

A Global Cybersecurity Embedded Course: Student Learnings and Curricular Design

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Abstract—This full paper research reports on the curriculum design and voluntary Institutional Review Board (IRB) approved student laboratory learning and surveys from a global cybersecurity embedded travel course. The Cybersecurity in a Global Context embedded course is designed as a global spring break graduate and undergraduate enrichment program centered in Rome, Italy. The program curriculum was designed to expose students to classroom laboratory assignments, participate in related guest lectures, university site visits, and cybersecurity-related museum activities to enrich their understanding of international cybersecurity topics of relevance.

The curriculum was designed for the graduate and undergraduate students to add breadth to their growth in knowledge extended from their classroom experience. Topics covered in the course include foundational cybersecurity and digital forensic concepts, network infrastructure security, and secure software and scripting development. The goal of the week was for students to submit assignments and participate in discussions within the four domains of knowledge. In the first two labs, students explored global topics including international criminal activities, the dark web, and networking concepts such as virtual private networks. In the third lab, students worked on securing portable WiFi routers. In the last labs, the students worked on securing the software running on the WiFi portable routers. The students worked in teams to complete the labs based on the classes they were enrolled into. A graduate student was a team captain of every team that consisted of 1-2 undergraduate students. Students were also asked to keep a daily journal for cybersecurity lessons learned from site visits, guest speakers, and laboratory assignments. These journals were transformed into blogs about their experience. Students were encouraged to publish their experience blog to raise awareness of international cybersecurity concerns.

We report on the laboratory lesson objectives, guest lectures, and report on our site visit curricular designs. On learning, we report on the laboratory assignments and on the IRB-approved embedded student artifacts submitted from their assignments. We lastly report on student feedback from lessons learned along with insights from both faculty and students for next iterations of this course and similar embedded courses.

Index Terms—Cybersecurity, Global Curriculum, Travel Course, Curriculum Development, Travel Laboratory Exercises,

site visits. The students have an opportunity to meet with their Italian peers and learn about international cybersecurity topics of relevance, such as security around the Vatican, museums of Rome, international cyber-crimes, finance and start-ups. Two senior faculty lead the experience each bringing a wealth of industry and academic experiences and perspectives to the week-long curriculum.

II. LITERATURE REVIEW

Literature exists for international curriculum development and e-tourism. However, little literature exists on building global cybersecurity curricula and international understandings for embedded course programs. And, only a few, shared student perspectives with curricula. In addition to developing global experiences in a semester-long class, we report on the international course design and share student feedback and suggestions in later sections of our research report.

A. Engineering Study Abroad Curricula Research

We identified six relevant studies in the ACM and IEEE databases. First, Jing et al., [1] report on knowledge gaps between e-tourism industry needs and the knowledge provided by tourism curricula in higher education. The authors propose solutions to closing gaps through an integration of the tools of supply chain, and knowledge management. Farkas and Murthy [2] report on an undergraduate computer and network security course and the need to develop study abroad experience in engineering and technology university curricula. The authors report international exposure benefits including a better awareness of issues in globalization and ABET specific internationalization requirements. The report issues in course design, curricula, content developing, and logistics.

International research exists in terms of technology-centric mission trips. Reid et al., [3] report on a new first-year engineering international program entitled, “Freshmen Without Borders.” They describe the ABET accreditation criteria of the first-year capstone project mission trip implemented in an impoverished population. Northcut [4] describes a series of university initiatives where faculty from humanities and STEM disciplines collaborated to integrate humanities pedagogy with existing programs in Latin America with a STEM-heavy curriculum. They report a goal to increase cultural and communicative understanding among engineering and

I. INTRODUCTION

The Cybersecurity in a Global Context experience is a leading spring break undergraduate and graduate enrichment program visiting Rome, Italy during Spring break staying on the university Rome Campus and participating in daily cybersecurity-related laboratory exercises, guest speakers, and

increase engagement with international issues and experiences among humanities majors to improve cultural understanding and communication skills in undergraduate students across all majors.

Research also reports on virtual international experiences. Shih et al., [5] report on using panoramic street-view technology to enhance cultural learning and presents a curriculum design/implementation proposal for follow-up cultural learning within the framework of a virtual environment in which participants, embodied through avatars, immerse themselves in virtual travel simulations.

Research also exists in primary and secondary school curricula. Jingtao [6] report on curriculum evaluation of study travel in primary and secondary schools focusing on ontological aspects of personality development, multicultural values, harmonious development, among others.

B. Literature Relevant to our Curricula Design

There has been research in developing hands-on and real-world interventions for courses including: *Introduction to Cybersecurity and Digital Forensics*, *Secure Software and Script Development*, and *Network Security*. Research that was directly integrated into the curricula include components of the following research reports. Dragos and Schmeelk [7] present integrating real-world projects into digital forensics curricula to engage students in simulated career skill-sets. Schmeelk et al., [8] report on continual curricula impairments in a secure software course where students develop their own application and learn to incorporate security controls and mitigation to reduce stakeholder data and system risks. Schmeelk and Dragos [9] report on wireless security skills in the NICE framework and make suggestions for incorporating additional industry focused wireless skills into curricula. Sample laboratory exercises to showcase the skill-sets are also shared and discussed.

III. INTERNATIONAL CYBER EXPERIENCE + FEEDBACK

The week-long international embedded course was designed to be incorporated into six potential classes: four cybersecurity undergraduate courses and two M.S. Cyber and Information Security program graduate classes. Students across all six classes were eligible to apply to the spring break travel abroad as part of their coursework. The two faculty taught all the semester-long courses and traveled abroad with the students during spring break. The project objectives were for participating students to gain more meaningful cross-cultural experience, invaluable skills for the job market as related to the attached course, and grow into globally aware, responsible citizens and effective leaders in our increasingly interconnected, complex and diverse world.

The laboratory exercises were designed to highlight topics from the courses that were eligible to apply to attend: an introductory course on cybersecurity; an introductory course on Digital Forensics; an upper-level undergraduate course, Network Security; an upper-level undergraduate course, Secure Software Development; and, two core graduate courses Digital Infrastructure Security and Principles of Secure Scripting and

Cryptography. Sixteen students participated in the experience with some students joining from each class. Therefore, we had students in their first undergraduate introductory course and advanced graduate students in attendance.

A preliminary laboratory challenge was to design laboratory exercise appropriate for both undergraduate and graduate students. We found that five full-time graduate students joined the Rome travel course program. From this count we established week long teams consisting of at least one graduate student lead. Students gave positive verbal and survey feedback based on the team construction as described in the following subsections.

Sixteen students were eligible to join the week-long international cybersecurity course hosted during Spring Break 2024 on our university Rome University Campus. Fourteen students volunteered to share their anonymous survey feedback that was volunteer-based and under IRB approval. All feedback was positive and quite extensive totaling approximately 40 pages of data. We have highlighted anonymous responses to ensure the paper meets the conference paper length requirement. Future work involves including all the 30-pages of dataset and discussed in *Section V: Future Work and Conclusions*.

A. Day 1 and 2: Arrival Day + Free Day

The spring break embedded course arrival day started on Saturday with the first day of Spring Break. Many students took overnight flights and arrived in Rome Saturday morning. The students received packets, their roommate assignments, and moved into their door rooms.

In the evening of the arrival day, all study abroad programs in Rome for the spring break week participated in an open reception to refresh the rules of engagement and ethics while abroad. All the participating week-long students and faculty participated in the evening reception to meet with each other and familiarize ourselves with the Rome Campus. The opening reception provided a central opportunity for the students to meet and connect and discuss their Day 2 free day activities. Students were also given an opportunity to participate in the international cybersecurity experience IRB-approved survey feedback. Twelve of sixteen students volunteered to share their anonymous experience feedback.

B. Day 3: Introduction + Vatican Swiss Guards

On Monday, Day 3, we met as group in the Rome Campus classrooms and worked on introductory lessons and problems in cybersecurity and digital forensics in the morning. After lunch, we worked together on network and digital infrastructure laboratory assignments. In the labs the students were guided to explore international cyber crimes and crime solving skills of techniques used for digital forensics. The students explored different Virtual Private Network (VPN) technologies and secure configuration of portable wireless devices. In the evening we established a university visit to the Vatican Swiss Guard barracks. All participants were vetted prior to entry.

1) *Laboratory Exercises:* Given that everyone traveling abroad had used WiFi—either in Rome, or during travel to Rome, the focus of our network security activity was WiFi. The student teams were all given a portable wireless router to securely configure, install a software original equipment manufacturer (OEM) firmware upgrade, and install the latest OpenWRT firmware for their device. The instructors provided a background lecture and guidance before the start of the hands-on activities. The activities included 10 questions for the configuration of the devices.

The teams worked together each led by a graduate student. AS students encountered difficulties they were encouraged to discuss with the professors and/or the other groups.

2) *Lessons Learned:* We found that the students worked well in their teams. The graduate students were more experienced with technology and supported the newer perhaps introductory students. Every team had demographically diverse characteristics.

In terms of assignment, the hands on portable router configuration was a great fit as many activities are cloud-based or virtual machine heavy. This activity provided participants with hands-on configuration. We were fortunate enough to have brought power adapters, Ethernet-usb adapters, and HDMI adapters; however, in future iterations we suggest bringing more if not enough for everyone. One setback was that the Rome Campus WIFI was not configured to have portable device attach through a service account. In the future, we may look into establishing a service account to additionally track activities.

3) *Volunteer IRB Highlighted Feedback:* To keep our research report within the page, we will explore all open-ended IRB-approved survey questions for the first day. We describe each question and provide response highlights below.

Q1: Describe how your knowledge of security has expanded. Please be specific with examples written in anonymous format.

Anonymous Responses were recorded from 14 students who volunteered to participate in the IRB study. A thematic analysis shows that the participating students expanded their thinking in many ways after only a few days abroad. The students reported expansion in: international perspectives, hands-on cyber topics (VPN, configurations, alternative Web marketplaces, browser functionalities, protocols, etc.), teamwork development, and international careers. A sample of anonymous responses are listed below.

- My knowledge of security has expanded because we learned about the the VPN tunnel which means that network traffic is never completely safe because it is still exposed to companies. This implies that security is not always guaranteed. This taught me that in order to ensure security, VPN may not be the safest option to go towards. After learning and exploring the dark web, I also gained more knowledge regarding how onionrouters are used like a vpn to hide our location and potentially identity as well.
- Today my knowledge of experience has expanded tremendously. Professor were able to dive into the importance of global security and how it attributes to what we are able

to view while surfing the web. In addition we learned that some site are restricted such as the viewing of American web sites on Italian networks. A way to combat this would be the introduction of a VPN which provides user anonymity and a secure tunnel of accessing networks. In addition we learned how to access the dark web and mask our IP. This greatly applies because this is a tool used globally

- My knowledge of security has expanded through various talks/presentations from the professors and guest speakers. I have expanded my knowledge of domestic and foreign cybersecurity issues, job opportunities, and cyber threats.
- My knowledge of security has expanded past the barriers of the US. I am now thinking of cybersecurity and how it applies to other countries as well as the US. For example the international privacy laws that dictate the resources of investigations that expand into other countries (GDPR to be specific).

Q2: Please describe in your journals internal, external and international collaboration activities. Were your communications effective? Why/why-not. In-effective? Why/why-not. And did you see any communications skills improve? If so, how? If not, why-not.

Anonymous Responses were recorded from 14 students who volunteered to participate on this question and on the IRB study. A thematic analysis shows that the participating students gained from collaboration activities. The students reported effectiveness in: developing strategies for collaboration, sharing ideas, encouraging different experience levels, and outside classroom activities. A sample of anonymous responses are listed below.

- The communications in our team were effective as we had assigned different group members to different tasks as a part of the lab. [A student] led in terms of the networking given his background in networking. While I researched the documentation for OpenWRT, and that helped with the rest of our security policy.
- In class, we collaborated when securing and configuring our routers. I felt that our group world effectively and we were able to utilize everyone's differing experience level to our benefit. I also collaborated with my peers throughout the day when exploring the city.
- I would say that the communication was effective. We got along well as a group and we were able to complete our work in a timely and orderly fashion. Even living together in a quad, we were all able to get along very well as roommates and had no issues.

Q3: What was the nature of the activity you worked on today.

Anonymous Responses were recorded from 14 students who volunteered to participate on this question and on the IRB study. A thematic analysis shows that students reported what they actually worked on technical cybersecurity activities, in a relaxed, cross-cultural and collaborative environment which

was described by one participating student as “more laid back and chill.” A sample of anonymous responses are listed below.

- Today, our cyber security-based trip to Rome kicked off with a dynamic mix of practical lab sessions and immersive cultural experiences. The morning began with a hands-on lab session focusing on router setup straight out of the box. We delved into VPN (Virtual Private Network) configurations and explored the intricacies of OpenWRT, expanding our understanding of network security. Effective communication was evident in the presentations and discussions led by our instructors, which facilitated cross-cultural understanding and knowledge sharing.
- Today’s activities included a discussion on LANs, VPNs, and the dark web, followed by another hands-on activity centered around configuring a wireless router as if we had just received the shipment of the router after ordering it online.
- The nature of the activity began with an understanding of networks while we learned about VPN services. We then learned about the Dark Web from a digital forensics perspective that Dr. Dragos was able to offer us. Later in the day, we worked on more networking by unboxing and configuring routers.

Q4: Describe the activity you worked on and focus on why you think it was selected.

Anonymous Responses were recorded from 14 students who volunteered to participate on this question and on the IRB study. A thematic analysis shows that student reported what they actually worked on technically as being part of a world citizen with or without a cybersecurity background. A sample of anonymous responses are listed below.

- We opened up for the dark web activity by discussing different networking concepts, which provided a steady lead to our discussions about virtual private networks. From this talk about VPNs, we brought our attention to the Tor Browser, where we ultimately visited the dark web. This activity was selected because it highlights how the criminal underworld is accessible from anywhere and how easy it is for anybody to access and get involved. Even if we were to track our access to the dark web from a law enforcement perspective, a VPN would pull the activity to a server in any country, such as the United States, even though we were physically located in Italy. As for the wireless router activity, the premise was that we ordered a new router from the Internet, and it was our job to build out the router for our wireless devices on the network. This task included configuring the built-in VPN feature. This task has applications to the Cybersecurity in a Global Context program because regardless of where you are in the world, setting up a wireless router is more or less the same, and the threats you face when working on a wireless network will be the same. For this reason, it is essential to configure measures like a VPN and firewall properly and turn off your SSID broadcast.
- In class, we worked on configuring a mini router out of

the box on our own given the box instructions. I believe this was selected so that we can have the experience of a regular consumer without professional help who buys a router and has to configure it on their own. Understanding their perspective gives us future professionals an insight into what they may struggle with.

- We worked on setting up our own Wi-Fi, and customizing our networks and network information. We also tried to see what external changes we can make to our Wi-Fi or to aspects related to our Wi-Fi.

Q5: What was the significance about the activity

Anonymous Responses were recorded from 14 students who volunteered to participate on this question and on the IRB study. A thematic analysis shows that student reported what they actually worked on technically as being part of a world citizen with or without a cybersecurity background. A sample of anonymous responses are listed below.

- The significance of this activity lies in its direct applicability to real-world scenarios. In today’s digital age, understanding how to set up and secure networks is crucial for protecting sensitive information from cyber threats. Additionally, learning about VPNs and OpenWRT expanded our knowledge of privacy-enhancing technologies and alternative firmware options for routers. By combining hands-on learning with immersive experiences, participants were equipped with the knowledge and skills necessary to navigate the complexities of cyberspace and contribute to a safer digital environment.
- The significance of this activity was the knowledge we gained in terms of VPNs as well as open source development.
- The significance was problem solving in a team.
- This activity was significant because it allowed us to configure a small LAN.
- The significance of the activity, as explained in the previous answer, includes the global use of the dark web and being able to configure a wireless router regardless of the country you are in.
- It helped me learn more about how Wi-Fis work and how to set up the base network for a Wi-Fi as well as trying to customize it as per your needs.

Q6: What was new for you about the activity

Anonymous Responses were recorded from 14 students who volunteered to participate on this question and on the IRB study. A thematic analysis shows that student reported what they actually found that the daily activities to be culminating activities for their degree as well as having one feel like a professional. The students also reported the Italian cite visit to the Swiss Guard barracks as “eye-opening.” A sample of anonymous responses are listed below.

- One new aspect for me was delving into the deep and dark web. We downloaded Tor and explored its relevance to security, gaining insights into the hidden corners of the internet where illicit activities often take place. This experience highlighted the importance of understanding

the full spectrum of cyber threats, including those lurking in the depths of the dark web

- I have never configured a brand new router before so the whole activity was new for me. The Swiss Army barracks were very eye-opening as well.
- I have never manually configured a router or utilized the Dark Web or a VPN. I felt that the router activity did a great job of combining different skills that I learned in classes across my degree.
- Having to work with documentation to figure out the problem from scratch it made me feel like a little professional!

Q7: What knowledge was gained while working through the activity?

Anonymous Responses were recorded from 14 students who volunteered to participate on this question and on the IRB study. A thematic analysis shows that student reported that the knowledge they gained from collaboration, technical, humanity-related, and cross-cultural. A sample of anonymous responses are listed below.

- Through today's activities, I gained knowledge about the differences in cybersecurity approaches between Italy and the United States, as well as the global impact of cybersecurity. Additionally, our visit to the Vatican and interaction with the Swiss Guard provided cultural context and showcased the intricacies of international collaboration in security, particularly in protecting high-profile figures like the Pope.
- Similar to what I mentioned earlier, it showed me the process of setting up Wi-Fi that is not set-up by providers or huge companies. And how one can change the settings and information about their networks as needed, even if they are simple changes.
- While working through the activity, I learned to collaborate better with teammates and how to set up a wifi router.
- I was able gain a new perspective on how people are affected by technology limitations and how we can leverage this by using vpn. In addition we learned how to monitor and effectively work together.

Q8: What would you like to see added to the activity on the next iteration for students?

Anonymous Responses were recorded from 14 students who volunteered to participate on this question and on the IRB study. A thematic analysis shows that student reported that they would either keep the course design the same or have future leader-researchers add: cyber attack simulations, further alternative web activities, time for full class participation, and add more supporting materials. A sample of anonymous responses are listed below.

- I would suggest adding a simulated cyber attack scenario where students can apply the knowledge they gained during the lab sessions and cultural visits. This scenario could involve a fictitious organization or network facing

various cyber threats, such as phishing attempts, malware infections, or denial-of-service attacks. [...]

- On the next iteration for students, I would like to see more activities to do with tor and the dark web.
- There is not much I have to add as I really enjoyed this lab.

Q9: Would you recommend this activity from today to peers? why/why-not

Anonymous Responses were recorded from 14 students who volunteered to participate on this question and on the IRB study. A thematic analysis shows that all the participating students would recommend the activity but for many different reasons including secure travel, technical, professional, and collaborative. A sample of anonymous responses are listed below.

- I would highly recommend today's activities to peers as they provided a well-rounded learning experience combining technical skills with cultural insights. The hands-on lab sessions and immersive tours offered valuable perspectives on cybersecurity and its global implications, making it a worthwhile learning opportunity.
- Yes because it is important because traveling is something most people do and technology is something most people have
- Yes I would because it exposes students to how work in a job environment is where you may not know things beforehand. But you must quickly think on your feet and learn in order to succeed.

Q10: Please record daily anonymous activities of collaboration (within teams, across teams and with potential international Italian colleagues), skills gained, understandings gained and future suggested enhancements/changes.

Anonymous Responses were recorded from 14 students who volunteered to participate on this question and on the IRB study. A thematic analysis shows that all the participating students learned collaboration activities including many already mentioned above. A sample of anonymous responses are listed below.

- I gained the skill of exploration. When I didn't know something we had to look up for tutorials online and were able to follow step by step how to do it.
- Throughout the day I collaborated with different students as we adventured around Rome. I was able to gain an understanding of people's differing career goals and interests within the field.
- My main contribution of activities of collaboration was leading the group, teaching the group members about OpenWRT as they haven't taken a course teaching about it yet.
- Attending the Swiss army barracks. It was great seeing the physical security pov and then take into account how much they pay attention to detail. This emphasis could be applied to cyber security because security is top priority

C. Day 4: Embassy + Secure Scripting/Software Day

On Day 4, Tuesday, we explored as a group secure scripting and secure software development. In the morning the groups continued their work on the Day 1 activities and were asked to pull a local copy of OpenWRT to review for secure coding discussions.

After lunch, the United States embassy liaison speakers were available to visit the campus and discussed international cyber-crime concerns. The topic coverage gave cyber-crime related job insights and insights into international challenges, relationships, and careers.

1) *Laboratory Exercises:* The students were asked to review the source code for OpenWRT both in the online repository as well as pulling down a local copy for review. The students examined static analysis features to detect software vulnerabilities and weaknesses. Future iterations of the course will include a problem set of tasks with OpenWRT such as locating different elements in the software. The graduate students already had been working on related problems during their semester-long coursework. In the future, having the students push OpenWRT through an open static analysis engine would be more helpful for when they return to their main campus semester-long activities. Specifically the graduate students were asked to continue their research and investigations when they reached their main campus after spring break.

2) *Lessons Learned:* We found that students needed more time to complete the tasks assigned on Day 1 with the portable routers. In the future, more time will be needed to be allocated for additional secure software scavenger hunts in OpenWRT. One challenge we encountered was that guest speakers were not always formalized weeks in advance so that we had to be able to adjust the curricula as needed.

3) *Volunteer IRB Highlighted Feedback:* The IRB-approved survey feedback from six questions is listed below.

Q1: Describe how your knowledge of security has expanded. Please be specific with examples written in anonymous format.

Anonymous Responses:

- I learned more about the US policies in regard to cybersecurity within both the US and other countries, especially, Italy.
- I learned how different cybersecurity roles are available within the FBI and the department of state.
- I gained an understanding of how the US uses its foreign policy to collaborate with other countries with handling domestic issues that may spill into international borders.
- We continued the OpenWRT lab today and we also had a talk with the US embassy stationed in Italy.

Q2: Please describe in your journals internal, external and international collaboration activities. Were your communications effective? Why/why-not. In-effective? Why/why-not. And did you see any communications skills improve? If so, how? If not, why-not.

Anonymous Responses:

- We traveled around the city as a group and I spoke to the tour guide about some questions I had about Rome. I

feel that my communication with my peers was effective. I was also able to listen carefully and overcome any language barriers when understanding the tour guides accent.

- We got the chance to speak with an FBI and a State Department professionals about their jobs and what they do for the country. It was effective to learn about their duties and how we may one day join the fight against cybercrime.
- The communications were effective together on the group activities. I talked to more people from my class than usually back at the queens campus. I made new friends also.

Q4: Describe the activity you worked on and focus on why you think it was selected.

Anonymous Responses:

- I believe this activity was selected because of the real world applications it has. There are often times where one's job will throw them a new assignment with a new technology to work with and then become a subject matter expert on. Thus we had a small taste of that when we worked on the lab.
- Today we completed the lab and effectively communicated with the U.S officials stationed in Italy gaining an understanding on their role and influence in Rome.
- I believe us going to Link University is to see the difference in fundamental of how Rome goes about cybersecurity and how it differs from America.

Q7: What knowledge was gained while working through the activity?

Anonymous Responses:

- Both presentations were extremely informative and delved deeper into the EU regulations and the US government's involvement overseas.
- I learned to install new firmware on a wifi router, and developed my group collaboration skills.
- Rome's history, FBI and US Embassy's role in international cyber crime, securing data networks even if they're private.

Q8: What would you like to see added to the activity on the next iteration for students?

Anonymous Responses:

- A tour of the U.S. Embassy would be an incredible addition. I feel like it would couple exceptionally well with the talks given by our speakers.
- I think a little more time allocated to complete the routers would be helpful because everyone is at different understanding levels about networks. I also thought the guest speakers were very informative so it would be helpful to hear from even more United States government employees from different organizations if possible.
- If it will be possible to work in a group and do lab work with Link University

Q9: Would you recommend this activity from today to peers? why/why-not

Anonymous Responses:

- Yes, because it showed another perspective when it comes to cybersecurity that I had not heard a lot about before. Seeing problems and threats from multiple perspectives is an important part of being a cybersecurity professional.
- I would definitely recommend this activity to my peers and think everyone should be aware of the great career paths available within the government. Both guest speakers emphasized how they may not make as much money as big tech companies offer but the mission of protecting the constitution and the country makes these government roles more rewarding.
- I would 100 percent recommend this activity because in cybersecurity many students are interested in governmental roles and this applies immensely,

D. Day 5 + 6: Link University, Vatican Tour, Industry Talks

Day 5 and Day 6 of the week-long experience were spent partially on Link University on the outskirts of Rome Campus. Link University campus is the former summer place of the pope. The two university faculty and students met and discussed international cybersecurity topics such as Artificial Intelligence, Policies in the European Union, European Union Agency for Cybersecurity (ENISA), and corporate legal policies such as big tech in different states across the United States. On Day 3 we returned to the Vatican for a tour of the Vatican and Sistine Chapel. And on Day 4, we returned to our campus for an invited industry talk.

1) *Lessons Learned:* Going forward we learned to build activities and/or scavenger hunts into our extracurricular activities. For example, when visiting outside locations, we should ask the students to reflect on physical security and other related-cybersecurity concepts they encounter.

2) *Volunteer IRB Highlighted Feedback:* We highlight the responses to four IRB-approved survey questions below.

Q1: Describe how your knowledge of security has expanded. Please be specific with examples written in anonymous format.

Anonymous Responses:

- My security knowledge has expanded through the sessions held on Wednesday and Thursday, as we got to look at cybersecurity through the lens of faculty at Link University, wherein we covered a plethora of information, ranging from introductory cybersecurity topics to regulation and compliance for mergers and acquisitions and the EU/Italy. We also learned about software that provides organizations with a secure mechanism to save their files and data, which is once again crucial for mergers and acquisitions and, more so, confidential environments.
- I learned about Italy's cybersecurity Posture I also learned about the FBI and its work to help against Cyber threat internationally and internally within the United States.
- My knowledge expanded about how the EU requires nations to meet certain security requirements. I also gained knowledge about their AI policies.

Q2: Please describe in your journals internal, external and international collaboration activities. Were your communica-

tions effective? Why/why-not. In-effective? Why/why-not. And did you see any communications skills improve? If so, how? If not, why-not.

Anonymous Responses:

- As with the previous days, I continued to increase my international collaboration activities, especially when posing questions to the speakers from Link University and the MultiPartner Virtual Data Room.
- While at Link University I had a conversation [with someone in] international admissions which was very beneficial. I also communicated effectively with my peers throughout the day and inside the Vatican.

Q4: Describe the activity you worked on and focus on why you think it was selected.

Anonymous Responses:

- For the Link University visits, we had the privilege of going to another campus to partake in talks regarding cybersecurity. Because we partner with this university, it is always good to engage with them when possible. Still, on a personal level, it is fascinating to learn how cybersecurity is taught elsewhere in the world. As for talk with MultiPartner, it also provides good insight into the standards that cybersecurity firms that are not US-based adhere to, using EU and international regulations rather than NIST and international regulations. The tour of the Vatican Museums and Sistine Chapel was also spectacular and allowed us to connect with an essential piece of history, not just for Rome but the world..
- We visited Link University where we listened to a lecture about the Italian perspective of cybersecurity from a professor. We also visited the Vatican which is a main attraction of Rome. I believe we went to Link University in order to understand how a different global location can change someone's perspective on certain security issues.
- We listened to the lectures and took notes.

Q8: What would you like to see added to the activity on the next iteration for students?

Anonymous Responses:

- I believe a lab session with the students of [Italian] University would be fun. The session would not have to be too long, but just long enough to provide an authentic hands-on working experience with students from another nation and see that working dynamic play out.
- I would like to see a second iteration of this activity.
- I believe focusing on the differences between Italian and American Cyber regulations would be the most beneficial. It also could have been helpful to interact with the students at Link University more.

E. Day 7: Communications, Innovation + Farewell Dinner

Day 7, Friday, was the final structured day of the embedded course. The students were given a chance to visit the Vigamus Video Game Museum in the morning and visit the Vatican Radio Museum in the afternoon as a university party. The radio museum was full of historical communication artifacts

and learning experiences. In the evening, the group met for their final farewell to Rome departing dinner at a local and popular trattoria.

F. Day 8: Free Day

Day 8, Saturday, was the final free day of the spring break embedded course. Students scattered into different activities with some traveling to other cities for the day such as Florence or Naples. A few students chose to return to the USA early to prepare for their next week of classes.

G. Day 9: Departure Day

Day 9 was the departure day with everyone traveling at different times. Some students chose to share flights and depart at similar times. A few students extended their stay.

IV. END OF SEMESTER REFLECTION

Two months after the return from Spring Break, students were asked to participate in a voluntary anonymous retrospective survey. We highlight responses to four of the ten questions below.

Q1: Have you had any further discussion with SJU Queens peers about the event? Why/why-not.

Anonymous Responses:

- I have certainly been in contact with other SJU Queens peers about the program. I have been a massive advocate in letting other students know if they can take the courses that align with the study-abroad program in the Spring because it is a memorable educational and personal experience.
- I've talked about the event with my SJU Queen's friends and classmates that I went to Rome with. Through these conversations, we exchanged stories and viewpoints and reminisced about the trip that we spent together in the eternal city. We discussed the breathtaking moments we had while seeing ancient sites and how wonderful it was to wander through the Vatican's extensive radio museum. Through these conversations, they had the opportunity to learn what the program offers and develop a mutual excitement for what lay ahead if they decide to apply. While on the trip, many of us were inspired to apply for similar experiences after hearing other students' various stories and first-hand experiences from the students who were already in other abroad programs. We learned a great deal about cybersecurity from our discussions, and we also developed new interests and goals. We returned from the trip with an inspiration to explore the world and extend our horizons beyond the campus.
- Yes because it was an amazing/ insightful trip that I truly believe many student's in the cyber program could benefit from.
- Not much since I don't have any classes with the people I spent time with, but in general I've shared my experience with a few friends. However, I personally didn't see a point in sharing about the experience outside of my

family since to me, it was very enlightening and that's what mattered most.

Q2: As you are working to apply for graduate school and jobs, are you expecting to write about your experience in your resume and/or personal statements? Why/why-not.

Anonymous Responses:

- I have yet to have an outlet to introduce the study-abroad program during any applications for a job or grad school, but I would touch upon it and discuss it. The focus on global cybersecurity is extremely valuable, especially for more client-facing roles, which is my preference. Because I have some offers lined up already, I still need to include the trip in my resume, but when I re-work my resume, the experience will be included.
- I plan to include my experiences during my study abroad trip to Italy in my statement and resume for graduate school and job applications. The trip improved my cross-cultural communication abilities, exposed me to a wide range of viewpoints from subject matter experts, and gave me invaluable insights into global cybersecurity issues. These experiences show my proactive approach to learning and my capacity to thrive in multicultural settings, in addition to being essential. In my resume, I'll highlight specific projects or experiences from the trip that showcase my skills and competencies in areas such as research, problem-solving, and collaboration. This will help me stand out to potential employers or admissions committees by demonstrating my real-world application knowledge in a global context.
- I did include the study abroad program and its details in my resume just because it shows I have even if it's just a little bit, of experience outside the country.

Q3: As you think back about your return to your home institution, are there any anonymous changes or improvements you would suggest for future iterations of such a course? Why/why-not.

Anonymous Responses:

- A change that could be implemented is having further notice on the Spring semester courses before the deadline for submitting the deposit for the trip. The issue is that people tend not to do a lot of forecasting regarding their schedules, so although they want to participate in this program, they do not have the option to because they already took the course or because they took the course in the Fall. Having more explicit notice and more flexibility to know that I want this course in the Spring because I want to be a part of the trip would go a long way in making sure it runs every year.
- Real-world simulations, case studies, or collaborative projects focused on global cybersecurity challenges would provide participants with valuable skills and experiences that they can apply in their academic and professional career.
- Perhaps more labs and meeting other cyber students internationally.

- I personally would recommend getting all the educational/scheduled programs, having them as early as possible in the day even if it's at 7 am or earlier, to finish the educational day early, and give students a lot more time to explore the city or even more of Italy. The days sort of ended in an awkward afternoon time most days which didn't allow for much to be seen, since unless NYC which is a city that never sleeps, most of Rome sleeps by like 11.

Q7: What do you think was the most significant positive technical experience from all the activities? Why?

Anonymous Responses:

- Significant positive technical experience from all the activities was likely the hands-on lab sessions focusing on the dark web. Exploring the dark web in a controlled environment allowed us to gain practical insights into the tools, techniques, and vulnerabilities commonly exploited by threat actors. By actively engaging with real-world scenarios and experimenting with various cybersecurity measures, such as encryption and anonymization techniques, we developed a deeper understanding of the challenges and complexities associated with combating cyber threats in the digital underground
- The most positive technical experience I had from the whole trip was setting up a wireless router from scratch, downloading open-source firmware for the device, and setting up a VPN server on the wireless router. I have had plenty of experiences playing around with wireless routers, but it was never to this degree that gave me many unique hands-on experiences.
- The activity related to setting up the router/modem and doing it securely was an interesting and educational activity, because if the router isn't installed securely, then there's not much other technologies can do to protect you.
- Learning to mask our ip through vpn because it is very critical when online especially in another country.

V. FUTURE WORK AND CONCLUSIONS

Future iterations of the travel course are planned for 2025. In this research report we have highlighted 3-4 anonymous responses to ensure the paper meets the conference paper length requirement. Future work includes further analysis based on attached classes and class (e.g. undergraduate junior, undergraduate senior and graduate student) standings. Work from Dragos and Schmeelk [10] show that term frequency inverse document frequency (TF-IDF) analysis may help to create topic categories of feedback; however preliminary data analysis shows that the feedback covers many categories. Categorical analysis may be more appropriate. Additionally, have surveys from our Italian peers also could shed light on their experience working on similar laboratory exercises and feedback from collaborating with a United States university. Lastly, if the embedded course runs again in 2025, we will incorporate voluntary feedback from any students who participated both years.

Fourteen of sixteen students volunteered to provide IRB-approved feedback, having a vast dataset has proved to be quite useful for future iterations of the course. Overall, the students indicated they were thrilled by the experience, some have shared blogs (e.g. [11]), and many have shared the experience with prospective employers. Students reported that the international experience helped them to open new global perspectives on cybersecurity that they plan to reflect on long after graduation.

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