



Enhancing Learning Experiences: Insights into Student Preferences in Cybersecurity Assessments

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Research Question

What **motivates** students to choose a particular type and format of examination when they are provided with different assessment options?

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Exam Selection and Participants

Exam Preference Selection Process

- One week before the midterm and final exams scheduled in the course, students were asked to choose a preferred exam option through a Qualtrics survey.

• Participant Overview

- Total Participants: 33 students
 - Note: Two students did not complete the second survey.
 - Male (84.8%) and Female (15.2%)

Assessment Types and Formats

Option #	Exam Types	Exam Formats	Participants
Option 1	Knowledge-based	Classroom Only	6
Option 2	Knowledge-based	Virtual Only	5
Option 3	Knowledge-based & Practice-based	Classroom Only & Virtual Only	1
Option 4	Knowledge-based & Practice-based	Virtual Only	0
Option 5	Practice-based	Virtual Only	19

Exam Types:

- The knowledge-based exam included true/false and multiple-choice questions.
- In the practice-based exam, the students conducted a forensic analysis on one or more disk images and submitted the completed exam report to the university learning management system (LMS).

Qualitative Content Analysis: Option # 1

- Option #1: knowledge-based assessment (classroom only)
 - Lack of confidence in the practice option
 - Less ambiguous format
 - **Feel comfortable with this style of assessment**
 - **Less stressful than practice-based assessment**
 - Busy preparing for other exams
 - Requires the least amount of time to study for the exam

Qualitative Content Analysis: Option # 2

- Option #2: knowledge-based assessment (virtual only)
 - **No need to commute to campus**
 - Best at memorization
 - Do not feel prepared for the practice exam
 - Less anxious option
 - **Do not have to wear a mask while taking the exam**

Qualitative Content Analysis: Option # 3

- Option #3: knowledge-based plus practice-based assessment (the classroom option for the knowledge-based and the virtual option for the practice-based)
 - A complete practice assessment would be difficult and time-consuming
 - **Not confident in completing the full practice exam without instructions**
 - **Probability of getting a good grade if both formats of the exam are attempted**
 - Not confident to take the full knowledge-based exam

Qualitative Content Analysis: Option # 4

- Option #4: knowledge-based plus practice-based assessment (virtual options for both formats)
 - Opportunity to apply practice knowledge on an exam
 - This option is rarely given as an option in computer & information technology courses
 - **Feel comfortable and less pressured when taking the exam alone virtually, rather than in class**

Qualitative Content Analysis: Option # 5

- Option #5: practice-based assessment (virtual only format)
 - **Confident in my practical skills than my memorization skills**
 - Knowledge-based exam requires to memorize terms and facts
 - **Freedom to complete the exam in my own time from a remote location**
 - Open book availability – **no memorization**



Qualitative Content Analysis: Option # 5 (Conti.)

- Option #5: practice-based assessment (virtual only format)
 - Always perform better on practice-based than knowledge-based exams
 - **Our career relies on technical skills**
 - **Provides the most time to complete**
 - Feel comfortable with this style of assessment
 - **Have test-taking anxiety** – this option will spread out the workload over several days

Key Findings

- Our study concludes:
 - Accommodating diverse learning styles and preferences in educational settings fosters a **more inclusive and engaging learning environment**.
 - Providing students with various assessment formats **allows them to showcase their understanding** in ways that align with their individual strengths and preferences.
 - The more students feel autonomous, competent, and connected to their peers or instructors, the more likely they are to **become autonomously motivated to learn in the class**.

Reference

- Undergraduate Students' Motivation to Learn, Attitudes, and Perceptions of Assessments in the STEM Course
- Authors: Khan, T., Cho, H., Bonem, E.
- Publication date: 2022/6
- Conference: CIT Division for ASEE-2022 Annual Conference and Exposition



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Thank You!

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