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LEVEL OF COMPETENCE OF REGION IVA FORENSIC PERSONNEL

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ABSTRACT

Despite the crucial role of forensic resources in criminal investigations, there is a pressing concern about the adequacy of resources within Philippine law enforcement agencies. This issue includes shortcomings in personnel, knowledge, experience, and infrastructure that could prevent forensic instruments and procedures from being used effectively. The study focused on investigating the competence of forensic personnel in Region IVA using the combination of two theories as bases: Competence-based Theory (CBT) and Continuing Professional Development Theory (CPD). The study is important to address a huge gap in literature concerning forensic services in the Philippines. Using quantitative research design, it gathered data using an online survey questionnaire among 107 respondents. The results of the study indicate that forensic personnel in Region VIA is mostly male and 21-39 years old. There are also mostly S.O.C.O. personnel in the ranks. Sadly, there are only 7 forensic experts in the whole region. Region IVA forensic personnel are proficient in the performance of their roles across 8 forensic divisions, and highly proficient in 2 divisions. It was further discovered that there are no significant differences in the competencies when grouped according to gender and forensic unit/office, but there are significant differences when grouped according to age and current position. Reasons for the differences are highlighted and explained. The study contributes new knowledge concerning the state of forensic personnel in the country, which is important in data-driven policy-making, decision-making, and strategic planning for the forensic services of the Philippine National Police.

KEYWORDS: *forensics, competence, forensic officers, Region IVA, Philippines*

INTRODUCTION

Modern criminal investigations rely heavily on forensic science, which offers a methodical framework for analyzing evidence to bolster legal claims. The efficiency and efficacy of forensic personnel are critical to upholding justice and public confidence in the criminal justice system in the Philippines, an archipelagic nation with a diverse cultural terrain. This is why it is urgent to improve the Philippines' forensic skills in light of changing criminal tactics, advances in forensic science, and the growing complexity of criminal cases. There is a large vacuum in the literature when it comes to a thorough evaluation of forensic resources. By offering an overview of the current competencies of forensic personnel in the nation, this study will help close this gap. The goal of this study is to perform a thorough analysis of the competencies of Philippines' forensic personnel, highlighting their current strengths, pointing out their weaknesses, and suggesting areas for future development.

Literature Review

It is well acknowledged that forensic science can support a wide range of criminal justice system operations (Walsh, 2023). As a result, forensic science—which is defined as a collection of scientific disciplines concerned with applying their specific field of expertise to criminal, civil, legal, and judicial matters—has been incorporated into national security and policing (Woodman et al., 2020). Historically, the use of forensics has resulted in the exoneration of people who the public had previously believed to be guilty (Kelty et al., 2018). In other cases, the application of forensic science revealed the real criminals to be people who were thought to be innocent. Forensic analysis is important, especially in prosecution and defense (Hamid & Yusoff, 2022; Gupta & Singh, 2022).

Researchers like Motunrayo (2016) and Tengpongsthorn (2017) have acknowledged the significance of police readiness to use forensic science in carrying out their tasks. The reliability and validity of forensic science evidence rest primarily on the expertise of personnel and available equipment (Stern et al., 2019). Forensics operatives also need continuous upskilling. Rossinskaya (2018) enumerated problems related to forensic expert training and continuing education, so resources such as those provided by Williams et al. (2017) and Shishkina (2021) have been very helpful. There is no scarcity of literature advocating training of forensic agents, especially in the areas of forensic pathology (Spencer et al., 2017), geosciences (Spoto et al., 2023), digital forensics (Tiepolo, 2022; Moise, 2021), forensic psychology or psychiatry (Nishad & Hariharan, 2021; Healy & Healy, 2024), forensic anthropology (Vaswani & Ahmed, 2019; Ost et al., 2022), legal chemistry (Naquet, 2024), DNA profiling (Amankwaa & McCartney, 2021), autopsy (Hodge & Holjencin, 2020), S.O.C.O. investigations (Kuo et al., 2020; Spyropoulous, et al., 2023).

It would seem that formal education and informal training of forensics practitioners is a common concern in the world. Resources such as those published by Shishkina (2021) in investigative activities, Mayorova (2020) on judicial-ecological examination, on teaching neuropsychology (Hoy-Watkins et al., 2017), on doing android forensics (Kroger & Creutzburg, 2013),

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UKAS on forensic science process (2022), and Dvoryanskov et al. (2021) on the interpretation and application criminal law are important. In response to the need to equip forensics operatives, the U.S. National Institute of Justice published *Education and Training in Forensic Science: A Guide to Forensic Science Laboratories, Educational Institutions, and Students* in 2012.

The primary goal of police training has remained mostly unchanged over time: to enable police officers to carry out their duties (Koedjik et al., 2019). Changing policies and technological advances (Frenkel et al., 2021) necessitate upskilling. These days, police emphasizes extra competencies including decision-making, problem-solving, and communication (Blumberg et al., 2019). In terms police training, recent research has looked into ways to enhance some police training components and facilitate skills more effectively. Di Nota and Huhta (2019), for example, have demonstrated how police officers' situational awareness and decision-making abilities may be enhanced through realistic and immersive scenario-based training. The more recent publication addressing education and training in forensics was a book edited by Williams et al. (2017). In the book are insights and specific guidelines about education and training in digital forensics, forensic fire investigation, forensic anthropology, and DNA profiling. It is a helpful resource because it deals with other pedagogical topics such as teaching with limited resources, developing the research skills of forensics students, use of virtual teaching aids, available online teaching aids, use of simulations and virtual realities, and even suggestions concerning examinations and assessments.

There are many publications for forensic trainings and may be used as references and textbooks published recently. General textbooks include those written by Shrivastava et al. (2023), Lawless (2022), Cage (2022), Bell (2022), Mirakovits and Siegel (2021), Saferstein and Roy (2020), Fraser (2020), and Bell (2020). There are topic-focused references available. The use of data analytics in forensic science was dealt with by Curran (2019). Galbacs (2023) deals with laser technology. Elkins and Zeller (2022) deals with next generation sequencing in forensic science. A book by Inuwa et al. (2022) deals with medical biotechnology, biopharmacy, and bioinformatics. Singh and Sharma (2022) wrote a book on crime scene management (Newquist, 2021). Wilkes (2022) provides real life murder cases cracked by forensic science. There are also those written for cybersecurity and digital forensics (Joyce et al., 2022) and the relationship between digital forensics and crime science (Ijeh & Curran, 2021). Dealing with emerging and advanced technologies is also crucial (Johnson, 2021; Chen et al., 2021), especially those related to A.I. and machines (Misra et al., 2020). Franck and Frank (2020) wrote on ethical standards in forensic science while concerns for humanitarian action was the focus of Parra et al., (2020). Rogers and Drogin (2019) offer insights on psychological forensics, along with Marquez (2019).

Despite the fact that ASEAN Citations Index (ACI) does not have any literature written on forensics in the Philippines within the last 10 years, there are a good number of published writings from various scholars. It would seem that most Filipino scholars writing on forensics-related matters prefer to publish in journals based outside Asia. This can be because of a number of reasons, such as global visibility and impact, higher impact factors, access to diverse peer reviewers, opportunities for collaboration, and inclusion in prestigious databases.

There is a good number of journal articles that focus on appraising the current status of forensics in the Philippines. Although its major contributions to knowledge are its presentations of recent efforts in research, education, and legislation in the country, Go (2018) evaluated the situation of forensic anthropology in the Philippines and provided the need for its further development. As if responding to Go's challenge, Algee-Hewitt et al. (2019) proposed using an admixture approach to looking at the ancestry variation in the Philippines and its implication to forensic anthropology. This development goes hand in hand with the recent advances in forensic anthropological research in Southeast Asia (Go et al., 2019). Nikkimor et al. (2018) proposes regression analysis to determine stature from footprint anthropometry (Moorthy et al., 2021).

Other studies focus on exploring the need for development in other forensics areas. On forensic entomology, Pedales and Fontanilla (2018) lament that the Philippines has yet to put into practice forensic entomology policies and procedures, including creating local databases, and that the country has fallen behind in developing evidencebased investigations, especially when compared to other Southeast Asian nations. De Ungria (2010) also raised the same concern that the Philippines does not yet have a national DNA database or any legislation that would facilitate its establishment. Ethical governance of forensic DNA databases is another concern (De Ungria & Jimenez, 2022). Another challenge is the insufficient facilities and equipment for digital forensics in the country, which does not spell well for Filipinos, given that cybercrime has increased through the past few years, especially in online scams (Blancaflor et al., 2023).

The war on drugs initiated by the Duterte administration spurred interest on forensics, mostly to ensure that fair judicial trial is received by accused Filipinos and that judgements are based on forensic evidence (De Ungria & Jose, 2020; Go & De Ungria, 2019). After all, wrongful convictions without proper forensic evidence is a reality in the Philippines. This is why De Ungria et al. (2008) pushed for the improvement of forensic DNA analysis, especially in rape cases. Interview skills of police investigators is also crucial (Tañola et al., 2023).

There are many concerns related to sexual assault cases in the country that require DNA testing (Campbell & Fehler-Cabral, 2022). In the Philippines, the number of cases of sexual assault that are reported each year keeps rising. Identifying attackers quickly and correctly using DNA test results is a significant step towards solving this issue. Differential DNA extraction is a standard procedure used by foreign forensic laboratories to

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separate the sperm fraction (Rodriguez et al., 2017). To ensure that findings are accurate for court use as evidence, Rodriguez et al. (2019) recommends integrating presumptive and confirmatory semen tests in DNA profiling of sexual assault evidence. Determination of relationship between father-offspring, especially in rape cases, is also important (Maiquilla et al., 2011).

In whatever circumstance—whether crime-related or not—solving complex kinship relations is important in whatever nation (Salvador et al. 2018). On fingerprints analysis, the combination of sex identification and hand morphology is proposed by Liyana (2021) to advance the field. De Mesa et al. (2021) and Taduran et al. (2017) also propose sex determination using plain fingerprint ridge density. Different methods for estimating height in an available sample among Filipinos is also advocated to determine offenders (Taduran et al., 2017). Rey et al. (2022) suggests the combination of fingerprint and face recognition.

Orders from the Philippine National Police mandate that forensic science-based crime scene investigations be carried out by the Directorate for Investigation and Detective Management - Police detectives in criminal investigations. It is important, therefore, to assess whether the mandate is being performed well. Quiape and Painaga (2023) conducted a study to assess the capabilities of operatives in Antique. The findings revealed that police investigators were highly skilled in ballistics and photographic forensics, but displayed lack of forensic dactyloscopy experience. A similar study by Benter (2021) on selected Bulacan provincial crime laboratory revealed the following conclusions: (1) the most advanced technology used for drug testing and toxicology is Gas Chromatography-Mass Spectrometry (GC-MS); (2) Forensic Chemistry is the most commonly used forensic service in the laboratories; (3) SOCO courses are the training resources offered to its staff; and (4) inadequate staff, facilities, and office space are the challenges faced by its staff.

Theoretical/Conceptual Framework

Using a strong theoretical foundation, this research undertakes a thorough investigation of the competencies of Philippine forensics officers in Region IVA. The combination of two theories and models enabled the convergence of strategic insights: Competence-based Theory (CBT) and Continuing Professional Development Theory (CPD). A framework for evaluating and enhancing the particular skills, knowledge, and abilities required for efficient job performance is called Competence-based Theory (CBT). This theory entails identifying the fundamental skills required for forensic staff in Region IVA to perform duties including gathering, analyzing, and presenting evidence in court. According to this theory, performance assessments, testing, and observation would all be used to gauge an individual's competency in different areas. Organizations can guarantee that their forensic staff members have the necessary abilities to carry out their duties and support the administration of justice by implementing Competency-Based Theory (Shakurov et al., 2022).

According to the principle of Continuing Professional Development theory, or CPD, maintaining professional competence and adjusting to changes in the workplace need continual learning and skill improvement (Magwenya et al., 2023). It makes the argument that in order for professionals to be relevant and productive in their professions, they must continuously upgrade their knowledge, skills, and talents throughout their careers. CPD theory would entail offering chances for training, workshops, conferences, and other learning experiences pertinent to forensic science, legal procedures, and technical improvements to forensic personnel in Region IVA (Allen et al., 2020).

As the PNP Forensic Group 2021 Annual Accomplishment Report indicates, there is an increasing number of requests for forensic analysis in the country. This means that there is a need to increase the number of skilled forensic officers and ensure that their competencies are sufficient to make quick forensic analysis. The modernization of forensics in the country is also aligned with the recently released Philippine Development Plan 2023-2028, which highlights the need to advance research development, technology, and innovation (Chapter 8), the need to expand and upgrade infrastructure (Chapter 12), and the importance of ensuring peace, security, and the administration of justice (Chapter 13). Further, this supports several older laws that underscore the need to modernize the country's military and investigative capabilities such as RA 10867 for the National Bureau of Investigation (NBI) and RA 7898 for the Armed Forces of the Philippines (AFP).

Additionally, the PNP Patrol Plan 2030 includes human resources management and development as one of its key areas. According to the document, it is crucial to improve PNP's human resources management systems, including staffing, recruitment and selection, personnel administration, career development and promotion, police remuneration, police education and training, performance monitoring and evaluation, and police discipline. Finally, the PNP's *Crime Laboratory Scene of Crime Operations Manual* (2021) and the *PNP Forensic Group Citizen's Charter* (2022) served as the bases for the identification of the roles and responsibilities of forensic officers. They provided the list of competencies that each forensic officer in various divisions should necessarily possess to carry out their mandate. PNP Resolution No. 2020-0382 also provides the basis for the lifelong learning of forensic officers that will enhance their levels of effectiveness and efficiency.

Significance of the Study

The dissertation is highly relevant to a number of stakeholders, and its conclusions have the potential to improve both the criminal justice system and the field of forensics in the Philippines. The study is important because it can contribute the various stakeholders.

First, for *forensic units or offices,* the dissertation helps to improve the caliber and efficacy of forensic services rendered by evaluating the qualifications of forensic staff in Region IVA. It guarantees that forensic experts have the abilities and know-how

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required to carry out their responsibilities effectively, which eventually helps with the administration of justice and public safety. Moreover, forensic units can improve their recruitment and selection procedures by having a better understanding of the competencies required for forensic positions.

Second, for *forensic officers,* the study offers insightful information about the particular skills needed for forensic work in Region IVA. Using this data, specialized training and development programs catered to the requirements of forensic staff can be created, assuring ongoing development and advancement in the field. Third, for the *academia,* the study advances our understanding of forensic science in general and competency evaluation and workforce development in particular. It offers insightful information and useful data that can guide future investigations and academic discussions on the competencies of forensic specialists.

Fourth, for *law enforcement agencies,* the research will provide a thorough evaluation of the country's forensic capabilities and limitations. It provides information about areas in need of development, allowing agencies to improve their investigative procedures, implement best practices, and manage resources more wisely. This may result in criminal investigations that are more precise and effective. Finally, for *legislators and policy makers,* the study provides important information to help them create evidence-based forensic procedures policies related to human resources. It might draw attention to areas in which changes to the law are required, fill in the gaps in available resources, and encourage the creation of a legal framework that facilitates the efficient training and selection of forensic officers in the country.

Objectives of the Study

Despite the crucial role of forensic resources in criminal investigations, there is a pressing concern about the adequacy of resources within Philippine law enforcement agencies. This issue includes shortcomings in personnel, knowledge, experience, and infrastructure that could prevent forensic instruments and procedures from being used effectively. The study fills the current gap in knowledge concerning the current level of competence of forensic personnel in the Philippines by using Region IVA as the sample population. The study focuses on assessing the competence of forensic personnel that unquestionably influence effective investigations.

To accomplish the objectives of the research, aside from demographic profiling, the following two main research questions, each with two sub-questions, will be asked: (1) What is the level of competencies of the four groups of respondents in terms of the ten major forensic divisions? and (2) Is there a significant difference on the forensic competencies of the four groups of respondents in terms of the above-mentioned ten divisions?

METHODOLOGY

Research Design

The dissertation employed a descriptive research design. The goal of descriptive research is to characterize a population's or a phenomenon's features without manipulating the variables. Rather than supplying an explanation for why something is happening, its main focus is on giving an accurate description of the current state of affairs or circumstance. Descriptive research is a fundamental element in the research process that is frequently utilized by researchers who want to comprehend the fundamental characteristics of a research subject (Siedlecki, 2020). Descriptive research is suitable because the goal is to identify characteristics, frequencies, trends, and categories related to a topic or problem. It is often used when little is known about the subject, and before exploring the reasons behind certain phenomena. Descriptive research is appropriate for the dissertation topic because it promises measurement and objective observation of the topic of interest (Omair, 2015).

Research Method

The study used quantitative research method, a systematic and empirical approach to scientific inquiry that involves the collection, analysis, and interpretation of numerical data (Goertzen, 2017). This method uses variable quantification and relationship analysis to comprehend, explain, and forecast a phenomenon or situation. It is commonly used in fields such as psychology, sociology, economics, education, and the natural sciences. In quantitative research, objective measurement is emphasized. To collect data, researchers employ scales, numerical measures, or standardized equipment. This guarantees that the information gathered is trustworthy and replicable in other research projects or situations (Apuke, 2017).

A cross-sectional survey method was used. When conducting research on attitudes, perceptions, and related topics, a number of studies (Déverge, 2016; Fagernaes, 2015) have recommended using the cross-sectional survey method. It is deemed more significant and pertinent since it offers a timely and extremely valuable look at what the public is thinking and doing. According to Maxfield and Babbie (2012), surveys are most suited for examining broad issues and particular emotional states, as demonstrated by the studies under evaluation. A survey provides a researcher with the chance to learn more about the topic and all of its details and aspects (Sahu, 2016). In addition, because data collection is done at a single time point, cross-sectional surveys are time- and cost-efficient and offer a very quick data collection from a large number of respondents.

Population of the Study

There are a total of 141 forensic offices in the Philippines, although 8 of them are currently not functioning and 26 are not approved. There are 17 regional forensic offices, 77 provincial forensic offices, 29 city forensic offices, 5 district forensic offices, and 13 satellite forensic offices. The study only included the forensic units and offices in Region IVA. With 147 total number

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of personnel, the study employed *complete enumeration*. All team leaders, officers, personnel of the offices in Region IVA were included as target respondents. Unfortunately, even after the deadline of the data gathering was extended for three days, only 107 responded to the online survey questionnaire. With the help of the adviser, and using Slovin's formula with 5% margin of error (e) the total number of respondents was determined to be 107, which is precisely the total number of responses gathered.

Data Gathering Tools

A cross-sectional survey method was used. This method was chosen because a single time point is used to gather data, giving an overview of the status or features of the population. Thus, the method gives timely insights by offering a snapshot of the population's characteristics at a certain moment in time. Moreover, when it comes to saving time and money, cross-sectional surveys are more effective than longitudinal studies that take a longer time to complete. Third, a cross-sectional survey is perfect in conducting descriptive research and analysis. A standardized questionnaire was used to gather data. A series of preset questions intended to elicit data regarding the variables of interest are included in the survey instrument. Because the research is the first of its kind, it used a self-made questionnaire based on the 2022 *PNP Forensic Group Citizen's Charter* and the 2021 *Crime Laboratory Scene of Crime Operations Manual*. See Appendix E for the research instrument.

Date Gathering Procedures

The researcher distributed the survey questionnaire to the respondents. Data was gathered using an online survey, particularly using Google Survey, which means that the Google link was included in the letter to the respondents. All quantitative data have been gathered from 107 respondents, which is the allowed margin of error calculated through Slovin's formula.

Treatment of Data

The study used statistical analysis. Descriptive statistics like mean, median, and standard deviation were used to summarize data (Zybur & Pierides, 2020). First, to describe the central or average value of the data, the research measured central tendencies by using mean. Also, to indicate how spread out the values are, the research measured dispersion by standard deviation. Likert scale is used to assess the proficiency levels of forensic personnel. The scale provides a quantitative measure of proficiency, which helps in interpreting and analyzing the data effectively. The legend used is as follows:

3.25 - 4.00	Highly Proficient
2.50 - 3.24	Proficient
1.75 - 2.49	Slightly Proficient
1.00 – 1.74	Not Proficient

The verbal interpretations of the various means may be interpreted as follows. First, *highly proficient* (mean = 3.25-4.00) indicates that the forensic personnel demonstrate a high level of proficiency in their skills and competencies. Scores in this range suggest that the personnel are exceptionally skilled and are likely among the top performers in their field. They can handle complex tasks independently and often take on leadership roles or mentor others. Second, *proficient* (mean = 2.50-3.24) means that personnel in this category are competent and capable of performing their tasks effectively.

Scores in this range indicate a reliable level of skill and knowledge. These personnel are effective in their roles, consistently meet performance standards, and can handle most tasks without significant issues. Third, *slightly proficient* (mean – 1.75-2.49) reflects a basic level of proficiency. Personnel can perform some tasks adequately but may require additional support or supervision. Scores in this range suggest that while the personnel have some relevant skills, there is significant room for improvement. They may benefit from additional training and development to enhance their proficiency. Finally, *not proficient* (mean = 1.00-1.74) means that personnel in this category demonstrate a lack of proficiency in the required skills. Scores in this range indicate a need for substantial improvement. These personnel may not be adequately prepared for their roles and will likely need extensive training and development to reach a competent level of proficiency.

Kruskal-Wallis test was employed to assess whether there are any statistically significant differences between the competencies of the forensic agencies in Region IVA in relation to the demographic profile. This provided valuable insights into potential differences when analyzed by the demographic profiles of the respondents. Because the Kruskal-Wallis tests indicated significant differences for age and current position categories, further post-hoc tests were conducted using Dunn Bonferroni to identify which specific groups differ from each other.

Ethical Considerations

The research had no ethical issues to consider in the data-gathering and datatreatment. An Informed Consent Form was not used in the study, since no minors are among the respondents. However, the following steps were made to ensure informed consent, confidentiality, privacy, data security, and honesty. First, to ensure anonymity and confidentiality, respondents were not required to provide their names or contact details in the online survey. Second, by filling the survey, they have indicated their voluntary participation. A statement containing the possibility of withdrawal from the study was also included in the opening statement of the Survey.

RESULTS AND DISCUSSION

The demographic profile of the respondents were limited to gender, age, current position, and which forensic unit/office they belong. Concerning gender, 71.03 percent were male while 26.17 percent were females. Only 2 or 1.87 percent belong to the LGBTQIA, while 1 or 0.93 percent preferred not to reveal their gender. This means that forensic personnel in Region IVA is predominantly male. This is consistent with the fact that there are

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more male than female police officers in the country. Concerning age, 35.51 percent belonged to the age bracket of 21 – 29 years old and 30 – 39 years old, respectively, followed by 23.36 percent belonging to the age bracket of 40 – 49 years old, and 5.61 percent belonged within the age range of 50 – 59 years old. Concerning positions, the highest number of respondents are S.O.C.O. personnel with 35.51 percent, followed by other personnel with 28.04 percent. Third comes administrative/operative personnel with 11.21 percent, followed by 7.48 percent of chemistry personnel 6.54 percent of forensic experts, and 5.61 percent of medico-legal personnel and another 5.61 percent identified themselves as Chiefs. The demographic reveals that there is an abundance of S.O.C.O. and other personnel, while there is significant low number of chemistry personnel, medico-legal personnel, and forensic experts. This is a cause for concern (Benter & Cawi, 2021; Quiape & Painaga, 2023). Finally, the highest number of respondents are personnel from provincial units/offices of Region IVA, with 65.42 percent. This is followed by 20.56 percent of respondents from regional forensic units/offices. Also, there are 5.61 percent of respondents from district forensic units/offices, 4.67 percent from city forensic units/offices, and 3.74 percent from satellite forensic units/offices.

According to the respondents, all forensic divisions personnel are competent in their performance of their responsibilities. The mean of all divisions did not fall below 2.49. In fact, none of the divisions got a mean lower than 3.0, the lowest being 3.14 of the Questioned Document Examination division. The two highest ranking divisions in terms of competency are S.O.C.O. and Forensic Chemistry divisions, respectively with the mean 3.31 and 3.29. Moreover, all of the standard deviations of the division means are homogenous, which means that there is general agreement among the respondents about the competency of personnel.

Table 1
Level of competence of Divisions personnel

Divisions	Mean	SD	Verbal Description
Scene of Crime Operations Division	3.31	0.82	Highly Proficient
Forensic Chemistry Division	3.29	0.84	Highly Proficient
Firearms Identification Division	3.22	0.86	Proficient
Forensic Photography Division	3.22	0.85	Proficient
Physical Identification Division	3.21	0.83	Proficient
Fingerprint Identification Division	3.19	0.81	Proficient
Polygraphy Division	3.18	0.90	Proficient
Medico-legal Division	3.15	0.87	Proficient
Questioned Document Examination Division	3.14	0.87	Proficient
DNA Laboratory Division	3.07	0.90	Proficient

Scene of Crime Operations Division (mean = 3.31) and Forensic Chemistry Division (mean = 3.29) stand out with slightly higher mean scores. Their lower variability (SDs of 0.82 and 0.84, respectively) suggests a consistent high level of performance across their operations**.** Firearms Identification and Forensic Photography Divisions (both mean= 3.22) show slightly better performance among the "Proficient" group, but not significantly higher than the others in this category. Physical Identification, Fingerprint Identification, Polygraphy, Medico-legal, and Questioned Document Examination Divisions have very similar performance levels (means ranging from 3.14 to 3.21), indicating a consistent level of proficiency. DNA Laboratory Division (mean = 3.07), while still proficient, has the lowest mean score, suggesting a need for improvement relative to the other divisions. Although the SDs are relatively close, divisions with slightly higher SDs (e.g., Polygraphy Division with 0.90) might benefit from initiatives aimed at reducing variability, ensuring more consistent performance across all members. Moreover, regular assessments should be conducted to ensure all divisions maintain or improve their proficiency levels. Identifying best practices from the highly proficient divisions and applying them across other divisions will be beneficial.

Forensic Chemistry and Scene of Crime Operations divisions have been designated as highly proficient. This shows that these divisions have well developed competence that may be used to drive innovation and high performance. The personnel in the Forensic Chemistry and S.O.C.O. divisions exhibit higher competence over other personnel belonging in other divisions. The other eight divisions classified as proficient meet certain requirements for essential competence. To achieve higher proficiency, these divisions may benefit from focused development programs (Magwenya et al., 2023). Ongena (2023) recommends training in data literacy to improve governmental performance. It must be remembered, however, as Matwiejczuk (2022) argued, that division competence are grounded in personnel competence. In short, individual competence cannot be separated from the organizational context in competence-based analysis.

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The notion of competence-based focus recommends the strategic distribution of resources for the growth and maintenance of key competencies. Additional resources and training to improve competences may be given priority to divisions with lower mean scores, such as the DNA Laboratory Division (mean = 3.07). Although their verbal description is "proficient," the fact that they have the lowest mean in the ten division's ranking signify that there is room for improvement in their competence. On the other hand, to maintain and improve upon their already high levels of skill, divisions such as the Scene of Crime Operations (mean = 3.31) should get the same amount of support and encouragement it was getting before. In fact, for all division personnel to be relevant and productive in their professions, they must continuously upgrade their knowledge, skills, and talents throughout their careers (Mansour et al., 2014).

Moreover, developing a culture of ongoing learning and improvement is a fundamental component of competence-based thinking. This is also the focus of Continuing Professional Development Theory (Allen et al., 2020). It is recommended that regular training programs be undertaken, particularly in divisions where people exhibit a larger range of proficiency (e.g., Polygraphy Division, with an SD of 0.90). In addition, to improve overall competency levels throughout the company, highly skilled divisions can impart best practices and expertise to other divisions. Also, because competence must be viewed as a compound reality and not just an individual domain of skill, or that it must be related to the social composition of the larger group (Pedersen & Caviglia, 2019), the overall culture of competence in Region IVA is affected by all the divisions.

Concerning the results of the Kruskal-Wallis H test to compare the ranks across different genders within various divisions, the results reveal that there are no statistically significant differences in ranks across all divisions (See Table 2). This implies complete equality in ranks regardless of gender. There are observed differences in the Physical Identification Division (p = 0.15), Forensic Photography Division (p+0.24), Questioned Document Examination Division (p=0.13), Firearms Identification Division (p=0.34), Medico-legal division (p=0.22), Forensic Chemistry Division (p=0.25), Fingerprint Identification Division (p-value=0.41), Polygraphy Division (p=.061), and S.O.C.O. Division (p=0.23), but these differences are not statistically significant. The results indicate that gender does not influence the ranking or performance measures within these divisions. The rankings are fairly assigned without gender bias. The equality in ranks indicates that the processes and evaluations within these divisions are gender-neutral, promoting a fair working environment.

Table 2
Kruskal-Wallis Test for Gender Grouping

GENDER		N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
DNA Laboratory Division	Male	28.00 2.00	54.00	0.00	3.00	1.00
	Female	76.00	54.00			
	LGBTQIA+		54.00			
	Prefer not to say	1.00	54.00			
	Total	107.00				
Physical Identification Division	Male	28.00	58.52	5.38	3.00	0.15
	Female	2.00	88.50			
	LGBTQIA+	76.00	50.97			
	Prefer not to say	1.00	88.50			
	Total	107.00				
Forensic Photography Division	Male	28.00	61.14	4.19	3.00	0.24
	Female	2.00	78.25			
	LGBTQIA+	76.00	50.50			
	Prefer not to say	1.00	71.50			
	Total	107.00				

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Questioned Document Examination Division	Male	28.00	62.80	5.61	3.00	0.13
	Female	2.00	66.50			
	LGBTQIA+	76.00	49.95			
	Prefer not to say	1.00	90.50			
	Total	107.00				
Firearms Identification Division	Male	28.00	60.11	3.33	3.00	0.34
	Female	2.00	62.75			
	LGBTQIA+	76.00	51.08			
	Prefer not to say	1.00	87.50			
	Total	107.00				
Medico-Legal Division	Male	28.00	61.30	4.43	3.00	0.22
	Female	2.00	66.25			
	LGBTQIA+	76.00	50.52			
	Prefer not to say	1.00	89.50			
	Total	107.00				
Forensic Chemistry Division	Male	28.00	56.63	4.11	3.00	0.25
	Female	2.00	86.00			
	LGBTQIA+	76.00	51.77			
	Prefer not to say	1.00	86.00			
	Total	107.00				
Polygraphy Division	Male	28.00	55.84	1.82	3.00	0.61
	Female	2.00	64.00			
	LGBTQIA+	76.00	52.61			
	Prefer not to say	1.00	88.50			
	Total	107.00				
Scene of Crime Operations (SOCO) Division	Male	28.00	56.95	4.31	3.00	0.23
	Female	2.00	86.50			
	LGBTQIA+	76.00	51.63			
	Prefer not to say	1.00	86.50			
	Total	107.00				
Fingerprint Examination Division	Male	28	61.16	2.870	3	0.412
	Female	2	64.50			
	LGBTQIA+	76	50.91			
	Prefer not to say	1	67.00			
	Total	107				

Despite the fact that forensic science as a whole remains a male-dominated profession (Ward et al., 2019), the finding that gender does not influence the ranking or performance measures within forensic divisions indicates that both men and women are evaluated and perform their duties based on their skills, qualifications, and professional contributions rather than their

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gender. This suggests a level of gender equality within the forensic divisions. Also, the finding suggests that men and women in forensic science receive similar opportunities for education, training, and professional growth. Philippine universities and training institutions must be commended for offering forensic science programs that do not differentiate between male and female students, ensuring that all have equal access to the necessary knowledge and skills. A STEM program on forensic science like what the U.S.A. has been doing can be replicated in the country (Casey et al., 2023).

Second, it is evident that there are significant differences in the performance competencies in the various areas of forensic divisions when classified according to age (See Table 3). In all the forensic divisions tested, there are statistically significant differences between the groups. In the post hoc tests, it revealed that across all divisions, the groups with the meaningful differences are (a) 21-29 years old and 40-49 years old and (b) 21-29 years old and 30-39 years old. These results suggest that the different groups within each forensic division have different median values. The results further suggest that age influences the ranking in this division, or that age may play a role in performance evaluations, promotions, or other ranking criteria within these divisions. The significant p-values indicate that younger and older age groups are ranked differently, which might reflect differences in experience, skills, or other age-related factors.

Table 3
Kruskal-Wallis Test for Age Grouping

AGE		N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
DNA Laboratory Division	21-29 years old		54.00	0.00	3.00	1.00
	30-39 years old		54.00			
	40-49 years old		54.00			
	50-59 years old		54.00			
	Total	107.00				
Physical Identification Division	21-29 years old	38.00	35.04	24.76	3.00	0.00
	30-39 years old	38.00	66.49			
	40-49 years old	25.00	64.34			
	50-59 years old	6.00	51.92			
	Total	107.00				
Forensic Photography Division	21-29 years old	38.00	37.04	19.89	3.00	0.00
	30-39 years old	38.00	66.72			
	40-49 years old	25.00	60.78			
	50-59 years old	6.00	52.58			
	Total	107.00				
Questioned Document Examination Division	21-29 years old	38.00	36.83	20.09	3.00	0.00
	30-39 years old	38.00	64.36			
	40-49 years old	25.00	64.68			
	50-59 years old	6.00	52.67			
	Total	107.00				
Firearms Identification Division	21-29 years old	38.00	35.39	24.85	3.00	0.00
	30-39 years old	38.00	67.59			
	40-49 years old	25.00	62.66			

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	50-59 years old	6.00	49.67			
	Total	107.00				
Medico-Legal Division	21-29 years old	38.00	37.79	19.14	3.00	0.00
	30-39 years old	38.00	64.68			
	40-49 years old	25.00	64.08			
	50-59 years old	6.00	47.00			
	Total	107.00				
Forensic Chemistry Division	21-29 years old	38.00	33.79	30.72	3.00	0.00
	30-39 years old	38.00	65.17			
	40-49 years old	25.00	70.02			
	50-59 years old	6.00	44.50			
	Total	107.00				
Polygraphy Division	21-29 years old	38.00	35.18	24.64	3.00	0.00
	30-39 years old	38.00	66.53			
	40-49 years old	25.00	64.28			
	50-59 years old	6.00	51.00			
	Total	107.00				
Scene of Crime Operations (SOCO) Division	21-29 years old	38.00	36.34	24.20	3.00	0.00
	30-39 years old	38.00	67.49			
	40-49 years old	25.00 6.00	63.02			
	50-59 years old	107.00	42.83			
	Total					
Fingerprint Examination Division	21-29 years old	38	36.62	21.409	3	0.000
	30-39 years old 38	67.26				
	40-49 years old 25	59.72				
	50-59 years old	6	56.25			
	Total	107				

Age as a factor influencing competencies can be understood through various dimensions such as experience, physical capability, and familiarity with technology and new methodologies. First, older forensic personnel often have more years of experience, which translates into a deeper understanding of forensic techniques and the nuances of criminal investigation. They may have encountered a wider variety of cases, providing them with a broader perspective and better problem-solving skills. In short, the experience of older personnel is invaluable (Jaeger, 2023). Second, forensic work can be physically demanding, requiring personnel to be on-site at crime scenes, sometimes for extended periods. Younger personnel might have an advantage in

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terms of physical endurance and agility, which is essential in fieldwork (Poncio, 2020). In the Philippines, with its challenging terrain and often hot and humid climate, the physical demands on forensic personnel can be even more pronounced. Therefore, the age factor might play a significant role in determining who is more suited for particular types of forensic tasks. Finally, younger forensic personnel might be more adept at using the latest technology and digital tools, which are becoming increasingly important in forensic investigations. Third, it is evident that there are differences in the performance competencies in various areas on forensic divisions when classified according to current position (See Table 4), except for the DNA Laboratory Division (p-value=1.00), Forensic Photography Division (p-value=0.14), and Firearms Identification Division (p-value=0.14). The p-value of 0.05 in Physical Identification Division and the p-value of 0.06 in Polygraphy Division suggests there is a borderline statistically significant difference in the mean ranks among the positions in this division. This indicates some variation in performance or other measured attributes across different positions. The p-value of 0.07 in Medico-legal Division and the p-value of 0.08 in Fingerprint Identification Division are marginally nonsignificant, indicating potential but not definitive differences in mean ranks. Finally, there are statistically significant differences in Questioned Document Examination Division (pvalue=0.04), Forensic Chemistry Division (p-value=0.02), S.O.C.O. Division (pvalue=0.02), which suggest variability in the measured attribute across different positions, potentially indicating different levels of performance or other factors.

The post hoc test revealed that in the Questioned Document Division, the groups with the meaningful differences are (a) forensic experts and Chiefs (Adj. Sig.=.673), (b) others and Chiefs (Adj. Sig.=.410), and (c) others-chemistry personnel (Adj. Sig.=.246). For the Forensic Chemistry Division, the groups with the meaningful differences are (a) others and Chiefs (Adj. Sig.=.185) and (b) others and administrative/operations personnel (Adj. Sig.=.326). For the S.O.C.O. Division, the groups with the meaningful differences are (a) forensic experts and Chiefs (Adj. Sig.=.345) and (b) forensic experts and administrative/operations personnel (Adj. Sig.=.408), (c) forensic experts and chemistry personnel (Adj. Sig.=.207), (d) others and Chiefs (Adj. Sig.=.574), (e) others and administrative/operations personnel (Adj. Sig.=.892), and others-chemistry personnel (Adj. Sig.=.395). The significant differences suggest that the competencies, skills, or performance levels related to the measure in question vary based on the current position. This could reflect differences in training, experience, job responsibilities, or other positionspecific factors.

Table 4

Kruskal-Wallis Test for Current Position Grouping

CURRENT POSITION		N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
DNA Laboratory Division	Chief	12.00	54.00	0.00	5.00	1.00
	Administrative/Operation s Personnel	8.00	54.00			
	Medico-legal Personnel	6.00	54.00			
	Chemistry Personnel	7.00	54.00			
	Forensic Expert	6.00	54.00			
	Others	68.00	54.00			
	Total	107.00				
Physical Identification Division	Chief	12.00	67.50	11.04	5.00	0.05
	Administrative/Operation s Personnel	8.00	69.94			
	Medico-legal Personnel	6.00	63.17			
	Chemistry Personnel	7.00	70.50			
	Forensic Expert	6.00	39.50			

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	Others	68.00	48.51			
	Total	107.00				
Forensic Photography Division	Chief	12.00	65.21	8.21	5.00	0.14
	Administrative/Operations Personnel	8.00	55.81			
	Medico-legal Personnel	6.00	66.92			
	Chemistry Personnel	7.00	73.71			
	Forensic Expert	6.00	40.50			
	Others	68.00	49.83			
	Total	107.00				
Questioned Document Examination Division	Chief	12.00	68.92	11.56	5.00	0.04
	Administrative/Operations Personnel	8.00	61.56			
	Medico-legal Personnel	6.00	64.50			
	Chemistry Personnel	7.00	76.79			
	Forensic Expert	6.00	43.25			
	Others	68.00	48.15			
	Total	107.00				
Firearms Identification Division	Chief	12.00	65.13	8.39	5.00	0.14
	Administrative/Operations Personnel	8.00	68.06			
	Medico-legal Personnel	6.00	61.25			
	Chemistry Personnel	7.00	70.36			
	Forensic Expert	6.00	46.92			
	Others	68.00	48.68			
	Total	107.00				
Medico-Legal Division	Chief	12.00	71.67	10.08	5.00	0.07
	Administrative/Operations Personnel	8.00	60.31			
	Medico-legal Personnel	6.00	58.25			
	Chemistry Personnel	7.00	69.93			

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	Forensic Expert	6.00	36.67			
	Others	68.00	49.65			
	Total	107.00				
Forensic Chemistry Division	Chief	12.00	70.92	12.85	5.00	0.02
	Administrative/Operation s Personnel	8.00	73.13			
	Medico-legal Personnel	6.00	59.00			
	Chemistry Personnel	7.00	69.00			
	Forensic Expert	6.00	44.83			
	Others	68.00	47.59			
	Total	107.00				
Polygraphy Division	Chief	12.00	72.17	10.55	5.00	0.06
	Administrative/Operation s Personnel	8.00	51.06			
	Medico-legal Personnel	6.00	60.17			
	Chemistry Personnel	7.00	75.50			
	Forensic Expert	6.00	48.42			
	Others	68.00	48.88			
	Total	107.00				
Scene of Crime Operations (SOCO) Division	Chief	12.00	68.83	13.47	5.00	0.02
	Administrative/Operation s Personnel	8.00	70.50			
	Medico-legal Personnel	6.00	47.25			
	Chemistry Personnel	7.00	75.79			
	Forensic Expert	6.00	34.92			
	Others	68.00	49.48			
	Total	107.00				
	Forensic Expert	6	40.17			
	Others	68	49.03			
	Total	107				

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Fingerprint Examination Division	Chief	12 8	64.21	9.602	5	0.087
	Administrative/Operation s Personnel		64.50			
	Medico-legal Personnel	6	68.92			
	Chemistry Personnel	7	71.86			

Current positions can influence competencies through the specific responsibilities and tasks associated with different roles, as well as the access to resources and training opportunities. Different positions within forensic divisions require specialized skills and knowledge (Bitzer et al. 2022). For example, a forensic pathologist would need expertise in medical examinations, while a crime scene investigator focuses on evidence collection and preservation. In the Philippines, where forensic science divisions may have limited specialization due to resource constraints, personnel in higher or more specific positions might have developed greater competencies through targeted practice and on-the-job learning. Moreover, higher positions often come with greater access to training programs, workshops, and professional development opportunities.

Fourth, it is evident that there are no statistically significant differences between the groups in the forensic unit/office grouping (See Table 5). The lack of significant differences suggests that the groups perform similarly in these areas. This indicates a high level of consistency across groups in these forensic divisions. This could imply effective standardization of practices and potentially high-quality control within this division. This finding suggests that merely being part of a forensic unit or office does not significantly affect an individual's competencies. Factors such as individual dedication, continuous learning, and the nature of their specific roles might be more critical. In the Philippines, where resources for formal training might be scarce, self-motivated learning and the pursuit of additional certifications or online courses can be crucial for enhancing competencies.

Table 5
Kruskal-Wallis Test for Forensic Unit Grouping

FORENSIC DIVISION			N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
DNA Laboratory Division	Regional Forensic Unit/Office		22.00	54.00	0.00	4.00	1.00
	Provincial Forensic Unit/Office		70.00	54.00			
	District Forensic Unit/Office		6.00	54.00			
	City Forensic Unit/Office		5.00	54.00			
	Satellite Forensic Unit/Office		4.00	54.00			
	Total		107.00				
Physical Identification Division	Regional Unit/Office	Forensic	22.00	48.16	5.98	4.00	0.20
	Provincial Unit/Office	Forensic	70.00	58.02			
	District Unit/Office	Forensic	6.00	53.33			

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	City Unit/Office	Forensic	5.00	27.90			
	Satellite Unit/Office	Forensic	4.00	49.38			
	Total		107.00				
Forensic Photography Division	Regional Unit/Office	Forensic	22.00	44.89	6.69	4.00	0.15
	Provincial Unit/Office	Forensic	70.00	58.66			
	District Unit/Office	Forensic	6.00	54.92			
	City Unit/Office	Forensic	5.00	30.60			
	Satellite Unit/Office	Forensic	4.00	50.50			
	Total		107.00				
Questioned Document Examination Division	Regional Unit/Office	Forensic	22.00	49.73	3.07	4.00	0.55
	Provincial Unit/Office	Forensic	70.00	56.93			
	District Unit/Office	Forensic	6.00	53.33			
	City Unit/Office	Forensic	5.00	35.50			
	Satellite Unit/Office	Forensic	4.00	50.38			
	Total		107.00				
Firearms Identification Division	Regional Unit/Office	Forensic	22.00	46.66	6.26	4.00	0.18
	Provincial Unit/Office	Forensic	70.00	58.51			
	District Unit/Office	Forensic	6.00	52.00			
	City Unit/Office	Forensic	5.00	30.30			
	Satellite Unit/Office	Forensic	4.00	48.13			
	Total		107.00				
Medico-Legal Division	Regional Unit/Office	Forensic	22.00	49.43	3.18	4.00	0.53
	Provincial Unit/Office	Forensic	70.00	56.91			
	District Unit/Office	Forensic	6.00	54.25			

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	City Unit/Office	Forensic	5.00	35.20			
	Satellite Unit/Office	Forensic	4.00	51.38			
	Total		107.00				
Forensic Chemistry Division	Regional Unit/Office	Forensic	22.00	46.25	6.61	4.00	0.16
	Provincial Unit/Office	Forensic	70.00	58.41			
	District Unit/Office	Forensic	6.00	49.25			
	City Unit/Office	Forensic	5.00	29.50			
	Satellite Unit/Office	Forensic	4.00	57.13			
	Total		107.00				
Polygraphy Division	Regional Unit/Office	Forensic	22.00	51.09	3.22	4.00	0.52
	Provincial Unit/Office	Forensic	70.00	56.39			
	District Unit/Office	Forensic	6.00	53.67			
	City Unit/Office	Forensic	5.00	32.60			
	Satellite Unit/Office	Forensic	4.00	55.38			
	Total		107.00				
Scene of Crime Operations (SOCO) Division	Regional Unit/Office	Forensic	22.00	47.43	5.87	4.00	0.21
	Provincial Unit/Office	Forensic	70.00	58.46			
	District Unit/Office	Forensic	6.00	49.58			
	City Unit/Office	Forensic	5.00	31.30			
	Satellite Unit/Office	Forensic	4.00	47.13			
	Total		107.00				
Fingerprint Examination Division	Regional Unit/Office	Forensic	22	42.09	8.640	4	0.071
	Provincial Unit/Office	Forensic	70	59.34			
	District Unit/Office	Forensic	6	53.50			

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City Unit/Office	Forensic	5	31.40
Satellite Unit/Office	Forensic	4	55.13
Total		107	

However, although no statistically significant differences were found in the divisions, the observed variability (particularly in mean ranks) suggests potential areas where performance or other attributes might differ slightly between groups. This variability, while not statistically significant, could still be relevant for internal reviews and quality assurance processes. Given the moderate variability in divisions like Physical Identification, Forensic Photography, and Firearms Identification, it may be beneficial to review training programs and resource allocation to ensure that any underlying causes of variability are addressed, even if they are not currently statistically significant. Since the categories show significant differences, no further post-hoc tests are necessary.

CONCLUSION AND RECOMMENDATIONS

Concerning the demographic profiles of the respondents, the Philippines is still progressing towards a more gender-inclusive workplace, coming out of its past sociocultural segregation and expectations between the roles of male and female in society. Forensic services in the country remains to be male-dominated. This follows the situation in the military and police services. Because a significant majority of forensic officers are aged below 40 years old, it means that most forensic personnel are considered young professionals. Forensic officers in the country are therefore simultaneously building their career and starting their family. There is a saddening dearth of forensic specialists in the region, as is the case in other parts of the country. Having one forensic expert per unit is not enough to meet the increasing demands for forensic analysis. Ideally, there should be ten forensic experts per unit, one for each of the ten major forensic divisions. Considering that Region IVA is a big region, having only 7 forensic units/offices is not sufficient to address the increasing demands for forensic services. There is a need to increase the number of forensic units, because having one provincial unit to address all the forensic needs of the entire province is not enough.

Concerning the level of competencies of the respondents, personnel of all ten divisions are perceived to be proficient in fulfilling their responsibilities, with S.O.C.O. and Forensic Chemistry divisions coming out on top, being the two divisions rated “highly proficient.” This means that despite challenges in resources, there is a great degree of confidence in the region regarding their performance competence. The competence of forensic personnel in every department suggests that they are skilled and equipped to perform their roles. Prolonged training and development programs are beneficial in maintaining and improving the abilities of forensic personnel, as indicated by the perceived proficiency across all divisions. Ongoing professional development is important and improves workforce proficiency overall.

Concerning the forensic competencies of the four groups of respondents in terms of the ten divisions, policing does not need to be a male dominated profession. The trend in juris doctor, for instance, is that there are more female law students now. For criminology, equal number would be ideal. Younger forensic officers see their competence level differently from their older counterparts and vice versa. The self-perception of younger versus older counterparts are influenced by the amount of experience they have on the field. Different positions within forensic divisions require specialized skills and knowledge, which is why current positions influence the competencies of forensic personnel in the various divisions. Competence in forensic science might depend more on personal dedication to continuous learning and professional development rather than affiliation in any forensic unit/office alone.

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