Week 1: Evaluate Cybersecurity

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# Compare Research Methods

Quality research begins with a well-defined set of questions, such as ‘can an autonomous vehicle safely navigate city streets?’ Next, the researcher needs a plan to answer the question by collecting evidence and observations. Executing that plan requires a collection of quantitive and qualitative methods.

Each of these methods is a tool that comes with its inherent strengths and weaknesses (Jason & Glenwick, 2016). These attributes necessitate researchers to understand when a hammer is more appropriate than a screwdriver. Consider the difference between the vehicle study’s objective is (a) to identify safety requirements versus (b) modeling the limitations of the braking system. Under (a), qualitative methods best support the open exploratory nature of the problem. With (b), the answer needs a quantitative method that describes the relationship of multiple variables, such as the car’s speed and the number of objects on the road. However, a more comprehensive study could answer both (a) and (b) by first uncovering the importance of braking enhancements, then describing the limitations in greater detail.

While performing these various methods, researchers need to be cognizant of their biases and worldviews (Creswell, 2014). These perspectives (see Table 1) influence data interpretation and can result in radically different conclusions.

Table 1: World Perspectives (Creswell, 2014)

|  |  |
| --- | --- |
| View | Perspective |
| Postpositivims | Theory verification |
| Constructivism | Theory generation |
| Transformative | Change-oriented |
| Pragmatism | Reality-centric |

For instance, the Washington Post (2020) maintains a record of every victim of police violence. When Pierce (2019) studied this dataset, they found statistical evidence that confirmed his view of systematic racism. Meanwhile, Harald Uhlig, an economist professor at the University of Chicago, used the same public dataset to conclude the opposite (Derby, 2020). Despite using the same quantitative approach with the same data, these two professionals came to radically different results due to being transformative and pragmatic. This challenge arises because statistics describe a specific context (Denis, 2015). Since both researchers could select a context that aligns with their narrative, Pierce examines the victims’ raw ratios versus the national population. In contrast, Uhlig uses demographically adjusted values based on the individual state’s populations (e.g., California or Texas).

Instead of relying solely on quantitative methods, these researchers could incorporate qualitative information to avoid solving the wrong problem (type III error) (Crabtree & Miller, 1999). From examining the fatality context upfront, both parties might have realized that the victim is armed is more influential than demographics. With nearly 75% of all incidents involve the suspect having a gun or knife—the better question asks, ‘how can society address this safety issue?’