OLD DOMINION UNIVERSITY

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Final Paper CYSE 368: Internship at The Brooks Crossing
Innovation Lab

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1. Introduction

As a cybersecurity student at Old Dominion University, completing an internship is a vital step in gaining real-world experience and preparing for a professional career. The CYSE 368 internship course allows students to apply their academic knowledge in practical settings, and I was excited to find an opportunity at The Brooks Crossing Innovation Lab. This makerspace in Newport News, Virginia, focuses on providing STEM education to students and community members, combining advanced tools like 3D printers, laser cutters, and robotic kits with creative and educational programs.

I began this internship with four clear goals in mind. First, I wanted to master the use of makerspace tools, including 3D printers, Laser4 cutters, and other technology central to the lab's activities. Second, I aimed to enhance my teaching skills by assisting hands-on sessions for K-12 students. Third, I wanted to improve my organizational skills by assisting with event planning, equipment setup, and other operational tasks. Finally, I hoped to connect my cybersecurity knowledge to real world applications, even in a setting that wasn't directly focused on cybersecurity.

This paper reflects on my journey through the internship. It describes the skills I gained, the challenges I faced, and how the experience will shape my academic and professional future.

2. Description of the Internship Beginning

The Brooks Crossing Innovation Lab is a makerspace designed to inspire creativity and learning through technology. It provides access to tools and resources that many people wouldn't have at home or school, including 3D printers, laser cutters, garment printers, and Cricut machines. The lab's mission is to make STEM education engaging and accessible, with a particular focus on serving K-12 students. It also

serves as a community hub, offering workshops and events that allow people of all ages to explore technology in new ways.

My internship began on September 3, 2024, and my title was Program Assistant. During the first week, I participated in an orientation led by my supervisor, Kaitlyn McCoy. Kaitlyn introduced me to the lab's equipment, walked me through safety procedures, and explained my responsibilities. I started learning how to use the 3D printer, which involved understanding how to load the filament, prepare the design files, and troubleshoot common issues. At first, I found it a bit overwhelming because of all the steps involved, but Kaitlyn's clear instructions and encouragement helped me gain confidence.

From the beginning, I was impressed by the lab's energy and welcoming environment. The staff were friendly and supportive, and there was a sense of shared enthusiasm for learning and creativity. I felt motivated to dive in and contribute to the lab's mission.

3. Management Environment

The management environment at The Brooks Crossing Innovation Lab was one of the highlights of my internship. Kaitlyn, my supervisor, was not only skilled and knowledgeable but also approachable and patient. She set clear expectations while giving me the freedom to take initiative and learn through hands-on experience. For example, after my first teaching session, she provided constructive feedback on how to engage students more effectively and break down complex instructions into simpler steps.

The lab operated with a collaborative culture that made it easy to work as part of a team. Whether we were setting up for an event, brainstorming new activities, or troubleshooting equipment, everyone pitched in to ensure that things ran smoothly. Regular team check-ins and open communication helped me feel supported and allowed me to share my ideas confidently. Kaitlyn's leadership and the team's

camaraderie created an environment where I felt valued and motivated to do my best.

4. Major Work Duties and Assignments

My responsibilities as a Program Assistant were diverse and engaging. One of my primary tasks was assisting hands-on workshops for K-12 students during field trips. These workshops introduced students to tools like TinkerCAD for 3D modeling and Canva for graphic design. Teaching these sessions required not only technical knowledge but also the ability to communicate clearly and adapt to different age groups and learning styles. For example, with younger students, I focused on simplifying instructions and making the activities fun and interactive, while older students were encouraged to explore and experiment more independently.

One of the most memorable projects I worked on was a Halloween themed activity. The students designed jack-o-lantern faces using TinkerCAD, and we printed their designs on the 3D printer. Seeing their excitement as they watched their creations come to life was incredibly rewarding. Another notable project involved making coasters using the laser cutter. After designing and cutting the coasters, we stained them to give them a polished, professional look.

In addition to teaching, I assisted with event preparation and cleanup. This included setting up equipment, organizing materials, and testing activities to ensure they worked as planned. I also helped develop new activities, such as creating a Cricut project where students designed custom stickers. These responsibilities taught me the importance of planning, attention to detail, and teamwork in running successful events.

5. Use of Cybersecurity Skills and Knowledge

Although the internship wasn't directly focused on cybersecurity, I found several opportunities to apply my knowledge. Managing the digital files for the lab's equipment required attention to detail and strong organizational skills. Ensuring that files were saved correctly and that machines were properly configured reminded me of the precision needed in cybersecurity tasks.

I also encountered technical challenges that required problem solving skills, such as fixing a filament jam in the 3D printer or adjusting the laser cutter settings for accurate cuts. These moments reinforced the value of critical thinking and troubleshooting, which are core skills in cybersecurity. The experience showed me that the principles of cybersecurity like precision, organization, and problem solving are broadly applicable across many fields.

6. Curriculum Preparation

My coursework at Old Dominion University prepared me well for many aspects of the internship. Classes on teamwork and problem solving gave me the skills to work effectively in a collaborative environment, while courses on ethics and communication helped me think about how to engage with students responsibly and professionally. For example, when teaching students how to use Canva, I drew on my communication skills to make the instructions clear and easy to follow.

At the same time, the internship highlighted areas where I needed more hands-on experience. While I had a strong theoretical understanding of cybersecurity concepts, working with makerspace tools like the 3D printer and Cricut machine required practical skills that I hadn't developed in the classroom. This experience emphasized the

importance of combining academic knowledge with real world application.

7. Fulfillment of Objectives

Reflecting on my time at The Brooks Crossing Innovation Lab, I can confidently say that I fulfilled all the objectives I set at the beginning of my internship. One of my main goals was to become proficient in operating makerspace tools, and I achieved this through consistent hands-on practice and detailed guidance from Kaitlyn. I started with basic tools like the Cricut machine and gradually progressed to more advanced equipment such as the 3D printer and laser cutter. For instance, learning to calibrate the laser cutter taught me the importance of precision, while working with the 3D printer helped me understand how to troubleshoot technical issues efficiently. By the end of the internship, I was able to use all the equipment independently, which gave me a great sense of accomplishment.

My second goal, improving my teaching and communication skills, was achieved through repeated interaction with K-12 students during field trips and events. Initially, I was nervous about teaching younger students, but with each session, I became more comfortable explaining complex concepts in simple terms. One memorable moment was when I helped a group of middle school students design their first 3D-printed objects. Seeing their excitement and curiosity grow as they completed the project reassured me that I was making a difference in their learning journey.

Lastly, I wanted to understand how a technology focused educational space operates. By observing the day-to-day operations of the lab, I gained insight into what it takes to run such a facility successfully. From planning events and managing resources to ensuring that every visitor had a positive experience, I saw firsthand how much effort goes into maintaining a space that fosters innovation. These

experiences taught me the importance of adaptability, teamwork, and organization.

8. Motivating Aspects of the Internship

The most motivating part of my internship was witnessing the positive impact of our work on the students and community members who visited the lab. Seeing the joy and curiosity on the faces of students as they explored new technologies was incredibly rewarding. For instance, during one session, a group of high school students was tasked with designing phone stands using TinkerCAD. At first, they were hesitant and unsure of their abilities, but by the end of the session, they had created unique, functional designs that they were proud to showcase. Moments like these reminded me of the power of hands-on learning to inspire confidence and creativity.

Another motivating factor was the support and encouragement I received from Kaitlyn and my colleagues. The collaborative environment of the lab made me feel valued as part of the team. Kaitlyn's guidance, combined with the camaraderie among staff, created a workplace culture that encouraged learning and growth. This positive atmosphere motivated me to take on challenges and give my best effort in every task.

Finally, the opportunity to contribute to the community was deeply fulfilling. Many of the students who visited the lab came from schools with limited access to advanced technology. Providing them with tools and experiences they might not otherwise have had felt like a meaningful contribution. Knowing that my work was helping to make a difference kept me motivated throughout my internship.

9. Discouraging Aspects of the Internship

While my overall experience at the lab was positive, there were moments that were discouraging. One of the most frustrating aspects was dealing with technical issues that disrupted sessions. For example,

there was a time when the 3D printer's filament became stuck in the middle of a demonstration. Although we eventually resolved the issue, it delayed the session and left some students disappointed. These technical hiccups were a reminder of how important it is to stay calm and patient in stressful situations.

Another challenge was managing the occasional lack of student engagement. While most students were enthusiastic, there were times when a few seemed uninterested or distracted. For example, during a field trip, a group of younger students struggled to focus on a project, which made it harder to keep the session on track. Learning how to adapt my teaching style to engage different age groups was a valuable, albeit challenging, experience.

Lastly, balancing multiple responsibilities during busy weeks could be overwhelming at times. Juggling teaching, event setup, and administrative tasks required careful planning and time management. While these moments were discouraging, they ultimately helped me develop resilience and organizational skills.

10. Challenging Aspects of the Internship

One of the most challenging aspects of the internship was learning to troubleshoot technical issues with the makerspace equipment. Each tool had its own set of quirks, and problems often arose at the least convenient times. For instance, the laser cutter occasionally failed to align properly, resulting in uneven cuts. Solving these problems required a combination of patience, analytical thinking, and sometimes trial and error. By the end of the internship, I had become much more confident in my ability to troubleshoot and resolve issues quickly.

Another challenge was adapting my teaching approach to suit different age groups and skill levels. For example, explaining how to use TinkerCAD to a group of elementary school students required a different approach than teaching high school students. With younger students, I focused on simplifying instructions and using analogies to make

concepts more relatable. With older students, I encouraged them to experiment and think critically about their designs. Finding the right balance between instruction and exploration was a skill I developed over time.

Managing my workload during event heavy weeks was also a significant challenge. On some days, I had to prepare materials for a morning session, lead a workshop in the afternoon, and assist with cleanup and equipment maintenance in the evening. While this was physically and mentally demanding, it taught me the importance of prioritization and time management.

11. Recommendations for Future Interns

For future interns at The Brooks Crossing Innovation Lab, I would recommend starting with an open mind and a willingness to learn. Familiarizing yourself with the basic functions of the lab's tools, such as the 3D printer and Cricut machine, before your first day can be helpful. Online tutorials and practice with similar tools can give you a head start.

Time management is another critical skill. Balancing teaching, event preparation, and other responsibilities requires careful planning. Creating a schedule and setting aside time for each task can help you stay organized and reduce stress.

It's also important to be patient and adaptable. Working with students means you'll encounter a wide range of personalities and learning styles. Some students may need extra guidance, while others might be more independent. Being flexible and approachable will help you connect with them and create a positive learning experience.

Finally, take advantage of the resources and support available at the lab. Kaitlyn and the other staff members are there to help you succeed, so don't hesitate to ask questions or seek feedback. This internship is a great opportunity to grow both personally and professionally, so make the most of it.

12. Conclusion

My internship at The Brooks Crossing Innovation Lab has been a transformative experience that exceeded my expectations. It allowed me to develop technical skills, improve my teaching abilities, and gain a deeper understanding of how technology can be used to inspire and educate others. The hands-on nature of the work helped me build confidence in my abilities, while the collaborative environment encouraged me to take initiative and grow as a professional.

This experience has also had a profound impact on my academic journey. It reinforced the importance of combining theoretical knowledge with practical application, which I will carry forward in my remaining coursework at Old Dominion University. Additionally, the skills I developed during this internship, such as problem solving, communication, and time management, will be invaluable as I pursue a career in cybersecurity.

Looking ahead, I am excited to build on the foundation this internship has provided. Whether I'm working in a makerspace, teaching others, or developing cybersecurity solutions, the lessons I've learned at The Brooks Crossing Innovation Lab will remain a cornerstone of my professional journey.

Appendices:

Appendix A: work samples