

Lived Experiences of a Forensic Ballistics Examiner in Firearm Evidence Examination: A Phenomenological Study

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Date Submitted:

August 21, 2026

Date Accepted:

September 19, 2026

Date Published:

October 02, 2026

DOI:

10.5281/zenodo.23100731

ABSTRACT

Despite the important role of firearm evidence examination in criminal investigation and judicial proceedings, limited research has examined the lived professional experiences of forensic ballistics examiners in the Philippine setting. This study explored how practicing examiners experienced firearm evidence examination, the challenges they encountered, their perceptions of the profession's nature and demands, the coping and adaptive strategies they used, the influence of experience on professional practice and decision-making, and the meanings they attached to their role in the criminal justice system. A qualitative phenomenological design was employed with two practicing forensic ballistics examiners from the Puerto Princesa City Forensic Unit and the Palawan Provincial Forensic Unit. Participants were purposively selected

because they were the only practicing firearm examiners in the two units who met the study criteria. Data were gathered through in-depth, semi-structured interviews, audio-recorded with consent, transcribed verbatim, and examined through narrative analysis. Findings showed that firearm evidence examination is a case-driven professional responsibility requiring technical competence, attention to detail, scientific objectivity, accuracy, integrity, patience, and continuous learning. Participants encountered technical, logistical, physical, organizational, and case-related pressures, yet protected examination quality through adherence to procedure, documentation, verification, time management, rest, work-life boundaries, and peer, family, and organizational support. Experience strengthened confidence and evidence-based judgment without reducing the perceived need for careful validation. The study concludes that credible firearm evidence examination integrates technical expertise with integrity, objectivity, accountability, and continuing professional development. The findings informed an experience-based Best Practices Guide for Forensic Ballistics Examiners in Firearm Evidence Examination.

Keywords: *forensic ballistics, firearm evidence examination, phenomenology, professional judgment, occupational challenges, criminal justice system*

INTRODUCTION

Forensic ballistics is a specialized field of forensic science concerned with the examination and comparison of firearms, bullets, cartridge cases, and related physical evidence. In criminal investigations, firearm examiners use controlled test firing, comparison microscopy, documentation, and professional interpretation to evaluate whether questioned evidence is consistent with a submitted firearm. Their findings may assist investigators and courts in firearm-related cases, making accuracy, objectivity, evidence integrity, and professional accountability central to the work (Nichols, 2018; Academy Standards Board, 2022). In the Philippine setting, firearm examination forms part of the forensic services provided by the Philippine National Police and operates

within legal requirements governing firearm identification, evidence handling, and expert testimony (Philippine National Police, 2011; Republic of the Philippines, 2013; Supreme Court of the Philippines, 2019).

Scientific research has increasingly examined the validity, reliability, repeatability, and human-judgment components of firearm comparison. Studies have shown that trained examiners can make reliable comparison decisions, while also demonstrating that evidence difficulty, examiner variability, and inconclusive outcomes remain important features of actual casework (Mattijssen et al., 2020; Law & Morris, 2021; Guyll et al., 2023; Monson et al., 2023a, 2023b). These findings underscore that firearm examination is not a purely mechanical procedure. It involves scientific methods applied by practitioners who must evaluate evidence quality, recognize limitations, and make defensible conclusions under conditions of uncertainty.

Beyond technical decision-making, forensic practitioners may also experience demanding workloads, organizational constraints, exposure to stressful cases, physical strain, and pressure associated with consequential findings. Research on forensic professionals has documented occupational stress, burnout, secondary traumatic stress, and the importance of organizational and wellness support (Almazrouei et al., 2021; Goldstein & Alesbury, 2021; Levin et al., 2021). Philippine studies likewise identify resource limitations, training needs, operational pressures, and the importance of professional competence within forensic work (Quiape & Painaga, 2023; Maningo et al., 2025; Lagura et al., 2026; Santiago et al., 2026). However, comparatively little research has centered specifically on how practicing forensic ballistics examiners themselves experience firearm evidence examination.

This study addressed that gap through a phenomenological inquiry into the lived experiences of practicing forensic ballistics examiners in Palawan. It examined their experiences in conducting firearm evidence examinations, the challenges they encountered, their perceptions of the nature and demands of their work, their coping mechanisms and adaptive strategies, the influence of professional experience on practice and decision-making, and the meanings they attached to their role in the criminal justice system. By foregrounding practitioners' narratives, the study sought to complement technical and performance-oriented research with an experiential account of how scientific procedures, professional responsibility, workplace demands, and personal meaning interact in actual forensic practice.

Literature Review

Scientific foundations of firearm evidence examination

Forensic firearm examination rests on the premise that firearm components may produce observable microscopic characteristics on fired bullets and cartridge cases. Toolmark Theory, often described within the firearm examination literature as the theory of identification, provides the scientific basis for comparing class and individual characteristics generated by barrels, breech faces, firing pins, extractors, ejectors, and other firearm components (Association of Firearm and Tool Mark Examiners, n.d.; Nichols, 2018). Standardized examination also requires appropriate handling, documentation, comparison, and reporting procedures so that findings remain scientifically supported and legally defensible (Academy Standards Board, 2022; National Institute of Standards and Technology, 2021).

Empirical studies have continued to test the validity of firearm comparison under conditions that approximate casework. Guyll et al. (2023) reported evidence supporting the validity of cartridge-case comparison decisions, while Monson et al. (2023a) found relatively low overall error rates in a large black-box study but also documented examiner-level variation and the frequency of inconclusive decisions. Monson et al. (2023b) further demonstrated the importance of repeatability and reproducibility in firearm comparison. Together, these studies show that credible examination depends on both the quality of physical characteristics available for comparison and disciplined application of scientific procedures by trained practitioners.

Professional judgment, accuracy, and evidentiary decision-making

Although firearm examination is guided by established procedures, professional judgment remains integral to interpreting evidence. Mattijssen et al. (2020) found that examiner judgments were related to comparison difficulty and that evidence characteristics can influence the decisions reached during firearm examination. Law and Morris (2021) likewise documented variability in examiner conclusions when practitioners evaluated cartridge-case reproductions containing comparable information. These findings indicate that the examiner must continuously assess whether the observed characteristics are sufficient to support identification, exclusion, or an inconclusive result rather than forcing a conclusion when the evidence is limited.

Practitioner-focused research reinforces this picture of casework as a combination of procedure and judgment. Scurich et al. (2022) found that practicing firearm examiners encounter varied case conditions and make decisions within real operational contexts, while the NIST-OSAC process map presents examination as a systematic sequence of assessment, comparison, evaluation, and reporting (National Institute of Standards and Technology, 2021). The literature therefore supports a professional model in which objectivity, documentation, review, and scientific restraint are not separate from technical competence; they are essential components of defensible decision-making.

Occupational demands, practitioner well-being, and organizational support

Forensic examination can involve occupational pressures that extend beyond the technical task itself. Almazrouei et al. (2021) identified workplace conditions, case backlogs, supervision, and support as relevant to the stress experienced by forensic examiners. Goldstein and Alesbury (2021) similarly reported occupational stress and wellness concerns among forensic practitioners, while Levin et al. (2021) found that forensic science professionals may experience secondary traumatic stress and burnout alongside compassion satisfaction. These studies establish that the reliability of forensic practice must be considered together with the human conditions under which practitioners perform demanding and consequential work.

Organizational support, professional relationships, recovery time, and access to adequate resources may therefore influence how forensic personnel sustain performance over time. The literature does not suggest that stress automatically undermines forensic conclusions; rather, it highlights the importance of systems that support practitioner well-being while maintaining quality assurance. This is relevant to firearm examiners who may work with difficult evidence, high-profile cases, time-sensitive requests, and physically demanding comparison tasks. Understanding the strategies practitioners use to manage these conditions can provide insight into how professional resilience and examination quality are maintained simultaneously.

Philippine forensic practice and the experiential research gap

Philippine research demonstrates the operational importance of competence, resources, training, and evidence-handling practices in forensic work. Quiape and Painaga (2023) reported a very high extent of forensic practices among police investigators while identifying challenges that required training and adequate equipment. Maningo et al. (2025) described both challenges and rewarding experiences among Cebu City forensic investigators, while Lagura et al. (2026) documented the work world of PNP Scene of the Crime Operatives, including teamwork, evidence recovery, resource constraints, and occupational demands. Santiago et al. (2026) similarly emphasized the importance of forensic capacity building, resources, and inter-agency coordination for provincial investigative practice.

These studies provide valuable information about forensic competencies, institutional capacity, and operational problems, yet they are not focused specifically on the lived experiences of practicing firearm examiners conducting firearm evidence examinations. The source thesis therefore identified a localized gap: little Philippine research explains how firearm examiners themselves experience technical difficulty, occupational pressure, coping, professional growth, and the moral weight of conclusions that may affect investigations and judicial proceedings. A phenomenological inquiry is appropriate for addressing this gap because it prioritizes the meaning individuals assign to first-hand experience rather than reducing professional practice to performance measures alone (Churchill, 2022; Van Manen, 2014).

Theoretical grounding and conceptual framework

The study was philosophically informed by phenomenology and anchored scientifically on Toolmark Theory and Locard's Exchange Principle. Phenomenology provided the orientation for understanding the participants' experiences from their own perspectives and for examining how meaning emerged from actual professional practice (Churchill, 2022; Van Manen, 2014). Toolmark Theory contextualized the comparison of microscopic characteristics on bullets and cartridge cases, while Locard's Exchange Principle explained how interactions among firearms, ammunition, persons, and environments may produce recoverable physical evidence (Association of Firearm and Tool Mark Examiners, n.d.; Mistek et al., 2019).

Together, these perspectives linked the human experience of examination with the scientific and evidentiary processes that structure firearm casework. The study's Input-Process-Output paradigm organized the inquiry around the research questions, participants, semi-structured interview guide, and ethical requirements; the interview, transcription, and narrative-analysis process; and the resulting narratives concerning lived experiences, challenges, work demands, coping, professional decision-making, and meaning. The original conceptual framework is retained below to preserve the study's logic and relationship among these elements.

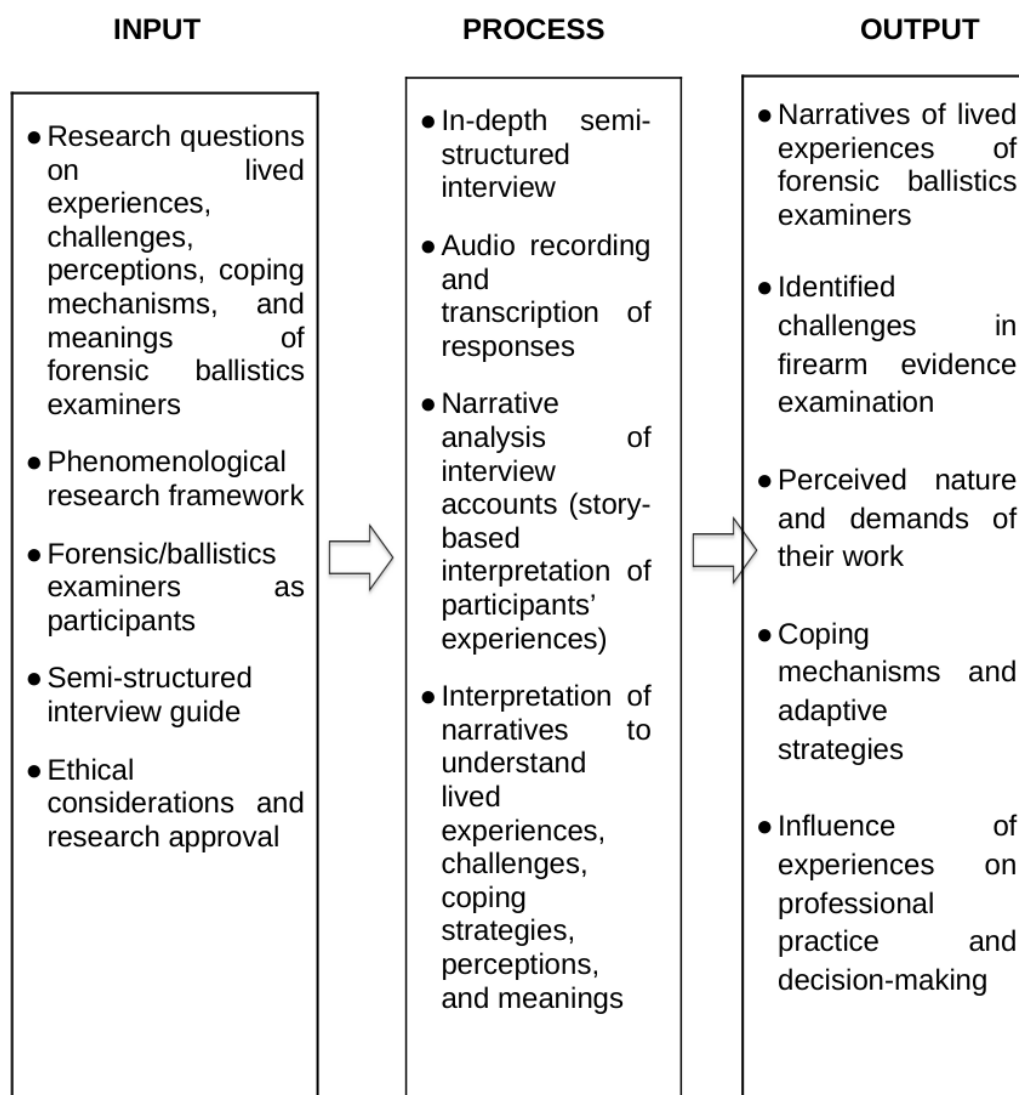


Figure 1. *Research Paradigm*

METHODS

Research Design

The study employed a qualitative phenomenological research design to explore and understand the lived experiences of forensic ballistics examiners and the meanings they attributed to those experiences. Phenomenology was used to examine how practitioners perceived and interpreted firearm evidence examination as it occurred in their professional lives, including technical work, occupational demands, coping, decision-making, and professional meaning (Churchill, 2022; Van Manen, 2014).

The inquiry remained qualitative throughout. It did not attempt to test the accuracy of forensic techniques or statistically generalize findings to all firearm examiners. Instead, it sought detailed first-hand accounts of a highly specialized professional phenomenon and interpreted those accounts in relation to the study's research questions.

Research Locale

The study was conducted in Puerto Princesa City, Palawan, at the Puerto Princesa City Forensic Unit in Barangay San Pedro and the Palawan Provincial Forensic Unit in Barangay Tiniguiban. The provincial unit handled cases from the municipalities of Palawan, while the city unit served cases within Puerto Princesa City. These sites were selected because they performed firearm evidence examinations and employed the qualified practitioners who directly conducted those examinations.

Participants and Sampling Technique

Two practicing forensic ballistics examiners participated in the study: one from the Puerto Princesa City Forensic Unit and one from the Palawan Provincial Forensic Unit. One participant was 30 years old and had two years of experience as a forensic firearm examiner after more than seven years of organizational service; the other was 41 years old and had approximately fifteen years of firearm-examination experience within almost seventeen and a half years of service. Their different levels of experience provided first-hand accounts from practitioners at distinct stages of professional development.

Purposive or judgmental sampling was used because participation required direct, specialized experience in firearm evidence examination. Coordination with the two forensic units confirmed that each unit had only one practicing firearm examiner who met the inclusion criteria during the study period. The two participants therefore represented the accessible qualified practitioner population within the selected locale rather than a statistically sampled population.

Research Instrument

Data were gathered using a researcher-developed semi-structured interview guide composed of open-ended main questions and probing questions aligned with the six research questions. Three validators with relevant academic, research, and professional backgrounds reviewed the guide for clarity, relevance, appropriateness, and alignment. Their recommendations were incorporated before data collection. With permission, audio recording was used to preserve the interviews accurately, while brief field notes documented relevant contextual observations.

Data Gathering Procedure

Following proposal approval and instrument validation, the researcher secured authorization to proceed and coordinated with the heads of the Puerto Princesa City Forensic Unit and the Palawan Provincial Forensic Unit. Qualified participants were identified through this coordination, formally invited, and scheduled according to availability. Before each interview, the researcher explained the purpose and procedures of the study, obtained written informed consent, and separately obtained permission to audio-record the conversation.

Face-to-face, in-depth semi-structured interviews were conducted in July 2026. The researcher used the validated guide but allowed appropriate probing and follow-up questions so participants could clarify and

elaborate on their experiences. Audio recordings were transcribed verbatim, checked against the recordings for completeness, and used as the primary qualitative data.

Data Analysis

The interview data were analyzed through narrative analysis. Each participant's account was first examined individually to preserve its context and sequence. The researcher repeatedly reviewed the transcripts and interpreted narratives relating to lived experiences, technical and occupational challenges, perceptions of the profession, coping and adaptive strategies, professional practice and decision-making, and the meanings attached to the examiner's role.

The two accounts were then examined across participants to identify similarities, differences, and contrasting experiences while retaining representative verbatim statements. Interpretations were discussed in relation to relevant literature and the study's theoretical foundations. Trustworthiness was supported through credibility, dependability, confirmability, and transferability procedures, including member checking, systematic documentation of the data-gathering and analytical process, reflexive grounding of interpretations in participant accounts, and sufficiently rich description of the context.

Ethical Consideration

Participation was voluntary and based on written informed consent. Participants were informed of the study's purpose, procedures, their right to withdraw without penalty, their right to decline sensitive questions, and the use of audio recording. Permission to conduct the study was secured from the relevant institutional and forensic-unit authorities before interviews were undertaken.

Confidentiality was protected through participant codes or pseudonyms, omission or anonymization of directly identifying information, and careful treatment of sensitive case details. Audio recordings, transcripts, field notes, and related files were securely stored and accessed only by the researcher. The participants were adult practitioners capable of providing informed consent, and no vulnerable population was intentionally recruited.

RESULTS AND DISCUSSION

Table 1. *Synthesis of Major Findings*

Area of Inquiry	Synthesized Finding
Lived experiences	Case-driven, continuously evolving practice shaped by real case exposure, scientific procedures, carefulness, accuracy, objectivity, responsibility, and continuous learning.
Challenges	Technical, logistical, physical, organizational, and professional difficulties, including damaged or difficult evidence, improvised or unfamiliar firearms, equipment and ammunition limitations, prolonged comparison, and pressure surrounding sensitive cases.
Nature and demands	A specialized and responsibility-laden profession requiring technical knowledge, patience, attention to detail, sound judgment, objectivity, integrity, mental and physical preparedness, and continuing learning.
Coping and adaptation	Time management, rest, work-life boundaries, family and peer support, organizational assistance, documentation, double-checking, adherence to procedure, patience, and continued learning.
Influence of experience	Greater confidence, stronger evidence-based judgment, increased appreciation of integrity and consequences, continued reliance on standard procedures, and emphasis on validation rather than complacency.
Professional meaning	A scientific responsibility extending beyond the laboratory; examiners saw accurate and objective findings as contributions to investigation, judicial decision-making, public safety, truth, and justice.

Lived Experiences in Conducting Firearm Evidence Examination

The participants described firearm evidence examination as an ongoing, case-driven learning process rather than a routine laboratory activity. Real case exposure progressively shaped how they approached test firing, microscopic comparison, documentation, interpretation, and the consequences of their findings. The PPC Examiner emphasized movement from earlier technical responsibilities toward more consequential examination work, while the Palawan Examiner emphasized learning from varied evidence and the pressure associated with difficult and sensational cases. Across both accounts, accuracy, carefulness, scientific objectivity, and professional responsibility remained recurring elements.

One important feature of the narratives was that professional development occurred through repeated engagement with actual cases. The participants did not portray experience as simple familiarity; instead, they described each case as requiring renewed attention to the evidence, procedures, and contextual demands. As the Palawan Examiner explained, even cases that appear similar to an ordinary observer may require different analysis and conclusions. This reflects Scurich et al. (2022), who showed that firearm examination occurs under varied real-world case conditions, and it is consistent with the scientific emphasis on evidence-specific comparison in Toolmark Theory.

The lived experience of examination also included an emotional and occupational dimension. Significant cases remained memorable because findings could affect investigators, courts, victims, accused persons, and public perceptions. These accounts align with studies showing that forensic practice combines technical responsibility with occupational stress and well-being concerns (Almazrouei et al., 2021; Goldstein & Alesbury, 2021; Levin et al., 2021). The participants' narratives therefore positioned firearm examination as both scientific work and a continuing professional responsibility whose quality depends on careful procedure, learning, and awareness of consequences.

Challenges Encountered During Firearm Evidence Examination

Challenges were technical, logistical, physical, organizational, and professional. The PPC Examiner described fragmented or deformed bullets, corroded firearms, faint characteristics associated with polygonal rifling, equipment limitations, ammunition availability, and pressure surrounding sensitive cases. The Palawan Examiner emphasized the unpredictability and safety concerns of improvised firearms, difficulty test-firing unfamiliar firearms, physical strain during prolonged comparison, and pressure to complete reports quickly in sensational cases.

Importantly, neither participant treated difficulty as justification for lowering the standard of examination. When characteristics were insufficient, the PPC Examiner regarded an inconclusive result as more defensible than an unsupported identification. The Palawan Examiner emphasized documentation, double-checking, consistency, and clarity. This orientation mirrors research showing that comparison difficulty and evidence quality influence examiner judgments and that variability may occur when cartridge-case evidence offers limited or ambiguous characteristics (Mattijssen et al., 2020; Law & Morris, 2021).

These accounts show that professional competence includes recognizing the limits of the evidence and protecting the integrity of the conclusion. Damaged specimens, modern rifling, resource constraints, and time pressure may complicate the examination, but the participants repeatedly returned to scientific procedures, sufficient observable characteristics, and validation. This reinforces the logic of Toolmark Theory and the process safeguards emphasized by NIST and forensic standards: conclusions should follow from the evidence and documented examination rather than from external expectations (Academy Standards Board, 2022; National Institute of Standards and Technology, 2021).

Perceptions of the Nature and Demands of Forensic Ballistics Examination

Both participants perceived forensic ballistics examination as specialized, demanding, and consequential. Technical knowledge was essential but insufficient by itself. They emphasized patience, attention to detail, sound judgment, objectivity, integrity, physical and mental preparedness, and the ability to manage emotional and professional pressure. The PPC Examiner framed the profession as a combination of science, investigation, and

public service; the Palawan Examiner emphasized the breadth, risk, commitment, and continuous learning required by the work.

Experience deepened their perception of responsibility. What initially might appear to be a task of completing an examination and laboratory report became, through repeated case exposure, recognition that findings can affect people's lives. This shift is captured in the participant reflection that the work is "not just a job" because people may be helped or harmed by what examiners do. The result is consistent with practitioner-focused research showing that forensic work combines scientific responsibilities with organizational and human demands (Scurich et al., 2022; Almazrouei et al., 2021).

The participants' accounts also complement studies of forensic practitioner wellness. Goldstein and Alesbury (2021) and Levin et al. (2021) documented occupational stress, burnout, and the relevance of organizational support. In the present study, the demands of the profession were experienced not only as workload or stress but as a moral-professional obligation to remain accurate, objective, and prepared despite those demands.

Coping Mechanisms and Adaptive Strategies

Coping involved both personal recovery and professional regulation. Participants described time management, brief periods of rest, exercise, conversations with coworkers, family support, personal boundaries, and work-life balance as ways of restoring focus and preventing exhaustion. The Palawan Examiner compared short breaks to "charging" before returning to work, while the PPC Examiner described managing stress through time, rest, relationships, and separation of work from personal life.

Professional coping strategies were equally prominent. Under pressure, the participants relied on established procedures, documentation, review, validation, and double-checking rather than adjusting conclusions to satisfy external expectations. The PPC Examiner stated, "I stick to our procedure," because the examiner personally signs the report and may later explain the findings in court. The Palawan Examiner similarly emphasized worksheets, documentation, and checking before releasing results.

"I stick to our procedure ... I also have to explain [my findings] in court in the future." — PPC Examiner

These coping practices suggest that well-being and quality assurance were interconnected. Rest and social support helped restore physical and mental focus, while procedures and verification protected scientific accuracy. This pattern is consistent with Goldstein and Alesbury (2021) and Levin et al. (2021), who emphasized wellness and organizational support among forensic practitioners. In this study, coping was not merely a reaction to stress; it was part of sustaining reliable professional performance.

Influence of Experience on Professional Practice and Decision-Making

Professional experience strengthened confidence, patience, carefulness, and judgment, but it did not lead the participants to describe themselves as less dependent on scientific procedure. Instead, increased experience reinforced the need to validate findings, rely on evidence, and remain objective. Both examiners described learning from each case and becoming increasingly conscious of the consequences attached to laboratory conclusions.

The PPC Examiner summarized this orientation by emphasizing that conclusions must be supported by evidence rather than assumptions or outside influence. The Palawan Examiner similarly described systematic examination, confidence grounded in demonstrable findings, and continued verification of work. These narratives are consistent with Mattijssen et al. (2020), who demonstrated the central role of examiner judgment in firearm comparisons, while also supporting the importance of controlling cognitive and contextual influences in forensic decision-making (Meterko & Cooper, 2021).

Experience therefore appeared to shape more than technical proficiency. It changed how the participants understood responsibility, assessed uncertainty, and positioned themselves in relation to evidence. Greater confidence was paired with greater caution, not complacency. The systematic emphasis on assessment, comparison, evaluation, reporting, and review parallels the NIST-OSAC Firearms Process Map (National Institute of Standards and Technology, 2021).

Meaning of the Profession and Role in the Criminal Justice System

The participants understood their work as a scientific responsibility extending beyond the laboratory. They saw accurate firearm examination as a contribution to criminal investigation and judicial proceedings, particularly by helping investigators and courts interpret whether recovered bullets or cartridge cases were associated with submitted firearms. The PPC Examiner described the profession as “a responsibility to serve justice through science,” while the Palawan Examiner emphasized the examiner’s large role in helping an investigation progress.

Integrity emerged as the central professional value in the participants’ accounts. The PPC Examiner stated that technical knowledge and skills “will not be enough” without integrity and urged examiners to remain objective because “the evidence speaks for itself.” The Palawan Examiner likewise stressed accuracy, objectivity, consistency, clarity, carefulness, and continuous learning. These accounts show that the professional meaning of firearm examination is tied to trust: technically sophisticated work loses value if the examiner’s independence or integrity is compromised.

“Technical knowledge and skills alone will not be enough ... integrity is just as important ... always rely on what the evidence says; the evidence speaks for itself.” — PPC Examiner

The participants’ interpretation of their role is consistent with the institutional responsibilities attached to firearm testing, evidence handling, documentation, and expert interpretation in Philippine practice (Philippine National Police, 2011; Republic of the Philippines, 2013; Supreme Court of the Philippines, 2019). Their narratives ultimately framed the forensic ballistics examiner as both a scientific practitioner and a professional entrusted with consequential evidence. The study’s Best Practices Guide therefore emerged from a consistent experiential message: reliable firearm examination depends on technical competence exercised with integrity, objectivity, careful documentation, validation, continuing learning, and respect for the limits of the evidence.

CONCLUSION

The study demonstrates that the lived experience of firearm evidence examination is simultaneously technical, professional, and human. Across the two participants, credible practice was characterized by scientific procedure, attention to detail, accuracy, objectivity, integrity, documentation, validation, patience, and continuous learning. The examiners encountered difficult evidence, resource and equipment constraints, physical strain, organizational demands, and pressure associated with sensitive cases, yet they consistently described protecting the examination through procedure, careful judgment, and restraint when the evidence was insufficient.

Professional experience strengthened confidence and decision-making while also deepening awareness of responsibility. Rather than making the work routine, experience reinforced the need to remain evidence-centered and accountable because forensic conclusions may influence investigations, court proceedings, and the lives of people involved in criminal cases. Within the context of the two Palawan forensic units, the findings contribute an experiential perspective that complements technical research on firearm comparison and provides the basis for the study’s Best Practices Guide for Forensic Ballistics Examiners in Firearm Evidence Examination.

Recommendation

Forensic units and supervising agencies may use the findings and the Best Practices Guide as a reference for strengthening firearm examination practice. Priority may be given to continued competency development; access to appropriate equipment, ammunition, and technical resources; systematic documentation and peer or supervisory verification; clear procedures for handling inconclusive evidence; and institutional mechanisms that protect scientific independence when examiners encounter time pressure or external expectations. Because participants linked sustained accuracy with personal recovery and support, workload management, reasonable rest, peer support, and practitioner well-being should also be considered part of quality assurance rather than treated as separate concerns.

Future research may extend the inquiry to additional forensic units and practitioners across regions while preserving the depth of qualitative investigation. Studies may examine how organizational culture, staffing, resource availability, courtroom experience, technological changes, cognitive influences, and formal quality-

assurance systems shape firearm examiners' judgments and well-being. Comparative or longitudinal qualitative work may also clarify how professional meaning and decision-making evolve across different stages of an examiner's career. Any broader inquiry should recognize that the present findings are context-specific and are not intended for statistical generalization.

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