Increasing the Participation of Young Women in Cybersecurity

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Abstract

This study has the goal of increasing the participation of young underrepresented groups of women in cybersecurity education and awareness activities, leading the way to increasing their participation in the field. The project was carried out over a period of several months using data from 213 young girls ages 13-18 that were visited at Junior and High Schools in Puerto Rico. The main objective of this study is to promote awareness and increase their interest in cybersecurity related professions before they start college. The author explains what motivated her to initiate this project, the problems that exist, the activities that were developed, results and the proposed solutions. The author also describes the steps and considerations that are currently being taken to contribute to this effort at the local and national level.

Introduction

The author discusses the problems that exist, the proposed solutions, the activities that were developed, and the results of the research work. The author describes the steps and considerations that are currently being taken to contribute to this effort. Finally, the author will discuss considerations on future work that is required to help solve the problem at the local and national level.

Background

But the gender disparity that affects cybersecurity is a discouraging fact for women that seek careers in cybersecurity. Studies reveal that women represent only 11% of all cybersecurity professionals around the world [1], and that very few have leaderships positions [2]. This present study has the goal of increasing the participation of young women from underrepresented groups in cybersecurity education and awareness activities, leading the way to increase the participation of more women in the field. The author's theory is that if we start to educate girls on the subject of cybersecurity at an early age, they will show interest when they graduate from High School and have a clear idea of what they want to study, where, and how to start.

The Ladies Can Code Camp is a one-week long activity that has been done for the last three years at Polytechnic University of Puerto Rico for young ladies from Intermediate Schools [3].

Figure 1. Ladies can code 2018

Problem

According to the study "Women in Cybersecurity 2017" [4] there is a strong gender gap, women only represent 11 percent of the total cybersecurity workforce (Women's Society of Cyberjutsu). One of the basic questions asked is: Where are women in cybersecurity? The presence of women in the area of technology and cybersecurity is scarce, missing out on the characteristics that women usually have, such as creativity, perseverance, and sensibility to human issues [5]. These could be young ladies in sixth grade to twelfth grade, while they are still deciding who and what they are going to be; or could be women currently in universities or part of the workforce. These girls could well be our future college students in Computer Science and Cybersecurity education, and the future professionals.

Methodology

The author visited the following Intermediate and High Schools: Specialized School of Science, Mathematics, and Technology; Holly Spirit College; Perpetuo Socorro Academy; Rosa-Bell College; and San Benito College. She gave presentations and talks on various topics of cybersecurity such as: Virus and Threats, Social Engineering, and basic areas of: Digital Forensics Analysis, Cyber Defense, Cybernetic Operations, Cryptology, among others. This included a presentation, awareness activities, information on career and educational opportunities, a survey, other general information, and the authors experiences at PUPR as a participant of the CyberCorps NSF-SFS Scholarship. The author's interest in this topic grew as she continued to develop and deliver the different activities. To be able to go to the schools to give talks, and thus be able to expose these girls to topics related to the cybersecurity field was exciting to the author. The author always encouraged the girls; she never underestimated the influence of this simple effort and the overall approach taken.
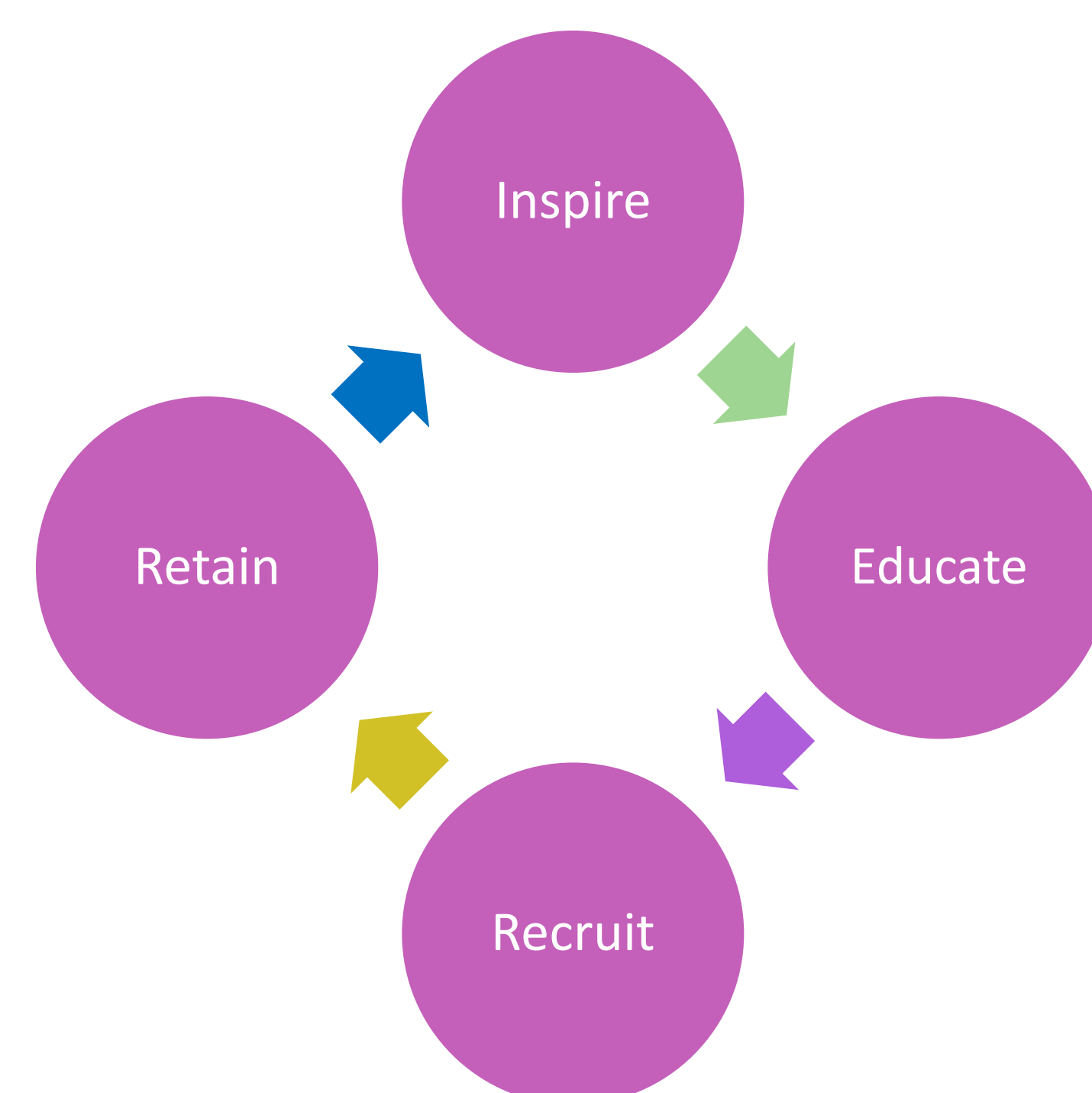

Figure 2. Four principles are comprehensive towards the project's goals.

Results and Discussion

The objective is to analyze and interpret the information obtained in the surveys and present a graphical representation of the data that allows the author to present the results more effectively.

In general, a total of 213 young girls were surveyed. All of them (100 %) were High School students from ages 13 to 18. Would like to study cybersecurity? Of the 213 respondents, 53.5% answered no, 28.6% said maybe, and 17.8% answered yes. Even though it seems from the last question of the survey data that few girls are interested in studies in cybersecurity, we have to consider that if 38 of every 213 girls that go to college enroll in cybersecurity related studies that would represent a significant increase in the quantity of females in the field. See Figure 12 below:
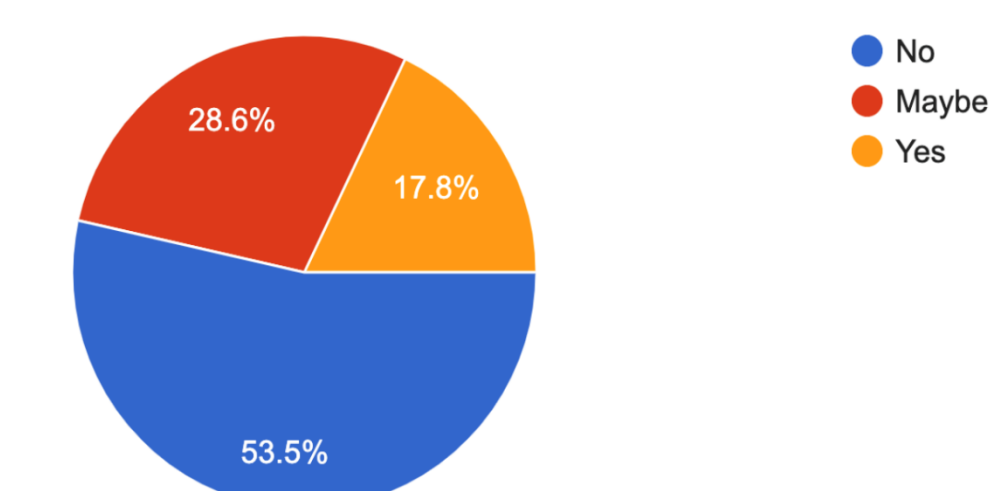

Figure 3 . Percentage of Girls That Would Like to Study Cybersecurity

What topic most caught your attention? Of the 212 responses, 32.7% answered that the topic on passwords, 24.6% the topic on Phishing, 21.4% the topic on viruses, and 21.4% on VPN. It is evident that these girls are technology oriented and know about cybersecurity in their daily lives because they seem to understand the topics well in order to answer this question as they did
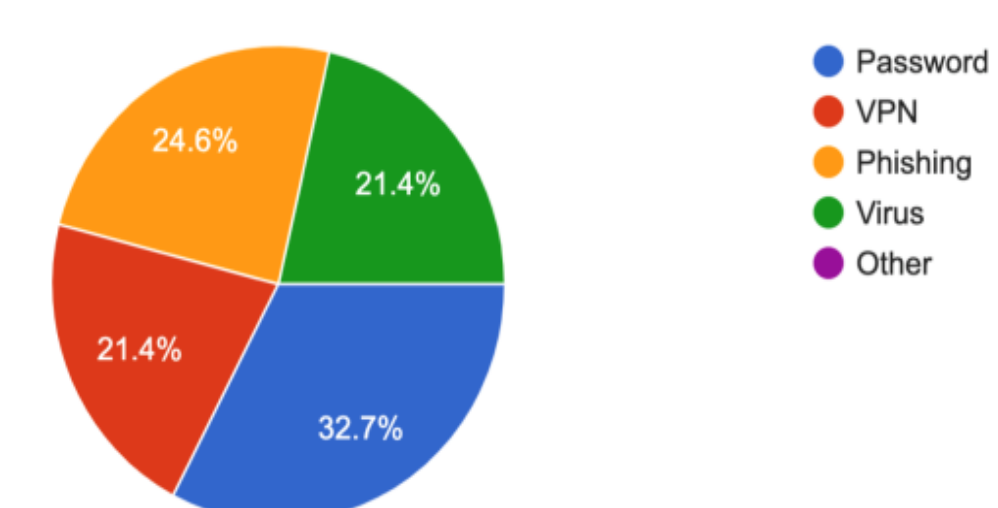

Figure 4. Topic that most caught girls attention

Schools and universities should emphasize on the field and its applications. Programs that promote technology for young women and girls should be encouraged, An excellent example is the GenCyber Ladies Can Code Camp, that promises to increase the number of women in IT and engineering. We need to reduce intimidation by creating an environment where the less technical are not intimidated by the "know-it-alls." CyberSecurity education has to be more accessible in schools at the early stages. We need to talk to school officials about the need to offer education in cybersecurity.

Figure 5. Activity that the Polytechnic University of Puerto Rico invites some high schools for teach them about CyberSecurity

Conclusions

In summary, through the activities the author was able to make the students interested and aware of the issues of privacy and cybersecurity. The motivation to acquire skills and technical knowledge related to cybersecurity will help our future generations to grow academically, professionally and personally. The girls have received a set of skills ranging from computer science, programming, cryptography, phishing, secure password, and many others. This experience has equipped them for a future where all these skills are valued, and that will give them an advantage over other students. Among them are future scientists and engineers that the world needs to guide us towards the next technological revolution, cybersecurity. The author is proud to be a part of this movement to: inspire, educate, recruit, and retain young ladies into the cybersecurity field.

Acknowledgements

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