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Assessment on the capability of criminology educators handling Forensic Science subjects in the First District of Northern Samar

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Abstract

Aim: This study aimed to assess the capability of criminology educators handling forensic science subjects in the First District of Northern Samar, focusing on their professional status, instructional capability, and challenges encountered in delivering forensic science instruction.

Methodology: The study employed a convergent mixed-methods research design. Quantitative data were gathered through a descriptive–correlational survey administered to fourth-year Bachelor of Science in Criminology students, while qualitative data were obtained through structured interviews with criminology educators handling forensic science subjects. Data were analyzed using frequency and percentage distribution, weighted mean, Pearson product–moment correlation, independent–samples t-test, and thematic analysis.

Results: Findings revealed that criminology educators demonstrated adequate pedagogical competence but only a moderate level of technical proficiency in forensic laboratory applications and industry-related experience. Significant relationships were found between educators’ forensic specialization and training and their instructional capability, while years of teaching experience showed no significant association. Major challenges identified included limited access to specialized forensic training, inadequate laboratory facilities, and insufficient institutional support.

Conclusion: The study concludes that while criminology educators possess foundational teaching competencies, gaps remain in technical and practical forensic expertise. Addressing these gaps through structured faculty development, specialized forensic training, and enhanced institutional support is essential to improving the quality and effectiveness of forensic science instruction and ensuring the professional readiness of criminology graduates.

Keywords: *criminology educators; forensic science education; instructional capability; faculty development; forensic training*

INTRODUCTION

Forensic science education plays a critical role in preparing competent investigators, criminal justice practitioners, and forensic specialists capable of addressing the growing complexity of contemporary crime. Global advancements in forensic technologies, including DNA analysis, digital forensics, and crime scene reconstruction, have raised expectations for criminology programs and educators. These developments require not only sound pedagogical competence but also specialized technical knowledge, laboratory proficiency, and practical field experience (Houck, 2015).

International literature emphasizes that effective forensic science instruction should be interdisciplinary, practice-oriented, and aligned with the operational needs of law enforcement and judicial systems (Morgan & Levin, 2022). However, most existing studies have concentrated on curriculum design, student learning outcomes, and policy compliance. Although challenges such as inadequate laboratory facilities, limited professional development opportunities, and weak institutional support have been widely documented particularly in resource-limited settings there has been limited empirical examination of educator capability as a central determinant of instructional effectiveness (Chin et al., 2022).

Global developments in forensic science education have increased instructional demands worldwide. In the Philippine context, these global expectations intersect with national policy requirements and institutional realities,

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which are further intensified in provincial settings such as the First District of Northern Samar (Taduran, 2025). Despite the mandate of Commission on Higher Education Memorandum Order No. 5, Series of 2018, which requires the integration of theoretical and applied forensic competencies, implementation remains constrained by limited access to laboratories, specialized training, and continuing professional development opportunities.

These challenges are more pronounced in provincial areas such as the First District of Northern Samar, where institutions face inadequate laboratory facilities, limited collaboration with forensic practitioners, and minimal institutional support for faculty capability enhancement. Consequently, forensic science instruction in these settings remains largely lecture-based, restricting experiential learning opportunities that are essential to competency-based forensic education.

Despite the growing body of literature on forensic science education, there remains a lack of empirical studies that directly examine the capability of criminology educators handling forensic science subjects, particularly in provincial and resource-limited higher education institutions. Existing research has largely focused on curriculum implementation and student outcomes, leaving the combined influence of educators' pedagogical competence, technical proficiency, and contextual constraints insufficiently explored.

Addressing this gap, the present study provides an empirical assessment of the capability of criminology educators handling forensic science subjects in the First District of Northern Samar. The study contributes theoretically by extending pedagogical content knowledge, experiential learning, and competency-based education frameworks to the context of forensic science instruction. Practically, it offers evidence-based inputs for the design of targeted faculty development and capability enhancement programs. At the policy level, the findings provide empirical support for higher education institutions and regulatory bodies in strengthening faculty qualification standards, professional development initiatives, and resource allocation for forensic science education.

Review of Related Literature and Studies

Forensic science education is an evolving discipline that requires educators to demonstrate both specialized subject expertise and robust pedagogical competence to meet the demands of contemporary criminal investigation. Recent literature has consistently underscored the importance of continuous professional development—through specialized training, workshops, and certification programs in ensuring that educators remain current with rapidly advancing forensic methodologies and technologies (Gul, 2025; Nilendu, 2024). While professional organizations such as the American Academy of Forensic Sciences offer structured development opportunities, empirical studies have revealed uneven access to these programs due to funding limitations, weak institutional support, and pronounced regional disparities (Houck, 2015). These findings suggest that professional development opportunities alone are insufficient unless supported by institutional mechanisms that facilitate sustained faculty participation.

Pedagogical preparedness has been repeatedly identified as a critical determinant of instructional quality in forensic science education. Studies have demonstrated that educators with formal pedagogical training employ more effective instructional strategies, including inquiry-based learning, case simulations, virtual laboratories, and competency-based approaches, all of which are essential for developing students' analytical and scientific reasoning skills. In contrast, educators lacking pedagogical preparation tend to rely heavily on lecture-based instruction, limiting opportunities for applied learning. Comparative findings further indicate that pedagogically prepared educators exert a measurable influence on student engagement, academic performance, and readiness for forensic practice (Nilendu, 2024), thereby highlighting pedagogy as a key variable rather than a peripheral concern in forensic education.

Curriculum relevance and alignment with professional standards constitute another recurring theme in the literature. Contemporary studies advocate for interdisciplinary curricula that integrate criminology, forensic science, digital technologies, ethics, and law enforcement practice to reflect the multifaceted nature of forensic work (Nilendu, 2024). Collaborative partnerships between academic institutions and forensic laboratories have been shown to enhance experiential learning and curricular responsiveness. However, contrasting evidence indicates that outdated curricula and limited faculty competence in emerging forensic tools continue to undermine instructional effectiveness, particularly in developing and regional contexts. This disparity points to a disconnect between recommended curricular frameworks and actual instructional capacity at the faculty level.

Student learning outcomes in forensic science have been closely linked to experiential and simulation-based instructional strategies. Empirical research has shown that mock crime scene investigations, virtual simulations, and blended learning approaches significantly improve students' critical thinking, problem-solving abilities, and professional preparedness (Li et al., 2025). Conversely, studies have also identified stress, inadequate academic support, and limited laboratory exposure as persistent barriers to learning, particularly in institutions with constrained



resources. These contrasting findings suggest that instructional innovations are most effective when supported by adequate institutional and faculty capacity.

Technological and laboratory resources further mediate the effectiveness of forensic science instruction. The integration of digital forensic platforms, virtual laboratories, and emerging technologies such as virtual reality and artificial intelligence has been associated with enhanced student engagement and skill acquisition (Barrot, 2023). Nevertheless, numerous studies have reported persistent challenges related to outdated equipment, insufficient funding, and limited faculty competence in digital forensic technologies. This imbalance reinforces the notion that technological advancement in curricula does not automatically translate into instructional effectiveness without corresponding educator capability.

Institutional support and policy frameworks have been identified as decisive factors in sustaining quality forensic science education. National policies and institutional guidelines shape faculty qualification standards, curriculum implementation, and laboratory investment. Evidence indicates that institutions with structured faculty development programs and strong policy support demonstrate higher levels of educator effectiveness and improved student outcomes (CHED, 2018). In contrast, institutions lacking coherent support structures exhibit fragmented implementation of forensic education standards.

Collectively, the literature affirms that effective forensic science education depends on the interaction of qualified educators, sound pedagogical practices, relevant curricula, adequate technological resources, and supportive institutional policies. However, existing studies have primarily examined these components in isolation, with limited empirical attention given to educator capability as an integrated construct particularly within localized and regional contexts. Notably, there remains a scarcity of empirical research assessing the capability of criminology educators handling forensic science subjects in provincial settings. This gap underscores the significance of examining educator qualifications, pedagogical competence, and instructional constraints within the First District of Northern Samar, providing empirical evidence to inform targeted faculty development initiatives, curriculum enhancement, and institutional policy interventions.

Theoretical Framework

This study is anchored on Shulman's Pedagogical Content Knowledge (PCK) theory (Shulman, 1987), which asserts that effective teaching requires the integration of subject-matter expertise and pedagogical competence. In forensic science education, criminology educators must possess adequate forensic knowledge and the ability to present complex scientific concepts through appropriate instructional strategies. Educators' qualifications, teaching experience, specialization, and participation in professional training reflect their level of PCK and directly influence instructional effectiveness.

The framework is further supported by Kolb's Experiential Learning Theory (Kolb, 1984), which emphasizes learning through direct experience. Given the applied nature of forensic science, effective instruction relies on hands-on activities such as crime scene simulations, evidence analysis, and laboratory exercises. Experiential teaching strategies enhance students' analytical and problem-solving skills essential to forensic practice.

Additionally, the Competency-Based Education (CBE) framework (Grus et al., 2016) informs the assessment of educators' capabilities by focusing on demonstrable skills and performance. CBE underscores the importance of measurable teaching competencies, certifications, and continuous professional development to ensure alignment with current forensic standards.

Together, these frameworks provide a theoretical basis for evaluating the capability of criminology educators handling forensic science subjects by examining the integration of content knowledge, pedagogical practice, experiential instruction, and demonstrated competence.

Conceptual Framework

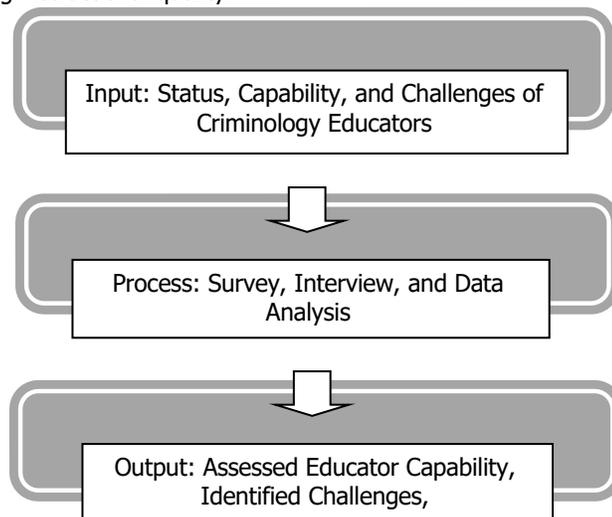
The conceptual framework of the study illustrates the relationship between the status, capability, and challenges of criminology educators and their effectiveness in handling forensic science subjects. It is composed of three major components:

- 1. Input:** Refers to the profile and existing conditions of criminology educators prior to assessment, including their academic qualifications, field of specialization, teaching experience, level of forensic science capability, and challenges encountered in delivering forensic science instruction.
- 2. Process:** Refers to the systematic assessment of educators through quantitative and qualitative methods, including surveys and interviews. Data gathered are analyzed using statistical and thematic



techniques to determine educators' instructional capability, identify recurring challenges, and examine patterns influencing forensic science teaching effectiveness.

- 3. Output/Outcome:** Refers to the assessed level of criminology educators' capability in handling forensic science subjects, the identified instructional challenges, and the formulation of evidence-based recommendations, including a proposed Forensic Science Faculty Development and Capability Program aimed at improving instructional quality.



The framework demonstrates a cause-and-effect relationship, showing that the systematic assessment of educator status and instructional challenges leads to informed interventions that enhance forensic science teaching effectiveness. It situates the study within the broader context of educational capability development, emphasizing continuous assessment and targeted faculty development as mechanisms for improving forensic science education.

Statement of the Problem

Despite the inclusion of forensic science subjects in criminology programs, challenges persisted in ensuring effective instruction, particularly in regional higher education institutions. In the First District of Northern Samar, variations in educators' academic preparation, forensic specialization, and access to professional training affected the quality of forensic science instruction. Limited laboratory resources and inadequate institutional support further constrained the delivery of practical, updated, and industry-aligned forensic education, potentially compromising graduate preparedness for professional practice. At its core, the problem centers on the varying levels of pedagogical, technical, and professional preparedness of criminology educators in delivering forensic science subjects amid institutional and resource constraints.

These conditions underscored the need to assess the capability of criminology educators handling forensic science subjects. Accordingly, the study evaluated educators' professional status and instructional capability, examined the relationship between their academic and professional profile and teaching capability, and identified challenges encountered in forensic science instruction. The findings served as the basis for proposing a Forensic Science Faculty Development and Capability Program to enhance instructional effectiveness.

Research Objectives

General Objective:

To assess the capability of criminology educators handling forensic science subjects in the First District of Northern Samar.

Specific Objectives:

- To identify the status of criminology educators handling forensic science subjects in terms of years of teaching experience, subjects taught, area of specialization, and trainings or seminars attended.



2. To evaluate the capability of criminology educators in handling forensic science subjects with respect to teaching competency and pedagogical skills, technical proficiency in forensic laboratory applications, industry and field experience, curriculum and instructional alignment, and assessment and evaluation methods.
3. To determine the significant relationship between the academic and professional profile of criminology educators and their capability in handling forensic science subjects.
4. To determine the significant difference in the capability of criminology educators when grouped according to selected profile variables.
5. To identify the challenges faced by criminology educators in handling forensic science subjects in terms of personal aspects, institutional support, and laboratory facilities and equipment.
6. To propose a Forensic Science Faculty Development and Capability Program to enhance educators' knowledge and skills in handling forensic science subjects.

Research Questions

1. What is the status of criminology educators handling forensic science subjects in terms of years of teaching experience, subjects taught, area of specialization, and trainings or seminars attended?
2. How capable are criminology educators in handling forensic science subjects with respect to teaching competency and pedagogical skills, technical proficiency in forensic laboratory applications, industry and field experience, curriculum and instructional alignment, and assessment and evaluation methods?
3. What is the relationship between the academic and professional profile of criminology educators and their capability in handling forensic science subjects?
4. Is there a significant difference in the capability of criminology educators when grouped according to selected profile variables?
5. What challenges do criminology educators encounter in handling forensic science subjects in terms of personal aspects, institutional support, and laboratory facilities and equipment?
6. How can a Forensic Science Faculty Development and Capability Program be designed to enhance educators' knowledge and skills in handling forensic science subjects?

Research Hypotheses

Based on the objectives of the study and the nature of the data analysis, the following null hypotheses (H_0) were formulated and tested at the 0.05 level of significance.

Hypothesis Set 1: Relationship Between Profile and Capability

H_{01} : There is no significant relationship between the academic and professional profile of criminology educators (years of teaching experience, area of specialization, subjects taught, and trainings or seminars attended) and their capability in handling forensic science subjects.

H_{11} (Alternative Hypothesis): There is a significant relationship between the academic and professional profile of criminology educators and their capability in handling forensic science subjects.

Hypothesis Set 2: Differences in Capability When Grouped by Profile Variables

H_{02} : There is no significant difference in the capability of criminology educators in handling forensic science subjects when grouped according to selected profile variables.

H_{12} (Alternative Hypothesis): There is a significant difference in the capability of criminology educators in handling forensic science subjects when grouped according to selected profile variables.

Methodology

Research Design

This study employed a convergent mixed-methods design, in which quantitative and qualitative data were collected during the same phase of the research process, analyzed independently, and then systematically integrated. The quantitative strand utilized a descriptive–correlational design to examine criminology educators' professional status and instructional capability, as well as the relationships between their academic and professional profiles and teaching performance. The qualitative strand employed semi-structured interviews to examine educators' instructional practices, professional experiences, and challenges encountered in handling forensic science subjects.



Convergence occurred at the interpretation stage, where quantitative results and qualitative themes were compared, corroborated, and integrated to generate a comprehensive understanding of educator capability. Areas of convergence, complementarity, and divergence between numerical trends and narrative accounts were identified to strengthen the validity of the findings. This integrated approach enabled the triangulation of results and provided both empirical measurement and contextual explanation, thereby informing the formulation of the proposed Forensic Science Faculty Development and Capability Program (Creswell, 2014).

Population and Sampling

The study population comprised criminology educators teaching forensic science subjects and fourth-year Bachelor of Science in Criminology students enrolled in these courses in the First District of Northern Samar during the academic year.

All educators handling forensic science subjects in the district (N = 12) were included through total enumeration due to the small population size. For the student respondents, a total of 260 fourth-year criminology students were selected using stratified sampling to ensure proportional representation from all schools offering the criminology program in the district.

This sampling strategy ensured that the perspectives of both educators and students were adequately captured for a comprehensive assessment of forensic science instruction.

Instruments

The study employed researcher-made instruments to collect both quantitative and qualitative data.

1. Survey Questionnaire: A structured survey questionnaire was developed to assess the capability of criminology educators in handling forensic science subjects. The instrument consisted of five domains, namely: teaching competency, technical proficiency, industry and field experience, curriculum alignment, and assessment practices. It also included sections describing educators' professional status and the challenges encountered in delivering forensic science instruction. The questionnaire comprised fifteen [15] items, measured using a four-point capability scale: 4 – Highly Capable, 3 – Moderately Capable, 2 – Capable, and 1 – Not Capable. Content validation was conducted by three experts in criminology education and forensic science instruction, all of whom were holders of Doctor of Philosophy in Criminology degrees and experienced forensic science educators. Their evaluations ensured the clarity, relevance, and alignment of the instrument with established forensic education standards. The questionnaire was pilot-tested among five [5] criminology educators who were not included in the final sample. Reliability analysis using Cronbach's alpha yielded an overall coefficient of .90, indicating acceptable internal consistency of the instrument.
2. Semi-Structured Interview Guide: A semi-structured interview guide was developed to gather qualitative data regarding criminology educators' instructional practices, professional experiences, challenges encountered, and perceived needs in teaching forensic science subjects. The guide consisted of fourteen [14] open-ended questions, designed to elicit in-depth and reflective responses. The interview guide underwent content validation by the same panel of experts PhD in Criminology holders and forensic science educators to ensure conceptual adequacy and relevance. It was pilot-tested to confirm clarity, sequencing, and appropriateness prior to actual data collection.

Data Collection

The data collection was conducted in selected higher education institutions offering criminology programs in the First District of Northern Samar, Philippines, during the April to May 2025, in accordance with the convergent mixed-methods design of the study.

For the quantitative phase, the validated survey questionnaires were administered to 260 fourth-year criminology students to assess the capability of educators handling forensic science subjects. The questionnaires were distributed personally within classroom settings and retrieved immediately after completion to ensure respondent understanding and to maximize the response rate.

For the qualitative phase, semi-structured interviews were conducted with criminology educators teaching forensic science subjects in the same institutions. Interviews were scheduled at mutually convenient times and were guided by a structured interview protocol that allowed probing and clarification of responses related to instructional practices, professional experiences, and challenges in teaching forensic science subjects. With the participants' consent, responses were documented through written notes and audio recordings.



Treatment of Data

Quantitative Data: Survey responses were encoded and analyzed using descriptive and inferential statistical techniques. Frequency counts and percentage distributions were used to describe the respondents' academic and professional profiles. Weighted mean scores were computed to determine the levels of educator capability and the extent of instructional challenges encountered. Inferential analysis employed the Pearson Product-Moment Correlation Coefficient (Pearson r) to examine the relationship between educators' academic and professional profiles and their instructional capability in forensic science subjects. Additionally, independent-samples t -tests were conducted to determine statistically significant differences in capability levels across groups classified according to selected profile variables.

Qualitative Data: Interview data were analyzed using thematic analysis following a systematic and iterative process. Audio recordings were transcribed verbatim, after which initial coding was conducted to identify significant statements related to instructional practices, professional experiences, and teaching challenges. Similar codes were grouped into categories, from which overarching themes were generated. These themes were reviewed and refined to ensure internal coherence and clear distinction, allowing for the identification of key factors influencing the effectiveness of forensic science instruction.

Integration of Quantitative and Qualitative Data: Integration occurred during the interpretation phase through triangulation of findings from both data strands. Quantitative results were compared with qualitative themes to identify areas of convergence, complementarity, and divergence. Numerical trends in educator capability and instructional challenges were substantiated and contextualized using narrative accounts from interviews. This integrative analysis provided a comprehensive understanding of criminology educators' capability in handling forensic science subjects and served as the empirical basis for formulating the proposed Forensic Science Faculty Development and Capability Program.

Ethical Considerations

The study adhered to strict ethical standards:

- **Ethical Approval and Permissions:** Secured from school administrators and program heads in the First District of Northern Samar.
- **Informed Consent:** Participants were briefed on the study's purpose, procedures, and voluntary nature before participation.
- **Confidentiality:** Personal information and responses were kept private and used solely for academic purposes.
- **Anonymity:** Names of respondents and institutions were not disclosed in the report.
- **Right to Withdraw:** Participants could withdraw from the study at any time without penalty.
- **Data Protection:** All collected data were securely stored and accessible only to the researcher.

These measures ensured participants' rights, dignity, and privacy were respected while maintaining the study's integrity.

Results and Discussion

Status of Criminology Educators

Analysis of the educators' profiles revealed that the majority had one to five years of teaching experience and handled both core criminology and forensic science subjects. Most educators held a bachelor's degree in criminology, while only a small proportion had completed advanced degrees or obtained formal specialization in forensic science. Participation in institutional and regional seminars was common; however, engagement in specialized forensic training was limited.

These results indicated that while educators had accumulated sufficient classroom exposure, their academic preparation and technical specialization in forensic science were limited. The lack of advanced forensic training likely constrained instructional depth and laboratory competence, particularly in highly technical subject areas. This finding aligned with previous studies emphasizing that forensic science instruction requires discipline-specific expertise beyond general criminology training (Nilendu, 2024).



Weighted mean analysis (Table 1) showed that the overall capability of educators was rated as Moderately Capable. Higher mean scores were obtained in teaching competency and pedagogical skills, indicating relative strength in lesson planning, content delivery, and assessment strategies. In contrast, technical proficiency, particularly in laboratory procedures and the use of forensic equipment, obtained lower ratings. Industry or field experience was likewise limited.

This pattern reflected a workforce that was pedagogically competent but technically underprepared. The findings suggested a mismatch between instructional skills and applied forensic competence, reinforcing the argument that effective forensic education requires the integration of pedagogical expertise with hands-on technical capability (Shukla, 2021).

Table 1. Capability Ratings of Educators

Capability Domain	Weighted Mean	Interpretation
Teaching Competency	4.2	Capable
Pedagogical Skills	4.0	Capable
Technical Proficiency	3.2	Moderately Capable
Industry/Field Experience	3.1	Moderately Capable
Overall Capability	3.6	Moderately Capable

Differences in Capability

Independent-samples t-test results (Table 2) revealed a statistically significant difference in educator capability based **on forensic specialization and training**, with educators who had undergone specialized training obtaining higher capability scores. In contrast, years of teaching experience did not yield a significant difference.

These results indicated that specialized forensic preparation, rather than length of teaching service, was a stronger determinant of instructional capability. Teaching tenure alone did not compensate for the absence of forensic-specific training, underscoring the importance of targeted professional development in strengthening forensic instruction.

Table 2. Differences in Capability Based on Profile Variables

Variable	t-value	p-value	Interpretation
Specialization & Training	3.45	.002*	Significant
Years of Teaching	0.89	.376	Not Significant

*Significant at $p < .05$

Relationship Between Educators' Profile and Capability

Pearson correlation analysis revealed a significant positive relationship between educators' area of specialization and forensic trainings attended and their overall capability in teaching forensic science subjects. Conversely, years of teaching experience and number of subjects handled did not demonstrate significant correlations with capability levels.

These findings reinforced the notion that forensic teaching competence was driven by discipline-specific preparation and practical exposure, rather than by general teaching experience. The results highlighted the critical role of advanced training and specialization in addressing existing capability gaps in forensic science education (Wickenheiser et al., 2023)

Challenges in Teaching Forensic Science

Qualitative thematic analysis identified three major categories of challenges, as illustrated in Figure 1: personal, institutional, and laboratory-related challenges.

Personal challenges included limited technical skills and reduced confidence in conducting laboratory demonstrations and practical exercises. Institutional challenges involved insufficient administrative support, limited access to specialized forensic training, and the absence of structured faculty development programs. Laboratory-related challenges were characterized by inadequate, outdated, or malfunctioning forensic equipment, which restricted hands-on instruction.



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These interrelated challenges explained the moderate capability ratings obtained in the quantitative findings and underscored the structural constraints affecting laboratory-based forensic instruction. The results were consistent with previous studies highlighting the impact of institutional and resource limitations on the quality of forensic education (Baniqued & Bautista, 2024).

Integration of Quantitative and Qualitative Findings

Integration of quantitative and qualitative findings revealed strong convergence between statistical trends and educators' lived experiences. Moderate overall capability levels, significant associations with specialization and training, and recurring qualitative themes related to limited technical preparation, inadequate facilities, and insufficient institutional support collectively provided a coherent explanation of instructional capability gaps.

The findings demonstrate that educators possess strong pedagogical foundations. However, constraints related to technical proficiency, laboratory access, and institutional support persist and affect instructional effectiveness and student readiness (Pacadaljen, 2024).

Conclusion

Based on the findings, it was concluded that criminology educators handling forensic science subjects generally demonstrated adequate pedagogical competence, while their technical proficiency and industry-related application skills remained at a moderate level. Although many educators had completed graduate-level academic units, the limited completion of advanced degrees and low participation in specialized forensic training constrained their capacity to deliver highly technical and laboratory-intensive instruction.

The results further indicated that years of teaching experience did not have a significant relationship with educators' overall capability in handling forensic science subjects. Similarly, academic attainment, field of specialization, and number of subjects taught were not statistically significant predictors of instructional capability. These findings suggest that general teaching tenure and academic credentials alone were insufficient indicators of competence in forensic science instruction, which requires discipline-specific preparation and applied technical exposure.

Additionally, discrepancies observed between educators' self-assessments and students' evaluations highlighted variability in perceived instructional capability, underscoring the complexity of assessing teaching effectiveness in forensic science. Persistent personal, institutional, and laboratory-related challenges such as limited technical confidence, inadequate facilities, and insufficient institutional support for forensic specialization were found to constrain effective instructional delivery and laboratory-based learning.

Taken together, these conclusions demonstrated that while pedagogical foundations among criminology educators were generally sound, gaps remained in technical capability, practical exposure, and institutional support mechanisms. The findings provided an empirical basis for understanding the current state of forensic science instruction in the study context and highlighted structural and competency-related factors influencing educator capability.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are offered for consideration by relevant stakeholders in criminology and forensic science education.

First, the Commission on Higher Education (CHED) and Higher Education Institutions (HEIs) may consider encouraging the completion of advanced degrees among criminology educators handling forensic science subjects. This could be supported through mechanisms such as scholarship opportunities, faculty study leaves, and research incentives, which may help strengthen educators' academic preparation and readiness to teach technically demanding forensic courses.

Second, to address the identified gaps in technical proficiency, HEIs may explore the establishment of collaborative linkages with the Philippine National Police (PNP) Crime Laboratory and the National Bureau of Investigation (NBI) Forensic Division. Such partnerships could facilitate access to specialized training and certification opportunities in areas such as ballistics, dactyloscopy, forensic chemistry, toxicology, and digital forensics, thereby enhancing educators' practical exposure and alignment with industry standards.

Third, to support continuous professional growth, the Commission on Higher Education (CHED) and the Professional Criminologists Association of the Philippines (PCAP) may consider developing continuing professional development programs that integrate pedagogical enrichment with laboratory-based and skill-oriented learning



experiences. These initiatives may assist educators in maintaining current teaching practices while gradually strengthening their technical competencies.

Fourth, in light of the observed differences between student and faculty perceptions of instructional capability, university administrators and institutional quality assurance offices may implement or strengthen mechanisms such as periodic performance evaluations, classroom observations, and mentoring arrangements. These processes may promote reflective teaching practices and support ongoing instructional improvement.

Finally, to enhance the quality of practical instruction, Higher Education Institutions (HEIs), in coordination with Local Government Units (LGUs), may explore opportunities for investing in shared or upgraded forensic laboratory facilities. In addition, the Commission on Higher Education (CHED), the Department of Science and Technology (DOST), and partner institutions may consider institutionalizing a faculty development and capability enhancement initiative that integrates technical training, laboratory immersion, research engagement, and collaboration with law enforcement agencies. Collectively, these efforts may contribute to the strengthening of educators' capabilities and the alignment of forensic science instruction with contemporary professional and industry expectations.

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