Introduction

In the summer of 2012, I was fortunate to have an internship with the Girlstart organization in Austin, Texas. Girlstart is an educational organization focused on encouraging girls in science, technology, engineering and math (STEM). Women in STEM jobs are scarce commodities; only 24% of STEM jobs in the United States including public, private, and government sectors are fulfilled by women. However, according to the Department of Commerce, women represent 48% of the total workforce. Additionally, even if women do obtain a STEM job they still make 14% less than men in similar positions (A Gender Gap to Innovation 2011).

I believe that there are two main causes for these disparities. The first is that women are hired for STEM jobs less frequently than men. A study conducted through Yale University took a typical application for a laboratory manager position and randomly attached a male or female name to it. The researchers submitted the applications to 127 faculty from research-intensive universities and asked them to rate the applications. The male applications consistently came back as “more competent and hirable than the (identical) female applicant”. The male applicant was offered a high salary and more “career mentoring”. Interestingly even the sex of the faculty member didn’t affect the gender choice of the applicant. The study stated that a female applicant was “less likely to be hired because she was viewed as less competent”. Yet “evidence suggests that biological sex differences in inherent aptitude for math and science are
small or nonexistent” (Moss-Racusin et al. 2012). The other reason for this disparity is that there is still a misconception that STEM work is not for women. As stated in the AAUW report “Why so Few”, the negative stereotypes persist regarding women and their ability to perform in math and science related professions.

The Girlstart organization was started in 1997, in Austin. Girlstart is has served over 22,000 young girls in 4-8th grade. It offers several programs, including summer camps, afterschool programs, conferences, and special events. All of these educational outlets are designed to reach young girls and get them excited early about STEM. Additionally, the facility is equipped with state of the art technology which helps to develop tech savvy young women for this generation. Without these amenities some of these girls would have very little contact with technology.

Girlstart's mission is to empower girls in STEM. “Girlstart develops and implements a range of innovative, research-based education and mentorship programs designed to promote girls’ early engagement and academic success in STEM, encourage postsecondary aspirations and persistence in the STEM pipeline among women and other under-represented groups, and develop a diverse STEM workforce for the 21st century” (http://girlstart.org/about-us). The support that Girlstart provides young girls is crucial because as the Yale study stated: there is “less support for the female student” (Moss-Racusin et al. 2012).

The absence of support for women who are studying STEM affects both their productivity and self-esteem. Without programs that help young girls develop an understanding of STEM, how can we possibly expect them to pursue a career in it?
Unfortunately students in this country cannot count on receiving a solid background in STEM, so supplementary programs like Girlstart are filling this educational gap.

**Staff and Space**

The Girlstart property is laid out in a welcoming and direct manner. When you first enter the building, you are greeted by a lobby that opens directly into the first computer lab as well as the first classroom. Down the left-hand side is the administrative wing and on the right is the second set of classrooms. The distinction between these two spaces stems from their different purposes; the offices are for organizational work while the rest of the building is for learning and creative expression.

The property has several unique features that draw students to Girlstart. The facility is equipped with a photo booth as well as a three dimensional printer and several Promethean boards (touch screen white board monitor). Instead of collections of desks, the classrooms offer only the floor (we have bean bags for optional use) so that instructors can be on the same level as students as they work on projects and move around. The property has a gated backyard for outside projects and play. The restroom facilities are painted with themes, such as the luau loo and the Paris bathroom. Altogether, it is a distinctive environment that fosters creativity.

The administrative branch of Girlstart is comprised of several offices, a staff room, a copy room and a conference room. Every room in this branch is professional but unique. Every staff member with an office gets to decorate their room as want. I feel that this attitude towards decorations really stays true to the Girlstart ideals.
Presentation is very important for technology and the modern young girl. Poor presentation and marketing demonstrates that the program is not committed nor intuitively able to understand what young girls are seeking from an educational organization; but this is not the case with Girlstart. The organization’s information and plaques are designed by a graphic artist. I noticed this most significantly when I started at Girlstart. Young girls interested in technology react positively to graphic design which seems to illustrate a sense of cultural relevance for the girls.

The staff comprises directors, grant writers, a graphic designer, curriculum writers, program teachers, and others. The staff is composed of all women, and when men are in the building they seem out of place. The absence of men creates a different dynamic in the organization. Coed workplaces create a sense of competition and a need to be seen. When women comprise the whole workforce the competitiveness shifts to a more internal battle, everyone trying to beat their personal bests.

When a staff member walks down the administrative hall, they can expect to see most of the doors open and people speaking to one another from across the hall. This creates a low stress atmosphere that is creative and professional. Although there is a definite hierarchy in the organization but the lines of communication don’t need to follow that chain.

The entire staff continuously maintains a professional attitude, while still being semi-casual in form. The program staff were expected to wear color specific staff shirts to work every day as well as pants longer then mid-thigh, while skirts were not allowed
here (probably because we mainly taught on the floor). The color coordination is intended to convey a sense of continuity and structure.

**My role in Girlstart**

I was actually hired to be a camp counselor. I worked Monday through Friday from 7:30-1:30pm with the 6th through 8th grade group. The camp was comprised of two age groups, 4th and 5th grades in one section of the building and 6th through 8th grades in the other section. The entire summer camp was comprised of seven separate weeks of camp, divided into four different themes, such as a veterinary theme and a forensic theme. The veterinary theme included lessons on how to make animal prosthetics, cat and dog dental hygiene and a few others. The forensic theme was just a younger girl’s camp theme. They had to use their forensic lessons like finger printing to discover the “mystery” at Girlstart.

Every counselor taught on their own so that the student to instructor ratio was consistently low. There were two counselors per group in the morning and a different two counselors per group in the afternoon. Being a counselor required patience and the ability to be a consistently positive role-model. Counselors were expected to join the campers for snack and lunch a few times a week; no matter what was done at Girlstart the counselors were expected to cleanup afterwards. In my role as a counselor I needed to learn, and teach lessons and activities. The lessons were provided ahead of time, but they often needed to be adapted such as adding a mini lesson to help demonstrate the content of the curriculum. All the materials needed to be prepared and organized prior to the actual lessons which required planning and preparing some
aspects of the lessons. For instance when I taught a lesson on LED hair clips (fabric hair accessories that light-up) I needed to pre-sew battery pouches for each camper (I often had help). In addition to lessons, games and crafts were scheduled into the day to support the idea that it was camp, and therefore a fun and relaxed learning environment.

One of the games played at camp was designed to have the camper focus and build up their memory skills. The game had the girls build off each other’s efforts to discover a secret path on a grid. It began with a counselor taping off a grid. Then she would secretly draw on a separate piece of paper a path for the girls to travel on in the grid. Next the girls would line up, and the first person in line would step onto a square in the grid. She would then make a choice of which square to step into next. She would be allowed to keep walking and picking squares as long as the counselor confirmed that she was following her secret path. The moment she picked an incorrect square the camper would have to leave the grid and let another girl try to figure out the secret path. This game was great because if the girls in line did not pay attention then they could not benefit from the progress that the prior campers had made in discovering the secret path.

The lessons I taught varied quite a bit. I taught lessons in physiology, genetics, computer game programming, dental hygiene, the Cartesian coordinate system, and LED fabric circuits. One of the lessons I taught was how to use a computer program called Agent Sheet. This program used the conditional statements, “if” and “then” to program games. One of the themes of camp was World Tour, so to keep with the theme we had the girls follow preplanned directions to create an iceberg invaders game (like
Space Invaders). The girls had to design the graphics for their agents (characters and setting components) as well as layout their worksheets (the screen that the game was played in) and to make the game interactive the girls need to utilize these conditional statements. One example we used to explain the conditional statements was “if you are hungry, then you eat something” or in terms of a game “if you push the up arrow, then your agent will move up”. These games were probably the favorite lesson amongst the campers.

The Girlstart schedule was fairly typical all summer long except for the change in the theme of the week, as well as the periodic guest speaker. On Mondays and Fridays the schedule was different from the rest of the week. On Mondays the two morning counselors led orientation. During orientation we covered the policies and created rules as a group, as well as conducted a tour of the campus. On Fridays the morning crew had to have the entire group sign and leave kind comments for every camper that week on “sunshine cards” (a yellow piece of paper with an outline of a sun on it). They also had to make sure that any unfinished projects were completed so that the afternoon crew could set up and conduct a “showcase”. The showcase was a time allotted during the last hours of camp, where the campers got to take guests around to show off and demonstrate what they accomplished all week.

**The Five E Teaching Model**

Girlstart teaches using Constructivist Methodology by employing the 5E model. The constructivist premise is to “help learners to initialize and reshape, or transform, new information. Transformation occurs through the creation of new understanding that
results from the emergence of new cognitive structures” (Brooks and Brooks 2001). This methodology allows for students to create their own, more lasting connection to the information being offered. The lessons are student driven which allows the teacher to understand where the student is coming from. It does not have to follow a rigid format that constricts creativity. The curriculum is distanced from textbooks and is more tied to primary sources, giving the student a more relevant understanding. On the whole, this teaching style is more reminiscent of a post-secondary approach to education (Brooks and Brooks 2001).

The 5E model exemplifies the main purpose of the Girlstart organization. It strives to foster ingenuity and exploration. The 5E model is composed of the 5 pillars of the model as described by Cardak, et al (2008). The first pillar is the engagement section of a lesson. The engagement section is designed to “capture the students’ attention, stimulate[s] their thinking, and help[s] them access prior knowledge.” The second pillar is the exploration section which is designed to have the student “think, plan, investigate, and organize collected information.” The third pillar is the explanation section which is designed to have the students conduct an “analysis of their explorations”, so that their “understanding is clarified and modified because of reflective activities.” The fourth pillar is the extension section of a lesson; designed to “give [the] students the opportunity to expand and solidify their understanding of the concept and/or apply it to a real world situation.” Lastly, the fifth pillar is the evaluation section of a lesson. The evaluation section is designed to be “implemented throughout the lesson”, so that the teacher can “observe students' knowledge and skills along with their application of new concepts and a change in thinking.”
All the lesson plans at Girlstart are constructed using the 5E model. When I taught the LED hair clip lesson it began with the engagement pillar by asking the students what prior knowledge they had and by leading them through some circuit construction exercises. Then I started the exploration section where we created the LED hair clips. The explanation section occurred when we completed the project; and we reviewed what we had accomplished. The extension process happened when the LED light didn’t always work and I would ask them how they would improve the lesson. Lastly the evaluation part was present in the lesson because I was consistently checking in with different groups and watching as well at talking to them about their projects. Also since the girls worked in groups I could see who was truly grasping the concepts by observing which girls would step-up to help their other teammates.

Conclusion - The Impact of Different Teaching Methods on Education

My experience during my internship at Girlstart taught me how to teach within a specific methodology and the greatest thing I gained from this internship was teaching experience. I am about to begin my Masters in elementary education and I want to bring this commitment to science to my classroom. I have always cared for the field of science and feel that it is incredibly important that women become equal participants in this arena and I hope to one day be able to say that I was a true supporter of young girls who are interested in STEM. The support system for women in STEM is very small, and I aspire to increase the foundation of assistance and guidance for girls beginning in elementary school.
Arguably, the majority of the education system in the United States is currently bound by an archaic paradigm. This paradigm is a traditional pedagogical system of lecture-based instruction. The lecture-based method deprives the student of the ability to experience the material and focuses more on the regurgitation of their lessons through exams and worksheets. This teaching method had been maintained because it is inexpensive, can be done in large classrooms and has a long history in traditional teaching.

Conversely, I found that the teaching style at Girlstart is not limiting and allows for greater individuality. The fundamentals of STEM are born from creativity and thinking outside the box. Given this, it is difficult to understand why we try to teach science and math in such a restrictive format. Education itself is a learning process, yet our education system is very reluctant to do just that (Brooks and Brooks 2001). Change and innovation are a must if our society is to grow and evolve. If the United States wishes to remain at least minimally competitive in STEM we will have to eventually undergo a massive remodeling of the system so that we don’t impede the progress that our children are capable of making.

According to the United States Census Bureau, women comprised 50.8% of the population of the United States as of 2011; and as such women must take a greater role in STEM subjects if we are to remain competitive. Therefore women need to be a major component in the STEM world and to do that we need to encourage and create support systems for women in STEM. This begins at the classroom level with a shift in focus from lecture to hands on learning. We like to pride ourselves on being a progressive
society that provides equal educational opportunities for both men and women yet we will have to do much more if we are to be able to live up to this ideal.
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