

GAME ON!

Connected Learning and Parental Support in the CyberPatriot Program

by
Melissa Brough

CONNECTED LEARNING
WORKING PAPERS

March 14, 2016

Digital Media and Learning Research Hub



This digital edition of **Game On! Connected Learning and Parental Support in the CyberPatriot Program** is licensed under a Creative Commons Attribution Unported 3.0 License (CC BY 3.0)
<http://creativecommons.org/licenses/by/3.0/>



Published by the Digital Media and Learning Research Hub. Irvine, CA.
March 2016.

A full-text PDF of this report is available as a free download from
www.dmlhub.net/publications

Suggested citation:

Brough, Melissa. 2016. *Game On! Connected Learning and Parental Support in the CyberPatriot Program*. Irvine, CA: Digital Media and Learning Research Hub.

This report series on connected learning was made possible by grants from the John D. and Catherine T. MacArthur Foundation in connection with its grant making initiative on Digital Media and Learning. For more information on the initiative visit www.macfound.org.

For more information on connected learning visit www.connectedlearning.tv.

CONTENTS



4	EXECUTIVE SUMMARY
6	STUDY BACKGROUND
10	FINDINGS
12	CASE STUDY: RAÚL
15	CASE STUDY: MIA
17	CASE STUDY: XIMENA
19	CASE STUDY: FERNANDO
20	CONCLUSION
21	ACKNOWLEDGMENTS

EXECUTIVE SUMMARY

The Connected Learning Research Network, based at the Digital Media & Learning Research Hub at the University of California, Irvine explores how interest-driven, networked activities online may present learning opportunities for junior and high school aged students. **We define connected learning as learning that is driven by an individual’s interests, supported by peers and/or caring adults, and linked to academic, civic, or professional opportunities.** Our research seeks to understand how to best support connected learning among a diverse range of youth, and especially, the important roles that parents can play in helping their children bridge interests with educational and other opportunities.

Over the course of six months from June through November 2015, I conducted a qualitative study of high school students who participate in Beyond the Bell’s CyberPatriot program, and their parents. CyberPatriot is an afterschool program founded by the Air Force Association to inspire high school, middle school, and elementary students toward careers in cybersecurity or other science, technology, engineering, and math (STEM) disciplines. Students work in teams to compete in cybersecurity competitions at the local, regional and national level.

The aim of this study was to help identify factors that affect students’ interest-driven learning and their participation in the CyberPatriot program, especially those factors related to home life and parental influence. Students were recruited from CyberPatriot programs at six high schools in the Los Angeles Unified School District as well as from three regional CyberPatriot events. A total of twelve families participated in the study. Students and their parents completed in-depth, semi-structured interviews typically taking place in their home.

The twelve (12) families in this study represented a range of socioeconomic and educational levels and race/ethnicities. The majority reported an annual household income of under \$49,000. The majority of families were also Latino/Hispanic; the parents were primarily immigrants from Mexico and Central America. Most parents had completed some high school education or less.

This report provides an analysis of the data collected from these twelve families, which included twenty-seven (27) semi-structured, in-depth interviews. This report also includes four case studies of particular students and their parents in order to offer a more in-depth picture of some of the emergent themes. My analysis considers factors such as technology and digital media use in the home, and digital literacy and how parents may promote it. It also asks how students’ interests connect to learning opportunities, and investigates the roles that parents and the CyberPatriot program may each play in fostering connected learning. Key findings of this study include:

- Digital media is prevalent in the homes of these students and plays a significant role in their daily lives. Despite having limited resources in most cases, parents invest in technology for their children for both educational and entertainment purposes.
- Some parents are actively promoting digital/technology literacy by letting their children “mess around” and be hands-on with digital media from an early age.
- CyberPatriot appeals in particular to gamers, as well as to students with an existing interest in science, (computer) technology, and engineering. It offers self-described “geeks” or “nerds” a community in which their interests in games and digital media are

validated, supported by peers and mentors, and geared toward new opportunities.

- The CyberPatriot program is therefore functioning as a bridge between these students' interests/passions and institutional opportunities for academic and professional development.
- However, girls may often enter the program through different pathways than boys, driven less by peer culture around gaming and more by professional or academic interests or goals.
- Parents remain largely isolated from the program and often feel ill-equipped to support their students' connected learning in this context.

STUDY BACKGROUND

ABOUT THE CONNECTED LEARNING RESEARCH NETWORK

The Connected Learning Research Network (CLRN) is a group of researchers working across the United States and beyond to study new ways of learning in the digital age. We define *connected learning* as **learning that is driven by an individual's interests, supported by peers and/or caring adults, and linked to academic, civic, or professional opportunities.**

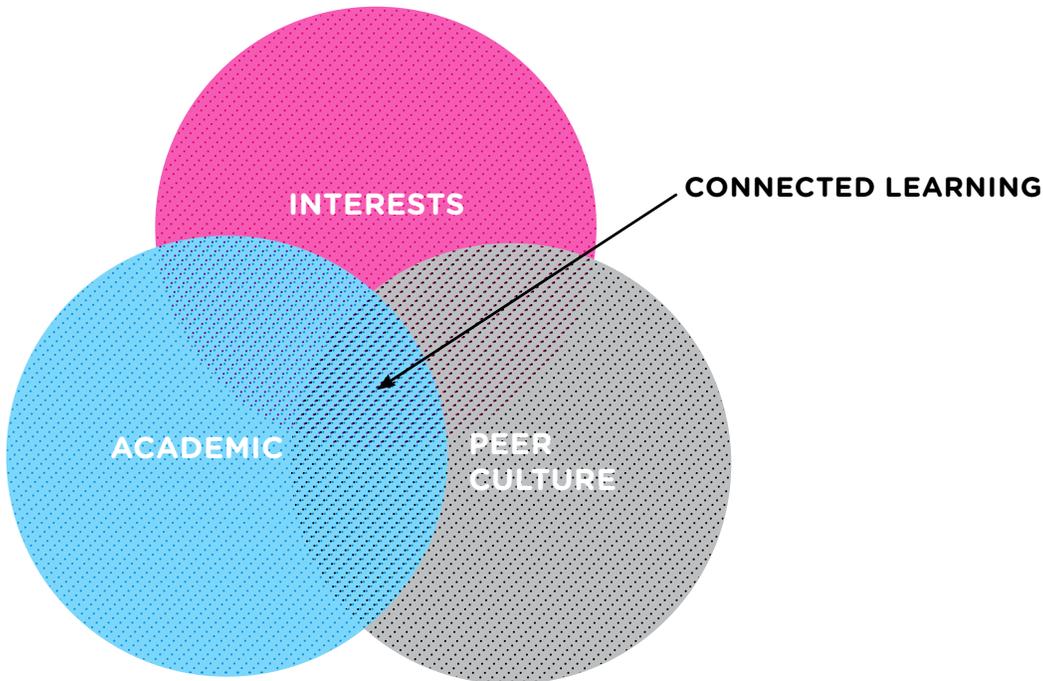


Figure 1
Connecting the
Spheres of Learning,
from Ito et al. 2013

Existing research illustrates how learning activities centered around young people's interests can be highly impactful, particularly when supported by peers and caring adults. Even as inequities in access to digital technology remain, the widespread proliferation of digital and mobile media in the United States help make this kind of learning increasingly possible.¹ The CLRN's research identifies key opportunities to connect young people's personal interests or passions with their academic achievement, career possibilities, or civic engagement.²

The Connected Learning Research Network, based at the Digital Media & Learning Research Hub at the University of California, Irvine, explores how interest-driven, online activities may present learning opportunities for students. Our research seeks to understand how to best support connected learning among a diverse range of youth, and especially, **the important roles that parents can play in helping their children bridge interests with educational and other opportunities.** This report details the 2015 phase of this study, led by CLRN Postdoctoral Researcher Melissa Brough, in collaboration with Beyond the Bell.

¹ For current data on teen access to digital technology in the United States see the Pew Research Center's report "Teens, Social Media & Technology Overview 2015" at: <http://pewrsr.ch/1IHJDlc/>

² See "Connected Learning: An Agenda for Research and Design", available at: <http://dmlhub.net/publications/connected-learning-agenda-for-research-and-design/>. This report includes a comprehensive review of the literature and research that informs our connected learning model.

OBJECTIVE AND SCOPE OF RESEARCH FOR BEYOND THE BELL

Over the course of six months from June through November 2015, I conducted a qualitative study of high school students in the CyberPatriot program and their parents. The aim was to identify factors that affect students' interest-driven learning and their participation in the CyberPatriot program, especially those factors related to home life and parental influence.

Lines of inquiry included:

- Students' personal interests, and parental/familial influences on these
- Parental attitudes about digital media
- Parents' use of digital media
- Parental mediation of students' digital media use in the home
- Parental support of student's informal and formal learning
- Whether and how parents or other family members have helped their students connect to new opportunities related to their interests (including CyberPatriot)
- Whether and how CyberPatriot has helped connect students' interests with academic, civic, and/or professional opportunities

This qualitative research is meant to complement ongoing quantitative analysis of the CyberPatriot program by ERC, another Beyond the Bell research partner.

RESEARCH METHODS

Recruitment

From June to November I visited CyberPatriot programs at the following six schools and three CyberPatriot regional events to provide students with information about the study and instructions for how to participate.

High school CyberPatriot programs:

- Manual Arts
- South East
- Robert F. Kennedy
- West Adams Prep
- John F. Kennedy
- Polytechnic

Regional CyberPatriot events:

- GenCyber camp at Cal Poly Pomona
- CISCO training at the 4th Street Boys & Girls Club
- CyberGirlz

Schools were selected based on location (to ensure diversity of the sample), consultations with Beyond The Bell's Principal Analyst, and on responsiveness of coaches to scheduling our recruitment visits. Recruiting at regional events allowed us to invite students from across the school district to participate in the study.

At each recruiting visit, I informed all of the students present about the study process, and distributed flyers for students to share with their parents containing information in both English and Spanish about how to participate. I invited students to fill out a sign-up sheet so that they or their parents could be contacted with further information about the study or to schedule their family's participation, pending parental consent. I also provided my contact information on the flyers. All participation was voluntary and carried out in accordance with the University of California, Irvine's guidelines for ethical human subjects research. Parental/guardian consent was obtained in all instances.

Data Collection

This qualitative research yielded **twelve case studies of CyberPatriot families**. The case studies are intended to offer a nuanced picture of CyberPatriot participants and their families, rather than statistical norms. Nine (9) male students and three (3) female students participated in semi-structured, in-depth interviews lasting between 60-75 minutes each. Parents were interviewed immediately following their student's interview for approximately the same length of time; this included eleven (11) mothers, three (3) fathers, and one (1) sister acting as legal guardian and primary parental figure. In several cases only one parent was available to be interviewed. I completed a total of **twenty-seven (27) interviews** for this study. In some cases, parents chose to be present during the interview with their student. In most cases the student was not present for the interview with the parents. Interviews took place in the family's home, except when parents requested to meet elsewhere. I interviewed students in English, and parents in English or Spanish depending on parent preference.

DEMOGRAPHICS OF STUDY PARTICIPANTS

The following table (Figure 2) provides information regarding the household income, race/ethnicity, and education level of the parents interviewed for all twelve (12) families.³ The majority of families participating in this study fall below the \$49,000 income level. The vast majority of the students and their parents identified as Latino/Hispanic (with the majority of these parents being immigrants from Mexico and Central America); one family identified as Asian (Filipino) and one as white.⁴ The majority of parents interviewed had completed some high school education or less; twenty percent (20%) had some higher education.

CyberPatriot Student's Age	Female	Male	Percent (%)
14	0	2	17%
15	1	1	17%
16	0	3	25%
17	2	3	42%
Full Sample	3	9	100%
Race/Ethnicity			
Latino / Hispanic	3	7	83%
White	0	1	8%
Asian	0	1	8%
Full Sample	3	9	100%
Household Income (self-reported)			
<\$20,000	2	1	25%
\$20-34,000	0	1	8%
\$35-49,000	0	3	25%
\$50-75,000	0	1	8%
\$100-150,000	0	1	8%
Unknown	1	2	25%
Full Sample	3	9	100%
Educational Attainment of Parents Interviewed			
Primary or less	1	2	20%
Secondary or less	3	4	47%
Some higher ed.	0	3	20%
Unknown	0	2	13%
Full Sample	4	11	100%

Figure 2. Demographic information of the twelve participating families (12 students and 15 parents).

³ These data are based on self-reports by parents; instances in which they chose not to respond to the question are listed as “unknown”.

⁴ Despite special effort to recruit African American students, none volunteered to participate. African American students represent only a very small percentage of CyberPatriot students in LAUSD’s program, and under 11% of all of LAUSD’s afterschool program participants (ERC, L.A. Unified After School Program Report Card for 2013-2014).

FINDINGS

TECHNOLOGY IN THE HOME

Parents, and in some cases older siblings, were the primary providers of digital media and technology for the students who participated in this study. Despite the fact that many of the families interviewed had limited financial resources, they tended to have several digital media devices in the home (see Figure 3). The majority of families had a shared family computer and a gaming system (75% and 67%, respectively), both with Internet connectivity. The majority of the students (83%) themselves had their own personal computer or laptop (some of which were provided by CyberPatriot). All parents and a majority of the students (83%) had their own cell phones, which were primarily smartphones with Internet capability.⁵ Parents consistently felt that access to a computer and the Internet in the home was important for their students' education, and that mobile phones helped with family communication, coordination, and safety. They therefore prioritized technology as a valuable resource for their family.

	Shared Family Computer with Internet	Personal Computer or Laptop ⁶	Gaming System with Internet	Gaming System without Internet	Mobile Phone with Internet Capability	Parent(s) Have Mobile Phone ⁷
Total (% of 12 families)	75%	83%	67%	17%	83%	100%
Sex						
Female	3	3	0	0	3	3
Male	6	7	8	2	7	9

Figure 3. Digital technology available to students in the home.⁸

Nearly all of the parents interviewed for this study described using digital media as a “carrot and stick” for disciplining their student. (This may partially explain why several of these homes were relatively media rich.) Most parents reported buying things like video games, a cell phone or other technology as a reward for good grades; on the other hand, they described taking away such technology (including Internet access in the home) if their student misbehaved or was doing poorly in school.

Nine of the twelve students (75%) reported using a computer or tablet outside of school several times a day or several times a week. Seventy-five percent (75%) also reported using a mobile phone with Internet access with the same frequency. All of the students reported accessing the Internet at home, in addition to other locations like afterschool programs or school computer labs.

⁵ These figures generally reflect the latest national data collected by the Pew Research Center on teen access to digital technology, though their survey shows lower rates of smartphone access among low-income youth than in our cases. The Pew Research Center’s report “Teens, Social Media & Technology Overview 2015” is available at: <http://pewrsr.ch/1IHJDlc/>

⁶ In some instances the personal laptop was provided by the CyberPatriot program; in other cases the student already had their own.

⁷ This includes both smartphones and basic mobile phones.

⁸ Note that this is not a comprehensive list of all forms of digital technology in the home, just some of the most relevant to this study.

Most parents appeared to have limited understanding of what their children do online or of how to monitor it. Parents who did want to monitor their children’s online behavior said that they found it difficult to do so. One-third (33%) of the parents reported that computer use is difficult for them. Parents reported being slightly more comfortable using the Internet; those parents with smartphones tended to access the Internet more frequently from their phones than from a computer or tablet. The majority of parents (69%) reported using the Internet several times a day, while the other parents reported several times a week.

	Agreed	Total respondents	Percent of total respondents
Comfortable using a computer	5	9	56%
Uncomfortable using a computer	3	9	33%
Use Internet several times a day	9	13	69%
Use Internet several times a week	4	13	31%
Think tech is important to their child’s education	10	13	77%

Figure 4. Parents’ attitudes toward and use of technology.

In sum, it was clear among the families who participated in this study that digital **technology is prevalent in their homes and that it plays a significant role in their daily home life.**⁹ **Parents were generally not as comfortable or as savvy at using digital media as their children, but it was also clear that these parents imagine digital technology will play a significant role in their children’s education and future professional lives, so they invest in technology in the home.** These dynamics were apparent in the case of Raúl and his family.

⁹ It was not within the scope of this study to collect comparable data from families whose students do not participate in the CyberPatriot program.



Raúl¹⁰ is 17, a senior in high school, and lives with his parents and younger sister in an apartment complex. Their living room has a table, a full-sized bed, and an entertainment center that houses a computer, printer, modem, and TV. Raúl's mother oversees the cleaning of the apartment complex. His father works as a sample maker. Both of Raúl's parents immigrated to the United States from Mexico with limited means.

Like several of the students interviewed, Raúl's interest in technology stems from his gaming. Raúl has loved playing video games since before he started elementary school. Some of his current favorites are Call of Duty and Minecraft. Raúl runs a Minecraft server¹¹, and recently he bought himself software to make video games with a friend.

In middle school Raúl started teaching himself about cybersecurity by watching YouTube videos and reading online forums. As he describes it:

"What kind of got me to get into computer security is that a scammer called my mom and she speaks no English so I took over. And he sort of convinced me that I should do stuff on the computer. And he got some more information [from me]... and I got kind of mad at that person. So I decided to go into computer security from there on. And in middle school I kept looking for any after-school programs that offer computers, anything involved with computers. I couldn't find any so I went onto the internet, to online forums to find more stuff, cool things to do with, like, the basic stuff you have. From there on when I went to high school is when I learned that my school offers this program called CyberPatriot, and I joined it. And that's where I got into programming, I learned Cisco, which got me to networking."

Raúl has participated in the CyberPatriot program for the past three and a half years, and he hopes to continue in college. He enjoys the competitions and being hands-on with the technology. He has recruited most of his friends

¹⁰ All case study names are pseudonyms.

¹¹ Minecraft is an open world game that allows players to host their own local servers to play with their friends.

to join CyberPatriot. He feels the CyberPatriot program has helped him clarify that he wants to study computer science/engineering in college and go into the field professionally. He aspires to go to Harvard University to do so.

Raúl's father, Gerardo, has supported his son's digital media use. He bought him a computer in second grade to help with his school work, and gaming systems and video games as rewards for good grades. Gerardo himself has had an interest in computers for many years, teaching himself how to use them. He describes himself as a curious person interested in understanding how things work (a trait he feels his son has inherited). Gerardo explained that his curiosity about computers cost him when he made bad purchases or failed to adequately protect his computer against viruses. He is now learning from Raúl about how to avoid such pitfalls.

Raúl's mother said she is somewhat fearful of computer technologies. However, she also said that coming from a very impoverished background never allowed her to pursue her own interests or passions, so it is important to her that her son be able to do so.

Raúl felt that his parents were generally supportive of his interest in digital media, but that they did not see how he could translate his interests into a profession until he joined CyberPatriot. Gerardo said that he'd originally hoped his son would become a lawyer, but seeing how dedicated he is to the CyberPatriot program convinced him that Raúl could apply himself to a successful career related to computer technologies.

"If someone is doing something like getting up so early of his own accord [to attend CyberPatriot events] without me having to get him up... he gets up early, at Sam, which means that yes, this interests him; so how can I not support him, I see his determination so I've supported him..."

Because of both Raúl's and his father's interests, technology plays a significant role in the daily life of this family. As this and other cases in this report illustrate, CyberPatriot is helping Raúl connect his informal and formal learning.

PARENTS PROMOTING DIGITAL LITERACY

Most parents felt strongly that computer literacy will be key to their children's future employment and professional success; **some parents were taking a proactive approach to promoting it. These parents described letting their children “mess around” with digital media from an early age, permitting them to be hands-on with the technologies and explore them.** As one parent reflected,

“I’m very careful with my stuff. When it comes to my kids [using my technology], it still gets to me but the return to them is going to be much higher. I’m not okay with them breaking everything, but I see the return is higher. Keep the end goal in mind, which is to have them learn.”

Another parent shared her story of being a single mother of four. She herself had been one of eight children and had grown up feeling that her mother never had time for her; in reaction, she was committed to showing interest in her children's pursuits and to encouraging them to experiment with things they were curious about.

“My son was eight years old and he wanted to make light with electricity and cables... this was in Mexico. He asked me permission to do it and I said yes... at the time I was really busy because I was alone and had two jobs to support my four kids... but when my son said mom, look what I’m going to do, then I had to stop everything I was doing... [He said,] ‘Look mom, look what’s going to happen’, and when he connected it it exploded and all the lights in the house went off. I couldn’t clean, I couldn’t do anything, I had to send for an electrician to fix everything. And my son said, ‘Oh, sorry mom.’ [I said,] ‘Don’t worry, son, the next time it will work out, check what you did wrong.’ I didn’t reprimand him, I didn’t scold him... we learn from our mistakes. Yes, it cost me a lot... [but] I’ve let them do things and supported them, I think it’s good.”

Despite the hardship and resources it cost her, this mother chose to support her son's interest and create a learning opportunity from the experience. Her son now builds and refurbishes computers. Cultivating digital literacy in this way sometimes comes at a cost if children accidentally damage the technology. Yet these parents felt that in their experience, the learning opportunity outweighed the cost of the technology, and that it has encouraged their children's digital literacy.

STUDENT INTERESTS AND CONNECTED LEARNING

In this sample, students' interests included computer science and engineering; video games and game art; science and medicine; drawing; music; and reading. CyberPatriot clearly appeals to students interested in computer technology. The program especially appeals to gamers.¹² Several of these students described themselves as “geeks” or “nerds” and **CyberPatriot offered a community in which their interests in games and digital media were**

¹² These findings are consistent with ERC's fall 2015 focus group findings.

validated, cultivated, and geared toward new opportunities. Such communities centered on student interests can enhance not only a student’s learning environment, but also their social capital.¹³ All students interviewed reported making new friends and bonding with other students in the program, growing their network of support for their interests.

Many parents had negative or ambivalent attitudes toward their student’s gaming. Other parents accepted or even embraced their student’s gaming but did not feel equipped to advise or support their student in connecting their interest to academic, civic, or professional opportunities. **CyberPatriot thus appeared to be playing a crucial role in helping students, like Raúl, whose passion for videogames had yet to connect to more formal learning opportunities.**

The same can be said of the following student, Mia, whose passion is hip hop. It is first worth noting, however, that girls are a minority in the CyberPatriot program, representing approximately 26% of the students.¹⁴ While our data on girl participants is limited, it suggests that girls may enter the CyberPatriot program through different pathways than boys – pathways that are driven less by peer culture around gaming, and more by professional, academic, or personal interests or goals. Girls reported feeling comfortable and supported once integrated into the CyberPatriot program but there were greater barriers to their entry in the first place; among them, the fact that they were not being recruited by friends/peers as frequently as boys were.

¹³ Larson, Ito, Brown, Hawkins, Pinkard & Sebring (2013), “Safe Space and Shared Interests: YOUmedia Chicago as a Laboratory for Connected Learning”, available at: <http://dmlhub.net/publications/safe-space-and-shared-interests-youmedia-chicago-laboratory-connected-learning/>.

¹⁴ Source: Principal Analyst, Beyond The Bell Branch.



Mia is 15 and lives with her parents and her older sister. She is in 10th grade at a STEM-focused high school. I spoke with Mia and then her mother in their family's small living room, at a table that was sandwiched between the couch and a large, flat screen TV. While everyone in her family has their own mobile phone, only recently did they get a computer with Internet access in the home.

Mia has big aspirations; one of them is to be the female version of “the next Dr. Dre” (a famous record producer, rapper, and entrepreneur). She is a fan of old school hip hop and rap, and listens to music much of the day. In eighth grade she started learning to play the electric guitar at school. On her own time she also started writing rap lyrics and learning how to make beats and edit music tracks using audio editing software on her mobile phone. While Mia has not shared much of her work with others, of her own accord she reached out to local hip hop artists she admires using Facebook, to ask their advice about her songwriting. She heard back from one of them and was encouraged by their correspondence.

Mia is increasingly interested in the technical side of music making, and this has sparked a desire to study audio engineering and computer programming. This fall she joined CyberPatriot after a coach came to her English class to recruit new participants. Mia likes the peer teaching, support and encouragement, and the teamwork aspects of CyberPatriot, commenting, “they don't leave you behind”.

Mia's parents are supportive of her interests and her mother, Paola, is engaged at her school. Yet her parents do not participate directly in her interests. Paola is not comfortable with or interested in technology. She completed little formal education as a child in Mexico. Mia's father is first generation Mexican-American and works as an armed security guard. He seems relatively comfortable with computers, having taken computer classes and used them occasionally for his work. However, when asked who in her life has most influenced her interests, Mia cited her teachers and friends. Mia describes her friend group as “nerds”. In Mia's case, CyberPatriot is one of the ways that she is able to connect her passions with learning opportunities, in a supportive community that shares some of her interests.

FAMILIAL INFLUENCES & PARENTAL SUPPORT

While parents were the primary providers of digital technology for these students, most students were unable to identify other ways in which their parents were directly influencing or supporting their interest in technology.¹⁵ Of the twelve families, three of the students (all male) had been influenced by their father's interest in computers. Most of the students had become interested in computer technology largely independently of their parents, and had been more influenced by older siblings, cousins, or friends playing video games. In Raúl's case (described above), his interest in cybersecurity was motivated by a negative experience with a scammer.

Parental support of students' engagement in CyberPatriot was usually limited to verbal encouragement and/or providing rides to and from trainings and events. In only one exceptional case did a parent facilitate the connection between the student and the CyberPatriot program; the father was a teacher who helps host CyberPatriot at his son's school. In all other cases, students were connected to CyberPatriot and recruited into it by friends, teachers, or CyberPatriot coaches themselves.

A fundamental barrier to parents supporting their students' participation in CyberPatriot was a significant lack of knowledge among parents about the program or the topics it addresses. While educating parents on topics of cybersecurity may be beyond the scope and capacity of CyberPatriot, there is an opportunity to better inform parents about the nature of the program and the ways in which they may be supportive of their student's participation. Very few of the parents interviewed had any clear idea about the program and some knew nothing about it at all, as in the following case study of Ximena and her parents. By and large they had not had any direct engagement with the program.¹⁶ CyberPatriot could be a resource for parents to learn more about the kinds of careers their students might pursue related to computer engineering and cybersecurity, so that parents can better support their child's professional development.

¹⁵ Again, these findings are consistent with ERC's focus group findings.

¹⁶ The one exception is the previously mentioned father who is involved in the CyberPatriot program. None of the other parents had had any direct contact or experience with the program.



Ximena is 17 and in the 12th grade. She lives with her three siblings and her parents, both of whom are Mexican immigrants. Her parents work in a grocery store, her father as a baker and her mother as a cashier. When I interviewed her, Ximena was taking four AP classes in hopes of going to college to study computer science. She found her way to this interest largely on her own, when she started doing her schoolwork on her family's home computer and wanted to learn more about how it worked. Mid-way through her junior year Ximena heard about CyberPatriot at a school fair and she joined the program, not having any friends in it at the time. There were only two girls and seventeen boys participating in CyberPatriot at her high school when she started. Ximena felt somewhat intimidated by the gender disparity, but also determined to represent women in a field that is so male-dominated.

"I kind of did shy away from it in the beginning when I felt like a burden to the boys, when I was just, like, 'Ooh, I don't know what to do.' But at the same time I saw it more like a challenge, like I want to be that person that gets to walk in a room and say, 'No, I'm not the waitress or anything; I'm the one that's here to teach you guys how to do the programming.' Or, 'I'm the one that's here designing your web page.'"

Ximena likes the collaborative nature of the CyberPatriot program, and she likes that she feels kind of "like god" when she learns how to make a computer work. Her CyberPatriot coach told her she should practice over the summer, so she found information on the Girls Who Code program online and signed up of her own accord.

Ximena's path as a connected learner was supported largely by peers and mentors who connected her to opportunities, but this has happened with relatively limited support from her family. Ximena's parents are verbally supportive of her interests, but they have limited means and limited understanding of how they might engage with her interest in computers. (They themselves do not use the family computer.) They reported knowing almost nothing about the CyberPatriot program. The peer and mentor support Ximena has experienced in the CyberPatriot program have been more influential on her connected learning than her home life.

CYBERPATRIOT'S ROLE IN CONNECTED LEARNING

It was clear across nearly all of the interviews with students that the CyberPatriot program was playing an important bridging role. That is, **CyberPatriot offered students an institutional connection between their interests/passions and potential career pathways – a connection that, in most instances, had been notably lacking.** This finding is supported by survey data detailed in ERC's Spring 2015 report, which found significant increases in the percentage of students who stated they would likely pursue education or a career in cybersecurity or a STEM field and that they felt they knew how to do so.¹⁷

LAUSD's CyberPatriot program has the potential to help strengthen the connections between all three of the spheres of learning identified in the connected learning model: interests, peer culture, and academics. To date the program has emphasized connecting student interest in technology to academic and professional opportunities. **Finding ways to support peer interaction and culture within the program could further enhance the program's impact on student learning.** Suggestions for doing so include increasing (and perhaps incentivizing) peer-to-peer mentoring opportunities, developing opportunities for networking between current students and alumni, and creating school-based events that allow students to celebrate their peers' accomplishments. Supporting peer connections may have the added benefit of encouraging peer recruitment of new team members.

Our research found that parents have remained largely isolated from the CyberPatriot program and were not well informed or comfortable being active supporters of this form of connected learning. This is significant because, while CyberPatriot may enhance connected learning in one sphere of the students' lives, it may also be exacerbating a disconnection in another – that is, in the extent to which parents are able to engage in and be supportive of their children's interests. These dynamics are illustrated in the following case of Fernando, but were also apparent in the cases of Ximena and Mia, above.

Parents could benefit from school-level meetings and general informational sessions at the beginning and end of each school year to better inform them about the CyberPatriot program, the opportunities it offers to their student, and the ways in which they can be supportive. Following the sports model, the program might also consider organizing booster clubs for parents.¹⁸

¹⁷ ERC found a 36.7% increase in the percentage of students who reported being somewhat or very likely to pursue education or a career in cybersecurity (from 44.9% to 81.6%); a 22.5% increase in the percentage of students who reported being somewhat or very likely to pursue education or a career in a STEM field (from 57.1% to 79.6%); and a 34.7% increase in the percentage of students who reported knowing a lot about cybersecurity career opportunities and how to pursue them (from 2.0% to 36.7%) (Price & Vang, CyberPatriot Season VII Local Evaluation Update, Spring 2015).

¹⁸ These suggestions arose in conversation with Beyond the Bell staff and other adults involved in LAUSD's CyberPatriot program.



Fernando is 17 and is a senior in high school. He lives with his parents, younger sister, uncle and cousins in a small apartment. His parents are immigrants from El Salvador, and they both work graveyard shifts at menial jobs; his father works in a fabric dying factory, and his mother works six nights a week making meals for air travel. Fernando's mother completed elementary school but has had no further education. She had Fernando when she was 16. In her interview she appeared exhausted by life's challenges and her long work hours.

Fernando is a self-described introvert, preferring to mess around with electronics and computer technology (learning how they work, fixing them, reconfiguring them, etc.) to interacting with people. He comes across as quite isolated, even within his own home. Fernando reported that his uncle has been the biggest influence in his life because he got him his first computer.

"Because, I don't know, I like technology. It's one of the few things I'm somewhat good at. And I'm always on it, so might as well try to learn more about it... I would consider myself as more in touch with technology... I feel more in touch with technology more than I do with some people, or I guess with people in general."

Fernando's role model is Elon Musk, the engineer and entrepreneur behind SpaceX and Tesla. Fernando has a voracious appetite for learning how things work; for example, when he comes home from school he often spends his time watching YouTube videos on his phone on topics ranging from cellular biology to astrophysics.

"My main interest is learning new things. Well, mostly how things work... technologies, phones, computers, earphones, how sound works in general, how the mind works, how rockets work, how black holes are, how everything in space works. I try to study that to know a little bit about it at least. I like to learn about a little bit of everything. Like for example, how does this work, or how does that work, how does that stay alive, stuff like that.... Actually the last thing I watched was, "Can the Human Brain Be Reprogrammed?" and how this experiment would change particle physics forever. Those are the last things I watched on YouTube."

However, Fernando does not feel that the videos he watches connect to his learning experiences in school. Fernando wants to go to college to study for a career in cybersecurity/computer science, neuroscience, or medicine, but lamented that his grades in the past have not been very good. So despite Fernando's thirst for learning, it appears that his learning experience is largely one of disconnection. He had never had a mentor or a close relationship with his teachers, and he said his teachers did not know about his interests. He reported being uninspired by his high school classes, though he took a community college class that he found to be highly engaging. Until joining CyberPatriot this fall, he had not been engaged in a community of people who share his interests.

While Fernando had only been involved in CyberPatriot for about six weeks at the time of our interview, it appeared likely that the program could help him become a connected learner; it was offering him mentoring (peer and coach) and a community of learners who share his interests and can help him connect those interests to new opportunities. Yet Fernando's parents remained completely disconnected from his connected learning.

CONCLUSION

The purpose of this research was to investigate some of the factors and dynamics that may support connected learning in the context of the CyberPatriot program; in particular, those related to home life and parental influence. By examining how connected learning may be supported in and around the home, the study is at the forefront of current research in digital media and learning.

This qualitative research yielded twelve case studies of CyberPatriot students and their parents from a variety of LAUSD schools. Digital media use is prevalent in the homes of these students and plays a significant role in their daily life, despite the often limited resources of their families. Some parents actively promoted digital/technology literacy by letting their children “mess around” and be hands-on with it from an early age.

In nearly all cases, CyberPatriot was functioning as a crucial institutional bridge connecting students’ interests and passions with opportunities for academic and professional development. CyberPatriot was supporting connected learning among students who had an interest in video games, computers, science and technology. Whereas other adults in their lives (parents, teachers, family members) may have perceived gaming or “geeking out” on digital media as a threat to their academic success, CyberPatriot was offering these students a community in which their interests in games and digital media were validated, cultivated, and geared toward new academic and professional opportunities. However, this tended to be the case more for boys than for girls, who were drawn to the program by more academic or career-oriented motivations than by gaming and peer culture. LAUSD’s program could do more to support peer culture within the program to enhance connected learning for both boys and girls.¹⁹

My case studies also revealed a significant disconnection between the CyberPatriot program and the parents of these students. Parents knew very little, if anything, about the program and remained isolated from it. They were not able to engage directly in supporting the program or their student’s participation in it, other than through verbal encouragement, providing digital technology in the home, or transporting their student to/from Cyberpatriot activities. While these are important forms of support, the extent to which parents are able to further encourage the academic and professional development of their students in the ways the CyberPatriot program hopes to promote remained limited.

The Connected Learning Research Network has found that “Young people can have diverse pathways into connected learning. Schools, homes, afterschool clubs, religious institutions, and community centers and the parents, teachers, friends, mentors and coaches that young people find at these diverse locales, all potentially have a role to play in guiding young people to connected learning”.²⁰ CyberPatriot plays an important role in helping students connect their informal and formal spheres of learning; parents can also play an important role in this when they are equipped to do so. Increasing parents’ knowledge of CyberPatriot and strengthening the ways in which they may directly support their student’s participation in it would likely enhance the student’s learning ecology, their development, and ultimately the impact of the program.

¹⁹ Some suggestions for doing so are listed on page 17.

²⁰ Ito, M. et al., “Connected Learning: An Agenda for Research and Design” (p.8), available at: <http://dmlhub.net/publications/connected-learning-agenda-for-research-and-design/>

ACKNOWLEDGMENTS



This research was supported by the Los Angeles Unified School District's Beyond The Bell Branch and conducted as part of the Connected Learning Research Network, under the MacArthur Foundation's Digital Media and Learning initiative. I would like to thank the members of the CyberPatriot community in the greater Los Angeles area for their assistance and support, and am particularly indebted to the families who participated in this study. I would also like to thank our tireless research assistants, Adilene Uriostegui and Lan Nguyen. This report has greatly benefited from the advice and guidance of Mimi Ito and the Connected Learning Research Network Leveling Up team, as well as Amanda Wortman (Collaborative Research Manager) and the Digital Media and Learning Research Hub communications team.