

Exploring The Desired Strategies of Collegiate Cybersecurity Instructors That Maximize Student Engagement as Identified by Generation Z Cybersecurity Learners

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Abstract

Using the lived experiences of study participants, the purpose of the exploratory qualitative study was to explore collegiate cybersecurity instructors' qualities needed to maximize the engagement of Generation Z cybersecurity learners to successfully become cybersecurity specialists. This understanding is important to increase the likelihood of Generation Z cybersecurity learners completing collegiate-level cybersecurity programs and filling the critical shortage in the cybersecurity workforce. There is a need for a better understanding of Gen Z in collegiate-level cybersecurity programs. Generation Z has unique learning preferences and desires. The problem addressed in this study is that the qualities of collegiate cybersecurity instructors that GenZ learners feel maximize their engagement have not been identified. The study explored the perceptions students had regarding the desired qualities of their cybersecurity instructors. The sample selected for this exploratory qualitative research study consisted of 10 individuals and used purposeful and snowball sampling to select study participants. Data collection was accomplished through a semi-structured interview strategy. Instructor Qualities was the first category to emerge and contained the major themes of (a) relational, (b) engaging, and (c) personable. The second category included Coursework and Learning Experiences and contained the themes of (d) real and (e) relevant. These findings can impact practice by understanding that the participants felt more engaged through touchpoints, exposure to the real, non-theoretical side of cybersecurity, understanding how their learning applied to real life, and being exposed to practitioners.

Keywords: cybersecurity, undergraduate, Generation Z, pracademic, Generational Theory, education

1. INTRODUCTION

There is a thread that ties all of cybersecurity together. The thread remains constant whether it is developing defense-in-depth strategies, adhering to compliance frameworks, or even

taking an offensive security posture. Methodologies might differ. The focus might vary. The strategy might diverge. However, there is a singular constant string that ties all of cybersecurity together. That thread is people.

Technology is extremely important in preventing the realization of risk. However, people are the critical component in this task and there is a significant need. The International Information System Security Certification Consortium, ISC², estimates that there are currently 805,000 cybersecurity specialists working in the United States (ICS2, 2019). While this may be considered impressive, ICS² in the same report also estimates a current demand for an additional 500,000 cybersecurity specialists in the United States. This global shortfall has been calculated at nearly 4.07 million (ICS2, 2019). More people are needed in this critical field.

Colleges and Universities are helping to fill the gap but only minimally. According to the National Center for Education Statistics (NCES, 2019), out of 6,369,484 degrees granted between 2018 and 2019 in American colleges, only 7,350 consisted of graduates from degrees classified as Computer and Information Systems Security.

2. RESEARCH PROBLEM & SIGNIFICANCE

The problem addressed in this study is that the qualities of collegiate cybersecurity instructors that GenZ learners feel maximize their engagement have not been identified. Generation Z individuals have unique perspectives, expectations, needs, and desires. Thus, consideration of these expectations, preferences, and differences may require a change in education and the fields of Computer Science and cybersecurity programs (Graham, 2018; Mládková, 2017; Seemiller & Grace, 2017). Schwieger and Ladwig (2018) call for a better understanding of these perspectives to aid this generation's future success.

The purpose of the exploratory qualitative study was to explore the qualities of collegiate cybersecurity instructors that members of GenZ identify are important to maximize engagement in their cybersecurity studies. This understanding is important to enhance both the quality of education and the student experience to increase the likelihood of Generation Z cybersecurity learners completing collegiate-level cybersecurity programs and filling the critical shortage in the cybersecurity workforce.

It is essential to understand two main underlying concepts to complete this study. First, since the study focuses on a specific generation of individuals, Generation Z, it is crucial to understand Generational Theory and the specific defining characteristics of Generation Z learners. Second, the study is informed by understanding

how Generation Z learns. Cognitive development significantly impacts Generation Z's learning (Rothman, 2016), learning environments (Watters, 2017), and interactions with instructors (Miller & Mills, 2019).

Generation Z has unique learning characteristics that can, in part, be attributed to the many technologies they have been exposed to (Persada, Miraja, & Nadlifatin, 2019). This generation of learners prefers hands-on learning that is immediately applicable and used in their careers (Seemiller & Grace, 2017). This generation tends to prefer observational and hands-on learning approaches (Shatto & Erwin, 2017). Generation Z learners will tend to feel unengaged in primarily theoretical courses (Ivanova, 2010). Traditional lecture-based classes are underwhelming to this generation (Erjongmanee, 2017). Generation Z is cognitively different, and Shatto and Erwin (2016) note that GenZ has a shorter attention span than previous generations. Generation Z learns differently. Rothman (2016) states that they appreciated complex visual images, have a general disdain for auditory learning, and enjoy learning through collaborative projects, interactive games, and challenges. Instructors form a key role in Gen Z's engagement over course material.

Axelsson and Flick (2010) state that instructors are strong influencers over their student's ability to engage and become intrigued with the subject matter. Meyer (2014) indicates that student engagement has a positive correlation with student satisfaction and retention rates. Nepal and Rogerson (2020) echo Meyer and state, "greater student engagement translates into valued student experiences, higher academic performance, and increased retention rates." Since instructors can help foster student engagement and engagement leads to higher retention, instructor qualities that contribute to students' engagement must be identified and understood. Identifying these critical qualities is especially important for fields, such as cybersecurity, that have an overwhelming gap in the workforce. Cybersecurity programs in higher education may desire to develop a deeper understanding of this unique generation, including attitudes, behaviors, beliefs, and ideas of social and societal norms (Chicca & Shellenbarger, 2018). A unique research opportunity presents itself.

Considering the relatively small number of collegiate-trained cybersecurity specialists entering the workforce each year, the cybersecurity workforce shortage, and the unique

characteristics of Generation Z individuals, colleges and universities must make every effort to keep Generation Z cybersecurity learners retained and engaged in computer and information security programs. Engagement and retention can be accomplished, in part, by better understanding the unique perspectives (Schwieger & Ladwig, 2018) and considering the different needs and expectations (Moore, Jones, & Frazier, 2017) of Generation Z cybersecurity students.

3. POPULATION & SAMPLE

The population focus of this research targeted Generation Z individuals who are or were in undergraduate cybersecurity programs in the Illinois, Michigan, Wisconsin, and Indiana regions. There is no standard to when a generation begins. However, many researchers describe Generation Z as born after 1995 (Seemiller & Grace, 2016; Twenge, 2017). For this study, Generation Z will be described as individuals born after 1995 and before 2010.

The analysis of an NCES's (2019) dataset revealed that higher education institutions granted 6,369,484 associate and baccalaureate degrees between 2018 and 2019. The analysis showed 7,350 graduates received degrees classified as Computer and Information Security. The analysis used the NCES Classification of Instructional Programs (CIP) code 11.1003 to identify graduates receiving degrees in Computer and Information Systems Security. Using simple extrapolation, an estimated population of 29,400 was determined to be currently enrolled in Cybersecurity programs at colleges and universities in the United States. Since the research target area includes individuals from degree-granting institutions in Illinois, Indiana, Wisconsin, and Michigan, further dataset analysis was completed. Analyzing the dataset for this region determined there were 555 information security graduates in two or four-year institutions in 2018 (NCES, 2019). An estimate indicated a maximum of 2,220 information security students currently enrolled in the four-state region.

Creswell (2014) suggests a sample size of three to ten for studies is appropriate to reach saturation. Levy, Livingood, and Maranga (2016) indicate sample sizes of seven to twenty. Research by Mason (2010) showed most common sample sizes for qualitative research studies include 10, 20, 30, and 30. This exploratory qualitative research study utilized ten participants, using purposeful and snowball sampling techniques.

4. METHODS

This study used a semi-structured interview strategy. A semi-structured interview is where the subject answers predefined open-ended questions (Jamshed, 2014). However, it also allows for probing questions that seek a deeper understanding of the response (Gray, 2004). Gray (2004) further states this is contrasted with an unstructured or non-directive interview approach where questions are not typically preplanned, and subjects speak freely about the particular topic.

The semi-structured interviews in this study took place over a Zoom video call. The call was secured with a passcode that prevented zoom bombing and unauthorized or unintended viewing of the interview. An audio-only recording of the interview was created for each subject. The interview, which consisted of 14 questions, was subdivided into categories that created a natural progression through the interview.

A. Qualifying and Demographic Questions

1. Have you signed the informed consent form?
2. What year were you born?
3. What state did you receive your cybersecurity education in?
4. Did you major or concentration in cybersecurity?
5. Did you have any instructors who practiced in the topic area they taught?
6. Did you graduate or are you still in school?

B. Introductory Questions:

7. How do you feel your overall academic experience had prepared (or is preparing) you for your cybersecurity career?

Neutral prompt: Tell me about what got you interested in cybersecurity

Probe: What key components contributed to the success of your cybersecurity education?

Probe: What was a part of your cybersecurity education that impacted or aligned most with your career?

8. How did your cybersecurity program allow for changes in curriculum, knowledge, or current events?

9. Did you ever consider pursuing another area of study after starting the cybersecurity program?

Neutral: Tell me why?

Probe: What caused you to remain in the program?

C. Central Questions:

10. Thinking about the cybersecurity instructors you have had, what qualities stood out to you or were most important in your education?

Neutral Prompt: Tell me about the cybersecurity instructor(s) that influenced you the most.

Probe: How did they affect your decision to remain in the cybersecurity degree path?

11. What aspects of your cybersecurity education affected your learning and performance the most?

Probe: How much impact did your instructor, the course material, or the subject matter impact your learning?

12. Describe for me your ideal cybersecurity instructor

D. Closing Questions

13. Are there any qualities or characteristics that you wish your cybersecurity instructor had that would have made an impact on you?

14. Could you refer me to anyone who may meet the criteria for this research and be interested in participating?

5. LIMITATIONS

This study has several limitations. First, this study does not account for the impact of COVID-19, which may have temporarily or permanently altered the perceptions of Generation Z cybersecurity learners in this study. Second, the research focuses on individuals in the Illinois, Indiana, Michigan, and Wisconsin regions. Data collected from participants in these states may not accurately reflect data from other areas.

An additional limitation was identified after the research was complete. The study identified the desired qualities collegiate cybersecurity instructors should have to maximize Generation Z cybersecurity learners' engagement. The study did not, however, substantiate the absolute need for these qualities. The study did, however, identify the desired qualities collegiate cybersecurity instructors should have to maximize Generation Z cybersecurity learners' engagement, according to the study participants.

Finally, this study explored one facet of student engagement. Desired instructor qualities contribute to student engagement. However, engagement is multifaceted. Factors impacting engagement include peer influence, interest in subject matter, and other social and academic influences (Fredricks, Blumenfeld, & Paris, 2004). Caruth (2018) noted additional engagement factors might include educational experiences,

caring college environment, support, and course rigor.

6. STUDY FINDINGS

Five major themes emerged from the research. The themes can be divided into two categories. The first category is specific to the participant's identifications of instructor qualities that help to keep them engaged in undergraduate cybersecurity programs. The identification of essential cybersecurity instructor qualities was the primary focus of the research. The themes that emerged in this category are relational, engaging, and personable.

The second category concerns the participant's feelings towards cybersecurity coursework and learning experiences. While coursework and learning experiences were not an intentional focus of the research, it became clear that the participants had strong feelings and perceptions of the coursework. The themes that emerged in this category include real experiences and relevant coursework. The combination of the two categories is synergistic and forms a robust foundation for emerging undergraduate cybersecurity programs.

A. Instructor Qualities

Theme A: Relational. The first emerging instructor quality theme is relational. Relational refers to a quality where cybersecurity students feel a personal or close connection to the instructor. Relational can also infer that an instructor works to develop a personal relationship with the cybersecurity student. This theme is mentioned by 100% of the study participants. 45% of the coded responses in this category refer to an instructor's ability to be relational with their cybersecurity students. Each participant made specific statements to indicate that an instructor who is relational helps increase their level of engagement.

This quality is exhibited in the form of care or nurturing. This relational quality can also be demonstrated by an instructor who goes out of their way to engage a cybersecurity student. One participant shared a story about their most engaging cybersecurity instructor. The participant had planned to be involved in a summer internship. That opportunity, however, fell through, and the participant was left without a summer cybersecurity learning opportunity. The student had exhibited an interest in vulnerability scanners and reached out to one of their cybersecurity instructors. That instructor spent an entire summer with the participant building a

vulnerability scanner on a Raspberry Pi. The participant stated that the extracurricular engagement and the instructor's willingness to go above and beyond was one of their biggest influences.

Another participant shared a story of an impactful instructor that helped them engage in the subject matter. This cybersecurity instructor noticed the participant was interested in a particular area of cybersecurity. The instructor made an intentional effort and gave them a book on the subject. The effort was a simple gesture that made the participants feel cared for and caused an increased level of engagement. The study shows that the participants felt cybersecurity instructors who work to establish relationships or show effort to reach out to them showed caring on a social-emotional level and increased their level of engagement.

Theme B: Engaging. The second central theme of instructor qualities that emerged was that of being engaging. An engaging instructor is inspiring, passionate, dynamic, or motivating. 80% of the participants mentioned that having a cybersecurity instructor who exhibited these qualities impacted the subject matter level engagement. 34% of the coded responses in this category refer to the cybersecurity instructor's ability to engage inside and outside the classroom.

One participant commented that their cybersecurity instructor was very motivating simply because they could "tell they loved what they did and what they were talking about." The antithesis was shared by another participant whose experience was less than engaging. The cybersecurity instructor refused to respond to questions and emails from the participant, resulting in the participant having to retake the course. Another participant commented on their cybersecurity instructor's ability to be engaging by asking students thought-provoking questions. This approach taught them less about factual knowledge and more about thinking, which should be at the heart of all undergraduate education efforts.

The study shows that participants felt more engaged in their cybersecurity studies by having engaging instructors. Participants saw their instructors as engaging in the classroom, out of the classroom, and on interpersonal levels. These participants indicate that the instructor's ability to be engaging is a crucial quality.

Theme C: Personable. The third central instructor quality theme that emerged was that of being personable. This quality describes a cybersecurity instructor that is friendly, humble, a good listener, or made the participant feel welcome or acknowledged. 19% of the coded responses in the Instructor Quality category mentioned personability as being important. In addition, 80% of all participants indicated the quality of being personable helped increase engagement in their cybersecurity studies.

One participant shared how the instructors who stood out to them the most would be present. These cybersecurity instructors would be in their offices or the labs and classrooms and would be interested in talking with them about class topics or personal matters. Another participant shared how much they enjoyed cybersecurity instructors coming before class and striking up conversations with the students. A participant shared that he enjoyed cybersecurity classes where the instructor made sure to greet each student.

While some participants shared positive examples of personable cybersecurity instructors, many of the participants whose responses were coded under this theme shared negative stories and experiences. Instead of sharing about the instructors who helped them engage in the subject matter, the participants shared about those instructors who caused them to be less engaged in the material.

One participant shared how they wished their cybersecurity instructors had been easier to talk and work with them. One shared that some cybersecurity instructors tended to talk down to them to make themselves feel superior. Another participant had similar experiences and felt many of their cybersecurity instructors were condescending.

The study revealed that participants felt more engaged in their cybersecurity courses when the instructor was personable. Many thought they learned better from instructors who exhibited this quality. These participants identified the ability for their cybersecurity instructors to be personable as an essential quality to keep them engaged.

B. Coursework & Learning Experiences

Theme D: Relevant Coursework. The fourth central theme to emerge is that of relevancy. Relevant describes coursework that is current, and cybersecurity students can see that it is directly applicable to the state of the cybersecurity field. Relevant coursework includes

hands-on labs, exercises, and lectures that give cybersecurity students a glimpse of the real world. This includes lectures covering new and emerging topics and projects that help answer the seemingly age-old question: "when am I going to use this in real life?" 100% of the participants indicated the need for relevant coursework to keep them engaged in their cybersecurity coursework. 55% of the coded responses under the Coursework and Learning Experiences category refer to the desire for coursework to feel overtly relevant to what they will be doing or experiencing when they are a cybersecurity specialist.

The study shows that the Generation Z cybersecurity learners desired coursework and learning activities that are clearly applicable to the real world. Cybersecurity students felt engaged in the classroom by lectures that include current events. They feel that illustrating how current events apply to what is being taught in the classroom increases their engagement. These participants illustrated a desire to know what they are learning is relevant to life after college. One participant indicated that their engagement is significantly increased when they see what they learn in their cybersecurity courses can be used directly in their cybersecurity roles after college. They tend to feel that knowledge is most important when they see how it can be applied. This result is congruent with the literature.

The study also reveals undergraduate cybersecurity student participants felt engaged with hands-on labs and learning. Participants indicated this type of learning is extremely meaningful and impactful. They preferred hands-on learning and referred to an increased level of excitement and engagement over the subject matter. This finding is congruent and in line with the literature.

Theme E: Real Experiences. The fifth central theme to emerge is that of the real. Real describes participant learning experiences that were nontheory-based. These experiences, some of which are extracurricular, expose students to the real world. 100% of the participants indicated actual experiences are essential to their engagement in cybersecurity programs. 45% of coded responses in this category reveal the need to be exposed to real things.

Cybersecurity students can gain real experiences from network opportunities, industry experience, internships, and cybersecurity clubs. They can gain exposure to real experiences from instructors who actively practice what they teach.

Cybersecurity students can gain real experience by exposure to extracurricular workshops and conferences. The study shows that the Generation Z cybersecurity participants feel these real experiences are critical for their engagement.

Family Factors. While not a prevalent theme, it is important to point out the research further showed factors that influenced Gen Z individuals to enter the field of cybersecurity. Predominately, the research participants indicated the family members were significantly impacting. 50% of respondents specified that a family member or family dynamics were a primary motivating factor in entering the cybersecurity field.

7. PRACTICE IMPLICATION OF STUDY FINDING

There is evidence from the study that the participants have strong feelings about their cybersecurity education and experiences. This is evidenced by the statements made by the participants during the interviews. These findings add to the body of knowledge and relevant literature. The study also offers an opportunity to inform practice by providing practical recommendations. Addressing the instructor qualities identified by the GenZ cybersecurity participants, these recommendations seek to maximize engagement of Generation Z cybersecurity students in undergraduate cybersecurity programs and increase the likelihood of members of this generation completing the programs, successfully becoming cybersecurity specialists, and filling the critical shortage in the cybersecurity workforce. It is important to note that data collected from the participants may not be representative of other cybersecurity students in different geographical areas. The instructor qualities desired by participants are a facet that can attribute to deeper student engagement. However, the study did not measure the amount of engagement attributed to instructors with the identified qualities.

A. Establish Touchpoints

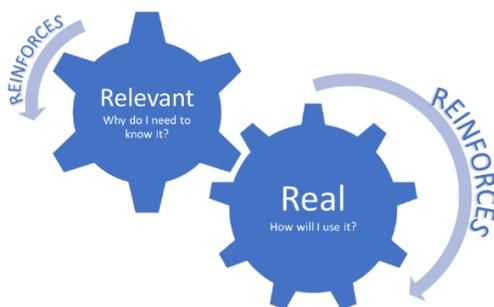
Establishing Touchpoints is derived from the respondent's desire for their cybersecurity instructors to be relational and personable. The participants indicated they feel more engaged in cybersecurity coursework when their instructors seek to form a relationship with them and when their instructors are friendly. The qualities come naturally to some cybersecurity educators. However, they can come as a challenge to others.

Further study may be desirable to determine a more definitive impact on student engagement by cybersecurity instructors with these qualities. However, in situations similar to the study participants, cybersecurity directors and administrators may desire to identify these qualities in hiring new faculty. Additional study may also be needed to determine the impact of instructors who are intentional and seek opportunities to form relationships and touchpoints with their students.

B. Exposure to the Real

Exposure to the real reflects the respondent's desire to understand and experience the real side of cybersecurity to maintain their level of engagement in the cybersecurity field. The cybersecurity students in this study indicated exposing them to real-world situations was very meaningful. Several of the participants noted they enjoyed guest speakers. Others suggested that co-ops and internships were essential to their cybersecurity education. Others highly valued networking events and cybersecurity competitions. A 2017 research study conducted by Barreiro and Bozutti found students stated they had a high level of difficulty correlating theory with practice (Barreiro & Bozutti, 2017). Exposing students to the real life application of theory may enhance student learning and increase engagement.

Figure 2: Relationship Between Relevant and Real Relationship Between Relevant and Real



C. Tell Them Why

Tell them why relates to the participant's desire for relevant coursework. Undoubtedly, very few cybersecurity instructors would design coursework that is not relevant to the cybersecurity field. However, students may not recognize when or why their coursework is relevant to their careers as cybersecurity specialists. These participants seemed to have two subconscious questions about their coursework: "why do I need to know it?" and

"how will I use it in the future?". They tended to appreciate when instructors intentionally correlated what they were learning in the classroom with real-life events and scenarios. Figure 2 illustrates the relationship between relevant coursework and the real world.

D. Pracademics

Pracademics reflect the desire of the study participants for authentic and relevant cybersecurity instruction. For the course of this discussion, a pracademic is defined as individuals who are both academics and practitioners. Several of the participants indicated they appreciated instructors who were practicing in the field. Practitioners know what knowledge, tools, and resources are most important to combat cyber threats. They can speak directly to the relevance of what they are teaching and what students need to know. Several participants appreciated hearing first-hand stories and accounts from instructors who practiced what they taught.

Using pracademics in higher education, however, is not without controversy. Many academicians feel that practitioners do not live up to the academic standards required by higher education. Likewise, many practitioners think academicians do not look at the broader picture. Animosity may exist between the two in specific environments. Thus, the selection of the individual pracademic must be made with significant consideration. Not every cybersecurity practitioner will be well suited to academics. The individual must embody a balance of practical experience and academic ability. Regardless if the individual has experience in academia or pervasive expertise in practice, embracing a pracademic model means an attempt must be made to develop these cybersecurity subject matter experts into exceptional faculty.

8. RECOMMENDATIONS FOR FURTHER RESEARCH

Participants selected for this study consisted of individuals who are currently in undergraduate cybersecurity programs or who recently graduated from one. Generation Z is just beginning to enter the workforce. One recommendation is to conduct a similar qualitative study with Generation Z individuals who have been in the cybersecurity workforce for 3-5 years. This study may garner additional revelations about what cybersecurity students learned in college and what they do as cybersecurity specialists.

This qualitative study was designed to understand the perspective of Generation Z cybersecurity learners. However, the perspectives of current cybersecurity instructors were not a focus of the study. Determining what qualities and strategies cybersecurity instructors use to teach Generation Z cybersecurity students would paint a holistic picture of cybersecurity in higher education. Additionally, the next few years will see Generation Z cybersecurity students becoming Generation Z collegiate cybersecurity instructors. Understanding if GenZ instructors possess the same qualities and use the strategies they desired from their cybersecurity instructors to teach the next generation of cybersecurity students would add to the body of knowledge.

This study explored the perceptions of Generation Z cybersecurity learners regarding instructor qualities they felt impacted their engagement in their coursework. Engagement can be multifaceted and involve cognitive, emotional, and behavioral engagement (Fredricks et al., 2004). A study that measures the changes to engagement by instructors who exhibit the identified desired qualities would be beneficial and add to the understanding of this generation of Cybersecurity learners.

One may consider a quantitative study that explores other members of Generation Z cybersecurity students. Using the qualities identified in this study, a researcher could determine if these qualities are essential to cybersecurity students outside of this geographic area. The study may desire to measure the amount of value GenZ cybersecurity students place on each of the qualities.

Additionally, this research was not designed to be a comparative study. Further research may identify if differences in desired instructor qualities exist between Generation Z Cybersecurity students and Generation Z students in other fields. Furthermore, a longitudinal study could determine if these desired preferences change between Generation Z, Gen Alpha, and the generations beyond.

9. CONCLUSION

There is a cybersecurity workforce shortage. This shortage extends beyond the borders of the United States and encompasses the globe. Cybersecurity professionals are in short supply. One avenue for developing these cybersecurity professionals and specialists is through cybersecurity programs in higher education. Keeping individuals engaged in these programs is

extremely important to fill the gap. However, the generation in college now, Generation Z, has unique learning styles and preferences. The qualities of collegiate cybersecurity instructors that GenZ learners feel maximize their engagement had not been identified nor understood. This study was undertaken to explore the qualities of collegiate cybersecurity instructors that members of GenZ identify are important to maximize engagement in their cybersecurity studies.

The study used an exploratory qualitative approach to explore the qualities collegiate cybersecurity should use to maximize the engagement of Generation Z cybersecurity learners. These participants were selected using purposeful and snowball sampling methods. The study used a semi-structured interview of 10 participants. Interviews were conducted over a secure Zoom meeting and transcribed using Otter.ai. Thematic coding analysis was completed on the transcribed data for each interview question using MaxQDA Analytics Pro 2020. Major and overarching themes emerged from the data analysis in two categories. Instructor Qualities was the first category and contained the major themes of (a) relational, (b) engaging, and (c) personable. Coursework and Learning Experiences was the second category and contained the themes of (d) real and (e) relevant.

It is recommended that these findings can impact practice by understanding the participants felt more engaged through touchpoints, exposure to the real, non-theoretical side of cybersecurity, understanding how their learning applied to real life, and by being exposed to practitioners. Future research and studies were proposed. The findings and recommendations are consistent with the literature and add to the body of knowledge.

The conclusion identified cybersecurity instructors' qualities that were most important to Generation Z cybersecurity participants. The study suggested that qualities and coursework characteristics identified be used to select cybersecurity instructors and teaching strategies important to this study's population. The adoption of these strategies may aid in the engagement of Generation Z cybersecurity learners.

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