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Article Review: "Development and Evaluation on Cybersecurity Behavior Measurement Instruments for Undergraduate Students"

BLUF: This article review looks at a quantitative analysis of a cyber behavior measurement tool that was given to undergraduate students to assess their vulnerability on social media to cyber threats. Afterwards, the measurement tool was statistically analyzed for its validity.

Purpose of Article

Cyber professionals have realized that teenagers aged 18-24 often are the most vulnerable to cyber threats due to their low security awareness in the technology and social media that they use daily. As a result, this study was conducted by cybersecurity professionals and was published under the journal *International Journal of Cyber Criminology.* The main objective of the study was to develop and evaluate a detailed questionnaire of 100 items spanning four components: "1) Awareness of cyber threats, 2) Knowledge of cyber threats, 3) Experience with cyber threats, and 4) Self-protection against cyber threats," and then give the questionnaire to undergraduate students and evaluate the effectiveness of the questionnaire. (Ngamcharoen et al., 2024).

Hypotheses and Methods

The first hypothesis was that Exploratory Factor Analysis (EFA) could accurately measure if the behavior measurement tool was effective, which required at least four items per component, and a KMO score of at least 0.600. The second Hypothesis was that EFA could account for at least 60% of the differences in cybersecurity behavior amongst undergraduates. The final sample of students that answered the questionnaire was 820 undergraduates from a wide variety of schools and backgrounds (Ngamcharoen et al., 2024).

Analysis and Results

The researchers used three separate statistical analysis methods to evaluate the questionnaire. To evaluate the quality of individual questions, the researchers used "Independent-Sample t-tests and Pearson's Correlation Coefficient" (Ngamcharoen et al., 2024). The second statistical analysis tool was "Exploratory Factor Analysis and Confirmatory Factor Analysis" (Ngamcharoen et al., 2024). Thirdly, the third type was "Inferential Statistics, with a particular focus on SEM Analysis" (Ngamcharoen et al., 2024).

The results effectively supported all three hypotheses to be true. The Index of objective Congruence (IOC) assessment was conducted by behavioral science exports, and a total of 67 out of 100 questions met the necessary criteria. Additionally, the researchers found the average reliability score of measurement tool to be 0.885, with all four original components passing the criteria of at least four items/questions being approved, validating the first hypothesis. Furthermore, the EFA analysis explained over 64% of the variety in cyber habits of undergraduate students, which supported the second hypothesis. Overall, the researchers found the measurement tool to be effective, with recommendation to improve the questionnaire so that

it could better account for “other populations, such as school students or children” (Ngamcharoen et al., 2024).

Relation to Principles of Social Science

The article was mostly related to the principles of Empiricism, Objectivity, and Skepticism. Empiricism is obvious in the fact that the researchers used various quantitative measures and statistical analysis tools to determine whether the measurement tool of cybersecurity behavior was reliable. This leads to the next topic, which is Objectivity. The researchers did not make any conclusions or inferences that weren’t purely based on numerical data, which shows they were objective in their research. The last principle followed among others is skepticism. The researchers showed skepticism by having a multi-step verification strategy involving multiple analysis tools, in order to ensure their confident as possible the measurement tool is reliable.

Concepts from CYSE 201S

The researchers use multiple concepts that have been learned throughout CYSE 201S. For example, the researchers specifically state that the research focused on “developing and evaluating measurement instruments that incorporate the second level of Maslow’s Hierarchy of Needs alongside cybersecurity concepts” (Ngamcharoen et al., 2024). Additionally, the study conducted a study that involved using a survey styled measurement tool, which surveys are one of the common research methods used by sociologists and criminologists. Moreover, the questionnaire tested the conscientiousness of the undergraduate students as it asked them how adequate their cyber habits were. The questionnaire also tested the students’ openness to experience as it asked them how much risk they took in different activities online. All of which are concepts that we have discussed in class.

Marginalized Groups

The topic can be connected back to concerns of marginalized groups in multiple ways. The study seeks to support the technological needs of those with mental disabilities who may not be aware of how to use social media and other technology appropriately. Additionally, the questionnaire accounted for those in diverse economic backgrounds who may not be able to buy the appropriate technology that can protect against cyberthreats as well as others.

Contributions to Society

The study is a phenomenal contribution to society as it aims to better help the modern young adult be more aware of how they can be safe online and protect their own identity and others. Additionally, the study seeks to provide an accurate measurement tool of cyber behaviors that can eventually be applied to all people rather than undergraduates specifically.

Conclusion

In conclusion the researchers sought to create a cyber behavior measurement tool that could be given to undergraduates. The researchers then wanted to validate their measurement tool and make improvements based off the responses so that future studies could improve their tool to be applied to people of wide variety.

References

Ngamcharoen, P., Sakdapat, N., & Bhanthumnavin, D. (2024). Development and evaluation on cybersecurity behaviourmeasurement instruments for undergraduate students. *International Journal of Cyber Criminology*, *18*(1). https://doi.org/10.5281/zenodo.4766807