



AFA CYBERCAMPS

SUMMER 2020 REPORT

CYBERPATRIOT
National Youth Cyber Education Program



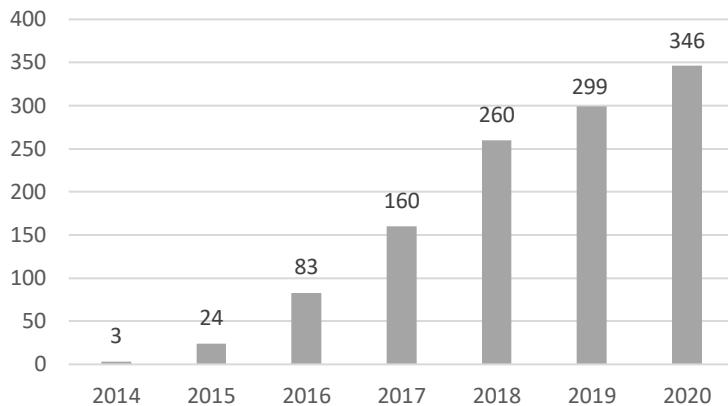
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Purpose

This report synthesizes the summer 2020 season of AFA CyberCamps. It provides camp participant demographics, effectiveness, and quality as reported in post-camp surveys of participants and instructors.

This report also tabulates recommendations for improvement received from participants and instructors. Each of these recommendations will be evaluated by AFA's CyberPatriot Program Office for possible incorporation into future CyberCamp seasons.

AFA CyberCamps



The non-profit Air Force Association's CyberPatriot Program Office has since 2014 operated week-long CyberCamps as part of its mission to inspire young men and young women to pursue education and careers in STEM fields.

The popularity of AFA CyberCamps has been strong. From a modest pilot program of just three locations in 2014, the program registered over 300 camp locations for the summer of 2020.

2020 Camp Highlights

Despite the restrictions and uncertainty caused by COVID-19, the 2020 CyberCamp season saw a record numbers of camps hosted and students participating.

To collect data on the 2020 CyberCamps, student participants were asked to complete a pre- and post-camp survey. Instructors were asked to complete a post-camp survey only. Completion of the surveys was strongly encouraged, though not required.



Pictured: Students participating in an Advanced Camp the week of July 13-17. Photo courtesy of Fort Gordon Cyber District.

Standard Camps:

Standard camps are designed to provide introductory cybersecurity skills to students with little or no prior cybersecurity training. Any student with even the slightest interest in computers can successfully attend a Standard Camp. In 2020, 181 Standard Camps were hosted across the country with an estimated 81% of camps were held virtually. Based on the feedback received:

- 35% female participation
- 93% of instructors rated the camp “Effective” or “Very Effective.”
- 91% of instructors indicated they would likely recommend AFA CyberCamps to a colleague (or host another camp)
- 85% of students rated their camp experience as “Good” or “Excellent”
- Student knowledge increased at least one full point across all topics covered during the week

Advanced Camps:

Advanced camps are designed to build on the skills learned in a prior standard camp or to further develop skills learned from participation in CyberPatriot’s National Youth Cyber Defense Competition. Students are expected to have a basic background in cybersecurity in order to successfully complete an Advanced Camp. In 2020, 126 Standard Camps were hosted across the country with an estimated 72% of camps were held virtually. Based on the feedback received:

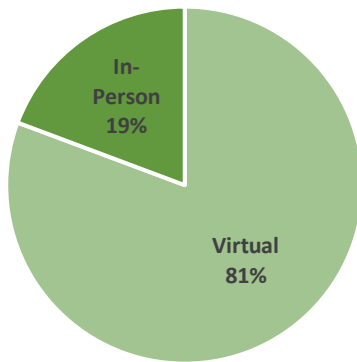
- 32% female participation
- 76% of instructors rated the camp “Effective” or “Very Effective.”
- 96% of instructors indicated they would likely recommend AFA CyberCamps to a colleague (or host another camp)
- 89% of students rated their camp experience as “Good” or “Excellent”
- Student knowledge increased at least one full point across all topics covered during the week

Standard Camps

Camp Demographics

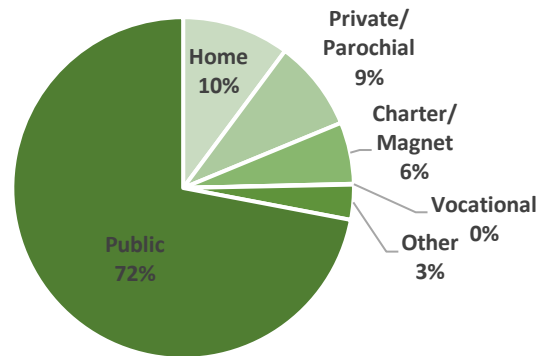
Camp Type

Due to COVID-19, the majority of camps were held virtually (58 instructor respondents).



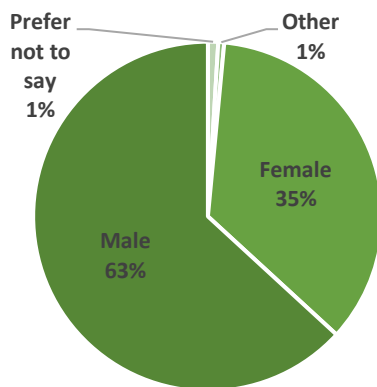
School Type of Attendees

Of the 1,268 student respondents, 72% of standard camp attendees are enrolled in public schools.



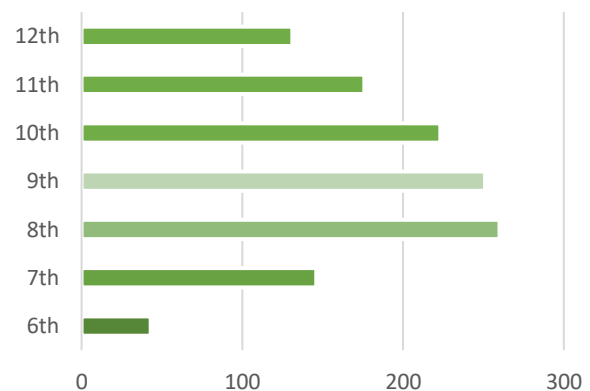
Gender

Of the 1,268 student respondents, 35% of the participants are female.



Grade / Age

Of the 1,268 student respondents, 60% are students in 8th, 9th, or 10th grade. The age range of respondents is 10-18 years old, with the most common age range being 13-15.

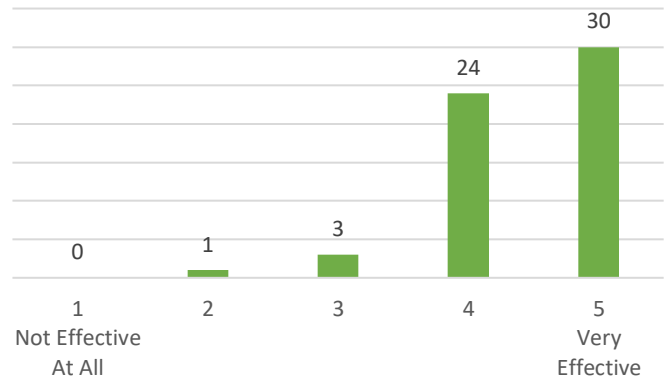


Camp Effectiveness

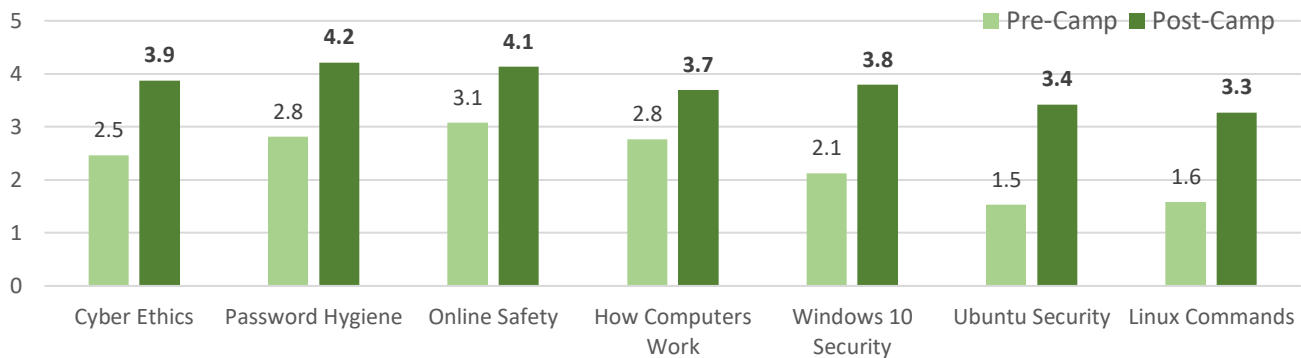
Knowledge Improvement Assessment

To measure the educational effectiveness of the camp, we asked the instructors, “Overall, how would you rate the effectiveness of this camp in improving students' knowledge of cybersecurity?” They rated on a scale of 1-5, with a rating of 1 being “Not Effective at All” and a rating of 5 being “Very Effective.”

Of the 58 instructor respondents, 93% rated the camp “Effective” or “Very Effective.”



Both before and after the camp, students were asked to rate their knowledge of specific topics on a scale of 1-5, with a rating of 1 being “No Knowledge” and a rating of 5 being “Expert Knowledge.” The average pre-and post-camp knowledge ratings show a full point increase in knowledge across every topic after completing the camp.

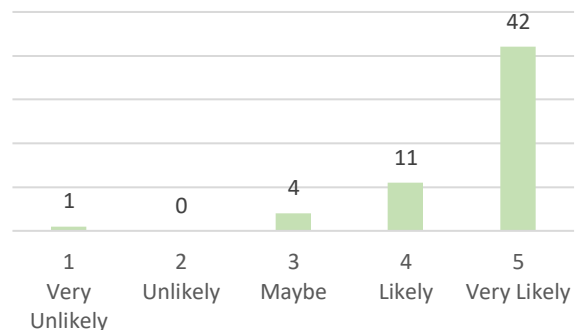
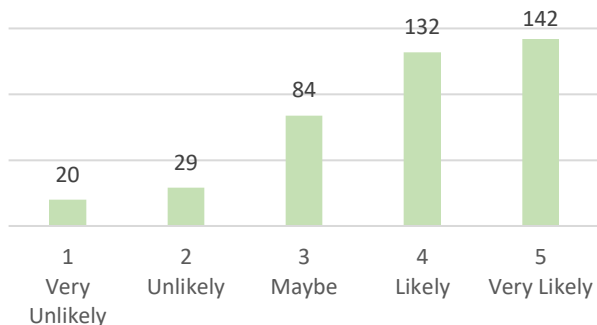


General Camp Ratings

To measure the overall camp experience, students (407 respondents) and instructors (58 respondents) were asked how likely they would be to recommend an AFA CyberCamp to a friend or colleague. In total:

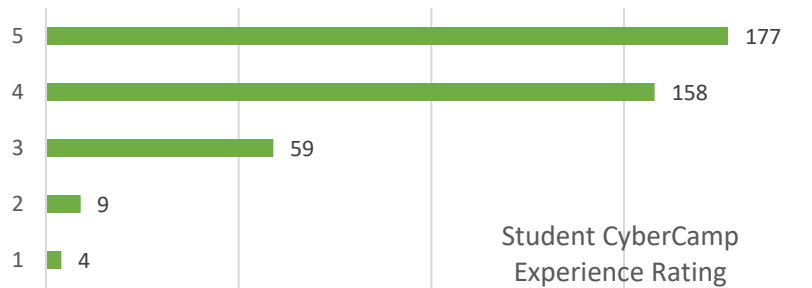
67% of students would recommend to a friend

91% of instructors would recommend to a colleague



In total, 85% of student respondents gave “Good” or “Excellent” ratings to their camp experience and would likely recommend to a friend.

(1=Very Poor, 5=Excellent)



Takeaways – What needs improvement

General Recommendations

- *Instructor Resources*
 - Include speaker notes in slide decks for ease of presentation
 - Larger screenshots of slides in instructor guide
 - Recommendation of smaller camp groups (or additional assistants) to encourage more 1-on-1 attention from instructors
- *Curriculum*
 - Add lesson to discuss types of security actions and how to interpret instructions
 - Reevaluate pace
 - Schedule time for guest speakers from industry
 - Additional teambuilding and student workbook activities. More quizzes
 - Additional hands-on activities for Windows Demo Image (Sharing Folders/Audit Logs/etc.)
 - Inclusion of forensic question in Demo Image
 - Inclusion of Read-me file for the Ubuntu Demo Image
 - Inclusion of Linux commands in student workbook (cheat sheet)
- *Technical Resources*
 - Increase the RAM memory on modules to limit technical issues
 - Host images in a cloud environment
 - Offer Live/Chat tech support

Virtual Camp Recommendations

- *Instructor Resources*
 - Allow the instructors to modify the content slightly for better delivery to the students
 - Videos of the activities that can be referred to by students who struggle to keep pace and need help
- *Curriculum*
 - Inclusion of more interactive resources that can be used in a virtual setting
 - Digital class prevented students from switching roles in the competition
 - Increased instruction on unzipping and opening VMs at home (for middle school students)
- *Technical Resources*
 - Computer resources are too demanding -- Lack of compatible home computers causes limited enrollment

- Use cloud environment or cyber ranges (where images are under the control of the instructors) to provide flexibility and minimize requirement of heavy computer resources for the students
- Use of “cyber ranges.” (virtual machines hosted online)
- Find optimal delivery platform (Zoom vs. Teams vs. WebEx, etc.)

Comments

“I really enjoyed and learned a lot from this camp. Thank you for giving me the opportunity to participate”

“This was truly an excellent camp and I learned a lot. I feel that the instructional materials were excellent. Since I am on the West Coast, I had to wake up at 5:15 AM every morning for this camp and I still believe that this was the highlight of my summer.”

“Assistance was OUTSTANDING!! Whenever I called or emailed AFA CyberPatriot, somebody was right there to help...thanks. JOB WELL DONE!!”

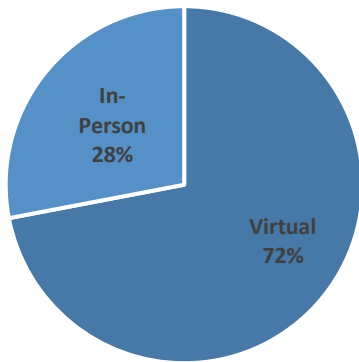
“The instructional materials were some of the best I have seen.”

Advanced Camps

Camp Demographics

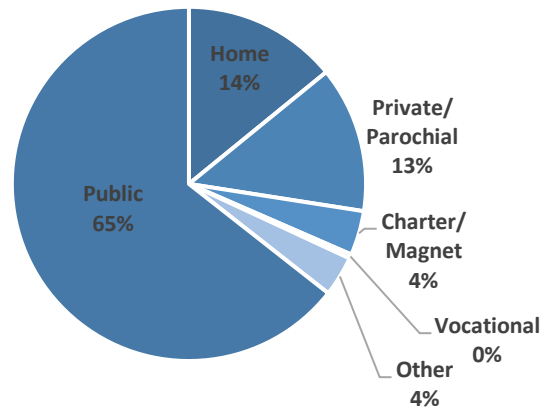
Camp Type

Due to of COVID-19, the majority of camps were held virtually. (25 instructor respondents)



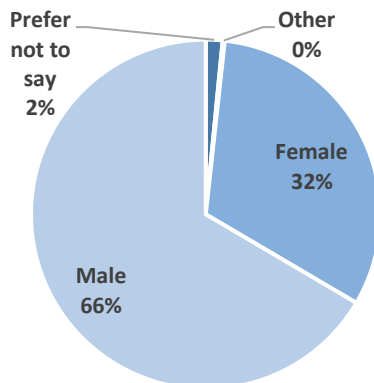
School Type of Attendees

Of the 517 student respondents, 65% of advanced camp attendees are enrolled in public schools.



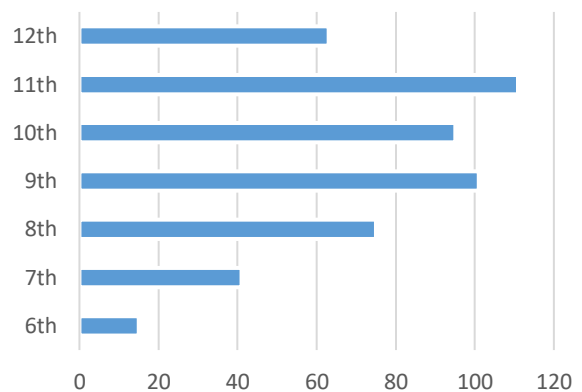
Gender

Of the 517 student respondents, 32% of the participants are female.



Grade / Age

Of the 517 student respondents, 75% are high school students (grades 9-12). The age range of respondents is 10-18 years old, with the majority of students between the ages of 14-17.

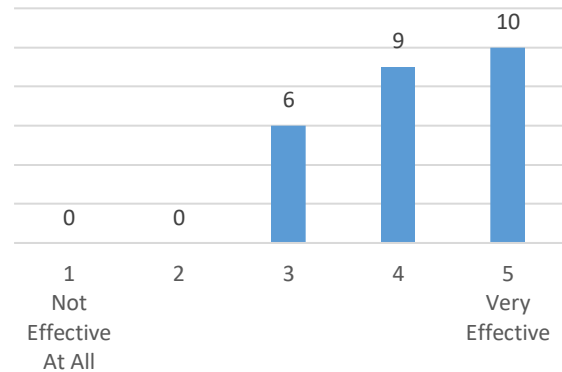


Camp Effectiveness

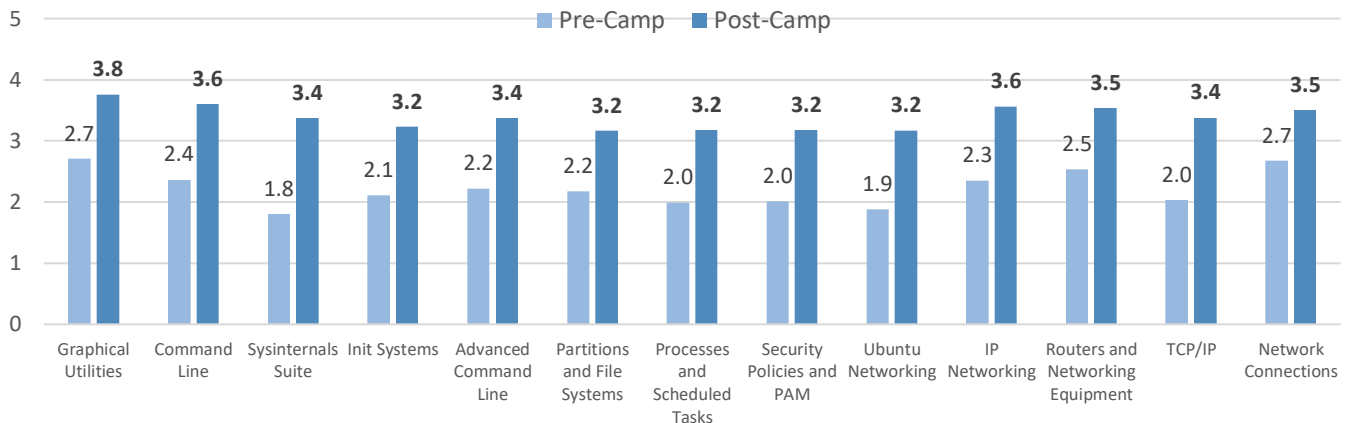
Knowledge Improvement Assessment

To measure the educational effectiveness of the camp, we asked the instructors, “Overall, how would you rate the effectiveness of this camp in improving students' knowledge of cybersecurity?” They rated on a scale of 1-5, with a rating of 1 being “Not Effective at All” and a rating of 5 being “Very Effective.”

Of the 25 instructor respondents, 76% rated the camp “Effective” or “Very Effective.”



Both before and after the camp, students were asked to rate their knowledge of specific topics on a scale of 1-5, with a rating of 1 being “No Knowledge” and a rating of 5 being “Expert Knowledge.” The average pre-and post-camp knowledge ratings show a full point increase in knowledge across every topic after completing the camp.

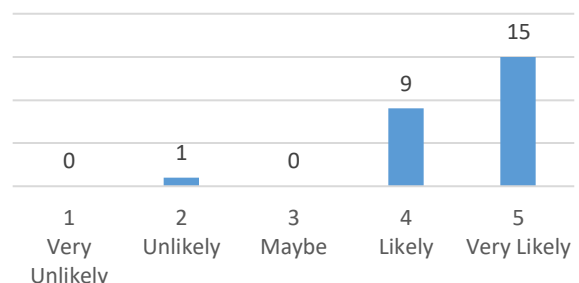
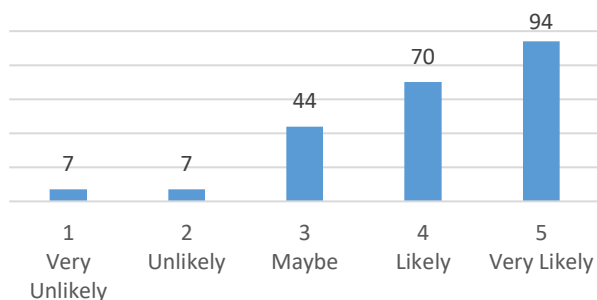


General Camp Ratings

To measure the overall camp experience, students (222 respondents) and instructors (25 respondents) were asked how likely they would be to recommend an AFA CyberCamp to a friend or colleague. In total:

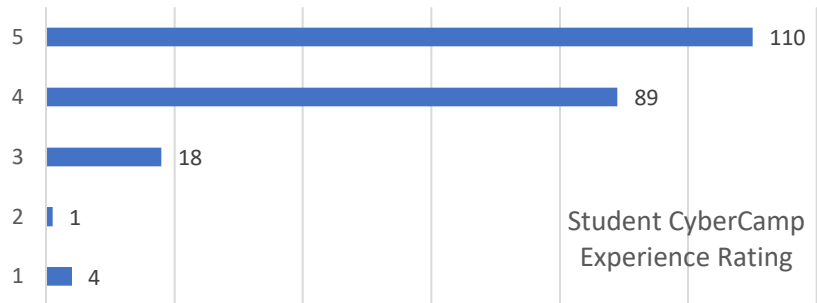
74% of students would recommend to a friend

96% of instructors would recommend to a colleague



In total, 89% of student respondents gave “Good” or “Excellent” ratings to their camp experience and would likely recommend to a friend.

(1=Very Poor, 5=Excellent)



Takeaways – What needs improvement

General Recommendations

- *Instructor Resources*
 - Larger screenshots of slides in instructor guide
 - Add step by step instructions / answer key in student workbook
- *Curriculum*
 - Update materials – some content is outdated (icacls, ifconfig, etc.)
 - Additional interactive games, videos, and Kahoot! quizzes (consider using “QUIZZZ”)
 - Inclusion of glossary of terms, acronyms and key commands for Windows 10 and Ubuntu
 - Linux lesson is too rushed
 - Competition timing -- use competition image after completion of that lesson
 - Cisco curriculum needs improvement (called “useless”)
 - Add a lesson on converting decimal to binary for subnetting
 - Add a lesson on the TCP/IP Stack
 - Create more meaningful and useful Packet Tracer exercises
- *Technical Resources*
 - Advanced images too difficult compared to what is taught
 - Host images in a cloud environment
 - Offer Live/Chat tech support

Virtual Camp Recommendations

- Add “Camp Day #0” for preparing computers and training students on VMs
- Use Canvas LMS platform for materials to guide instruction and assess student’s engagement and learning
- Find the right teleconference platform (Zoom, Google Classroom, Discord app, etc.)

Comments:

“Thank you so much to the amazing CyberCamp instructors! I learned a tremendous amount and plan to start a CyberPatriot team at my high school.”



**CyberPatriot is the Air Force Association's
National Youth Cyber Education Program.**

**For additional information, visit
www.uscyberpatriot.org**