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EDUCATIONAL TECHNOLOGY FOR INTRODUCTION TO CYBER CRIME COURSE

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ABSTRACT
The study aimed to provide an in-depth analysis of the factors and requirements necessary for developing the educational technology tool and testing its usability and applicability for students under examination. The controlled and experimental groups were utilized to explore the impact of the tool implementation on students' knowledge and skills in cybercrime and its investigation.
The study focused on designing and developing an educational technology tool tailored for criminology students in the Philippines, specifically enhancing their learning experience in the Introduction to Cybercrime course.
The following are the major findings of the study:
1.The design considerations in developing the educational tool include the challenges of the criminology faculty and students due to unequal access to the internet and digital devices. In addition, there are limited time constraints on delivering the subject and the course's high demands.
2.Key recommendations for effectively integrating the educational technology in the course syllabus and consistent system improvement and support.
3.The level of students' satisfaction with the tool is relatively high, similar to the degree of usability; it can be assumed that this measure is effective in a learning environment.
4.The educational technology tool enhances knowledge acquisition in cybercrime investigation among the selected criminology students.
Considering the findings of the study, the following conclusions were derived:
1.The proposed educational technology app for Introduction to Cybercrime was based on the learning challenges among Criminology students brought by unequal access to the internet and digital devices needed in the subject. Thus, the proposed educational technology app includes information packages and user requirements.
2.To effectively integrate educational technology for Introduction to Cybercrime Investigation, incorporate the educational app into the course syllabus and align the technology with course objectives and teaching learning activities. Second, the consistent improvement and support of the educational system are vital for its long-term success. Regular technical support and feedback mechanisms are necessary to address any issues promptly, ensuring minimal disruption to the learning process
3.The results unequivocally demonstrate the success of the educational technology tool designed for the Introduction to Cybercrime course for criminology students in the Philippines. It has been well-received, showcasing high levels of usefulness, ease of use, ease of learning, and satisfaction.
4.Implementing the educational technology tool for the Introduction to Cybercrime course has shown promising results in improving students' knowledge of cybercrime investigation.
Keywords: Keywords: Educational Technology, Cyber Crime Laboratory, Criminology Students With the rate of cybercrime on the rise worldwide, offering specialized criminology courses has become imperative so that students can cater to the needs of law enforcement in the future. The present study aims to enhance the learning process of criminology students in the Philippines enrolled in the Introduction to Cybercrime course by designing and implementing an educational technology tool.

BACKGROUND OF THE STUDY

Cybercrime incidents continue to rise worldwide, threatening individuals, organizations, and governments, and reports consistently show an increase in cyberattacks that highlight the need for stronger cybersecurity education. Webpages and Web 2.0 tools, such as wikis, blogs, and interactive platforms, offer flexible, collaborative, and multimedia-based learning opportunities that can enhance cybercrime education. Countries like Estonia and South Korea demonstrate the value of integrating modern learning technologies in schools through virtual labs, simulations, and digital tools that build cyber awareness and practical skills, showing how technology-supported learning can strengthen national cyber resilience. In

the Philippines, the study is anchored on the experiences of fourth-year criminology students from Bicol College, Holy Trinity College of Camarines Sur, and UNP, who face significant digital barriers such as poor internet connectivity, lack of devices, and limited access to learning platforms, while teachers in rural areas experience similar challenges. Given that the Introduction to Cybercrime course has extensive content but limited instructional time, innovative educational technology solutions are urgently needed. This study aims to develop a webpage-based educational technology tool aligned with CHED Memorandum Order No. 5 (2018) and grounded in outcomes-based education, examining how modern learning technologies can support teaching and learning, address digital inequality, and improve student engagement and understanding. The study is supported by the Technology Acceptance Model, Constructivist Learning Theory, User-Centered Design, the NICE Cybersecurity Workforce Framework, and the Diffusion of Innovations Theory. It follows an Input–Process–Output conceptual framework that includes existing curricula, expert insights, needs analysis, prototype development, usability testing, and alignment with international standards, leading to the development of a functional educational technology tool and evidence-based recommendations. Overall, the study seeks to bridge digital gaps, enhance the delivery of the Introduction to Cybercrime course, and contribute to improving cybersecurity awareness and resilience through effective, technology-enhanced education.

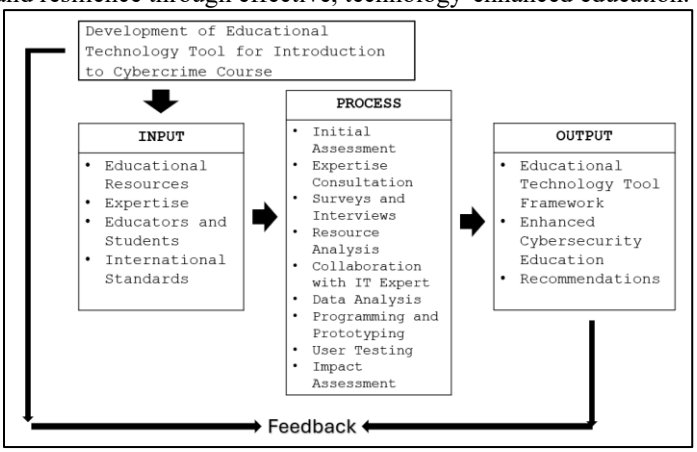

Figure 1. Paradigm of the Study

Statement of the Problem

The study focused on designing and developing an educational technology tool tailored for criminology students in the Philippines, specifically enhancing their learning experience in the Introduction to Cybercrime course.

Specifically, this study will answer the following:

1. What are the key considerations and requirements in designing and developing an educational technology for introduction to cybercrime that is specifically tailored to meet the needs and challenges of criminology students in the Philippines?
2. What are the key recommendations for effectively integrating and ensuring the sustainable implementation of the educational technology for introduction to cybercrime within the criminology curriculum in the Philippines?
3. What is the level of acceptability and usability of the educational technology for Introduction to Cybercrime Course?
4. How does the implementation of the educational technology impact students' knowledge acquisition and skill development in the field of cybercrime investigation?

DESIGN AND METHODOLOGY

The study focused on developing an educational technology tool specifically designed for criminology students in the Philippines to enhance their learning in the Introduction to Cybercrime course. Using a developmental research design guided by Sutton (2014), the study employed a systematic, iterative approach to identify students' needs and create practical, hands-on solutions. A comprehensive needs analysis was conducted to determine the specific challenges faced by criminology students, followed by the development of the tool using the Agile software methodology, which emphasizes flexibility, collaboration, and iterative improvement. The educational technology tool was designed to include realistic cybersecurity simulations, diverse cyber threat scenarios, virtual case studies, practical exercises, performance analytics, group projects, adaptive learning, user-friendly interfaces, and accessible features for students with limited technology access. An experimental component was also incorporated to assess the tool's impact on students' knowledge and skills in cybercrime investigation through controlled pre- and post-assessments. The study population included cybersecurity specialists, criminology students, and faculty members from selected institutions, ensuring diverse perspectives. At least five experienced cybersecurity professionals contributed their expertise in network security, digital forensics, incident response, and cybercrime investigation to inform the laboratory's design. Criminology students from Holy Trinity College of Camarines Sur and the University of Northeastern Philippines participated, with two sections from each school serving as experimental and control groups to assess learning outcomes. Additionally, twenty faculty

members who had undergone cybercrime mentoring training were randomly selected to provide insights into teaching practices. By including participants with varied expertise and experiences, the study aimed to develop a comprehensive, effective, and accessible cybersecurity educational tool while evaluating its efficiency and addressing the specific challenges faced by criminology students.

Table 1 Profile of the Respondents

Respondents	**Controlled Group**	**Experimental Group**
School A	40	40
School B	27	30
Faculty member		20
Total	**67**	**90**

Data Gathering Tool

The researcher utilized a crucial data collection method known as the User Story in this study. The User Story is a valuable tool commonly employed in Agile software development methodologies to outline a software feature from the user's perspective comprehensively. Each user story captures essential details, including the user's identity, specific requirements, and the rationale behind those needs. The adoption of User Stories serves as a deliberate strategy to streamline and elucidate the complex requirements of the Educational Technology Tool.

Once the educational tool was developed, the following data gathering tools were used to assess the functionalities and effectiveness of the developed tool.

Interview Guide. An interview guide served as basis for the interview and validation of the proposed system. It was composed of open-ended questions used to gather necessary data from the participants. Different sets of interview guide questions were prepared based on the nature of the participants. The questions were formulated based on existing literatures.

re-Test and Post-Test. Pre-tests were administered to evaluate prior knowledge of students regarding the subject matter. Questions were prepared based on the formulated course syllabus. Post-tests were given at the concluding phase of the study to test progress of students after using the educational tool.

Survey-questionnaire. The survey-questionnaire assessed the usefulness, satisfaction, and ease of use in using the educational tool. The indicators were lifted from the USE (Usefulness, Satisfaction, and Ease of use) questionnaire developed by Lund (2001).

Data Gathering Procedure

The development process of the educational technology tool for the Introduction to Cybercrime Course follows an agile methodology, specifically Extreme Programming (XP), to ensure efficient creation. The outlined development process is as follows:

With the agile approach using the Extreme Programming (XP) software development methodology as shown in Figure 1, the following phases observed in the development of the project:

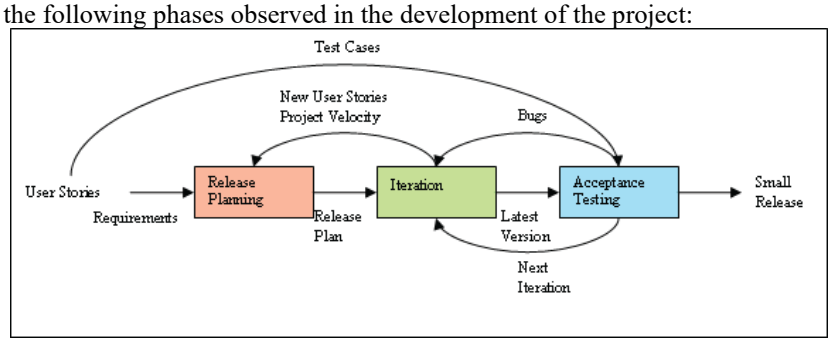

Figure 2. Extreme Programming (XP) Development

The researcher began the planning phase by defining the project timeline and budget and involved stakeholders, including potential users and educators of the Introduction to Cybercrime course, to collaboratively define user stories and requirements. These requirements were translated into iterative development cycles, during which the researcher and the development team focused on programming specific functionalities of the educational technology tool, completing multiple iterations until a fully operational tool was achieved. Each two-week cycle allowed users and educators to communicate their expectations, which were then decomposed into tasks with estimated costs, ensuring scope and work for each iteration were clearly defined. The development process included coding using PHP, MySQLi, Bootstrap, and HTML5, along with continuous testing, debugging, and automated unit tests to ensure functionality and reliability. High levels of communication with developers and user interaction were maintained throughout, following principles similar to Extreme Programming, while system design was continuously refined to minimize dependencies and incorporate feedback from clients, students, and educators. Although acceptance testing was initially planned, the focus shifted to

other development aspects, resulting in a prototype that serves as a preliminary version for further testing and refinement. The XP methodology allowed for the creation of a practical, user-focused educational tool aligned with international cybersecurity education standards. The evaluation phase aims to determine the tool's effectiveness in enhancing criminology students' understanding of cybercrime concepts and skills, using consultations with teachers, usage statistics, pre- and post-assessment scores, structured questionnaires, surveys, interviews, and expert evaluations. Quantitative and qualitative data were collected to provide a comprehensive assessment of usability, relevance, learning impact, and alignment with international standards, ensuring the tool bridges the gap between theoretical knowledge and practical cybersecurity skills. Limitations include the exclusion of in-depth technical explanations, advanced cybersecurity concepts, and interactive features such as forums or real-time collaboration, restricting the scope of student interaction to reading and navigating the content.

RESULTS AND DISCUSSIONS

This presents the data gathered by the researcher from the respondents and the data analysis with its interpretation. It focuses on the design considerations in developing the educational technology for the Introduction to Cybercrime Course and its impact on students.

Based on the industry consultation through interviews with Criminology faculty and students, the following are the design considerations in creating the educational technology for the Introduction to Cyber Crime course subject.

Optimized for Low Bandwidth

Unequal access to the internet and digital devices among Criminology students interviewed was emphasized. The fourth-year criminology students from three different schools—Bicol College, Holy Trinity College of Cam Sur, and the University of Northeastern Philippines—who were connected and started the study provided the general basis for this user story. They must address the cyber challenges they face. Again, getting online was a problem besides the chaos of device access. Nearly half of the students had poor or no internet access. On the one hand, they have uncontrolled access to some platforms since they use the bare data services provided by mobile telecoms (due to customers who frequent computer shops). This evident digital inequality highlights the critical need for equal access to the Internet as a teaching tool for inclusivity.

As Ozsoy and Muschert (2020) underscored, digital technology inequality can significantly exacerbate disparities in various aspects of life. This highlights the pressing need to address digital exclusion, as it can contribute to overall inequality beyond the digital realm, making the issue more urgent and immediate for the audience.

The frequent connectivity issues and lack of digital devices in criminology students' households emphasize the critical need for innovative solutions to bridge the digital divide. This shows the importance of research in finding practical solutions to real-world problems.

Khalid et al. (2023) discovered that students experience more internet connectivity issues than faculty in online education, impacting their ability to complete assignments and communicate effectively.

Teachers who work in remote locations or schools with inadequate infrastructure have additional challenges because they must also deal with connectivity problems.

Malipot (2021) that in the Philippines, the unreliable internet signal in the country emerged as the top problem among teachers and students under the distance learning set-up, according to a survey. Aside from unreliable internet signal, the survey showed limited access to devices and technology was also "high among students" - wherein only one in every five online learners have access to computers while not even half have internet connection at home.

With these challenges, the webpage is designed in such a way that it reduces data consumption by optimizing media files. This feature ensures that users with limited data plans or slow connections can use the application effectively. Moreover, the webpage is also designed to include a data-saving option that restricts high-bandwidth features like auto-playing videos, background data usage, or automatic content updates. The webpage has also been developed to guarantee that it is compatible with older devices and operating systems, as students with limited access may also have less powerful or outdated hardware.

Accordingly, media file optimization, such as compressing images and videos, reduces data consumption while maintaining visual quality. This is crucial for improving website performance, reducing load times, and saving bandwidth, especially for users in regions with limited infrastructure or those on restricted data plans. For instance, image compression techniques like WebP format and lazy loading (loading media as the user scrolls) can help minimize data transmission without compromising the user experience (XWP, 2023).

Alignment to the course syllabus

Coble (2020) notes that cybercrimes are often executed anonymously, making attribution and offender identification extremely difficult. The rapid execution of offenses—such as ransomware attacks—adds further challenges to real-time detection and investigation. As a result, cybercrime inquiries now require extensive international cooperation and collaboration among law enforcement agencies. Moreover, digital forensic work demands specialized training, which is both costly and time-intensive, reflecting the increasing complexity of cybercrime.

In the Philippines, the growing prevalence of cybercrime has required continuous monitoring and enforcement efforts from cybercops. Statista Research Department (2021) reported that approximately 1.4 million individuals in Region 7 fell victim to SMS scams in 2019. By early 2022, RACU 7 recorded a rise in cybercrime complaints, with cyber libel, online scams, and identity theft identified as the most common offenses (Mascardo, 2022). Oville et al. (2024) further observed that PNP cybercops face significant challenges, including insufficient personnel, supplies, and equipment, leading to an overload of cybercrime cases and difficulty resolving many incidents.

In response to these challenges, the Bachelor of Science in Criminology program incorporated the Introduction to Cybercrime course, a subject with demanding requirements intended for delivery within a single semester. Time constraints pose a major challenge, especially as the curriculum also integrates other complex topics, thus requiring more efficient strategies for instruction. This problem extends beyond local settings and reflects broader global issues in cybercrime education.

CHED Memorandum Order No. 05, series of 2018, formally introduced "Introduction to Cybercrime" into the BS Criminology curriculum, recognizing the evolving nature of criminal activity and the increasing significance of cybercrime as a modern threat. In alignment with this curriculum, the developed webpage mirrors the course syllabus and covers essential concepts required for the subject (see Appendices). Its structured lessons are designed to help students achieve course outcomes such as identifying cybercrime offenses and applying relevant legal principles. The webpage's organization enables efficient navigation and supports effective learning within limited instructional time.

Contains information packages

The information packages include assessments, documentation, profiles, and report samples. For students to better understand the scope and significance of the course, the first chapter in the information package is a general introduction to cybercrime. The introductory piece is designed to familiarize students with certain criminal activities and toolkits and emphasize that crimes are constantly changing and adjusting.

The platform's homepage (see Figure 2) is designed to serve as the entry point to an intuitive and encompassing educational technology tool. It features an easily navigable interface that accounts for the variety of student needs and is balanced to accommodate the full functionalities of the tool. One of the predominant ways students can use the platform is emphasized in that way.

Figure 2. App's Homepage

The homepage and registration features of the educational technology tool play a central role in ensuring ease of use and effective navigation. As emphasized by Karzan-Wakil et al. (2015), a homepage is a critical indicator of website quality, and in this system, it efficiently presents key modules, graphics, and learning tools. It also guides students in accessing chapter materials and participating in discussions through an integrated forum. The registration function further enhances usability by enabling students to create accounts, maintain personalized progress, and access all system features, while also supporting instructors in data collection and analysis.

Chapter 2 focuses on computer systems and digital device components, giving students foundational knowledge about hardware, software, and peripherals. Understanding core components such as the CPU, memory, and storage is essential since these elements determine computing performance and efficiency. Gartner (2023) reinforces this by highlighting the increasing complexity of software and its critical relationship with hardware in maximizing system potential, particularly in environments where reliability and performance are crucial.

Figure 3. Chapter Two (2)

Chapter 3 covers the cybercrime offenses unique to the territory of the Philippines and gives the students knowledge on the legal component and legislative provisions on cyber activities in the Philippines. There are assessment activities of cybercrime incidences in the Philippines. The student will analyze and synthesize a case study and the legal implications of cyber investigation on jurisdictional issues.

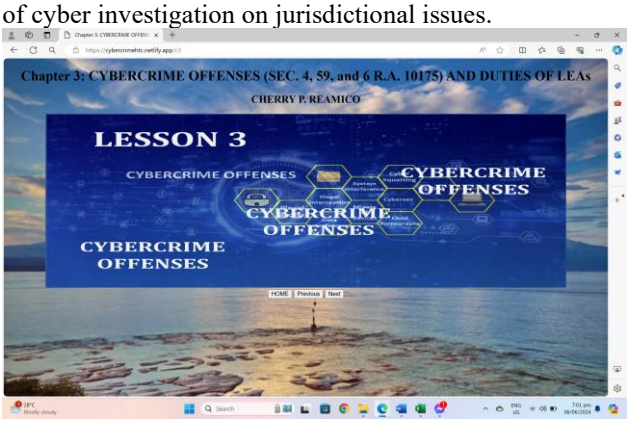

Figure 4. Chapter 3

Chapter 4 discusses cyber warrants, an essential part of cybercrime investigation. The fifth chapter familiarizes students with digital investigative planning and the need for a systematic approach to cybercrime investigations. As presented, the cybercrime offenses are based on Sections 4, 59, and 6 of Republic Act 10175, also known as the Cybercrime Prevention Act of 2012.

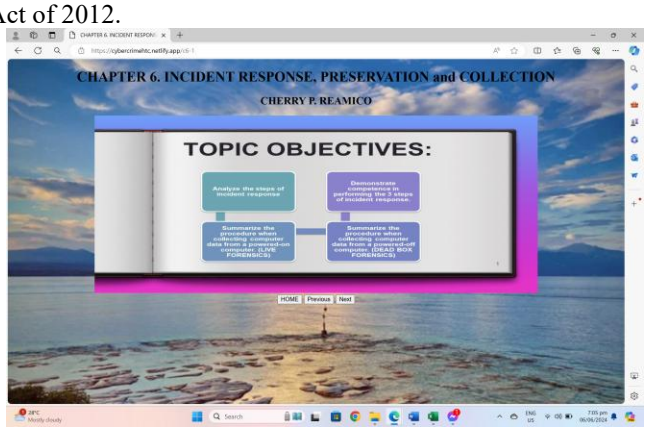

Figure 5. Chapter 6

In Section 4, various cybercrimes are defined, including illegal access, illegal interception, data interference, system interference, misuse of devices, cyber-squatting, computer-related fraud, identity theft, and cybersex, among others. Section 59 outlines the penalties for cybercrime offenses, specifying the fines and terms of imprisonment for those found guilty of such crimes. Finally, Section 6 provides information on the law's scope, including its application to crimes committed using ICT (Information and Communication Technology) and the corresponding penalties.

In addition, the fifth chapter familiarizes students with digital investigative planning and the need for a systematic approach to cybercrime investigations. This chapter provides the students on how to systematically approach an investigation, particularly in the realm of cybercrime. In the figure below, the Five-Step Model is presented. Identification is the first step, followed by Acquisition to collect data and evidence. Examination/Analysis involves extracting meaningful information. Findings are documented in a report for presentation to relevant authorities, and the final step is Court Presentation.

User Requirement

The field of cybersecurity education places increasing emphasis on developing educational technology tools that respond to the evolving needs of both educators and learners. In the BS Criminology program, the Introduction to Cybercrime course serves as a foundational subject, equipping students with essential knowledge about cyber threats, digital forensics, and investigative tools. While traditional classroom instruction provides core theoretical content, it is often unable to keep pace with the rapid evolution of cyber threats and criminal methodologies. As these threats continually change, conventional learning materials quickly become outdated. This highlights the need for educational technology tools capable of rapidly integrating new information, ensuring that students receive updated and relevant content aligned with current cybercrime trends.

Furthermore, the complexity of cybercrime necessitates a shift from purely theoretical instruction toward more practical and experiential learning approaches. Students often require real-world examples and contextualized learning experiences to fully grasp abstract digital concepts. Effective cybersecurity educational tools should therefore include simulations, virtual labs, interactive modules, and hands-on activities that bridge the gap between theory and practice. At the same time, accessibility and inclusivity remain critical concerns, especially in regions with limited technological infrastructure. For this reason, the development of the educational tool prioritized features such as device compatibility, low-bandwidth optimization, and Internet-independent functionality to ensure that students—regardless of their technological limitations—can fully benefit from the learning experience.

KEY RECOMMENDATIONS FOR EFFECTIVELY INTEGRATE EDUCATIONAL TECHNOLOGY FOR INTRODUCTION TO CYBERCRIME

Based on the interviews conducted, the following are recommended to effectively integrate the educational technology in the Introduction to Cybercrime course of the Criminology degree.

Incorporation of the educational app in the syllabus

A syllabus contains important information regarding the course. According to Riviere et al. (2014), A course syllabus serves multiple crucial roles: it establishes early contact between students and instructors, sets the course tone, and outlines the educational objectives and logistics. It introduces students to active learning, clarifies their responsibilities, and helps assess their readiness. The syllabus also situates the course within a broader learning context, provides a conceptual framework, and highlights available resources, including the role of technology. Additionally, it offers difficult-to-find reading materials, enhances note-taking, supports out-of-class learning, and can act as a learning contract between students and instructors.

Thus, four (4) of the faculty members teaching the subject provides the following statements:

P1: *"Mas Maganda kung maincorporate itong mga features ng system na ito sa syllabus natin. yung, magiging parte talaga ng course ang system, may module dapat. Kailangan ding magkaroon ng training para sa faculty para maging pamilyar sila sa paggamit nito* (It would be better if these system features are incorporated into our syllabus. The system should become an integral part of the course, with a dedicated module. Faculty training is necessary to ensure they are familiar with how to use it)."

P4: "*Kung isasama ang paggamit nito sa grading criteria mas maeengganyo siempre mga studyante natin a gamitin ito* (If the use of this system is included in the grading criteria, students will definitely be more motivated to use it).

These statements prove the importance of incorporating educational technology into the course syllabus and grading criteria, implying a shift towards a more technology-driven learning environment. This integration will require training and resources but could lead to enhanced student engagement, streamlined assessments, and more efficient feedback mechanisms.

Research has widely supported the integration of technology in education. According to Bates and Poole (2003), effective use of technology in teaching requires careful planning and alignment with course objectives, which supports the need for a dedicated module in the syllabus.

Thus, in the syllabus, specifically in the course outcomes, the proposed educational technology is included as tools that will be utilized throughout the course, such as online platforms for interactive discussions, digital forensic tools, or multimedia resources for studying cybercrime cases.

Assessment tools were also revised. Online quizzes, automated feedback systems, and progress-tracking tools were also incorporated to evaluate student performance and understanding of course material.

Consistent System Improvement and Support

This theme stresses the importance of maintaining an effective and user-friendly educational system through proactive technical support and regular feedback mechanisms. Regular technical support ensures that any issues users encounter are quickly resolved, minimizing disruptions in the learning process (Ko, 2017). Additionally, collecting and incorporating student feedback allows for ongoing refinement and enhancement of the system, ensuring it evolves to meet the changing needs of its users (Moore & Kearsley, 2012).

P5: "*Dapat meron laging nkahandang technical support kung sakali magkaproblema sa system, regularstudent feedback para maayos at mas maimprove ang paggamit* (There should always be technical support readily available in case any issues arise with the system, along with regular student feedback to address and improve its usage).

This statement emphasizes the importance of readily available technical support and regular student feedback's role in refining and enhancing the system's effectiveness.

This is supported by P1 when he shared the challenges encountered in the use of the educational technology.

P1: *Isa sa problema nung ginamit ko ito medyo nagkaproblema, nag lag at hindi ko na alam susunod na step kailangan ko sya ulitin, kaya natitigil ang iba naming activities kaya dapat ung tech support nito mayroon parati para maayos agad* (One problem I encountered while using this was that it lagged, and I didn't know the next step, so I had to repeat the process, causing delays in our other activities. That's why there should always be technical support available to fix issues immediately)."

Thus, P2 recommended,

"*Need ng regular upgrades para maayos agad ang mga issuesat mapabuti pa ang overall performance ng system, At importante laging may technical support para agad kaming maiassist kung may naeencounter na problem sa app* (There is a need for regular upgrades to promptly address issues and improve the overall performance of the system. It's also important to have technical support readily available to assist us immediately if any problems are encountered with the app)."

The need for regular upgrades and immediate technical support is essential to prevent disruptions in learning activities and ensure a smooth user experience. Without these measures, students and educators might face repeated frustrations, decreasing efficiency and potential disengagement with the system.

Research supports these concerns, indicating that technical issues and lag in educational software can significantly hinder learning outcomes and user satisfaction. For instance, a study by Deegan and Rothwell (2010) highlights that timely technical support and system updates are crucial for maintaining the effectiveness of educational technology in enhancing student engagement and performance.

In addition, they also suggested improving the educational tool to make it more interactive.

P3: "*For the courses and content, dapat mas marami at mas multimedia-rich ang courses. Makakatulong rin to add courses na nakatuon sa iba't ibang aspeto ng cybercrime. At kailangan din ng dagdag na training sessions para sa faculty at dagdagan niyo ng tools para ma-track ang progress ng students* (For the courses and content, there should be more courses, and they should be multimedia-rich. It would also help to add courses focused on different aspects of cybercrime. Additionally, more training sessions for faculty and tools to track student progress are needed).

P4: "*For me, Increase the system's versatility with relation to possibilities for importing and exporting courses/modules. Mas maganda kung may ganitong features. Isa pa, i-integrate nio ang gamification elements para mas upgraded at mas interesting ang learning process* (For me, increase the system's versatility with options for importing and exporting courses/modules. It would be better if it had these features. Also, gamification elements should be integrated to upgrade and make the learning process more interesting).

Both respondents emphasize the need to enhance the educational tool by incorporating more interactive, multimedia-rich content, and improving system functionalities to increase engagement and effectiveness. P3 and P4's recommendations align with modern educational trends that emphasize the use of multimedia and gamification to create a more engaging and effective learning environment. The push for additional training for faculty suggests a recognition of the need for educators to be proficient with these tools, ensuring that they can fully leverage the system's capabilities.

According to a study by Mayer (2009), multimedia learning, when properly designed, enhances understanding and retention of complex information. Additionally, Hamari et al. (2016) found that gamification in educational settings increases motivation and engagement, which are critical for successful learning. The need for continuous faculty training is also emphasized by Bates and Poole (2003), who argue that effective use of technology in education requires ongoing professional development.

LEVEL OF ACCEPTABILITY OF EDUCATIONAL TECHNOLOGY FOR INTRODUCTION TO CYBERCRIME COURSE

The study aimed to assess the acceptability level of the educational technology created for the Introduction to Cybercrime course. The focus was on such key indicators as its usefulness, ease of use, ease of learning, and satisfaction. The information in the table below provides the results that can be used to make the most valid judgments regarding users and their experiences. The results are summarized and discussed to highlight the strengths and areas for technology improvement.

The defined usefulness of the educational technology tool has an average weighted mean of 4.11, interpreted as "Agree". The highest rating falling within this category was obtained for the statements "It makes the things I want to accomplish easier to get done" and "It saves me time when I use it"; the weighted mean for both responses was 4.65, which indicates "Strongly Agree".

Table 2 Level of Acceptability of the Introduction to Cybercrime Educational Technology (Usefulness)

Indicators	**Weighted Mean**	**Adjectival Interpretation**
USEFULNESS		
It helps me be more effective.	4.03	Agree
It helps me be more productive.	3.60	Agree
It is useful.	4.53	Strongly Agree
It gives me more control over the activities in my life.	3.08	Neutral

It makes the things I want to accomplish easier to get done.	4.65	Strongly Agree
It saves me time when I use it.	4.65	Strongly Agree
It meets my needs.	4.05	Agree
It does everything I would expect it to do.	4.30	Agree
AVERAGE	4.11	Agree

The respondents generally agree that the tool enhances their effectiveness and productivity, although there is room for improvement. It is highly regarded as useful and time-saving, with strong agreement that it simplifies task completion and meets user needs. However, the tool is seen as less effective in giving users more control over their activities, with a neutral rating in this area. Overall, the tool is well-received, performing reliably as expected, but could benefit from enhancements to increase user control and productivity. The overall positive feedback, with an average weighted mean of 4.11 ("Agree"), implies that the tool is generally effective and useful for its users, particularly in enhancing productivity and task efficiency. However, the neutral rating for "control over activities" suggests that the tool may not fully empower users in managing their tasks independently, indicating a potential area for improvement.
Research supports the notion that technology tools significantly impact user productivity and task management. According to Davis (1989), perceived usefulness and ease of use are crucial determinants of technology adoption and effectiveness. The tool's strong ratings in usefulness and time-saving align with these findings, suggesting that users perceive the tool as beneficial in their daily activities.

Table 3 Level of Acceptability of the Introduction to Cybercrime Educational Technology (Ease of Use)

Indicators	**Weighted Mean**	**Adjectival Interpretation**
Ease of Use It is easy to use	4.75	Strongly Agree
It is simple to use	4.65	Strongly Agree
It is user friendly	4.86	Strongly Agree
It requires the fewest steps possible to accomplish what I want to do with it.	4.46	Agree
Using it is effortless.	4.76	Strongly Agree
I can use it without written instructions.	4.63	Strongly Agree
I don't notice any inconsistencies as I use it.	4.05	Agree
Both occasional and regular users would like it.	4.26	Neutral
I can recover from mistakes quickly and easily.	3.65	Agree
. I can use it successfully every time.	3.51	Agree
. Using it is effortless.	4.19	Agree
Average	**4.34**	**Agree**

Indicators such as "It is user-friendly" (4.86), "It is easy to use" (4.75), and "Using it is effortless" (4.76) received strong agreement, suggesting that users find the tool very intuitive and straightforward. Indicators like "I can recover from mistakes quickly and easily" (3.65) and "I can use it successfully every time" (3.51) received lower ratings, indicating that while the tool is generally easy to use, users may face challenges when errors occur. The overall average rating of 4.34 indicates a positive reception, with most users finding the tool effective and easy to use, though there is a need for improvement in error recovery and reliability during consistent use.
The results suggest that while the educational tool is largely effective and user-friendly, there are areas for improvement, particularly in handling errors and ensuring consistent success in use. This aligns with research by Davis (1989), which

emphasizes that ease of use and perceived usefulness are critical for the adoption of new technology in education. Enhancing these aspects could further increase user satisfaction and effectiveness in learning environments.

Table 4 Level of Acceptability of the Introduction to Cybercrime Educational Technology (Ease of Learning)

Indicators	**Weighted Mean**	**Adjectival Interpretation**
EASE OF LEARNING I learned to use it quickly.	4.45	Agree
I easily remember how to use it.	4.53	Strongly Agree
It is easy to learn to use it.	4.53	Strongly Agree
I quickly became skillful with it.	4.29	Agree
Average	4.45	Agree

Overall, the respondents find the system easy to learn, with strong retention and quick skill acquisition. This suggests that the system is well-designed for ease of use, but there may be a slight need for additional support or practice to enhance skillfulness further.

Research supports the idea that ease of learning is a critical factor in the successful adoption of educational technology. According to Venkatesh and Davis (2000), perceived ease of use and the ability to quickly learn and recall how to use a system are key determinants of user acceptance. This aligns with the strong agreement ratings for ease of remembering and learning, suggesting that these factors significantly contribute to the overall positive reception of the tool.

Table 5 Level of Acceptability of the Introduction to Cybercrime Educational Technology (Satisfaction Level)

Indicators	**Weighted Mean**	**Adjectival Interpretation**
SATISFACTION I am satisfied with it.	4.20	Agree
I would recommend it to a friend.	4.86	Strongly Agree
It is fun to use.	4.86	Strongly Agree
It works the way I want it to work.	4.22	Agree
It is wonderful.	4.22	Agree
I feel I need to have it.	4.86	Strongly Agree
It is pleasant to use.	4.12	Agree
Average	4.48	Agree

Satisfaction received the highest overall average weighted mean of 4.48, interpreted as "Agree." The highest ratings were “I would recommend it to a friend”, “It is fun to use” and “I feel I need to have it”, all these had a weighted mean of 4.86 implying strongly agree. This indicates that the participants have high satisfaction and are very enthusiastic which is of utmost importance if the user is to continue using it and may be motivated to learn. The lowest rating on this category was “It is pleasant to use” with a weighted mean of 4.12 or simply agree. Although this is still a positive outcome, some aspects of the user experience may need improvements.

IMPACT OF THE IMPLEMENTATION OF THE EDUCATIONAL TECHNOLOGY ON STUDENTS' KNOWLEDGE ACQUISITION AND SKILL DEVELOPMENT IN THE FIELD OF CYBERCRIME INVESTIGATION

This section presents the impact of integrating Educational Technology on Cybercrime course delivers at School A and School B.

The data captures the performance of students across a series of questions designed to assess their understanding of computer components, cybercrime offenses, legal processes, and digital forensic investigation techniques.

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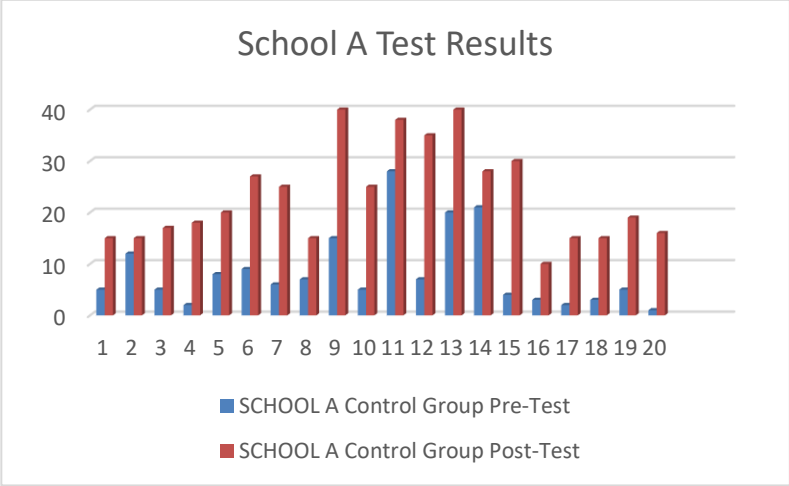

Figure 6. School A Test Results (Controlled Group)

The pre-test and post-test results of forty School A students who learned through traditional teaching methods showed significant improvement in their knowledge and skills in cybercrime investigation. Students gained stronger understanding of computer hardware, legal concepts, evidence handling, and digital forensic procedures, proving that conventional instruction can effectively support learning and skill development. However, the findings also suggest that while traditional methods are effective, integrating educational technology could further enhance engagement, deepen understanding, and improve practical skill retention. A blended approach combining both methods would likely provide the most comprehensive learning experience for criminology students.

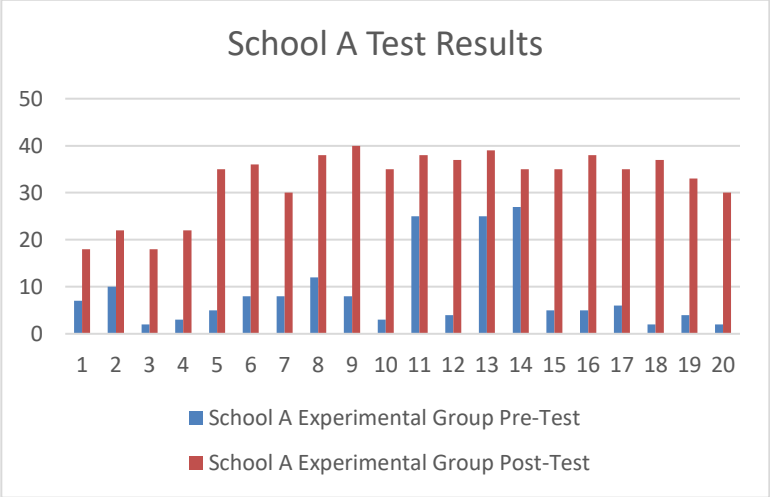

Figure 7. School A Test Results (Experimental Group)

The pre-test and post-test results of forty students in the School A experimental group show that using the educational technology app significantly improved their knowledge and skills in cybercrime investigation. Students demonstrated major gains in understanding computer hardware, cybercrime offenses, legal concepts, and digital forensic procedures. The sharp increases across all question categories—especially in technical and procedural items—indicate that the app effectively supported both theoretical learning and practical skill development. Overall, the results highlight the strong positive impact of integrating educational technology into the cybercrime investigation curriculum and suggest that such tools can enhance traditional teaching methods, improve student engagement, and lead to better learning outcomes in specialized criminology subjects.

The pre- and post-test results for the 27 students in School B's control group are shown in Figure 8. It is significant because it demonstrates how the employment of traditional teaching methods significantly influenced student performance. This data is essential because it demonstrates the general advancement in the fields of cybercrime investigation, which is also necessary to

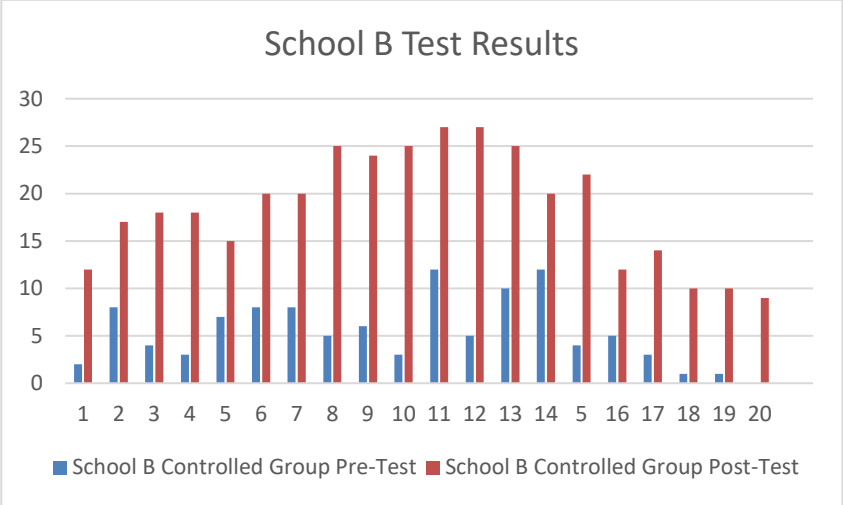

Figure 8. School B. Test Results (Controlled Group)

determine whether the existing approaches are still appropriate. Overall, changes in the rates of improvement and overall knowledge remain pretty notable. In terms of the students, mean scores across all the questions showed notable improvement, given that the initial scores were too low on pretest. Some of the students scored as low as 0, 1, or 2 on various questions, indicative of low understanding of the problem in question.

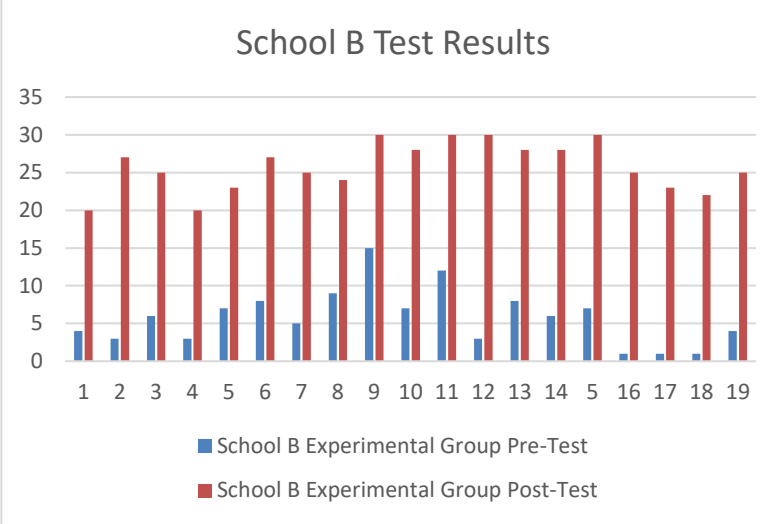

Figure 9. School B Test Results (Experimental Group)

The pre-test and post-test results of the 30 students in School B's experimental group show a dramatic improvement in their understanding of cybercrime investigation concepts. Many students who scored as low as 1–3 in the pre-test achieved scores between 20–30 in the post-test, with over 80% reaching the twenties or thirties after using the educational technology tool. This sharp increase demonstrates that the tool effectively supported students in mastering complex concepts that were previously difficult to grasp.

These findings align with Clark and Mayer's (2026) assertion that multimedia learning enhances student engagement and improves comprehension of complex topics. The results are also consistent with Mayer's (2009) Cognitive Theory of Multimedia Learning, which explains how multimedia tools strengthen memory retention and knowledge transfer. Furthermore, the improved performance supports Schacter's (2019) findings that students using educational technology often outperform those who rely solely on traditional classroom methods.

Overall, the strong post-test scores demonstrate that integrating educational technology into criminology instruction significantly enhances learning outcomes. The study highlights the importance of adopting modern tools to complement traditional teaching, especially in specialized fields like cybercrime investigation. It also emphasizes the need for continuous evaluation and iterative development of such tools, consistent with the agile development principles of Highsmith (2002), ensuring the technology remains responsive to the evolving needs of both educators and learners.

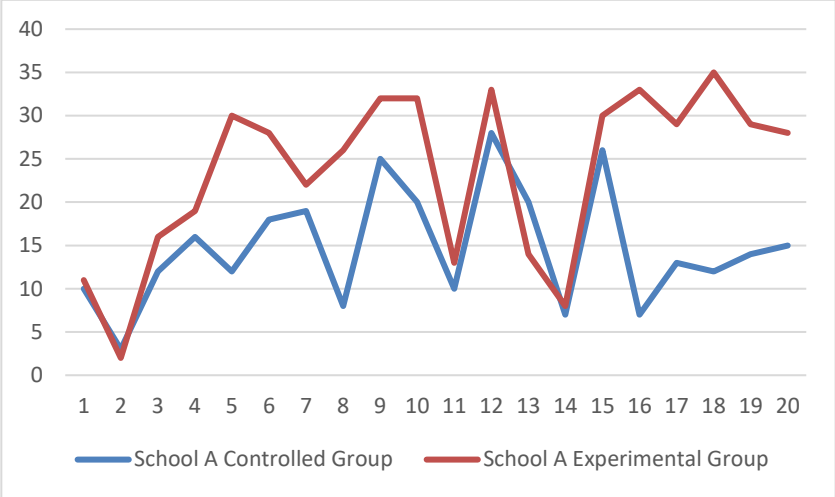

Figure 10. Increment Scores from School A

The data in Figure 12 compares the pre-test and post-test performance of the 40 students in School A's control group and the 40 students in its experimental group. While both groups showed improvement, the experimental group demonstrated markedly higher gains after using the educational technology tool. This indicates that technology integration significantly enhanced students' understanding and cognitive processing of cybercrime concepts.

These findings support existing literature that highlights the effectiveness of multimedia-based learning. Clark and Mayer (2016) emphasize that e-learning designed with multimedia principles strengthens comprehension, especially by making abstract ideas more concrete and accessible. Mayer's Cognitive Theory of Multimedia Learning (2009) further explains that learning improves when instructional materials align with how the brain processes information, which helps explain the stronger performance seen in the experimental group.

The result also validate the value of iterative software development. Highsmith (2002) notes that agile, feedback-driven development ensures tools remain relevant and responsive to user needs. The educational tool benefited from this approach, allowing continuous refinement that improved its effectiveness. Additionally, the findings are consistent with Schacter (1999), who reported that students using educational technology often outperform peers learning without such tools due to more adaptive and personalized learning experiences.

The study demonstrates the strong potential of advanced educational technologies to elevate student learning in specialized fields like criminology. It suggests that schools should consider adopting a hybrid approach, combining traditional instruction with modern educational tools to address diverse learner needs and enhance real-world problem-solving skills. The results also highlight the need for continuous evaluation and improvement of educational tools to maintain their effectiveness and ensure high-quality instruction.

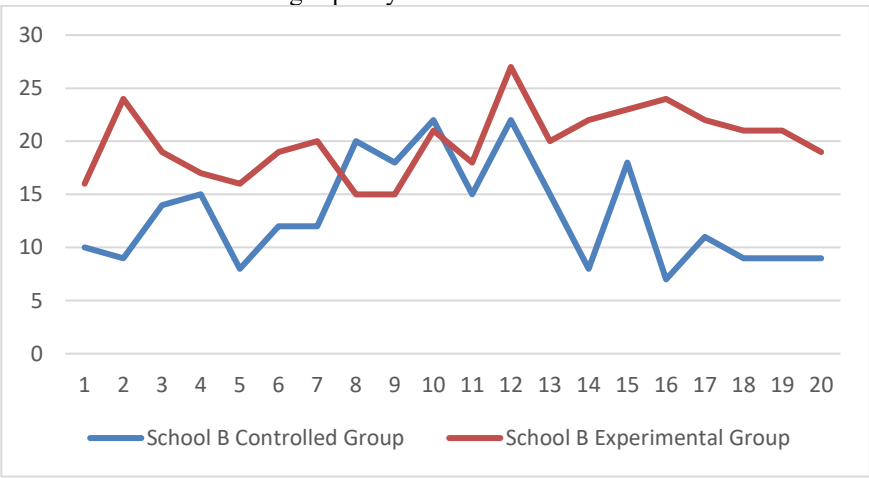

Figure 13. Increment Scores from School B

The pre-test and post-test outcomes for School B's control and experimental groups, as shown in Figure 13, demonstrate the significant influence of educational technology tools on student learning. The control group of 27 students showed moderate improvement, with scores increasing from 7–22 in the pre-test to 15–27 in the post-test. This progression reflects the typical gains expected from traditional, non-technology-based instruction.

In contrast, the 30 students in the experimental group displayed substantial improvement. Their pre-test scores ranged from 1–11, indicating minimal initial understanding, yet their post-test results rose dramatically to 19–35. This notable increase suggests that the educational technology tool played a central role in enhancing comprehension of cybercrime-related content.

These findings align with existing research supporting digital learning tools. Clark and Mayer (2016) emphasize that multimedia-based instruction improves learning by making abstract content more concrete and engaging. This is consistent with Mayer's Cognitive Theory of Multimedia Learning (2009), which asserts that interactive, well-designed multimedia enhances retention and understanding by aligning with cognitive processing mechanisms.

The tools effectiveness is further reinforced by its iterative development process. Highsmith (2002) stresses that agile, feedback-driven improvement ensures educational tools remain adaptive, relevant, and aligned with evolving instructional needs. Additionally, the results mirror Schacter's (2019) findings that students using technology often outperform those relying solely on traditional methods.

The substantial improvement in School B's experimental group indicates that educational technology tools can significantly enhance learning outcomes, especially in fields requiring detailed, technical understanding such as cybercrime investigation. These tools do not replace traditional instruction but serve as powerful supplements that deepen comprehension.

The study also underscores the importance of continuous evaluation and iterative refinement in educational tool development. Regular feedback from both educators and learners ensures these technologies remain effective, current, and responsive to changing educational demands.

Table 6Comparison of Pre-Test and Post Test of Controlled Group

Test	**Number**	**Stdev**	**T-Value**	**Tt-Value 5%, Df=19**	**Decision**	**Interpretation**
Pre-Test (School A)	20	7.43				
Post Test (School A)	20	9.37	9.77	2.093	**Reject Ho**	**Significant**
Pre-Test (School B)	20	3.53				
Post Test (School B)	20	5.96	12.03	2.093	**Reject Ho**	**Significant**

Table 6 summarizes the pre-and post-test findings for the 40 and 27 pupils in School A and School B, which comprised the control groups. The students' performance on a 20-item exam both before and after the educational intervention is highlighted in this data, along with the statistical analysis and conclusions.

The statistical data analysis of the pre-test and post-test for School A controlled group, which consisted of 40 students, shows the following information. The standard deviation for the pre-test was 7.43, which means the average level of the scatter of students' results at the beginning of the experiment was medium. The post-test results illustrated on a higher standard deviation of 9.37, which means that the level of scatter has increased. The calculated t-value is 9.77, which is higher than the tabular t-value of 2.093 for 19 degrees of freedom at a 5% significance level. Hence, the null hypothesis can be rejected by the presence of statistical data, and thus, the result is significant.

For the controlled group of school B there was a standard deviation of 3.53 as was the pretest standard deviation. This indicates that there was less variability in these scores than in the others from school A. The post test scores had a standard deviation of 5.96 which was higher than the others from school A, this shows that there was more variability in these scores, which was the aim and the hypothesis of the study, as Anier Dan has noted. Additionally, the t value computed was 12.03 which is greater than the tabular t value of 2.093 at 95% significance level. The t value, again as the hypothesis, confirmed that the difference in means is significant so the null hypothesis is rejected.

These results show that the educational interventions delivered at both schools had significant impacts on student performance. First, the increases in standard deviations from the pre-test to the post-test imply that whereas some students improved by huge margins, others showed an insignificant gain. Second, the t-values most likely reveal that these differences in scores could not occur by chance. Therefore, it is justifiable to conclude that the effects of the educational interventions were beneficial. This conclusion is supported by the literature on the benefits of educational technology.

For example, Clark and Mayer studies reveals that multimedia technology, if well designed, promotes learning among students. They argue that such platforms encourage students to form mental structure for complex topics. Such solutions, in their view, contain graphical or other visual stimulation that depends on students' different learning abilities, hence more positive academic outcomes.

Table Comparison of Pre-Test and Post Test of Experimental Group

Test	Number	Stdev	T-Value	Tt-Value 5%, Df=19	Decision	Interpretation
Pre-Test (School A)	20	7.86				
Post Test (School A)	20	7.21	10.59	2.093	**Reject Ho**	**Significant**
Pre-Test (School B)	20	3.76				
Post Test (School B)	20	3.43	27.57	2.093	**Reject Ho**	**Significant**

Table 7 summarizes the test results for the experimental groups in Schools A and B. A total of 40 and 30 students were involved in these two schools, respectively, and this table shows the statistical analysis and implications of their performance on a 20-item test before and after the educational program.

The statistical analysis of the pre-test and post-test results from the experimental groups in Schools A and B confirms the effectiveness of the educational interventions. In School A, the standard deviation decreased from 7.86 to 7.21, indicating slightly reduced variability, while the computed t-value of 10.59 exceeded the critical value of 2.093, leading to the rejection of the null hypothesis. Similarly, School B showed a decrease in standard deviation from 3.76 to 3.43 and an even higher t-value of 27.57, which also surpassed the critical value. These findings indicate that the improvements in student performance were significant and not due to chance.

The results are consistent with existing literature. Studies by Tamim et al. (2011), Hattie, and Kulik (2013) all highlight the positive effects of educational technology on academic achievement, student engagement, and performance. The outcomes of this research support those conclusions by demonstrating measurable learning gains in both schools.

Furthermore, the developed webpage for the Introduction to Cybercrime course aligns with the syllabus and is designed with accessibility in mind, especially for low-bandwidth users. Its optimization for reduced data usage and device compatibility helps address digital inequality and supports broader access to learning materials.

The USE (Usefulness, Satisfaction, Ease of Use) evaluation further reinforces the effectiveness of the tool. The usefulness dimension yielded a weighted mean of 4.11, indicating that students found the tool beneficial, time-saving, and efficient, although some felt it offered limited control over activities. Ease of use scored 4.34, with students describing the tool as simple and intuitive, though reliability during error handling needs improvement. Satisfaction scored the highest at 4.48, showing that users were generally pleased, found the tool enjoyable, and were willing to recommend it.

Overall, the statistical evidence, literature support, system design considerations, and positive user evaluation collectively demonstrate that the educational technology tool significantly enhanced student learning and met its intended instructional goals.

This chapter is significant as it presents the conclusions and recommendations drawn from our comprehensive research on the effectiveness of an educational technology app for Introduction to Cybercrime.

CONCLUSIONS

The proposed educational technology app for Introduction to Cybercrime was based on the learning challenges among Criminology students brought by unequal access to the internet and digital devices needed in the subject. Thus, the proposed educational technology app includes information packages and user requirements. To effectively integrate educational technology for Introduction to Cybercrime Investigation, incorporate the educational app into the course syllabus and align the technology with course objectives and teaching learning activities. Second, the consistent improvement and support of the educational system are vital for its long-term success. Regular technical support and feedback mechanisms are necessary to address any issues promptly, ensuring minimal disruption to the learning process. Lastly, the responses highlight the importance of enhancing the educational tool with more interactive and multimedia-rich content like simulations of the processes in investigating cybercrimes. The results unequivocally demonstrate the success of the educational technology tool designed for the Introduction to Cybercrime course for criminology students in the Philippines. It has been well-received, showcasing high levels of usefulness, ease of use, ease of learning, and satisfaction. The average scores for all characteristics provide solid evidence that the tool is effective in enhancing productivity and efficiency, user-friendly, easy to learn, and highly satisfactory for students. The implementation of the educational technology tool for the Introduction to Cybercrime course has shown promising results in improving students' knowledge of cybercrime investigation. The significant increase in test scores for both controlled and experimental groups, with a more significant improvement in the experimental group, suggests that the tool helps students understand complex

cybercrime-related concepts. The tool's user-friendliness and the high level of satisfaction it led to indicate that using this type of educational technology could significantly improve students' readiness and proficiency in cybercrime investigation.

Ethical Approval

The researchers obtained ethical approval from the Ethics Review Board of University of the Cordilleras on January 2023.

Consent Statement

All participants gave informed consent to be interviewed. The source of the informants was who agreed that the data were provided for research purpose and that the data can be published. They also consented that the data were provided for research anonymously without having distorted scientific meaning.

Data Availability Statement

All data underlying the results are available as part of the article and no additional source data are required.

REFERENCES

1. Bates, A. W., & Poole, G. (2003). Effective teaching with technology in higher education: Foundations for success. Jossey-Bass.
2. Blyth, A., Ceccato, M., & Vasile, M. (2017). NICE work if you can get it: Barriers to the development of a National Cybersecurity Workforce Framework. Journal of Cybersecurity, 3(1), 13-23. https://doi.org/10.1093/cybsec/tyx003
3. Clark, R. C., & Mayer, R. E. (2016). E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning (4th ed.). Wiley.
4. Coble, J. (2020). Cybercrime and its challenges in the modern world. Journal of Criminology, 28(4), 34-45.
5. Cockburn, A., & McKenzie, B. (2002). Evaluating the effectiveness of spatial memory in a zooming user interface. ACM Transactions on Computer-Human Interaction (TOCHI), 9(4), 311-328. https://doi.org/10.1145/586081.586085
6. Commission on Higher Education. (2018). CHED Memorandum Order No. 5, Series of 2018: Policies and Standards for Bachelor of Science in Criminology. Retrieved from https://ched.gov.ph/wp-content/uploads/2018/03/CMO-5-s2018.pdf
7. CISA. (2021). Ransomware guidance and resources. Cybersecurity & Infrastructure Security Agency. https://www.cisa.gov/ransomware
8. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319-340.
9. Davis, F. D. (2016). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340.
10. Deegan, M., & Rothwell, C. (2010). Supporting technology in higher education. Journal of Educational Technology, 21(2), 56-67.
11. Department for Digital, Culture, Media & Sport. (2021). Cyber Security Breaches Survey 2021: Statistical release. UK Government. https://www.gov.uk/government/statistics/cyber-security-breaches-survey-2021/cyber-security-breaches-survey-2021-statistical-release
12. Gartner, J. (2023). The evolving relationship between hardware and software. Technology Review, 35(7), 78-83.
13. Hamari, J., Koivisto, J., & Sarsa, H. (2016). Does gamification work? A literature review of empirical studies on gamification. Proceedings of the 47th Hawaii International Conference on System Sciences, 3025-3034.
14. Hariri, N., Kuznin, L., & Cárdenas, A. A. (2019). Identification of cybersecurity workforce skills and knowledge needed: Toward developing effective cybersecurity workforce. Proceedings of the 2019 ACM SIGSAC Conference on Computer and Communications Security (pp. 243-256). https://doi.org/10.1145/3319535.3354230
15. Hattie, J. (2009). Visible learning: A synthesis of over 800 meta-analyses relating to achievement. Routledge.
16. Hertzum, M., & Jacobsen, N. E. (2018). The evaluator effect: A chilling fact about usability evaluation methods. International Journal of Human-Computer Interaction, 13(4), 421-443. https://doi.org/10.1080/10447310109366153
17. Highsmith, J. (2002). Agile software development ecosystems. Addison-Wesley.
18. Holt, T. J., & Bossler, A. M. (2019). The Palgrave handbook of international cybercrime and cyberdeviance (pp. 3-34). Springer. https://doi.org/10.1007/978-3-319-78452-8_1
19. Khalid, M., Noor, M., & Azhar, S. (2023). Connectivity challenges in online education: Impacts on students and faculty. Journal of Online Learning Research, 9(1), 45-61.
20. Khechine, H., Lakhal, S., & Pascot, D. (2016). Assessing teachers' acceptance of Moodle in secondary education: A TAM-based longitudinal study. Computers in Human Behavior, 63, 656-667. https://doi.org/10.1016/j.chb.2016.05.059
21. Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. Educational Psychologist, 41(2), 75-86. https://doi.org/10.1207/s15326985ep4102_1
22. Kulik, J. A. (2013). Effects of using instructional technology in elementary and secondary schools: What controlled evaluation studies say. SRI International.

23. Liik, K. (2019). Cybersecurity education in Estonia: Addressing the digital skills gap. Atlantic Council. https://www.atlanticcouncil.org/wp-content/uploads/2019/05/Cybersecurity-Education-in-Estonia-Addressing-the-Digital-Skills-Gap.pdf
24. Lim, S. A. (2017). Enhancing cyber literacy through education: The case of South Korea. World Academy of Science, Engineering and Technology International Journal of Educational and Pedagogical Sciences, 11(1), 11-17. https://publications.waset.org/10006186/pdf
25. Mayer, R. E. (2009). Multimedia learning (2nd ed.). Cambridge University Press.
26. Moore, M. G., & Kearsley, G. (2012). Distance education: A systems view of online learning (3rd ed.). Wadsworth Cengage Learning.
27. Ozsoy, O., & Muschert, G. W. (2020). Digital inequality in the age of information: An analysis of access, skills, and usage patterns. Journal of Digital Society, 12(3), 210-225.
28. Oville, A., Reyes, J., & Santos, M. (2024). Challenges of cybercrime investigation in the Philippines. Journal of Criminology Research, 16(2), 89-103.
29. Riviere, J., Smock, C., & Lee, R. (2014). The role of syllabi in promoting student engagement and learning outcomes. Teaching and Learning Journal, 8(1), 11-25.
30. Rogers, E. M., & Scott, K. L. (2005). The diffusion of innovations model and outreach from the National Network of Libraries of Medicine to Native American communities. Journal of the Medical Library Association, 93(3), 334–338. https://doi.org/10.3163/1536-5050.93.3.010
31. Schacter, J. (2019). The impact of education technology on student achievement: What the most current research has to say. Milken Exchange on Education Technology.
32. Statista Research Department. (2021). SMS scam victims in Region 7, Philippines. Statista Research Journal. https://www.statista.com/region7/philippines/2021
33. Tamim, R. M., Bernard, R. M., Borokhovski, E., Abrami, P. C., & Schmid, R. F. (2011). What forty years of research says about the impact of technology on learning: A second-order meta-analysis and validation study. Review of Educational Research, 81(1), 4-28.
34. Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management Science, 46(2), 186-204. https://doi.org/10.1287/mnsc.46.2.186.11926
35. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425–478.
36. Zhan, Z., Mei, H., & Liu, C. (2015). The effectiveness of using a virtual chemistry laboratory to support student learning. British Journal of Educational Technology, 46(4), 838-859. https://doi.org/10.1111/bjet.12184

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