**Critical Review of the Literature Course Project**

***Critical Review of (Teaching Cybersecurity to Criminal Justice Majors)***

Brook Nodeland, Scott Belshaw, and Mark Saber, 2019

**Summary**

The authors identified an area of weakness in criminal justice programs at the college level. They evaluated several colleges and universities throughout the United States and found that most were lacking in teaching cybersecurity in their criminal justice programs. Because cyber-crimes are continuing to grow, it has become a top concern for criminal justice professionals. The lack of cybersecurity education has hampered their ability to handle these crimes (Nodeland et al., 2019).

It is the opinion of the researchers that institutions of higher learning must develop, implement, and promote cybersecurity courses. Researchers have developed a cybersecurity course recommendation complete with a suggested syllabus for incorporation into criminal justice programs (Nodeland et al., 2019).

**Article Analysis**

This study discussed the history of cybersecurity in education and addressed many of the issues that current criminal justice students face. For example, a student who desires a focus on cybersecurity will have to go outside the criminal justice department. They may have to look at courses in computer science, engineering, or business. The problem is that the courses from these departments aren't geared toward criminal justice. The student won't find material for developing skills in evidence collection, preservation, and legal, environmental factors (Nodeland et al., 2019).

I somewhat disagree with this assessment. In my MS program in information assurance and cybersecurity, we covered evidence collection and preservation. The program also had a section on how not to contaminate data by using copies or sandboxes. My point is that some college cybersecurity programs do consider evidence preservation and other criminal justice concerns. Also, a colleague of mine received her MS in cybersecurity at the University of Southern Florida. Her program had a whole section on forensics.

Additionally, where I teach (Pasco Hernando State College), we also have courses in forensics. The courses are at the AS and BS levels. I do believe that many programs have started to consider cybersecurity from a criminal justice perspective.

Another area of concern regarding the research methodology was the source material that the authors used to come to some questionable statements. For example, they state that cybersecurity has not been taken seriously because students are uninterested. The uninterest was due to a perception of low monetary reward (Nodeland et al., 2019). The sources cited were published in 2002 and 2000. I would argue that this is no longer correct. The researchers should've known since it had been almost twenty years ago.

Areas where the research shined, were in the area of recommendations for new cybersecurity programs in criminal justice. They said that programs should offer experiential learning (Nodeland et al., 2019). In my opinion, only through hands-on practice will a cybersecurity student learn how to perform a task. It is a combination of knowledge and muscle memory.

Another observation they made was noticing that there is a gap between law enforcement and cyber threat responses. They recommend that criminal justice experts bridge this gap (Nodeland et al., 2019). Criminal justice programs have to educate students with the latest knowledge and methodology to bridge the gap.

**Practical Applications**

The research clarified that criminal justice programs must create and promote a cybersecurity component to the security branch. This applies to any college or university that has a criminal justice department.

Graduates with this background will close the gap between criminal justice agencies and cybersecurity professionals with technical skills. Departments must develop an appropriate cybersecurity curriculum to teach these skill sets.

The curriculum should include; cyberspace, cybercrime, cybersecurity laws, policies, cyberterrorism, harassment, and stalking (Nodeland et al., 2019). If colleges and universities do not implement cybersecurity courses into their programs, criminal justice students will be ill-fitted for the future. The gap between law enforcement and technology experts will only continue to widen.

Barriers to implementation are cost and knowledgeable personnel. All new programs have a cost. Due to budget tightening, it is challenging to convince the administration to create new courses and curriculum material. However, these costs are justifiable and necessary.

It is critical to start hiring persons with strong cybersecurity technical backgrounds to teach the new curriculums in the department of criminal justice.

A possible unintended consequence to consider when implementing cybersecurity into the program is that it may drive some students away because of the technical nature of the cybersecurity course. For this reason, I recommend the cybersecurity courses be a concentration or a focus rather than a requirement.

***Critical Review of (Why digital forensics is not a profession and how it can become one)***

Michael Losavio, Kathryn C. Seigfried-Spellar, and John J. Sloan III, 2016

**Summary**

The researchers argued that digital forensics (DF) is not yet a profession. They identified several reasons that impede the advancement of DF to this status. Primarily a perception of the low social status of the clients and the uniqueness of this field with the division of labor has held back the advancement of DF (Losavio et al., 2016). The researchers argued suggestions for promoting DF.

**Article Analysis**

The authors did an excellent job of defining DF's objective. It is the search for truth. I especially liked the explanation of the DF process. It begins with interconnected systems in computer science, engineering, information systems, and communications. The process will ultimately end up in the judicial system, concluding in the courts (Losavio et al., 2016).

Additionally, they explained that public trust in the DF experts is paramount. The DF experts are expected to contain competency in their discipline and practice ethical behavior (Losavio et al., 2016). I feel that this is particularly challenging with the current distrust of science by the public.

In the paper of DF, the researchers stated some court cases had been dismissed due to a lack of standardized tools and forensics procedures. There are some standardized government tools, but more are needed (Losavio et al., 2016).

The researchers also claimed DF lacks in tools and procedures. They might have expanded a bit more on exactly which areas in DF are lacking.

An area of DF that was detrimental to its becoming an occupation was the claim of a high burnout rate due to practitioners working on data of a sexual nature (Losavio et al., 2016). The possibility of working on the suspect's hard drives that contain sexual content is something that I have considered. In the future, I would like to assist law enforcement in the area of forensics or cybersecurity. However, I wouldn't assist in the area of sexual crimes. Some things cannot be unseen. I do not want any images of that nature burned into my mind.

A surprising statement was the claim that there are no DF codes of ethics enforced through civil and criminal law. There are also no regulatory practices (Losavio et al., 2016). A discrepancy like this will have to be addressed for DF to be considered an occupation.

**Practical Applications**

A concern from this research was the possibility of misuse of the tools. Because the tools for DF are so technical, it is difficult to have public or private scrutiny. There is also a possibility of specific tools having proprietary technologies that a jury or the public would not be able to test. Reliability becomes an issue as it may not be possible to test or confirm results (Losavio et al., 2016).

The strength of DF may favor the prosecution because the tools may only be available to the prosecution and government officials who can afford them.

An ethical code must be developed and then accepted by the public and industry. Ethics will limit the possibility of misidentifying or possibly leading to incorrect conclusions about a suspect.

Barriers to implementation are cost and time. Many of these tools will be too expensive for either particular defense to purchase and could lean towards anyone who has the means to afford them. Thus, money may sway the balance of justice.

Furthermore, suspects convicted of crimes based on a forensics analysis that is biased or unreliable is a possible unintended consequence.

***Critical Review of (A principlist framework for cybersecurity ethics)***

Paul Formosa, Michael Wilson, Deborah Richards, 2021

**Summary**

The study posits that there is no agreed-upon cybersecurity ethical framework. The researchers in this study seek to address this shortcoming.

Researchers examined ethical issues that arise from four common cybersecurity attacks; penetration testing (pen), distributed denial of service (DDoS), ransomware, and system administration (Formosa et al., 2021). Responses to the attacks by victims and the cybersecurity community were examined using five ethical principles—the principles of beneficence, non-maleficence, autonomy, justice, and explicability (Formosa et al., 2021).

Finally, the study proposes the principlist ethical framework for cybersecurity.

**Article Analysis**

Authors examined cybersecurity attacks on civil cybersecurity infrastructure. Attacks on user financial, medical, or other sensitive information were the focus. These data breaches may cause psychological and social harm (Formosa et al., 2021).

Another area studied was system administrators' and programmers' role in making ethical decisions to control hate speech or misinformation. This type of ethical decision-making impedes freedom and the right to ethical privacy concerns (Formosa et al., 2021).

I found this fascinating because of our political environment. For example, Facebook system administrators examine user posts and determine what to post and what not to post, even flagging certain statements as inflammatory or racist, or untrue. The ethics of these types of decisions by the system administrators are questionable.

One limitation of the study was limiting the scope to civil. I find the broader context of state-sponsored cyber surveillance or cyber warfare more interesting. I feel that limiting the discussion to only civil cases was disappointing. How can we examine ethics without examining the vulnerability of the threats posed by foreign governments? Attacks on our election processes and results come to mind.

The researchers identified several ethical principles based on the five cybersecurity ethics categories: non-maleficence, justice, explicability, maleficence, and autonomy (Formosa et al., 2021). The ethical principles and their sub-categories were effectively displayed in a helpful chart for cybersecurity professionals to consider.

The research demonstrated the danger of moral disengagement from purely technological decision-makers, and ignoring ethics increases security problems. Results demonstrated system administrators engage in trade-offs to solve problems.

I feel that developing an ethical principle framework was accomplished with this research. There is a need for more ethical training and logical decision-making in the field of cybersecurity.

**Practical Applications**

A lesson learned from this study was the need for an ethical framework for cybersecurity. I was unaware that this was an issue. The recommendation of using the principalist ethical framework was a solid suggestion. This framework borrowed heavily from applied ethics, bioethics, AI, ethics which made solid sense.

The weakness of the study was that those with means would have access to more robust cybersecurity tools. The results might be biased without an ethical framework.

Another weakness of not having an ethical framework was that programmers and system administrators might bias the results, unbeknownst to the general public. Today this is visible via Facebook and Twitter canceling policies.

The most significant opportunity from the study is that of instilling an ethical framework in cybersecurity. This study and other studies that support the conclusions should promote cybersecurity policy changes in all organizations.

Another opportunity is to educate the public on the potential biases of system administrators in large technology domains. A more informed public could help to influence positive change.

A barrier to implementation might be resistance to change by organizations, especially system administrators who are reluctant to give up power.

Acceptance is also a barrier to implementation. For the principlist ethical framework for cybersecurity to be implemented, public and private organizations would have to be broadly accepted.

An unintended consequence for the principalist ethical framework for cybersecurity could be a new layer of bureaucracy that slows down progress. The cost might also be an unintended consequence that has to be burdened by organizations.

***Critical Review of (Criminal law protection of cybersecurity considering AI-based cybercrime)***

XiaoLing Wang, 2020

**Summary**

The study by Dr. Wang argues that artificial intelligence is invading cybersecurity at an alarming rate. This type of cybersecurity is a much more severe threat to national security and other public interest (XiaoLing, 2020).

He asserts that there must be a new strategy within the judicial system to address artificial intelligence cybercrime. In China, there is a high threshold for the conviction of those accused of cybercrime. The study proposes to adjust the threshold due to the substantially more dangerous AI cybercrime (XiaoLing, 2020).

The study also suggests a balance between justice and legislation. Objective interpretation is the methodology suggested for addressing the balance. Objective interpretation emphasizes fairness and justice by looking at the circumstances of the crime (XiaoLing, 2020).

Finally, Dr. Wang argues that other cybersecurity and criminal law studies must address the rapid advancement of AI-based cybercrimes (XiaoLing, 2020).

**Article Analysis**

The Article made a solid point about the rapid advancement of artificial intelligence in cybersecurity. It did an excellent job of defining the areas in which cybersecurity impacts our national security and infrastructure. The Article explained that cybercrime is not a single legal issue but a compound issue (XiaoLing, 2020).

I felt that Dr. Wang did not expand on what a compound legal issue meant. He could have expanded on the compound legal statement with some concrete examples.

The study also presented that society is moving on to the network where nearly everything we do is in the network to the point that it reflects actual reality. Because of this, we are much more sensitive to cyberattacks than ever before. AI also exaggerates these attacks.

His use of the term network was a little bit confusing to me because the network in the United States has a meaning that involves a series of computer systems, usually inside of an organization that is inter-connected. When Dr. Wang says the network, he is talking about what most people consider "cyberspace." The use of the term cyberspace would remove confusion and ambiguity from the Article.

The Article made an interesting assertion stating that the legal rules of the natural world will need to enter the virtual world, or what the Article calls network space (XiaoLing, 2020).

I believe it required a broader explanation. Although Dr. Wang explained that most of our lives are conducted in network space, he doesn't sufficiently explain how legal rules would enter this virtual world.

He also proposed that we must criminalize even the act of preparing for cyber crimes and create a new crime that he called "helping cybercrime" (XiaoLing, 2020). He does not explain or expand upon what preparing entails. I feel that he might be arguing for criminalizing the act of preparing to commit a crime. I believe this would be unconstitutional in the United States.

Dr. Wang stated concern with the potential for expanded charges and possible aggressive enforcement of the law. He addressed this by leaning on objective interpretation theory.

This theory involved a legal interpretation that explored the law within social development from the legal norms. He described it as a fair interpretation that seeks fairness and justice. The law should look at the essence of the crime rather than just the reality. In other words, the spirit of the law and not just the letter of the law.

He also argued that the objective interpretation would pay closer attention to the circumstances of the crime, particularly the severe circumstances. How this would remain objective was unclear.

**Practical Applications**

The study shed light on the need to review AI cybercrime judicial processes. Cybercrime is a multifaceted type of crime. The Judicial system must prepare itself for this new threat.

Objective interpretation theory may be the methodology for the judicial system. I should provide a fair and balanced punishment.

We risk not handing out the appropriate punishment for AI-based severe cybercrimes without an objective review of how the judicial system handles cybercrime. It is essential to understand AI-based cybercrimes are a much more potent threat to national security and infrastructure than basic cybercrime.

This study presents an opportunity to reflect carefully on how the US handles cybercrime. We must determine if implementing a new methodology is needed. The study also provided an opportunity to reflect on the need for further research in the area of AI cybercrime's

A barrier to implementation might be the lack of understanding of cybercrimes in general, but especially AI-based cyber crimes.

Furthermore, the judicial system's slow speed and reaction time versus the lightspeed movement of AI-based cybercrimes could also be a barrier.

One possible unintended consequence is over the sentencing of AI-based cybercrime partners.

***Critical Review of (Survey of intrusion detection systems: techniques, datasets and challenges)***

Ansam Khraisat, Iqbal Gondal, Peter Vamplew, and Joarder Kamruzzaman, 2019

**Summary**

In this study, the authors carefully reviewed signature-based intrusion detection systems (SIDS). They also looked at anomaly-based intrusion detection systems (AIDS).

Additionally, the researchers examined the taxonomy of contemporary IDS and took a careful look at the data sets used for detection. The authors presented a few evasion techniques used by malicious actors to avoid detection(Khraisat et al., 2019).

Lastly, the authors discussed the future challenges computer systems will face becoming more secure (Khraisat et al., 2019).

**Article Analysis**

The Article cited other articles heavily. The citations were probably due to the number of complex definitions and processes that needed defining. In any case, I didn't find much in the way of original research.

I found that their collections or aggregate data from previously published research could benefit someone interested in intrusion detection systems. In particular, I liked their table that compared the IDS datasets with accompanying results and observations.

The researchers also did an excellent job in explaining the advancements in cybercriminal intrusions. They made a strong argument for creating new or advanced intrusion detection systems due to the sophistication of attacks. I also appreciated the in-depth discussion on the advantages and limitations of each intrusion detection system.

Unlike most sources for intrusion detection systems, this research emphasized the limitations of each one, such as AIDS being excellent at catching zero-day attacks while simultaneously producing false positives (Khraisat et al., 2019).

A limitation of the research was that all of their studies examined public data sets. For an accurate evaluation, private datasets from the industry are necessary.

Furthermore, although the researchers briefly discussed polymorphic attacks, I would have liked a more in-depth discussion because, from my studies, polymorphic malware is significantly more powerful, difficult to detect, and also more highly utilized by malware designers.

**Practical Applications**

The lessons learned from this research are that a much better method for collecting datasets for IDS comparisons is necessary. It also revealed that updated documentation on IDS and AIDS along with testing results is needed.

Opportunities for testing IDS and AIDS while tracking malware are present. More research in these areas is needed.

As usual, barriers to implementation include funding, public support, or buy-in along with political champions.

An unintended consequence of implementation might be an over-locked down system that becomes slow and classifies everything as a threat.

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