their time on scene layout created arbitrary motion programs. Not surprisingly, these users tended to learn very little programming (the average quiz score was 2.8). Based on observations within the study workshops, these participants found laying out 3D scenes significantly more rewarding than programming.

Barrier: Failure to Develop a Sense of Control: When users begin to program in Generic Alice, they frequently have goals (ranging from very simple to quite complex) that they want to pursue. As users begin working towards their goals, they often carry out a series of exploratory experiments. If users' initial experiments and the affordances within the interface do not help users develop an idea about how to accomplish their goals, many of them simply give up. Rather than forming a new more approachable goal, users often stopped trying to explain the behavior of their program and began to add animations and programming constructs at random.

Storytelling Alice Programs

We observed that Storytelling Alice encouraged users to identify a story goal quickly and begin working towards that goal. The programs created with Storytelling Alice were of three general types: relationship stories, good vs. evil stories, and miscellaneous programs.

Relationship Stories (51%): 22 of the 43 users created stories about relationships, including romantic relationships, peer relationships, and familial relationships. Users used relationship stories to explore issues that were potentially relevant in their own lives. See Figures 2-1 and 2-2.

Relationship stories dealt with a range of issues including jealousy between two girls who liked the same boy, struggling to fit into a social group, and divorce. These topics may indicate that girls used the story creation in Alice as a way to think through issues in their lives.

Good vs. Evil Stories (21%): 9 of the 43 users created stories depicting conflicts between good and evil. See Figure 2-2. In the good vs. evil stories created by girls using Storytelling Alice, violence or the threat of violence were often (but not always) employed as a way to resolve conflicts. For example, in one story, an evil samurai attacks an innocent pig. A good magical tree resurrects the pig, enabling the pig to attack the samurai in retaliation.

Other Programs (28%): 12 of the 43 programs created with Storytelling Alice do not fall neatly into a single category. These miscellaneous worlds include two stories about finding lost dogs, two stories depicting running and swimming races, and three choreographed routines (circus and cheerleading) similar in nature to the dance routines created by Generic Alice users.

Nearly all of the users of Storytelling Alice made stories (with the exception of the 3 choreographed routines). Further, all of the users of Storytelling Alice (as compared to 38% of Generic Alice users) moved from experimental programming into intentional programming. Storytelling Alice helps to minimize the time to identify and begin working towards a goal.

While all of the users successfully created intentional programs, some were more complex than others. For example, one user created a crying animation which required her to create a new method for her character, learn how to use `loops`, `dotogethers`, and control the character's hands. Other users focused most of their attention on dialog and used existing animations such as walking. There are two potential reasons for these users' focus on a small subset of the system's functionality: 1) users do not know what is possible within the system 2) users cannot map programming tools to their story goals.

Barrier- Determining what is possible within the system: As users interact with any software system, they build a mental model of what they believe is possible within that system. Often that model will not incorporate all of the capabilities within the system. Then, users select goals that match their beliefs about the system capabilities. In Storytelling Alice, this can lead to users exploring only a small subset of the programming tools available within the system.

Barrier- Finding appropriate programming tools to realize a story goal: While some users begin to discard goals that fall outside of their mental model for the system, other users continue to suggest and pursue goals that would require the use of unfamiliar concepts and constructs within the system. However, given the large number of possible actions within the system, it can be difficult for a new user to evaluate which programming tools are most appropriate to their goals.

Conclusion

The results of this study suggest that the storytelling focus made learning to program more engaging for middle school girls. It is clear that more work remains to develop programming environments that can engage a broad spectrum of girls in learning basic computer programming. As we continue to design and develop programming environments and curriculums, the barriers to programming engagement encountered by Generic Alice and Storytelling Alice participants represent important problems that should be considered.

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Advances in Gender and Education, **1** (2009), 11-13. Printed in the USA.

The Education of Girls and Women in the United States: A Historical Perspective

Jennifer C. Madigan
San Jose State University

This essay will provide a brief historical overview of the educational experiences of girls and women in the United States dating from the early colonial settlement years to the present time. From "dame schools" in the 1700s to seminaries for teacher training, women and girls have historically been prepared for professions related to caretaking, such as nursing and teaching. A dramatic shift occurred in the 1970s with the passage of Title IX of the Education Amendments Act of 1972, which protects students from discrimination on the basis of sex in educational programs that receive federal financial assistance, and the Women's Educational Equity Act (WEEA), enacted in 1974. In spite of the new policies, many of the educational patterns of girls continued. Several researchers in the 1980s and 1990s suggested that female students in coeducational classrooms received less opportunity to participate and less feedback from teachers than their male counterparts (Grossman, 1998; Riordan, 1990; Sadker & Sadker, 1995). With the passage of No Child Left Behind in 2002 and the resulting changes in federal regulations (final rule changes published in 2006), prior restrictions on the establishment of single sex public schools and classrooms were lifted. Initial research on U.S. single sex programs indicate promise of academic achievement for girls and demonstrate socio-emotional benefits for girls attending single sex schools in urban, high poverty areas (United States Department of Education, 2008; author, 2008). Current advocates of single-sex education believe that it should be available as an option for all students, not just for children of privilege.

A Look Back

Single-gender education is not a new concept. At the close of the 18th century, most boys in colonial America attended "dame schools," defined as a school influenced by the English model of home instruction for small groups of children usually led by a woman in her home (Monaghan, 1988). These schools in New England prepared boys for town schools (Monaghan, 1988). Girls also attended dame schools, but only a small percentage attended town schools or academies. Educational institutions beyond the dame schools and single gender town schools were private, segregated by sex, and exclusive to wealthy families (Riordan, 1990).

The establishment of dame schools took place in the kitchens of older women in the community. It was at this juncture that women established themselves as teachers in colonial America. The primary focus of the dame schools was to prepare boys for admission to the town schools which, until the 19th century, girls were not allowed to attend (Riordan, 1990). When girls were finally admitted to the town schools, they usually attended at different times of the day than the boys or on days when boys did not attend, such as summertime or holidays.

The Massachusetts educational system has its roots in the Protestant Reformation which considered education necessary for all individuals to understand Scripture. Within 10 to 20 years of the arrival of the *Mayflower*, Massachusetts colonists had established town schools, a Latin grammar school, and Harvard College (Kolesnick, 1969). The growing economy in the colonies created an additional need for literacy. Colonial women were often heavily involved in family businesses and commerce. These conditions provided some of the foundation for equal opportunities for men and women in the educational process (Riordan, 1990).

Address correspondence to: Jennifer C. Madigan | Department of Special Education | San José State University
One Washington Square | San José, California 95192 | E-mail: jenmadigan@aol.com | Office: 408 924 3313

Concurrent with the establishment and growth of the coeducational public high school system in the 1800s was the single-gender seminary or academy movement. Led by Catherine Beecher, Emma Willard, and Mary Lyon, these institutions were modeled after the English finishing school. The function of the academy was to provide a moral, literary, and domestic education for young women (Riordan, 1990; Sexton, 1976). The Catholic Church played an important role in the burgeoning academy movement. By 1860, the Catholic population had increased to 3 million creating a great need for church-sponsored education. Seminaries served as a preparation ground for female teachers who were in growing demand to serve as educators in Catholic girls' schools (Riordan, 1990). The seminaries took on the training of teachers in an innovative manner, promoting dynamic teaching strategies and student cooperation (Sadker & Sadker, 1995). Eventually, the academy movement would lead to the establishment of the first women's colleges in the United States including Georgia Female College, Mount Holyoke Seminary, and Elmira Female College (Astin & Hirsch, 1978).

The limited population in the western territories in the early and mid-1800's made coeducation an economical and more viable option to single-gender institutions. This was not the case in the eastern states, however, where the established bastions of higher education remained financially independent. As a result, counterparts to the distinguished male colleges emerged in the form of affiliates. Affiliations with universities such as Harvard, Columbia, and Brown allowed women to participate, in a limited fashion, in the educational opportunities afforded to men in these prestigious institutions (Riordan, 1990; Stock, 1978). In college, women were closely supervised and segregated from men. Toward the end of the 19th century, some state universities allowed women to enroll in their degree programs. The private institutions, however, did not follow this pattern. As a result, Smith, Mount Holyoke, Wellesley, Barnard, Radcliffe, Vassar, and Bryn Mawr were established to provide women with single-gender university environments designed to meet their specific educational needs.

Despite the emergence of single-gender colleges for women, by the beginning of the 20th century, most public secondary schools and colleges had become predominantly coeducational. Coeducation, however, did not insure equal opportunity in education. In 1918, the Commission on the Reorganization of Secondary Education made a case for the creation of a two track system: one track steered students, primarily males, toward college preparatory coursework, and the other track provided vocational training. For White, Black, and other minority girls, the vocational track was encouraged. Even girls with strong academic records were required to take domestic science or home economics (Tyack & Hansot, 1990). Despite the expansion of women's role in society, through the mid 1960s girls were channeled into occupational choices that were limited to four categories: secretarial, nursing, teaching, or motherhood (Sadker & Sadker, 1995).

In 1972, with the passage of Title IX, it became illegal to discriminate in public schools on the basis of sex in school athletics, financial aid, career counseling, admission practices, and the treatment of students. Violators were at risk of losing federal funds. With the passage of the Women's Educational Equity Act (WEEA) in 1974, support was provided to assist schools in the recruitment of girls for math, science, and athletic programs. Teachers were provided with training to increase awareness of gender bias in curriculum and pedagogy. In the 1980s, however, funding for WEEA was drastically cut.

Looking Forward

In 2006, the United States Department of Education published amendments to the Title IX regulations that provide school districts with flexibility in the implementation of single-sex programs. To date, at least 540 public schools in the United States are presently offering gender-separate educational opportunities (National Association of Single Sex Public Schools). There is, however, a dearth of research examining the long term effects and outcomes of these programs. In 2004, the U.S. Department of Education contracted with RMC Research Corporation to conduct a descriptive study of existing single-sex public schools. Preliminary research findings demonstrate gains, particularly for girls. Teachers reported significantly greater benefits of single-sex schooling for girls in five of the 10 benefit categories. Teachers believed that girls demonstrated better peer interactions, a greater emphasis on academic behaviors, a greater degree of order and control, socio-emotional

benefits, and safe behavior in single sex environments. Furthermore, teachers believed that both sexes benefit equally from single-sex education in terms of a greater sensitivity to sex differences in learning and maturation (USDOE, 2008).

Conclusion

In reviewing the historical picture of women's educational experiences in the United States, it appears that expectations for girls in school have been different than expectations for boys. Historically, girls have been raised to assume specific and limited roles in society such as secretarial, nursing or teaching school. With the advent of Title IX, and the enforcement of equal access legislation, the options for girls have increased dramatically. As the journey into new educational terrain continues, it is important to look back and reflect on the accomplishments of those from the past so that we might better encourage those who will go into the future.

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Advances in Gender and Education, **1** (2009), 14-21. Printed in the USA.

The Student and the Teacher – Making a Match in a Single-Gender Classroom

Margaret M. Ferrara
University of Nevada, Reno

In 2002, only eleven public schools offered single-gender classrooms. At the end of the 2008-2009 school year, 542 public schools offered single-gender classrooms (NASSPE, 2009). As interest in single gender classrooms grows so does concern about who should be teaching in these classrooms. Will a male teacher be a better fit for an all boys' classroom? Or, should the teacher be female? Likewise, is there a gender variable in a teacher placement in an all girls' classroom? Or is this particular teacher a good fit in a mixed classroom – one that includes both boys and girls? This study probes these questions and explores how a teaching style questionnaire may help teachers and their administrators in the selection of teaching assignments based on a teaching composite that aligns with students in a single-gender or a mixed-gender classroom.

Building on the Research

Students have unique learning styles; teachers have unique teaching styles. Teaching styles are categorized by teaching preferences, typically identified by how the teacher delivers instruction, provides assessment, selects content, and supports the individual needs of the learner (Hunt, 1971; Grasha, 1996). Students will acquire more knowledge, remember more content, and learn skills more effectively when a teacher's teaching style matches students' learning style (Hunt, 1972; Lage, Platt, & Treglia, 2000). This approach – defining the match in terms of congruence - has led to a body of research called "goodness of fit." When there is a mismatch in that fit, there tends to be a decrease in students' performance, an increase in their dissatisfaction, and learner stress (Pervin, 1980, p.56). Sometimes, students are "out of sync" with the teacher's way of delivering instruction; it is difficult for students to attempt to resolve any inconsistencies in their learning environment by trying to learn with strategies that do not necessarily match their learning style (Joyce, 1984, p.33; Kagan & Moss, 1963, p. 202). These early researchers conclude that if the goal is immediate changes, then the fit needs to be more closely matched. With a good fit, students are able to learn within a comfortable environment that facilitates a meaningful learning structure (Joyce, 1984, p. 34).

Another realistic hurdle is to match students' learning styles with a teaching style. Often, a teacher is uncertain of his or her teaching style. Even if a teacher answers a teaching style inventory (e.g., Grasha-Reichmann's Teaching Style Survey, 1996), the results fall in the framework of how well a teacher's style aligns with teaching a specific course. Matching teaching styles to students' learning styles may be further complicated if the teacher's gender is taken into account. A teacher may teach 9th grade Social Studies differently from the way another teacher teaches the same course. Does that teaching style carry over to a better understanding of how to teach a male student differently from a female student? Are there specific strategies which might help teachers select a teaching style that supports distinctive learning abilities of boys and girls?

Some researchers believe that a teacher's gender influences how that teacher interacts and communicates with his or her students (Constantinou, 2008). Researchers such as Constantinou continue to find that most teachers react differently to boys or girls. A point to be made in gender research is that not all boys and girls in classrooms are "masculine" and "feminine," respectively. This was brought out in the research of Severiens and Ten Dam (1997) in their study of adult learners. They found that students in a single-gender environment mimic the "gender stuff" of the teacher. Students are more engaged, behave more appropriately, and interact at higher levels when they are taught by a teacher of the same gender. Their findings should be interpreted with caution because effect size was low and the study cited above was with only adult learners.

Address correspondence to: Margaret Ferrara | College of Education | University of Nevada, Reno | Mail Stop 0280 | Reno, NV 89557-0280. E-mail: ferrara@unr.edu.

These authors also stress that gender identity (masculine/feminine) is more relevant than biological gender (male/female). In another study, Carrington, Tymms, and Merrell (2008) found that the interaction of the gender of the teacher and the gender of the student was not significant, especially in the area of role model imitation. On the other hand, Harris and Barnes (2009) found that four-year-old boys preferred males to form a relationship and saw the male teacher as the person to be involved in sports and physical games. The researchers concluded that this preference might be based more on stereotyping than on actual gender matching. A final point to make is that race tends to make a difference in how students respond to their teacher's gender. In a study in a low-income, African-American school, women teachers were more effective in all-boys' classroom than were male teachers (B. Wright, personal communication, July 12, 2009).

If there is a need to have a gender match between the teacher and the students, and duly noting that this has not been clearly supported through research, it will not be an easy feat. A gender match of teachers and students appears to be more difficult in elementary and middle schools because of the dearth of male teachers. There are also fewer male teachers of English and fewer female teachers in mathematics and science at the high school level (Dee, 2006). In April 2004, the Census Bureau released statistics about the teaching force in the United States. According to the Census Bureau, the number of all teachers in the United States was 6.2 million; of this number, 71% were women (U.S. Census Bureau, 2004*).*

Ultimately, the questions that drive this study explore ways to assist in teacher preference and teacher selection. How do teachers identify themselves in terms of teaching style and gender preference? How should teachers be chosen to teach in single-gender classes? Is this a good match or a mismatch? What are the good, better, and best fits?

Methods

Survey Instrument

The author of this paper designed a survey instrument that may provide clues to determine a teacher "good fit" for a single-gender classroom assignment (See Attachment A). Characteristics outlined in several studies on learning styles of boys and girls that included the variables of environment, assessment, and instructional strategies and based on the work of writers in this field (e.g., James, 2007; Sax, 2007) were used.

The survey is composed of 25 questions about teacher preferences in the classroom related to learning environment, social support, and teaching strategies. Learning environment questions involve settings that support the teaching and learning process like engagement, noise level, energy level, activity level, and movement. Social support questions query the use of positive teacher comments and personal questions, the use of intrinsic and extrinsic rewards, and humor. Teaching strategies involve student directed learning versus teacher directed learning, cooperative and competitive learning, timed learning, and group work. Of the 13 "boy" and "girl" questions, four deal with learning environment, three with social support, and six with teaching strategies. There is an equal distribution of questions; one question is counted twice, categorized as descriptive for girls and boys.

The survey uses a Likert style with a range of 1-6 points; one for least likely and six for most likely to be used by the teacher. The questions deal with teachers' teaching beliefs about boys (13) and girls (13). The questions are written in random order and without regard to gender identification to minimize gender bias in the teachers' responses. The *Likert Scale* is used with a six-point spread because typically teachers tend to select values of three or four when asked to complete a survey. A wider response set facilitates teachers to use a critical process in their selection for each response.

Subjects

Elementary teachers (28 - 3 males and 25 females) in a Title I elementary school with single-gender classes in kindergarten, fifth, and sixth grades were the first teachers to answer the survey. Their teaching experiences ranged from 6-19 years with a mean score of 11.7 years with an SD of 11.7 years. At the beginning of the fall semester, all teachers in this school participated in two professional development days reviewing how boys and girls learn. During the school year, teachers in the single-gender classrooms, using the school website, shared some of their students' writings about their classroom experiences. The survey on teaching preference was given to teachers in the second semester.

The second administration of the survey was completed by 25 secondary teachers who were students in a curriculum course taught by the researcher (4 males; 21 females). Ninety-eight percent of these students are actively employed teachers. The four male teachers (one math teacher, three social studies teachers) indicated a preference to teach a mixed class of boys and girls. Two female teachers (math/science) indicated a preference for girls; two female teachers (social studies/science) preferred all boys. The remaining teachers specified a preference for a mixed class of boys and girls.

Statistical Measures

Interrater reliability. Interrater reliability was established by secondary teachers in a graduate level curriculum course. Prior to the student teachers answering the survey, the course instructor (researcher) lead a discussion on the meaning of each variable: learning environment (LE), social support (SS), and teaching strategies (TS). Teachers suggested different types of indicators for each variable and the course instructor continued the discussion until teachers reported they had a clear understanding of the meaning of each variable. The teachers enrolled in the curriculum course were then asked to categorize each item by one of the three criteria – LE, SS, or TS. Overall, the student teachers provided an Inter-rater reliability of 21 of the 25 items with an agreement rating of 90% or higher. The four items that had a mixed rating were rewritten and reconfirmed (see expert validity) to establish a higher internal reliability.

Internal reliability. The statistic of a Cronbach *r* was also administered on the items based on the responses of the 53 teachers. The Cronbach *r* showed a low (<.3) for each item in the survey. This indicates that each item was distinctly different from any other item in the survey.

Expert validity. Expert validity was provided by a review of three experts who have written on the subject of single-gender education. They were asked to determine if the gender specification and the variable assigned to the item matched their coding. The panel also reviewed the items for clarity of wording and instruction. Based on a review of three experts, four items were reclassified after these questions were rewritten. The four items were checked for internal reliability by an additional administration to 10 teachers randomly selected and the agreement rate of the four items was 90%.

Survey Administration and Scoring

Administration. The survey was distributed to teachers in a large group setting: the school cafeteria and the college classroom. Before the teachers took the survey, they were given an overview of the intent of the survey: to have them identify their teaching style preference. They were also asked to predict the answer to the question, "If you were asked what classroom in which you would prefer to teach – an all-boys' classroom, an all-girls classroom, or a mixed classroom of boys and girls – which one do you think you would be a better fit?

Scoring. To determine a single-gender preference of the teachers, the researchers used the scale as seen in Table: for questions dealing with girls, a teacher's total score was less than 27 (<27) indicated a preference to teach boys; if it was more than 27 and less than 53 (<53), that indicated a leaning toward teaching either boys or girls. If a teacher's choices indicated a score of more than 53 (>53), this indicated a preference to teach girls. To ensure that scores would be inclusive, a point was added to the highest numbers. See Table 1.

Table 1
Scoring of Responses

B&G Questions	Girl Questions	Preference	Boy Questions	Preference
	<27	Boys	<27	Girls
	>27 and <53	Boys & Girls	>27 and <53	Boys & Girls
	>53	Girls	>53	Boys
>53		Boys & Girls		

Attachment B provides an answer key for the survey. The key helps the teacher and/or administrator look at the outcome of the survey and discuss how a teacher's score reflects the goodness of fit in teaching in a single -gender or mixed-gender classroom.

Results

Fifty-three surveys were completed by teachers from a local elementary school involved directly or indirectly in single-gender education and by secondary teachers in a university graduate curriculum course. Seven males and 47 females completed the survey. The teachers were not aware of the categories (i.e., LE, TS, or SS) nor did they know which survey questions referred to a boy or girl. The teachers were asked prior to the survey completion to predict the outcome of the survey, that is, to predict whether their teaching style would be more fitting in a boys' classroom, a girls' classroom, or a mixed classroom.

Table 2
Relation between the Gender of the Teacher and Teacher Scores - Secondary

Teacher	*n*	Mean Score Girls	Std. Deviation	Mean Score Boys	Std. Deviation
Male	4	54.75	4.11	53.25	3.77
Female	21	54.14	5.64	52.95	6.11

Table 3
Relation between the Gender of the Teacher and Teacher Scores - Elementary

Teacher	*n*	Mean Score Girls	Std. Deviation	Mean Score Boys	Std. Deviation
Male	3	52.67	6.65	55.33	5.68
Female	25	54.56	4.41	52.92	7.18

The results in Tables 2 and 3 show that there is little difference between elementary and secondary teachers in their boy and girl cumulative survey scores. There was no significant difference between the averages for male teachers compared with female teachers, although the small number of male teachers severely constrains the statistical power of the comparison.

Table 4
Elementary and Secondary Teacher Survey Preferences

Elementary Teachers	*n* Male	*n* Female	Mixed	Girls	Boys	No preference
	3	25	17 61%	4 14%	4 14%	3 11%
Secondary Teachers	***n* Male**	***n* Female**	**Mixed**	**Girls**	**Boys**	
	4	21	20 80%	2 8%	3 12%	

Most of the teachers, elementary and secondary, indicated that their intuitive preference was to be in a mixed classroom. Among elementary school teachers who indicated a teaching preference, 3 teachers preferred teaching girls, 4 preferred teaching boys, 2 mixed class, and 19 indicated no preference. Six of those nine teachers who indicated preferences had preferences that coincided with the preferences predicted by the expert rating scale (just one more than would be predicted by chance).

Each teacher received an outcome analysis of the survey (see Attachment C). Discussions took place in small group settings in the elementary school and in a large group setting in the university classroom. The discussions centered on reviewing each item and how each one was related to a specific single-gender student learning preference. Teachers in each setting were surprised that boys and girls actually expressed unique preferences for their learning environment, teaching strategies, and social supports that foster learning.

Discussion

Most teachers in the survey indicated that their intuitive preference was to be in a mixed classroom of boys and girls. It is possible that teachers believe that teaching in a mixed classroom of boys and girls is the "right answer." In our schools of education, students are taught that good teaching accommodates the needs of individual students. A teacher wrote on her survey, "We do not need classrooms just for boys or just for girls, or just for kinesthetic learners. We need to find ways to differentiate instruction for the multiple learners with multiple learning preferences in our classroom."

Even though elementary and secondary teachers do not necessarily agree on teaching strategies or content delivery, in this study, they tended to agree that their "goodness of fit" was in a mixed classroom. When they were asked to select the type of classroom in which they would feel the most comfortable, sixty-one percent of elementary teachers and eighty percent of secondary teachers selected a mixed classroom option. Moreover, several teachers expressed a concern that a teacher would even consider a single-gender classroom. One teacher wrote, "I fundamentally disagree with segregation." Another one added, "A mixed classroom is a classroom community." Others reported that they would prefer a mixed classroom because "it is more balanced and includes both gender perspectives." One of the two teachers who selected the choice of being placed in an all boys' classroom provided the rationale of "I would choose boys because there is no drama." And, perhaps most telling, one of the two first-year teachers provided a contrasting view – "I don't know; I never thought about it."

The science of determining teachers' "right fit" for a single-gender classroom is in its infancy. It seems that a forced-choice paradigm in the next administration of the survey should allow for teachers to indicate an "either/or" choice. "If you had to choose either a boys' classroom or a girls' classroom, which would you choose?

It was equally apparent that teachers were largely unaware of teaching styles that were more supportive of boys' learning styles or girls' learning styles. Regardless of teaching choices, it is important to remember that when planning and developing instructional materials, teachers need to strive for a balance of teaching styles to match the various learning styles of the students in their classrooms (Felder & Soloman, 1992). Administrators who are considering the single-gender option might do well to train their teachers in what constitutes a boy-friendly teaching style and a girl-friendly teaching style.

The results of this study provide a glimpse of what these teachers believe is their actual teaching preference in a single-gender classroom. One way for principals and teachers to begin this discussion might be with the question, "Would you prefer to teach in an all boys' classroom, in an all girls' classroom, or in a mixed classroom?" The survey presented in this paper may serve as useful instrument for teachers to explore the answer to this question. The next step is to ask the student, "How do you prefer to learn?" In this age of matchmaking, it is not that far-fetched to imagine that finding a good fit between students and teachers in our schools will become a reality.

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Attachment A

Teaching Styles Survey

In each statement, **circle** the number that reflects your classroom practice. Please answer thoughtfully.

In the continuum 1-6, one (1) least likely reflects your preference and six (6) most likely reflects what you prefer and do in your classroom.

Name: _____ Your Gender: Male Female

Your Classroom Grade: _____ Subject Area: _____

Given the three choices below, in which classroom would you most prefer to teach?

_____ an all boys' classroom _____ an all girls' classroom _____ a mixed classroom

---

1. I encourage quiet student conversation.
   Circle One: 1 2 3 4 5 6
2. I don't mind some student noise distractions.
   Circle One: 1 2 3 4 5 6
3. I encourage students to use their own initiatives in completing assignments.
   Circle One: 1 2 3 4 5 6
4. I promote and enjoy high levels of team competition.
   Circle One: 1 2 3 4 5 6
5. I am careful about asking a student what is going on in his/her life.
   Circle One: 1 2 3 4 5 6
6. I prefer classroom assignments that involve creative projects.
   Circle One: 1 2 3 4 5 6
7. When I teach, I tend to talk a lot.
   Circle One: 1 2 3 4 5 6

8. I prefer that my students stay in one place instead of moving around in the classroom.
   Circle One: 1 2 3 4 5 6
9. I allow my students to gather in informal learning structures in my classroom.
   Circle One: 1 2 3 4 5 6
10. I give my students rewards (e.g., extra points, goodies) to motivate them to learn more.
    Circle One: 1 2 3 4 5 6
11. I can characterize my classrooms as social groups.
    Circle One: 1 2 3 4 5 6
12. I support my students but refrain from asking them personal questions.
    Circle One: 1 2 3 4 5 6
13. I talk less than my students do in my classes.
    Circle One: 1 2 3 4 5 6
14. I use a lot of quick question and answer responses during my classes.
    Circle One: 1 2 3 4 5 6
15. I am very calm and patient with my students.
    Circle One: 1 2 3 4 5 6
16. I often give my students more time to complete assignments and homework.
    Circle One: 1 2 3 4 5 6
17. I keep my students on task to make sure they finish their work within the allotted time.
    Circle One: 1 2 3 4 5 6
18. My classroom activities are timed but I often give students more time if they need it.
    Circle One: 1 2 3 4 5 6
19. I encourage my shy students to express themselves when I call on them.
    Circle One: 1 2 3 4 5 6
20. I prefer my students to be highly energetic while learning in my classroom.
    Circle One: 1 2 3 4 5 6
21. I don't mind if my students complete their learning tasks while they are active.
    Circle One: 1 2 3 4 5 6
22. I provide my students with direct feedback and corrections.
    Circle One: 1 2 3 4 5 6
23. I use humor in a teasing way to help my students deal with learning challenges and personal conflicts.
    Circle One: 1 2 3 4 5 6
24. I don't mind a high student "noise" level in my classroom.
    Circle One: 1 2 3 4 5 6
25. I make certain that my students are given complete instructions and answer any questions they may have before classroom activities begin.
    Circle One: 1 2 3 4 5 6

Attachment B

Survey Analysis Key

	Girls	Boys	LE Learning Environment	TS Teaching Strategies	SS Social Support
Total Number	13	13	11	8	7
Boys			5	4	4
Girls			5	4	4
Item Number	**LE**	**TS**	**SS**		
Boys	3,6,20,21,24	7,14,17,22	4,10,12,23		
Girls	2,8,9,11,21	13,16,18,19	1,5,15,25		
N.B.	#21=B & G				

Attachment C

Set One Instructional Strategies Conducive for Boys

1. I encourage students to use their own initiatives in completing assignments. (5)
2. I promote and enjoy high levels of student competition. (5)
3. I have a very structured classroom. (5)
4. I tend to be very verbal in my teaching. (3)
5. I give my students rewards (e.g., extra points, goodies) to motivate them to learn more. (5)
6. I support my students but refrain from asking them personal questions. (2)
7. I use a lot of quick question and answer during my classes. (4)
8. I keep my students on task to make sure they finish their work quickly. (5)
9. I prefer my students to be highly energetic while learning in my classroom. (6)
10. I prefer students get into action and complete their learning tasks. (6)
11. I provide my students with direct feedback and corrections. (6)
12. I use humor to help my students deal with learning challenges and personal conflicts. (6)
13. I don't mind a high student "noise" level in my classroom. (5)

Set Two Instructional Strategies Conducive for Girls

1. I prefer and actually encourage quiet student conversation. (3)
2. I don't mind some student noise distractions. (4)
3. I have no qualms about asking a student what is going on in his/her life. (5)
4. I prefer that my students stay in one place instead of moving around in the classroom. (4)
5. My students sit in circles during my classes. (6)
6. I can characterize my classrooms as having a lot of group work. (6)
7. I talk less than my students do in my classes. (4)
8. I would say that I am very calm and patient with my students. (6)
9. I often give my students more time to complete classroom assignments and homework. (4)
10. I give timed classroom activities but often give students more time if they need it.(6)
11. I make certain that my students are given complete instructions and answer any questions they may have before classroom activities begin.(6)
12. I encourage my shy students to express themselves when I call on them. (6)

The first set of statements (1-13) reflects teaching practices that are more conducive for teaching boys. The second set (1-13) reflects teachers' gender preferences for girls in their classrooms. The number in parenthesis indicates the value you assigned to this strategy: "1" as least likely and "6" as most likely. Your profile indicates that you obtained a composite score of 63 for boys and 60 for girls.

Advances in Gender and Education, **1** (2009), 22-23. Printed in the USA.

South Carolina: Lessons from Two Years of a Statewide Initiative

David Chadwell
Office of Public School Choice, South Carolina Department of Education

Single-gender education has exploded across South Carolina. Currently there are over 200 schools with single-gender classes and another 200 are exploring the option for the 2009-2010 school year. One of the reasons why single-gender education is thriving in South Carolina is due to the support of the State Superintendent, Dr. Jim Rex, and his creation in 2007 of a state level position to coordinate the single-gender initiative under the umbrella of public school choice.

Two years later, we have learned how to implement programs so that they have the best chance for success. Here are our Top Ten Tips for creating a single-gender program based on our experience.

1. **Choice**. All public school single-gender education must be a choice. Not only is this required by the Federal regulations of 2006, but it puts parents at ease. Many parents question the mandates of schools initially. By telling them upfront that single-gender programs are a choice, it turns the focus of these programs into an opportunity for them and their children.

2. **Designate a Point Person**. Someone at the school should be the coordinator or contact person for the single-gender program. This person may be the principal or the curriculum coordinator. A teacher could also fill the role. In any case, someone should be able to answer questions about the program, communicate with parents and the media, and be the liaison with the district or central office and other schools within the district who are considering single-gender programs. Coordination among schools will strengthen all programs.

3. **Know the Federal Regulations**. The school contact person should be familiar with the relevant federal regulations, which are available at our website www.ed.sc.gov/sgi. The attorney for the school district should also review all proposals for single-gender programs within the district.

4. **Make Gender a Schoolwide Focus**. Taking gender into consideration is not just a single-gender issue. Teachers in coed classes teach boys and girls too. And, in many schools, teachers teach single-gender classes as well as coed classes. All teachers should be involved in analyzing data through a gendered lens. Examining academic performance, attendance, discipline, and social issues in terms of males and females (as well as other subgroups) will help raise awareness among the entire school. That way, teachers of single-gender classes are not isolated from other teachers. This also keeps the school from creating a division among the single-gender program and coed classes.

5. **Support the Teachers**. All teachers in the school should be involved in some kind of training on gender. This can involve presentations by consultants, book studies, or sessions held district staff. Teachers of single-gender classes need to be interested and excited about the opportunity of teaching within a single-gender program. Teachers within single-gender classes may also receive additional training to focus on strategies that may work best within single-gender classes. These strategies may also be successful in coed classes and ultimately may be considered best practice, but how they translate within a single-gender class may also be different.

Address correspondence to: David Chadwell | Office of Public School Choice| South Carolina Department of Education
1429 Senate Street, 703-C | Columbia, SC 29201 | E-mail: dchadwel@ed.sc.gov | website: www.ed.sc.gov/sgi

6. **Support is a Year-Long Process**. Teachers of single-gender classes need time to talk with one another about what is happening within their classes. They need to discuss what is working in their classes and what isn't working. They need to examine data from benchmark tests, student work, and anecdotal information. Teachers need to have time to visit one anothers' classes to see what happens there. If possible, they need time to visit other schools with single-gender classes. Teachers need to know that they are not alone in this process.

7. **Meet the Needs of Students; Do Not Limit Them**. In general, don't stereotype students. Use information about girls and boys to expand opportunities and build engagement. Understanding gender allows the teacher to further differentiate the classroom; it shouldn't restrict options.

8. **Community Comes First**. Take the time to build community among your students in single-gender classes. If students are not comfortable in the class, they will not take advantage of learning opportunities. Having all-girls and all-boys in a class can bring new challenges that should be addressed up front and routines should continue throughout the year. This is one of the reasons training and talking with educators who have worked within single-gender classes is so important.

9. **Procedures, Not Lessons**. Despite requests from teachers, there are no lessons that are just for boys or girls. Rather, teaching with gender in mind is all about differing procedures and strategies. Good lessons are still good lessons, but they may be implemented in different ways within a classroom that has different routines. In the beginning, teachers of single-gender classes should commit to five strategies or procedures that they will use within their boy classes and girl classes. Over the first quarter the teachers can meet to discuss, reflect, and perfect the use of these. After, they can add more strategies and procedures to their list.

10. **Communicate with Your Community**. Do not assume that your community understands the reason you are starting a single-gender program or what happens within single-gender classes. Host parent nights, curriculum nights, and morning meetings for questions and answer. Include highlights from single-gender classes within school newsletters. Invite the media to events that involve students from single-gender classes. It is important to build support and awareness of any new program, and this is especially important for single-gender programs as they are often misunderstood by the community members.

Publisher's Note: Additional information about legal issues regarding single-sex education in public schools in the United States is available at www.singlesexschools.org/legal.html.

Advances in Gender and Education, **1** (2009), 24-25. Printed in the USA.

Building Sisterhood and Brotherhood in Gender-Specific Classrooms

Annette Duncan and Amy Schmidt
Waterloo Community Schools, Waterloo, Iowa

The Dr. Walter Cunningham School for Excellence in Waterloo, Iowa is a public school that began offering parents an option of gender specific classrooms or a coed classroom in 2003. Our school serves a diverse population consisting of African American, Hispanic, and Caucasian students. Cunningham School enrolls approximately 400 students, of which eighty-five percent qualify for free and reduced lunch. Based on research of best practices, Cunningham School provides a continuous year calendar, staff and student uniforms, early start time, and most recently a gender specific classroom option. As second grade veteran teachers, we have known for years that boys and girls learn differently. In the past five years, evidence-based research has allowed us to explore these differences and develop practical applications for the hard-wired differences that are evident between males and females.

An expert in the field of gender specific teaching, Dr. Leonard Sax, has offered teachers and parents the knowledge and the tools to develop instructional strategies for teachers based on his years of experience and his knowledge of the biological differences between males and females. Dr. Jawanza Kunjufu, an expert in the field of raising African American achievement, offers strategies to infuse culturally relevant strategies with our gender specific strategies. With the assistance of Dr. Sax and Dr. Kunjufu, the support of our district administrators and parents, and continuous on-going professional development, we have been able to implement a second grade all-girls class and a second grade all-boys class for the past four years. Being successful gender- specific teachers means that we have to first recognize the fundamental differences between sexes and then develop instructional strategies based on those biological differences in our classroom curriculum.

The past five years of research has shown that gender is hard-wired, but that there are no hard-wired differences in the "ability" to learn. Though the areas of learning develop at different times for males and females, they will eventually reach the same place. That is why gender specific teaching strategies will help us to work towards closing the achievement gap between sexes now, thus enhancing their learning experience and increasing test scores. Our goals for incorporating gender-based classrooms include improved academic achievement, increased standardized tests scores, and enhanced self-esteem and self-worth that positively contribute to our learning environment as well as our community. Through our research and gender-specific experiences, we have been able to define developmental differences that occur between sexes and offer instructional strategies to close any achievement gaps that may occur.

Recognizing the developmental differences in boys is essential. As a female teacher of all male students, we have had to redefine what classroom management in our classrooms means. We now understand that movement is not just to be tolerated, it is necessary. Boys can think better if they are able to move around. To expect a second grade boy to stay still in his chair all day at school is not only unproductive; it's detrimental to his learning potential. Given the opportunity to move around in a structured environment, boys are allowed to explore their boundaries and stay actively engaged in the learning process.

Team competition in academics works for boys. Boys respond positively to high stakes tests, time limits, and cooperative learning in groups. Based on this knowledge, we have incorporated academic games that include Spelling Baseball, Math Basketball, and Reading for Football Yards. Using non-fiction literature that involves boy friendly themes has also been successful. Boys tend to prefer non-fiction so we use that as a hook when teaching comprehension strategies. We choose books with strong male main characters and real life events. Boys will develop a love for all literature if you begin by choosing books they prefer.

Address correspondence to: Annette Duncan | 4124 Orchard Hill Drive | Cedar Falls, Iowa 50613
E-mail: duncana@waterloo.k12.ia.us | telephone: 319.404.2210

We have adopted boy-friendly strategies such as graphic organizers, hands-on activities, competitive learning, and immediate feedback opportunities. Speaking more loudly in order to best meet the needs of our male students has been effective. Boys generally have shorter attention spans than girls. We change up our instructional periods and offer a structured routine incorporating movement with our academic tasks. We have found that 2nd-grade boys prefer fewer words from the teacher and more task-oriented opportunities. We give directions that are clear and the point. Problems occur only when academic expectations are unclear or if too much down time is allowed. If a problem does arise and we need to have a serious conference with a boy, we will put a game or model in front of us in order to engage them in conversation. Discipline problems will not be an issue if boys are given the opportunity to be actively engaged in decisions and in their learning.

Gender-based instructional strategies are also vital to the success of an all-girls classroom. Some of the strategies used within the classroom were collaborative grouping, use of manipulatives, real-life application, relaxing music, and unconditional positive reinforcement. The goal of our classroom environment was to encourage girls to be risk-takers when performing academic tasks. Collaborative grouping played an instrumental role in encouraging the girls to be leaders during instructional time. During math lessons, we would use this strategy to promote positive support within the group. We felt this was a valuable time to help the girls experience the role of leadership. The exciting part of these collaborative group sessions was that it provided an opportunity for all of the girls to understand the importance of a leadership role. Through this process, it was amazing to see how the girls would encourage each other to accomplish the task at hand, thus continuing to promote the idea of a sisterhood. Sisters look out for each other and help each other out. In times of hardship, these sisters could always count on each other when they needed each other most academically and socially. Girls feeling that unconditional love at all times has been a key component to their academic success.

In recognition of the developmental differences in females, we have provided a loving environment and extra support in order to meet their needs both personally and academically. The girls' self-confidence and approach to risk-taking academically has helped them to achieve in extra-curricular areas as well, such as music, gym, and art. We saw some of our quietest girls volunteering for solos in music. Some girls who had never previously showed any interest in sports were playing basketball with the boys outside for recess. The strategies that were implemented in the classroom carried over into their everyday lives. The girls were doing more than just excelling in math and science; they were reaching for the stars and never looking back. The instructional strategies used within the all-girls classroom are based on research and are essential to the success of the girls' academic achievement. These strategies are matched and implemented according to the girls' strengths and developmental needs.

It is time we acknowledge that girls and boys who enter our classrooms learn differently. They are the future mothers, fathers, sisters, and brothers that will one day lead our communities. As we develop sisterhood and brotherhood in our classrooms, we promote the idea of community support in and out of the classroom setting. Whether students are male or female, we feel that it's extremely important to have high expectations for all children. Combining high expectations and a culturally relevant curriculum has led to our success as second grade single gender teachers.

For years, single sex classes have been available to only those who could afford it. Many of our country's leaders and groundbreakers have been educated in a private, single sex educational environment and have reaped the benefits from that type of education. With the current research available on hard-wired differences, we now have the chance and the tools within a public school setting to offer every student these unique opportunities.

Advances in Gender and Education, **1** (2009), 26-27. Printed in the USA.

From the Streets to the Classroom – Making Meaningful Connections with Inner City Males: An Interview with Roynell Young

Margaret M. Ferrara
University of Nevada, Reno

Roynell Young had been on the brink of flunking out of college. Instead, he earned his way onto the dean's list and became a first-round draft pick by the Philadelphia Eagles in 1980. This is his remarkable story.

Roynell Young founded Pro-Vision, a non-profit organization whose mission is to inspire hope and purpose for male youth, their families and communities through moral, cultural and educational opportunities. Pro-Vision achieves its mission through three core programs: the Pro-Vision Manhood Development Academy, the All Male Middle Charter School, and the Pro-Vision Job Enterprise Academy. Pro-Vision is located in Houston, Texas. Mr. Young traces this journey in the following interview.

Ferrara: Can you tell me about Pro-Vision? How did it start?
Young: First of all, it is not just a school. The foundation of Pro-Vision is a character development program, the Pro-Vision Manhood Development Academy -- and a job training and readiness program, the Pro-Vision Job Enterprise Academy. The Manhood Development Academy was established in 1990 in the community, not affiliated with any school. It began with a walk in the depressed areas of Houston and my hope was to engage young men who were not engaged. At first, I encouraged the boys to meet on the weekend and play basketball. Then one Saturday, three boys from the area walked on to the course and took a bet from me – that they could beat us in basketball. The loser would buy pizza for the winning team. We won but I bought the pizza. Next week, the three brought back 12 others. The numbers grew to 40 and then 50. After six months, I was able to purchase a location - a storefront. Teachers from Welch Middle School, which is across the street from the storefront, provided some homework assistance.
Ferrara: So the program became part of the middle school?
Young: The program benefitted the middle school but it was not part of the school. The students and teachers who became involved in the program shared their success across the county. They developed an "esprit de corps" – and involved students in bonding together and working on projects that would help others. The program focused on helping students develop their emotional development. And then, Ron Paige stepped into the picture and change took place in a significant way.
Ferrara: I am assuming you are talking about Ron Paige before he became Secretary of Education?
Young: Yes, Ron Paige was at that time the superintendent of the Houston Independent School District. He asked if we would be willing to come into the district and offer that opportunity to other young people in the district. We did with some reservation, as we wanted to be on our terms. By this time, I believe it was 1995, 60 young men were given an opportunity to be part of a charter school. The purpose of the school was to give our young men a purpose in their life and to close the achievement gap.
Ferrara: When Mr. Paige put his support behind your program, what were you able to do?
Young: In 1997, we started a residential charter school. It was a residential school in conjunction with the after-school program and was located in Pasadena, TX. Sixty students were selected to live on campus. These were students who were homeless, living in gang homes, abusive homes, or just released from prison environments. Right at the peak of the program, Dr. Paige left and funding soon dried up. In 2000, the residential school was consolidated and then moved to one campus.
Ferrara: Why is Pro-Vision so unique as compared to other programs that help boys with their learning and behavior?

Young: Pro-Vision was not started as a formal education program. It had heavy emphasis on social learning, and thirdly, it is not based on traditional education. It began from a grassroots, community initiative. In the early days, we made decisions and programs instinctively; then we found that what we were doing had theory and research behind it. What we were doing is verified by the work of Dr. Leonard Sax.

Ferrara: What is the present status of ProVision?

Young: At this time, there are over 200 male youth in our three core programs. After 20 years of moving from place to place, our board of directors decided that we needed to have a capital campaign and raise money to purchase our own land and build our own facilities. The new facilities include a community garden, a tree farm and other things we are doing – in agribusiness. Next year, we will start the first leg of the high school, 9th grade. At this time, the charter school includes grades 5-8.

Ferrara: Did you select unique teachers for your program?

Young: Yes, our teachers are unique, extraordinary human beings. We have some of the most profound human beings working here. These are teachers who are able to motivate our students, students who are typically two to three grade levels behind. Typically, our students come from young single mother households, and about 80% live in poverty. All our teachers are highly qualified or certified. But our teachers are also unique in that that work beyond their contract time; their hours are long, duties are difficult and multi-purpose. These teachers are competent, caring, and very passionate and result oriented individuals. At every level we have a committed and cohesive group and a family atmosphere. Typically, staff arrives at 7:30 am and students come in at 9:00 am. Staff puts in on the average 10 hours a day. The teachers try to get students ready about what education is supposed to do – not just passing the test but also to teach about thinking in a critical level both inside the school and outside the school.

Ferrara; How do you measure success?

Young: Success in terms of accountability is measured in ebbs and flows. Overall, I measure a student's improvement based on how well a student has made changes in his achievement over time. I use several achievement measures – the Texas criterion test and the Stanford 10 test. In addition, The University of Houston's Institute of Urban Education will be assisting us this year in establishing a Longitudinal Study to more effectively help track our students' success and needs.

Ferrara: Do you also have a uniform for students?

Young: We do have uniforms in the sense that we have white tops and dark bottoms. We also have other regulations; we do not allow young men to wear earrings and pants can't fall below the waist – all cell phones are checked in – no iPods allowed – no more than 5 dollars on a person. If you are checked and have more than 5 dollars, the money is taken away, until the end of the day. Hair styles must be very conservative- the reason for that is that it is an academic institution but also a social institute. Kids across the board are falling behind – we set the standards. There are so many variables learned before the young man arrives here – they get them from home and their neighborhoods – we cannot assume that their belts and shoes will be tied at all times.

Ferrara: You are heavily invested in this program. What would happen if you decided to drop out of being the director?

Young: My freedom is I realize that I am a part of – a steward of it. When I came to realize that emotionally – I started focusing on a transition plan. One of my earliest students, back in 1990, is now director of the Manhood Development Academy and is being prepared to one day take the helm of Pro-Vision. In addition, I have decentralized the operation. It is broken out among six different individuals. I am giving myself ten more years (been doing that for four years) to sustain the vision and pace. That is one of the things that drive me and one that keeps me up a night.

Ferrara: How did you get interested in the work of Dr. Sax?

Young: I believe that I discovered Leonard Sax at the NASSPE Conference and he is a godsend. I have used his books as part of my staff development. His work gave me insight on organizational design, staff and teachers' instructional development, and ways to transform our students and curriculum.

For more information about the school and programs founded by Mr. Young, please visit http://provision-inc.org/.

Presenters wanted for NASSPE VI

The first requirement for a worthwhile conference of course is to have lots of great presentations.

If you have had experience with single-sex education, and you think your colleagues might benefit from hearing your story – or if you are a scholar who has conducted relevant research – or if you have something relevant and interesting to say about differences between girls and boys, or variations *among* girls and *among* boys – then please consider giving a presentation at **the Sixth International NASSPE Conference** (NASSPE VI) **in Las Vegas** next October, Saturday and Sunday, October 9 and 10, 2010.

We will begin considering submissions after December 1. Send your submission to nasspe@verizon.net, via fax to 610 993 3139, or via snail mail to NASSPE, 64 East Uwchlan Avenue, #259, Exton, Pennsylvania 19341.

If you have questions about the process for becoming a speaker for our conference in Las Vegas, please call the NASSPE office at 610 296 2821 between 9 AM and 4 PM, Eastern Time, Monday through Friday.

Contributors wanted for this journal!

Please read Professor Ferrara's note "From the Editor" on the opening page of this journal. If you think you might have something interesting to say about gender and education, please consider sending it to Dr. Ferrara. Submissions should be sent to:

Professor Margaret Ferrara
College of Education
University of Nevada, Reno
Mail Stop 0280
Reno, Nevada 89557-0280
E-mail: ferrara@unr.edu.

For complete submission guidelines, please go to www.drmmferrara.com, click on "want to publish."