<!-- this script is designed for librarians coded by: knowledge quest-->

<STYLE>BODY {

<>2,445 Hours of Code: What I Learned from Facilitating Hour of Code Events in High School Libraries</>

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}
</STYLE>

<BODY onLoad="timerONE=window.setTimeout('slide(120,0)',20);">

<SCRIPT LANGUAGE="JavaScript">

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function slide(jumpSpaces,position) {

var msg = "This JavaScript will annimate your desired message.... Cool...isn't it???.......keep coding and learning!"

var out = ""

if (endScroll) {return false}

In 2013, as a long-term substitute school librarian at Dexter High School in Dexter, Michigan, I knew that expecting my principal to give me the go-ahead to coordinate an Hour of Code event for the entire student body was wishful thinking, but that is exactly what happened. Using what I learned that fall in Dexter I was able to coordinate a larger event in 2014 at a different school.

Hadi Partovi of Code.org conceived the Hour of Code "to get ten million students to try one hour of computer science" (Partovi 2013a). Organized by Code.org (a non-profit 501c3 organization supported by Microsoft, Amazon, Google, Bill Gates, Mark Zuckerberg, and others), the goal of Computer Science Education Week (CSEd Week) is to bring awareness of the value of including computer science in school curricula, increasing future job opportunities for students worldwide (CSEd Week 2013a). Many online computer programming portals, including Tynker, Lightbot, Codecademy, Scratch, and Khan Academy, provide free online tutorials to teach students (ages 4–104) basic programming concepts in one hour (CSEd 2013b).

Planning and Prep

Having signed up with Code.org, I received an e-mail in October introducing the Hour of Code event; I immediately decided that facilitating an event at my school would provide a unique opportunity for my students to be exposed to computer programming—most for the very first time. I also hoped that an Hour of Code event would increase awareness among administrators, teachers, students, and parents of the value of a computer science education and create a demand for more

computer science education in my district. My first step was submitting an enthusiastic proposal to my administrators. After discussing the benefits of the opportunity and the possible restrictions of our particular situation (including computer availability, curriculum support, teacher participation, and time available) we decided to give our teachers the opportunity to volunteer their classes for a one-day event.

I was pleased with the various promotional materials—posters, statistics, and videos—that Hour of Code provided to help introduce the event. The resource webpage also provided helpful answers and links to help facilitators promote, organize, and run the event. An online forum for questions also helped me understand how other organizers were dealing with some of the same problems I was attempting to solve.

One week prior to the event I presented the idea to the entire faculty at a staff meeting. I was concerned that such short notice wouldn't give teachers time to adjust their lesson plans, but the second question I received about my event

was, "Have you shared the sign-up yet?" Why were teachers so excited about this opportunity? Most schools don't offer computer science classes (Towns 2014). Not enough students are exposed to computer programming—at Dexter High School and around the country. Teachers were excited because I was offering an opportunity for all of our students to try coding. My hope was that through involvement students and teachers would see the benefits of knowing how to program a computer, and the event would spark an interest in computer programming students and staff never knew they had.

Students should be exposed to computer programming (preferably much earlier than high school) because by 2020 there will be one million more U.S. jobs in computing than people to fill those positions. Sixty percent of all projected math and science occupations will be in computing jobs. Computing occupations are among the highest-paying jobs for new college graduates (CSEd Week 2013c). These statistics are compelling, and after my staff presentation I had fourteen out of eighteen slots filled for my Hour

Photo Credit: Jo Mathis, Ann Arbor Public School District News

Amira and Ali, tenth-grade students participating in the Hour of Code at Huron High School.

of Code event and a waiting list for some class periods.

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I wanted to give *more* students the opportunity to participate in my event. This is where I ran into a small snag. I had planned to contact the school district's technology department to confirm that the server would be able to handle up to ninety students logging into the same website at the exact same moment to access the coding tutorials, but I didn't ask the question until the week before my event. This caused a problem; I did not follow the chain of command. Word got back to the head of the technology department, and I explained how many students would be logging in at the same time. He told me that it wouldn't work. I needed to come up with a remedy—two school days before my event.

There is nothing like someone saying that something can't be done to motivate me to figure out a way to make it work. To decide if my event could even proceed, my wonderful tech-support person was sent to discuss options with me. During our discussion we talked about ways to limit the stress on the district's server. The concerns of the technology department were

the amount of available bandwidth our district shared with other school districts in our county and whether or not the server would crash. I was more than willing to adapt my plans—and we came up with a solution that I believe made the whole event even better. It was suggested that we pair students on each computer to immediately cut the demand in half. Brilliant idea! Why didn't I think of it? Not only did the solution make sense on the technology side, but it also made sense from an instructional perspective. I had recruited a small group of volunteers to help me with the event (a few students from the University of Michigan's School of Information and a few of our high school's computer science students), but giving students the opportunity to help each other as they worked through the tutorial would reduce frustration and encourage cooperation.

Another solution was to pick a single tutorial for students to complete. Because students would have varying coding experience I thought each student should choose which tutorial to complete. The problem with this idea was that some tutorials included an explanatory video, which used too much bandwidth. It became my task to choose one tutorial that would be appropriate for all students regardless of their coding experience. This limitation also turned out to be a good thing, not only for reducing bandwidth usage, but also for my small group of volunteers. After I had picked a tutorial, I experimented to ensure that my volunteers and I would be able to troubleshoot issues for students. The chosen tutorial taught students how to code in JavaScript to write a program that would animate a word (Codecademy 2013). To understand the roadblocks students would experience accessing and completing the tutorial I ran

through the tutorial myself multiple times in different browsers on both desktops and laptops to discover and fix problems before students encountered them. I also asked my student library aides to complete the tutorial to see how long it would take individuals with varying levels of coding experience to complete the tutorial. By having students complete the selected tutorial, I was able to better prepare myself and my volunteers to effectively help students.

Event Day

My introductory presentation explained the Hour of Code event: why learning to code is important, a quick explanation of how to work through the tutorial, and how to submit completion of the tutorial to the Hour of Code organization so that students' participation would be counted. The kick-off video (Code. org 2013b) created by Hour of Code set the tone for the importance of the experience and was carefully cast to feature people with whom students could identify, including Ashton Kutcher, Macklemore, Shakira, and President Obama. Students were excited. So was I!

During each class period throughout the day of my event, at any one time, 33 to 82 ninth-through twelfth-grade students worked together in pairs. Every time a new class entered the school library with their teachers, I gave my presentation, and then asked students to find a partner and go to the tutorial's website to begin. Knowing that I had a student to teacher ratio of up to 30 to 1, I encouraged students to do three things before they raised their hands for help: check their code for typos, look at the instructions provided on the tutorial, and then ask someone nearby. This strategy worked extremely well. Students first

The author assisting students with a line of code.

Juniors Laura and Jessica take their first programming lesson.

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<div><problem solve></div>
<script language="JavaScript">
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helped participants to understand that there are many ways to tell a computer what to do, but some options are simpler and more *elegant* than others. Students thought through the process: "What am I telling the computer to do?" "What is the tutorial asking me to do?" "What can I do differently to tell the computer to do what the tutorial is asking me to do?"

There were a few glitches with the tutorial I chose. It worked well, but sometimes the instructions were misleading. Students consistently had a problem with an instruction that encouraged them to use the "length" command to measure the number of characters in a string (data that is usually represented in text rather than numbers and is enclosed in quotation marks). Instructions were written in full sentences, and, sometimes, when the code to be entered was at the end of the sentence, students thought the period to complete the sentence was part of the code. Another problem was that even if a student's code for a specific command was correct (that is, it would work), it might not have been what the tutorial was asking for. Another minor issue was that sometimes students tried to coast through the tutorial without following the instructions. The tutorial would prevent this from happening, but some students accidentally found themselves starting a different tutorial. These problems were easily rectified, as I was able to adjust my presentation to address these issues as the day progressed. However, having volunteers was extremely valuable to provide extra hands-on help to keep everyone progressing through the tutorial.

helped themselves before asking for assistance from others. But as high school students are reluctant to raise their hands and I wanted everyone to complete the tutorial, I encouraged my volunteers to keep an eye out for students who looked like they were having difficulties. It was surprising how few students had trouble completing the tutorial. I would estimate that the completion rate for the tutorial was about 95 percent for most classes, and this was among students who had little to no coding experience.

Once students finished the tutorial I encouraged them to try another tutorial from the Hour of Code's website. I was pleased at how many students actually did this. During the course of the entire event I did not see one group of students on a webpage that was unrelated to the Hour of Code. Many times throughout the day I heard "Woo!" "Yes!" "Bam!" and "This is cool!" The experience of working through the tutorial helped students understand that they were the ones telling the computer what to do. The tutorial's preview window showed the computer's response to the changing code as it was input by the students. My students had fun doing the tutorial as they realized the power of a few simple keystrokes.

Though computer programming aligns best with the curricula of the math department, I stressed to my principal, the teachers, and my students that learning how to program a computer teaches you how to think. Knowing how to communicate with a computer in the language it understands teaches you how to work step-by-step through a problem until your goals are achieved. This idea was tested by the tutorial I chose. During one step of the tutorial the student was asked to write code for an "if/else" statement. This step gave me the opportunity again and again to encourage students to try different solutions that would end up with the same result. This process

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One of the most interesting moments was when a Spanish class came to the library. As I was about to present my introduction to the students, their Spanish teacher reminded her students that the next

day they would be required to tell her "en Español" about their coding experience. Remembering that some tutorials are available in different languages I told the class that we were going to try a different Hour of Code tutorial and they would be completing it in Spanish. The "Angry Birds" tutorial had an option to choose one of twenty-four other languages (Code.org 2013a). This suggestion resulted in the collective groan of thirty-three Spanish 3 students who were hoping just to play around for an hour. After a few false starts and a group effort to understand the initial instructions, every student was able to complete the Spanish version of the tutorial and their teacher announced that they would not have to report on their experience "en Español" during the next class after all. Afterward, the teacher asked me to provide her with more tutorials that could be completed in Spanish because she had never before seen her students so engaged in an activity. Overall, teachers were so pleased with the experience that I extended the event an extra three days.

More Successes

As a result of my initial experience facilitating an Hour of Code event, I had no qualms asking my principal last fall to allow me to facilitate an Hour of Code event at my new school, Huron High School in Ann Arbor, Michigan. My first Hour of Code event (at Dexter) had 580 participants, and this past year my second Hour of Code event (at Huron) had 1,865 participants. At both schools most students were trying computer programming for the very first time. Computer programming can be taught at any grade level—and the sooner the better. Last spring, through the Hour of Code website, I introduced coding to kindergarten students at Deerfield Elementary in Novi, Michigan—and to my delight most of those five- and six-year-old students

were able to code to direct the Angry Bird through the maze.

My biggest takeaways from facilitating Hour of Code events will be to focus next year on recruiting participants from one subject area, most likely math. Also, now that all students at my high school have experienced an Hour of Code I intend to invite only ninth-grade students to next year's event. Because the goal of the Hour of Code is to *introduce* students to computer programming, both of these changes would limit repeat participants during an event and, thus, retain the element of novelty and keep excitement building.

To date over 100,000,000 students worldwide have participated in the Hour of Code (CSEd Week 2014). The movement became so powerful that Apple announced that every Apple retail store in the U.S. would host "Hour of Code Youth Workshops" for children and teenagers during Computer Science Education Week (Partovi 2013b). President Barack Obama encouraged all students to not just "play on their phone," but to "program it" too (Code.org 2013c). It is my hope that my events sparked an interest in my students, encouraging 2,445 participants to continue learning computer programming to become highly qualified for a job in computer science.

I encourage all school librarians to introduce their students to computer programming in any capacity. Check out the CSEd Week Hour of Code website this summer <csedweek.org> and consider hosting your own Hour of Code event next year in December. I know I will.

Jennifer Colby *is the school librarian at Huron High School in Ann Arbor, Michigan. She is the author of the* elementary-level informational text series Plants *from Cherry Lake Publishing. At the Michigan Association of Computer Users in Learning Conference in March she presented a Lightning Talk about how to facilitate an Hour of Code event. She is a member of AASL.*

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