



Bringing Family Code Night to Maine

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Executive Summary

In the fall of 2017, The Reach Center, a program of Maine Mathematics & Science Alliance (MMSA), brought Family Code Night (FCN) to Maine. This paper discusses in great detail how MMSA involved **83 community organizations** across the entire state in our Family Code Night effort during Computer Science Education Week, December 4-8.

Started in California in 2013 by the nonprofit MV GATE, FCN engages children and their parents by doing their first hour of coding together. These exciting events build community, stimulate multi-generational learning and raise awareness about computer science. MV GATE has a great set of resources to help K-5 schools plan and run these events. Virtually anyone who is comfortable using computers and working with youth can facilitate an event.

MMSA took on the challenge of sponsoring this program in Maine by involving other youth-based organizations including afterschool programs and public libraries as well as schools. MMSA's goal was to have at least one event in each of the 16 counties, with 1,000 participants statewide. We were successful on both counts, with 1,271 children and 785 adults experiencing a total of **2,056 hours of code!**

Our keys to success included:

- We started with a comprehensive set of materials and presented Family Code Night as a gift package that just about anyone can implement.
- We established a spirit of collaboration with MV GATE, openly sharing resources and ideas to improve the program and expand its reach.
- We set “SMART” goals for recruiting host sites, which kept our staff motivated to make this a truly statewide effort.
- We focused our efforts on supporting facilitators through webinars and frequent emails and allaying any concerns about their inexperience with computer programming.
- We leveraged contacts with multiple partners including other programs within MMSA.

For more information on Family Code Nights in Maine, visit www.mmsa.org/familycodenight. To launch a Family Code Night effort in your state, visit www.familycodenight.org.

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Introduction

It's no secret that computers are here to stay, and many organizations are working to teach youth how to do more than just search the web and create documents. Moving the use of technology beyond a fancy encyclopedia or word processor can come in many different forms, including activities in the classroom ranging from one-time games to semester-long integrated units or activities outside of school during the afterschool or family hours.



[Hour of Code](#) boasts 154,001 events held in 2017 in more than 180 countries around the world. Members of MIT's [Scratch](#) Community have created more than 28 million projects. [Khan Academy](#) offers 105 lessons in JavaScript alone. These resources are great ways to engage youth in computer science (CS), but the California nonprofit MV GATE sought to add what they thought was an important missing piece. In 2013, they pioneered Family Code Night (FCN) in Marin County schools, just across the bay from San Francisco. In that area, the event has teamed up thousands of students with their parents to do their first hour of coding together.

Thus began Family Code Night. In December 2013, California school cafeterias and libraries began to buzz with excitement of parents and their children pairing up to solve Code.org puzzles using the Blockly coding language. Teachers leading the session shared “Big Ideas” – basic yet important coding principles such as *debugging* and *repeat loops* with the participants. Families left the events excited to try the FCN “Code on at Home” activities that would further their CS learning.

The family element of this experience elevates coding to a new level. MV GATE's hypothesis was that introducing parents to coding would make them more likely to advocate for their children's access to quality computer science education. As one California parent said, “It exposed our kids to coding in a fun and non threatening environment... My son had a great 1st experience. We now need to have a follow up session to keep the connection and interest.” It has the additional elements of letting the youth be the ‘teacher’ of their parent and providing a less risky learning environment since the youth and adult can learn together; there is no need for the adult to be the expert. In this paper, we will use the word “parent” to mean any adult who brings a child to FCN, knowing that it could be a grandparent, aunt, mentor, or even an adult neighbor.

Bringing Family Code Night to Maine

In July 2017, MMSA's Experiential Math Specialist Renee Charette participated in the Computer Science Teachers Association conference in Baltimore. She attended a session run by John Pearce, where he introduced Family Code Night. Renee was inspired by the stories John shared, so she brought the idea to her colleagues at an MMSA staff meeting. Staff working on MMSA's [Reach Center](#) project, which serves youth ages 10-18 outside of school, decided to promote FCN statewide. Our goals were lofty: at least one event in each of Maine's 16 counties, with 1,000 people completing an hour of code via FCN during Computer Science Education Week, December 4-8, 2017. To meet this goal, we would recruit, train, and support host sites throughout their own recruitment and planning efforts.

Host Site Recruitment

Family Code Night has traditionally been conducted in schools, but we piloted an expansion of the program to include libraries, afterschool programs, and other community organizations. We knew that, with Maine's dispersed rural population, we would need to recruit more than just schools to meet our goals. The first stage of recruitment involved reaching out to our organizational partners interested in CS, including Maine State Library, Project>Login, and 4H. They would be instrumental in spreading the word about FCN and recruiting some of their constituents to the effort.

In September 2017, Reach Center staff “launched” the effort at a western Maine STEM EdCamp, where teachers gathered to share practices and ideas in an “open space” format. We made an informal presentation, provided information, and showed interested teachers how Blockly coding works. MMSA staff on other projects invited educators involved in their programs to consider hosting events. These projects included [Exploring Computer Science](#), [ACRES](#), and [STEM Guides](#). We put messages on Maine teacher listserves (afterschool, science, math and CS) and spread the word via Facebook and Twitter.

The messages we sent to teachers took some of the language from www.familycodenight.org and used what we have heard from Maine educators about the concerns they experience about teaching computer science. We explained that the activities are ready to use and that the web-based puzzles can be used on most devices (including laptops, Chrome Books, and iPads). We also stressed the facilitators did not need to be experienced coders, as the Event Kit provided a script to follow during the event.

While it is important to get support from a school's principal when doing a Family Code Night in schools, we started with teachers. MMSA's long history of teacher professional development (PD) has given us a statewide presence and extensive list of contacts. Efforts of recent years involving out-of-school educators gave us several additional recruitment avenues: afterschool programs, public libraries, and other youth-based organizations such as 4-H.

The Case for CS Education

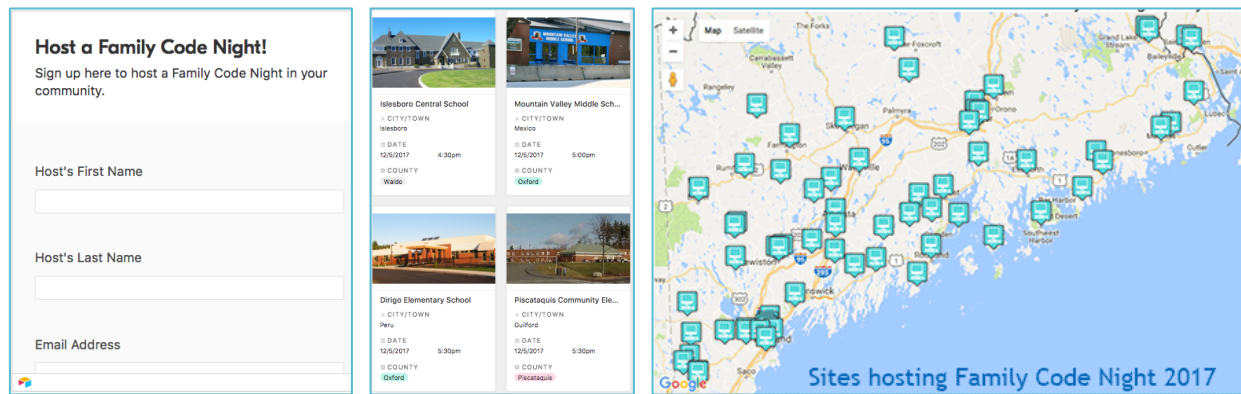
Why does MMSA care so much about CS? The quick answer is that jobs of the future will increasingly rely on more-than-basic computer skills. Here are the data to support our work:

- Students who learn CS in high school are **6 times** more likely to major in it in college. Females are **10 times** more likely.ⁱ
- Maine has **no** dedicated funding for teacher professional development in CS, does **not** require schools to offer CS courses, and has **no** K-12 CS curriculum standards.ⁱ
- Maine has **845** job openings in CS-related professions, including programming and cyber security.ⁱ
- In 2015, only **112** college students graduated with CS degrees. Only **16%** of them were female.ⁱ
- CS is a great career for people living in **rural** areas. The first **telecommuting** jobs were in CS.ⁱⁱ

If we get youth interested in CS, we'll feed the college and university programs and come closer to meeting the demand for computer scientists in the workforce. Bright young people who have interest in and affinity for CS will be able to stay in Maine if they choose.

MMSA's Communication Team created a landing page for Family Code Night, found at mmsa.org/familycodenight. It gave readers an introduction to Family Code Night, details on hosting an event, and provided the option for them to register to host an event. Part of the registration process asked hosts to choose a date for their event and select an introductory webinar to attend. Approximately half of the sites committed to a date upon registration. Asking host sites to register was important for us to monitor progress toward our goals.

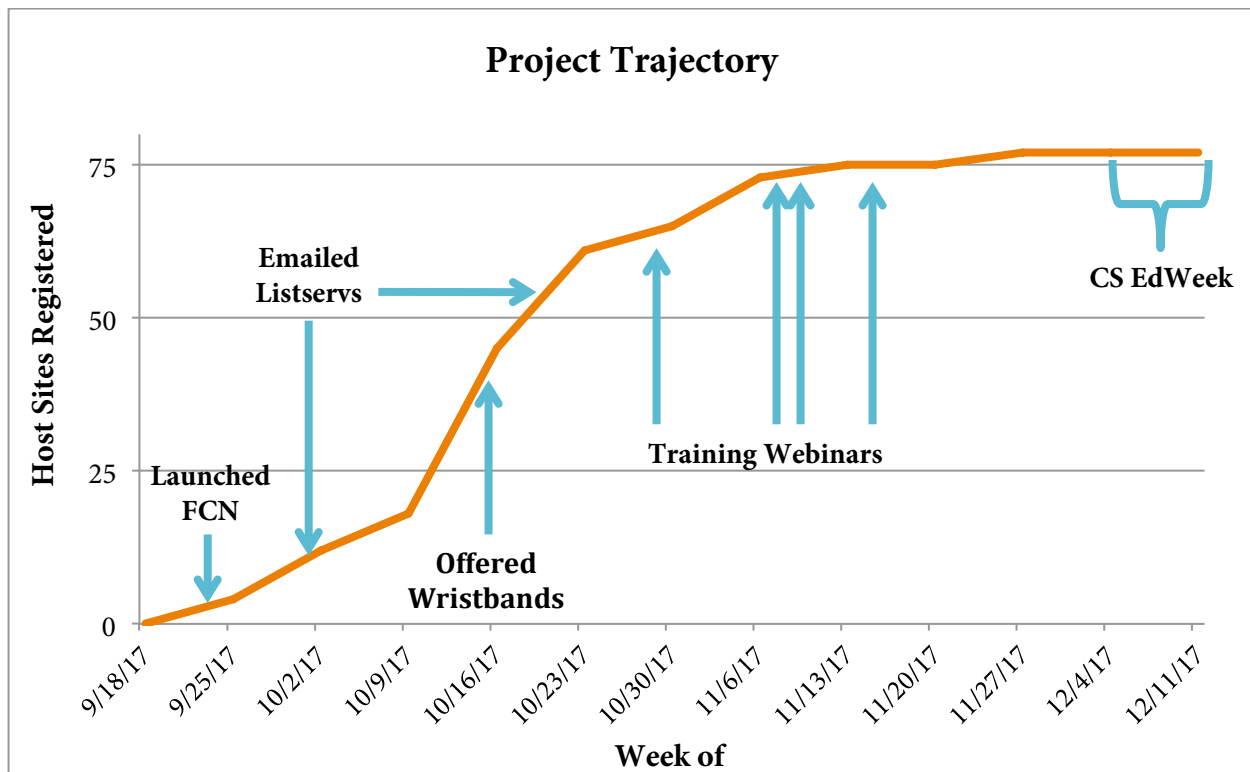
We used [Airtable](#) to manage the information we tracked about FCN. On the surface, it looks like a simple cloud-based database program. However, Airtable has several *views* that can be easily embedded in a website. For host site registrations, we embedded a *form view* that automatically populated our main table. An email would alert us to a new registration, at which point staff reviewed the listing. Clicking a simple checkbox would then make that event show up in a *gallery view* on our site. For each site, the address, date and time were displayed in the gallery. We chose to add a photo of each site to bring a visual element to the gallery. We also invested in the WP Google Maps Pro plugin so that we could upload our table of host sites and show them on a map.



From left: Airtable's form view and gallery view; WP Google Maps Pro plugin.

Once a site registered, they received periodic emails offering support and gained access to the FCN Event Kit from MV GATE. Initially, we were hesitant to select a specific week for host sites to hold their events because we thought some sites would choose not to host at all if that week was not feasible for them. It turned out that only a few sites requested dates outside of that time period, and we made it clear to them that they were free to host their FCNs any time during the year. Promoting FCN during CS EdWeek gave our staff a clear timeline for the project. We believe that it also encouraged host sites to be more proactive in setting a date.

On October 16, we announced that we would send USB wristbands to sites to give to their youth participants as an incentive to attend. We ordered 1,000 wristbands loaded with coding resources and asked each host site to give us an educated guess of how many youth would attend their events. We intended to send their wristbands in time for their events. It became clear early in the process that we would easily exceed our goal of 1,000 *total participants* as sites reported that they expected over 1,000 *youth*. This number continued to grow to 2,700 youth expected statewide. We ordered additional wristbands, knowing that many of them would be sent to the sites after their events happened. The following graph shows cumulative registrations over the project period and includes pertinent milestones and recruitment efforts.

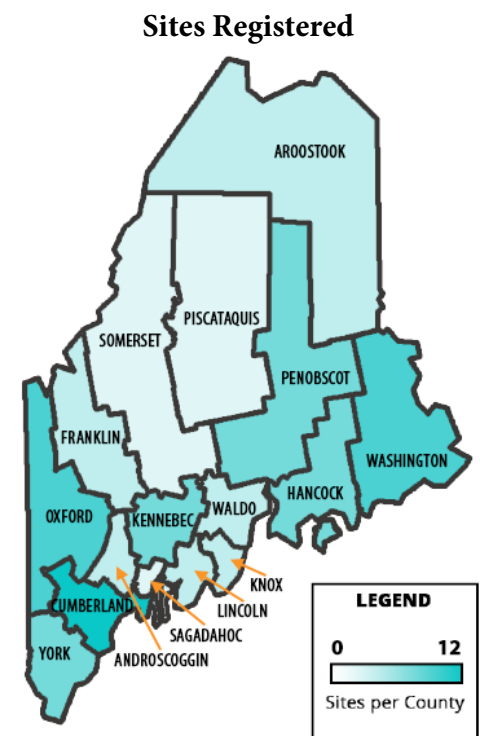


Although we assumed that we would exceed our participant goals, by the end of October we'd yet to schedule Family Code Nights in Sagadahoc and Piscataquis counties. It was not surprising that Piscataquis, our most rural county with just under 17,000 residents, would be a challenge.

Sagadahoc county, on the other hand, is in southern Maine and has 35,000 residents and two Class A high schools. We began to dig deeper into our contacts in those two counties.

Finally, in the first week of November, we had received commitments from sites in each of those counties. Two other counties, Washington and Oxford, had a great response due in large part to our STEM Guides project, which seeks to connect rural Mainers to the STEM in their own communities. The map, at right, shows the final number of sites committed to host FCNs during CS EdWeek. Giving ourselves a goal to make this a truly statewide event kept us from getting complacent after we met our goal of 1,000 participants.

We knew that the bulk of host sites would be schools (54), but we did receive a strong response from libraries (13) and afterschool programs (13). Three other sites included two Cooperative Extension offices and one community "co-working" center.



Host Site Training

MV GATE offers webinars for host sites. These sessions introduce Family Code Night and seek buy-in from viewers, who have traditionally been elementary school principals. Once a teacher or principal decides to do a Family Code Night, he or she can download an Event Kit. The kit contains recruitment resources, planning materials for organizers, support for facilitators, and materials for the event itself (including a slideshow, a script, and take-home materials for participants).

We took a different approach to offering webinars, operating under the premise that educators already know how important CS education is but either don't have the time or the confidence to work it into their existing structures. **We focused recruitment efforts on assuring facilitators that they do not need to be coding experts because we would provide resources and support throughout the process. We stressed that Family Code Night is a “gift package” that can be implemented by anyone who is comfortable with computers.**

We added a few resources to the Event Kit, including a guide to taking photos and video to share with the press, and customized it for our Maine audience. MV GATE provided a special Maine download page so that our sites could get this updated version. We added some out-of-school CS resources available in Maine such as the [STEM Resource Bank](#), Maine Robotics, and several app challenges. Once a host site attended one of the four webinars and downloaded the Event Kit, they would have the knowledge and resources to conduct their event. We invited additional volunteers from host sites to attend the webinars and made a recording available for those who missed the chance to participate live. We used the Zoom web conferencing platform, which enabled participants to see each other and interact, building community among the group.

Supporting Host Sites

After training, we did periodic email check-ins with host sites, reminding them about some important things to consider when planning their FCNs. Many people felt comfortable with asking questions via email, and we often shared our responses with the wider audience through periodic emails to the facilitators. These communications allowed us to monitor how planning was progressing and whether the host sites were still on track to have their events. We asked hosts to tell us if they changed the date, time, or location of their events so that we could maintain accurate information on our website.

MMSA's Communication Team prepared a press release and disseminated it widely with the intention of getting newspapers and TV crews to visit FCNs. We also used a Google Alert to track all mentions of Family Code Night on the Internet, allowing us to share any Maine-based stories on social media. Occasionally, a host would send us their own press release or article about their FCN. We passed those resources on to other hosts so they could repurpose them for their sites. In addition, we reached out to Maine's Congressional delegation and wrote articles for several weekly and monthly newspapers. These two efforts did not bear much fruit. We learned later that the local press will pay more attention to a teacher, librarian, or other community member who reaches out to them.

Maine Events

Although we recruited and supported host sites, the credit goes to the organizers and facilitators who put in the hard work to make each of the Family Code Nights happen in their communities. They needed to have a space that could accommodate all participants, a method for attendees to register, and enough devices for the families who could not bring their own. They prepared their volunteers, called “Code Coaches,” and some of them arranged for food and prizes to be given out at their events.

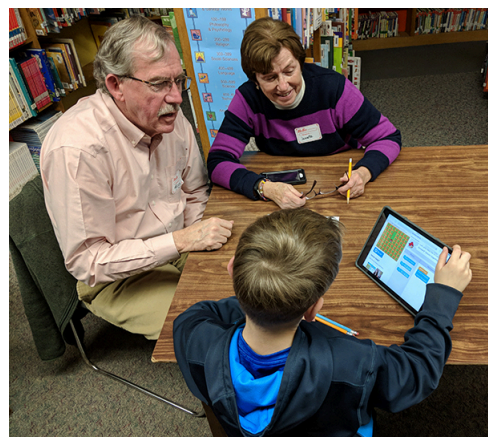


Facilitator Valorie Bemis & Code Coaches

Most schools hosted their events in the gym, cafeteria, or library. Other organizations, such as libraries, used meeting rooms. They had tables and chairs for each child/parent duo to work together on a single device. To open the event, the facilitator projected a slideshow, provided in the Event Kit. Using a script, also from the Event Kit, he or she introduced FCN and showed an energizing video from Code.org. Once they covered the ground rules for the evening, participants began learning to code by solving puzzles in the Blockly coding language.

Parents and children were encouraged to take turns with the mouse. Code Coaches moved about the room, checking on peoples’ progress and helping when needed. Every so often, the facilitator would ask the group to stop coding for a moment to discuss a “Big Idea” in coding. Big Ideas are basic yet important concepts, including:

- Program
- Repeat Loop
- Code Efficiency
- Debugging
- Conditional Statement
- If-Else Statement



Grandparents learning to code at Hall School in Portland

As participants progressed through the puzzles, the complexity increased and the Big Ideas came into play. Each pair worked at their own pace and tracked their progress on a program card. If they completed all 20 puzzles, they had the option of working on another set of puzzles called “The Artist.” If they did not complete the puzzles, they could finish at home using the program card.

Toward the end of the event, the facilitator ran the Big Ideas Contest in which the youth were asked to explain the Big Ideas. Some sites offered prizes to people who could recall how the terms relate to coding. At the conclusion of the evening, each child received a branded USB wristband that was loaded with coding resources, including “Code on at Home” activities and some Maine-based computer science offerings.

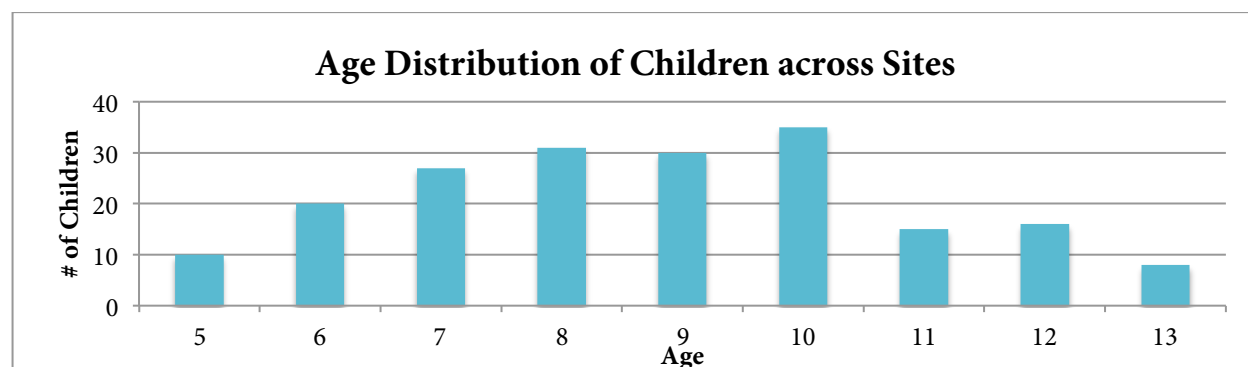
Evaluation

MMSA's Research Team helped to develop surveys for children and parents. Staff from several MMSA projects attended 11 Family Code Nights to administer evaluations. We opted to get evaluations from only a subset of sites because we wanted to get some testimonials and general feedback but did not want to code and analyze hundreds of surveys. We sent staff to do this because we did not want to add the additional burden of evaluations to the facilitators' plates. We collected evaluations from 137 children and 99 adults at the following sites:

- Appleton Village School
- Crescent Park Elementary, Bethel
- Great Salt Bay School, Damariscotta
- Learning Works, Hall School, Portland
- Hall-Dale Elementary, Hallowell
- Jefferson Village School
- Longley School, Lewiston
- Sanford Jr. High
- St. George School
- Willard School, Sanford
- Wiscasset Elementary

Child Surveys

We asked children for their age and how much they liked the event. We also gave them space to “draw a picture or write a sentence about what they learned.”



Knowing that not all students are strong readers, we asked children to share how they felt about the event by selecting one of four emojis. Their responses are shown at right.

99 students wrote about their experience. More than one third said they learned to code or *improved* their coding skills. 17 mentioned the Big Ideas, 14 said it was fun, and 12 commented on the ease or difficulty of coding. Five said they enjoyed learning with their parents or teaching them to code.

Student Survey Responses

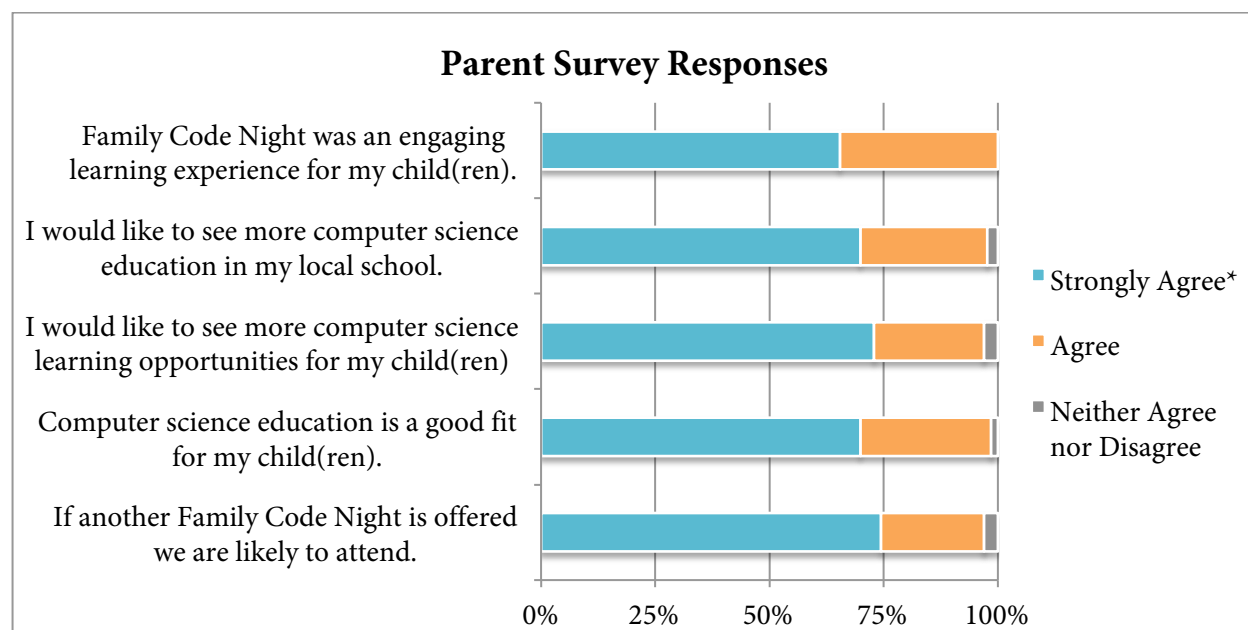


Children Said...

- “I learned to work together as a team and to not rush through your work.” (Age 13, Sanford)
- “I love coding! It’s my new favorite thing besides reading.” (Age 9, Bethel)
- “I learned that doing family code night can teach every kid or grown up that didn’t even know what in the world is coding, would learn how to do it.” (Age 10, Bethel)

Parent Surveys

We asked parents how many adults and children from their family attended and the age of their children. We then asked them to react to five statements on a scale of 1 to 5, where 5 is “strongly agree” and 1 is “strongly disagree.” The following chart shows the overwhelmingly positive response from parents regarding Family Code Night and CS education in general.



**5 adults made positive comments, but likely misread the responses to the multiple choice items. We have adjusted for these responses in our analysis.*

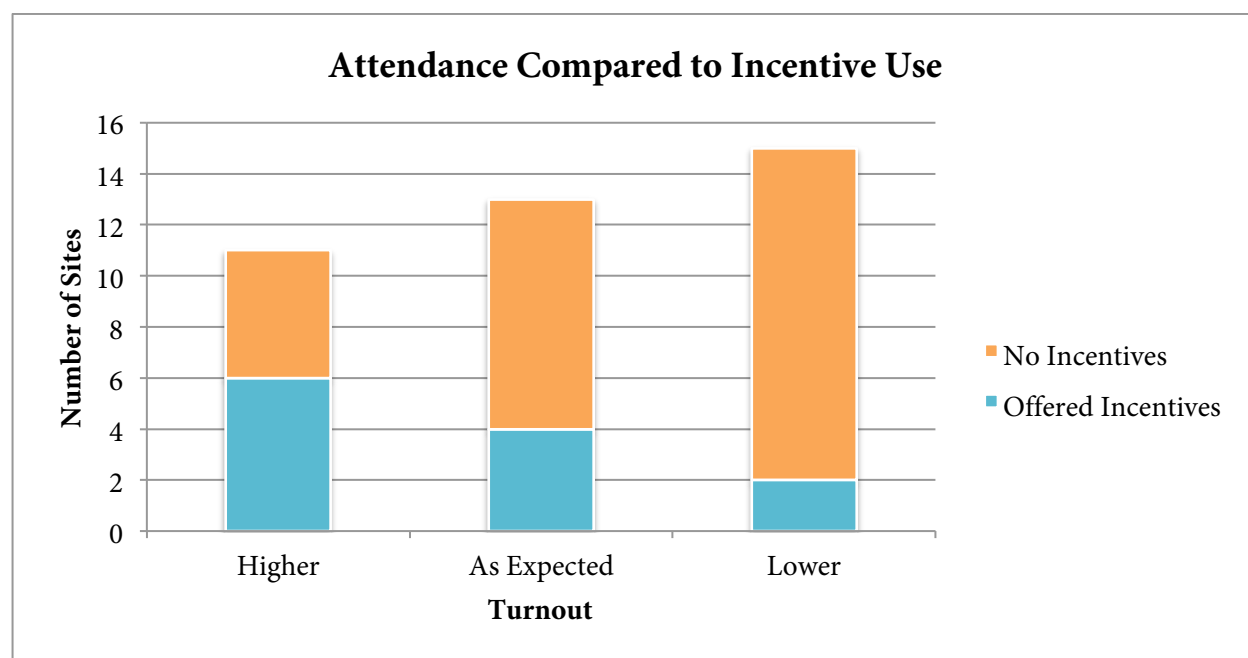
Parents Said...

- “He was focused, very engaged and most of all had a lot of fun. Can’t get him to stop! Maybe that’s a good thing. Thank you.” (Parent of 8-year-old, Damariscotta)
- “My daughter enjoyed teaching me how to code. And it was a nice night out with her as well.” (Parent of 13-year-old, Sanford)
- “Engaging with the community outside of school. Computer science is an important and part of our world and would like to see it continue.” (Parent of 6-year-old, Hallowell)

Host Surveys

We asked hosts to complete an online survey after their events. We received 39 responses, a response rate of 51%. The surveys helped us to collect data on the number of participants who attended events. They also gave hosts an opportunity to give feedback on the program. We also used this survey to see if there was any correlation between attendance and additional incentives offered such as food or prizes.

One question asked them to compare their expectations to their actual attendance. The group was split quite evenly, with 33% getting the number of attendees expected, 28% getting more than expected, and 39% getting fewer attendees than expected. We looked more closely at this group, and discovered that 12 of the sites advertised food and/or prizes, as shown in the chart below. Of those 12 sites, only 2 had a lower turnout than expected.



When asked to elaborate on why they thought their attendance was more than expected, the biggest reason was that people attended the event without registering in advance. Another major reason was simply inexperience: with no baseline for how many people they could expect, they set modest goals. Two of the sites believed that they had a great turnout because they did a lot of advertising. Popular means of advertising included sending flyers home with students and reminding parents via text message and robocalls.

The biggest reason cited for low turnout was that other school or community activities drew people away. One library scheduled their event for the same day as their town's holiday tree lighting ceremony, which led to a low turnout. Several other sites stated that it was hard for parents to attend due to work schedules, and some schools tend to see low parental involvement in general. Three sites did mention that they wish they'd done more to promote the event.

Half of hosts said their favorite thing about FCN was the child/parent interaction. Some hosts commented on how their students showed their parents what they were learning at school. Other hosts enjoyed watching the parents and children learn coding together. Overall engagement – smiles, excitement – was another highlight. Hosts also said that the materials and support provided by MMSA and MV GATE were helpful and that the event was easy to run.

Hosts Said...

- “Seeing the amount of learning that occurred for both students and parents in just 1 hour! The stops to check in and review vocabulary and strategies really helped them to see what they were learning.” (Girl Scout Troop Leader, Bethel)
- “My middle school tech team kids were the hosts and led the entire evening - their leadership was awesome! I’m so proud of them.” (Middle School Teacher, Readfield)
- “75% of the students who came were from our elementary school (3rd & 4th grade) and they were 100% girls!!” (Middle School Teacher, Bucksport)

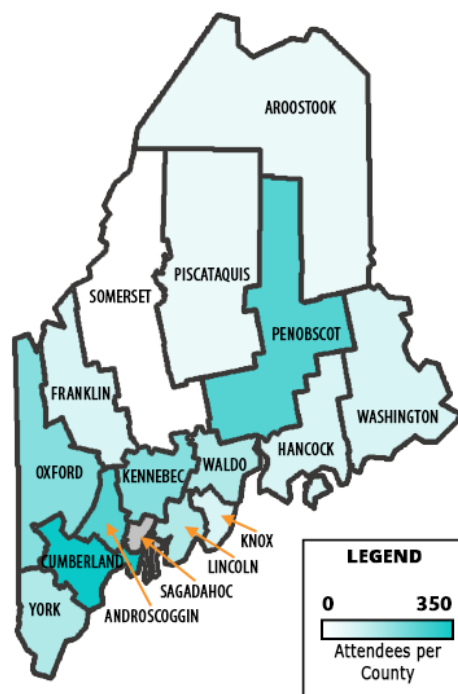
Quantitative Evaluation

We gathered attendance information from sites via email and in their host site evaluations. Of the 83 sites that registered, 64 of them held their events (77%). Eight canceled and another eight postponed. Two of those FCNs are scheduled for January. All but six sites had reported their numbers to us.

Statewide, Family Code Nights drew 1,271 children and 785 parents, exceeding our initial goal of 1,000 total participants. Ultimately, we had Family Code Nights in 15 of the 16 counties. The map at right shows the number of participants in each county.

These numbers also show that multiple youth often attended with one adult. Anecdotal evidence noted that some of the additional youth were younger siblings, including toddlers and preschoolers.

The most common reasons for canceling or postponing events were low enrollment, bad weather, and conflicts with other events. One site in Presque Isle chose to postpone their event until March because they wanted to use it to promote a coding class they were running through Adult Education in the spring.



The Future of Family Code Night

We at Maine Mathematics and Science Alliance are pleased with the response we elicited from educators when we began promoting Family Code Night. We have been documenting all feedback, both formal and informal, from people involved with FCN in Maine. We're actively working with MV GATE to improve the program as a whole and help other states grow FCN in their schools, libraries, and other community organizations.

We plan to continue promoting this great program in Maine. Although we will encourage schools to host the event during the next CS EdWeek again, we will support educators who want to do Family Code Nights any time of the year.



Girl Scouts learned to code in Bethel.

In Maine, we learned a few lessons about coordinating Family Code Nights, including:

- Offering USB wristbands to host sites is a nice perk, but the time spent organizing this portion of the project was significant.
- Collecting attendance data from host sites was challenging; not all sites were able to keep track of everyone who attended.
- Some sites were holding coding events, but did not use FCN activities. We didn't want to include those sites in our evaluations since they weren't following the official "Family Code Night" format.

We have some improvements in mind for Family Code Night, including:

- Age-appropriate puzzles for middle school students, including an event that combines Javascript with movie making;
- A central location for sites to register for Family Code Night, as opposed to each region creating and running their own registration systems like we did in Maine;
- A parent/PTA Action Kit to expand CS offering at K-5 schools; and
- A Code Club Kit, which anyone can use to run an 8-week coding club for K-2 students.

While we were introducing Family Code Night here in Maine, MV GATE worked with CodeVA to roll out the program in Norfolk, Virginia schools. They have recruited 19 of their 32 schools to host Family Code Nights. They are now working in the Richmond area schools, applying some of the methods we used in Maine to encourage educators to get involved.

Conclusion

Family Code Night is a fantastic way to introduce youth to computer science, but it mustn't end there. Once children understand how the Blockly language works, they can explore any of the dozens of programs that use Blockly such as MIT App Inventor, Made w/ Code, or LearnToMod. They'll also be able to transfer their knowledge to other block-based languages such as Scratch. Once they are comfortable with coding concepts, they can move away from visual coding languages and start writing code with Ruby, Python, or Javascript.

We can keep students' interest in coding by moving from the puzzle realm toward project-based learning. The Scratch Community allows coders to see the inner workings of each others' creations. They can adapt other members' work and collaborate on projects. Scratch can be used to make games, stories, artwork, and even animations.

As our youth grow and become comfortable with programming, they will be able to learn new coding languages more easily, as evidenced by one young woman who participated in the Maine State Science Fair. In order to analyze the data she collected in her social science project, she watched YouTube videos to teach herself to use the programming language R. The judges were impressed with her perseverance and awarded her a full-tuition scholarship to the University of Maine. She is a first-year student there and is studying to enter a medical profession. Fluency in computer science will no doubt make students more prepared for the future, whether they enter college or the work force after high school.

Works Cited

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ⁱⁱ Can I Work from Home with a Computer Science Degree? (n.d.). Retrieved January 05, 2018, from www.computersciencedegreehub.com/faq/work-home-computer-science-degree/s