After-School Coding through Raspberry Pi

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Introduction

According to a study by the New American Economy in 2017, there is still a shortage of qualified candidates to fill openings in the STEM-related fields including software engineering and product developers (Suciu, 2018). Software engineers use various forms of programming languages to design, construct, test, and maintain the system applications, while product developers need a basic understanding of coding to implement the architecture design. Baker (2017) explains software engineering has been on top of one of the most challenging job in the United States to fulfill for the past nine years; this dire situation continues to be happening in 2018 unless more students are encouraged to show an interest in coding as a career path. Besides, Jenkins (2018) pushes programmable coding as an essential ability for 21st-century learners. With an increasing number of digital projects around the global, the United States education system needs to take the initiative to sponsor various schemes to encourage prospective students to consider coding as a career, in order to fulfill the continuous demands from companies for coding roles to create, to design, and to modify the latest enhancements of their digital portfolios.

Issues

Computer Teachers Association released a report on why schools in the United States failed to teach computer programming skills (Oren, 2016). The report highlighted schools follow a national curriculum, and it is difficult to allocate enough time and resources devoted to computer coding modules (Kohli, 2015). Coding requires an enormous amount of time, practices, and persistence to hone the skills considered to be decent coders, ensuring the

students have a strong foundation and knowledge base once the coding curriculum ends. This effort of transforming beginners into experts takes a significant amount of time to let coders feel comfortable with their capabilities. In the United States, students are inundated with numerous other requirements to satisfy their degree completion; not much free time is available to solely devoted to coding.

Another pressing issue that needs to be addressed promptly, compared to other countries, the United States continues to not even place in the top ten ranking for countries with the best developers according to a published report from HackerRank (JanJigian, 2016). HackerRank is a free coding site that allows developers to hone their skills by solving challenges. From a global competition sponsored by HackerRank in 2016, even though, a considerable presence of participants from the United States, we continue to underperform in the challenges compared to other countries, respectively the top three, China came in first, followed by Russia, and then Poland (JanJigian, 2016). This competition validates that more resources are needed to modify and to enhance our coding curriculum to compete in the global arena effectively.

Also, another assessment performed by Burning Glass, a job market analytics firm, found the continuous unfilled seven million job openings that require coding as a prerequisite (Dishman, 2016). Besides, “Glassdoor acknowledged this trend and emphasized that eight out of the top 25 jobs need coding as a skill, this skill is one of the most in-demand across various industries” (Dishman, 2016). Dishman (2016) explains half of all programming opportunities are available in sectors outside of the technology world including finance, manufacturing, and health care. With this persistence delay in fulfilling the roles, many companies are delaying the launch of new product lines and enhancements to the existing digital portfolios.

Solutions

After-school coding through Raspberry Pi is a resolution to help students learn to program, where students would be in a collaborative environment working together to solve complex challenges facing by society today. In the United States, many students are enrolled in after-school programs, giving students the opportunity to learn more about logic and persistence, both essential coding skills that are being lost in today's connected society. Logic thinking is required for coders to solve complex challenges, but persistence is equally essential to keep trying and powering through failures. Many times no matter how well the strategy is laid out, it would almost never work out as planned, requiring to go through numerous attrition before the final satisfactory outcome.

As students continue to practice and to hone their coding skills in the after-school program, we are well prepared for the next coding challenge, and the fruition of placing in the top ranking is nearing. Also, as more students develop a passion and interest in coding, it would be a smooth transition for them to fulfill the numerous coding roles available as they enter into the workforce. The after-school coding program would get prospective students interested in coding as a career path and give them ample time to prepare, to develop, and to hone their coding skills and be career readied when they search for opportunities in the 21st-century job market.

My Involvement

I am working with Alice Feng from Immigrant Social Service Inc. (ISS), a nonprofit after-school program that is catering to the middle school students of New York City's Lower East Side community ("Immigrant Social Service Who We Are," 2018), to get the middle school

students a head start with an interest in coding through Raspberry Pi. Raspberry Pi is a tiny computer that students can learn to code through practical projects ("Raspberry Pi," 2018). Also, I am working with Alice and the ISS organization in the process of applying for a Walmart Community Grant ("Walmart Foundation," 2018) to get funding for the Raspberry Pi equipment needed to start the coding based projects. I will meet with Alice in mid-February 2019 to go over the coding curriculum. Two coding curricula would be developed, one for 4th and 5th grade, and the other would be for 6th to 8th grade. Also, I will train the high school and college student staff who are part of the ISS team in assisting me, since the program coordinator is expecting a high turnout for the Raspberry Pi event. The event will consist of 5 sessions, each session will be 3 hours, and the schedule start date will either be in April 2019 or June 2019, final details are being worked out. Also, I have reached out to the Boys and Girls Club of Hudson County to see if the organization is interested in partnering with me for the Raspberry Meetup, still waiting for the response.

Conclusion

The after-school coding program through Raspberry Pi is a step in the right direction to get middle-grade students engaged and interested in coding. For the United States to compete in the fast-changing technological field, students must be exposed to the elements of coding. Also, the after-school coding program will develop and prepare the next generation of workforce ready for the twenty-first-century careers.

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Appendix

A. Email Communication with Immigrant Social Service, Inc.

SW

Steven Wong

Mon 11/12, 10:43 AM

Good Morning Alice,

I would like to thank you for expressing an interest and allowing me to work with Immigrant Social Service, Inc. for the Raspberry Pi Meetup. As discussed, I'm in the progress of getting funding from the Community Grant Program from Walmart. I would keep you keep abreast of the new developments. The following proposed timeline: I will have a curriculum project to you by mid February 2019 for your inputs and feedback and to discuss the launch date. Thank you for supporting one of my goals in my professional growth plan for the New Jersey City University Educational Technology Leadership program.

Best,

Steven Wong

AF

Alice Feng <afeng@issnyc.org>

Reply all

Wed 11/14, 1:20 PM

Steven Wong

Hi Steven,

I just spoke to my supervisor. Is the curriculum geared towards middle school students? If not, would you be open to working with 4th and 5th grade students? We have three other ISS programs in the area that work solely with elementary school students. Summer camp for them happen over a longer period of time, usually 7-8 weeks in the summer from 9AM-6PM. Please let me know if this would be an option for you.

Alice

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Raspberry Pi Meetup Follow-up

SW Steven Wong
Wed 11/14, 3:13 PM

Alice,

I can develop the curriculum towards the 4th and 5th grade as well. It would be a wonderful opportunity for students to get a head start, offering them more time to hone their skills. Also, I can develop one for 6 to 8 as well if you like.

Best,

Steven

B. Email Communication with Boys & Girls Club of Hudson County

Raspberry Pi Project Initiative

SW Steven Wong
Mon 11/12, 11:10 AM
djefferson@bgchc.org

Reply all

Good Morning Devin,

I would like to see if I can partner with your organization to fulfill one of my goals in my personal growth plan for the New Jersey City University Educational Technology Leadership program. I'm planning to start up a Raspberry Pi Meetup group to work with the middle school students in Grades 6-8 to encourage them to develop an interest in the technology field. Raspberry Pi is a small computer that you can use to learn programming. Here's a link for more detailed information. https://www.raspberrypi.org I'm look forward toward this partnership. Thank you.

Best,

Steven Wong
New Jersey City University Educational Technology Leadership Doctoral Candidate