Radiologic Technology Enhancement Programs as A Predictor of Radiologic Technology Licensure Examination Performance: A Convergent Parallel Mixed-Methods Design

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Abstract-This convergent parallel mixed-methods study examined the extent to which Radiologic Technology Enhancement Program (RTEP) predicts Radiologic Technology Licensure Examination (RTLE) performance among graduates of a private higher education institution in Davao City. The quantitative phase involved 100 recent graduates of the academic year 2024 to 2025, while the qualitative phase included 10 purposively selected participants. Descriptive statistics, Spearman correlation, and general linear modeling were used to analyze the quantitative data, while thematic content analysis was applied to the interview narratives. Findings showed that both RTEP and RTLE performance were at a moderate level overall, with stronger results in Patient Care Management and Radiographic Positioning and Radiologic Procedures, and comparatively lower scores in Radiation Physics and Image Production and Evaluation. A very strong positive relationship was found between RTEP and RTLE performance, and the enhancement program significantly predicted licensure examination outcomes. Qualitative findings revealed three major themes: reconstructing academic preparedness through knowledge reinforcement, developing disciplined and strategic study behaviors, and developing resilience and adaptive test-taking behaviors. The integration of both strands showed strong convergence, indicating that enhancement programs helped strengthen foundational knowledge, improve exam strategies, and build confidence for licensure examination success. The study concludes that RTEP is a valuable institutional strategy for improving RTLE readiness and performance.

Index Terms: ***Radiologic Technology Enhancement Program, Radiologic Technology Licensure Examination, convergent design, Davao City, Philippines***

I. INTRODUCTION

Background of the Study

The Professional Regulation Commission (PRC) Licensure Examinations serve as the sole high-stakes gateway for professional registration in the Philippines (Alipio & Lantajo, 2024). Despite this critical role, the national performance in the Radiologic Technology Licensure Examination (RTLE) has remained alarmingly low and inconsistent, with an average passing rate of only 47.78% over the past 15 years (Ibañez, 2025). Such persistently poor outcomes suggest deeper systemic problems affecting examinees (Gallardo & Sison, 2025). More specifically, educational concerns including curricular inadequacies, ineffective instructional preparation, and insufficient readiness for board examination competencies have emerged as major contributing factors to low examination performance (Dimas, 2024; Albina et al., 2022).

In the United States, the American Registry of Radiologic Technologists (ARRT) reported a decline of passing rates from 2020 to 2024 (ARRT, 2025). Similarly, professional healthcare licensure examinations in Nepal have repeatedly produced passing rates below 50% (Kathmandu, 2024). As a result, enhancement programs are now being applied to further increase the passing rates of exam takers which showed significant success in North America and Saudi Arabia (Brown, 2024; Mansour & Gouda, 2025).

Nationally in Baguio City, enhancement initiatives designed to strengthen academic competencies and examination preparedness were associated with improved licensure examination passing rates (Dulipas, 2024). Comparable findings were reported in Laguna City, where structured review interventions and preparation strategies contributed to increased success rates among board examinees (Beraña & Montecillo, 2025). Supporting this perspective, Wagan et al. (2025) emphasized that structured enhancement programs become more effective when incorporated with targeted remediation and continuous performance monitoring, as these approaches promote deeper knowledge acquisition and better preparedness for licensure examinations.

Despite its effectiveness for licensure exam success, previous studies continue to highlight the need to validate enhancement programs as a predictor for licensure exam passing rates (Entero & Comeros, 2025; Abao et al., 2023). Moreover, a practical-knowledge gap exists evidenced by low and fluctuating examination results (Ibañez, 2025; ARRT, 2025; Kathmandu, 2024). Furthermore, a methodological gap is shown as most studies provide only quantitative data, while other researchers recommend documenting the narratives of the examinees (Zaspa & Maniago, 2025; Albina et al., 2022). Integrating qualitative approaches may also provide deeper insights into students' experiences and instructional challenges, leading to more effective educational interventions and policy improvements in Radiologic Technology education (Ibañez, 2026) As a result, this study aims to fill these gaps by identifying the role of the Radiologic Technology enhancement program on the RTLE performance through a convergent parallel mixed-methods design.

Worldview

Driven by the critical challenge of persistently declining national Radiologic Technology Licensure Examination (RTLE) passing rates, this study adopts a pragmatic philosophical worldview that prioritizes functional utility over theoretical abstraction. Pragmatism highlights the importance of action, practical outcomes, and real-world usefulness rather than relying solely on abstract theories (Elgeddawy & Abouraia, 2024). It holds that the value and truth of an idea are reflected in how effectively it works in addressing a problem. In this perspective, concepts and methods are considered meaningful when they produce practical and measurable results (Mifsud & Sammut, 2023).

Guided by this philosophy, the mixed-methods approach is appropriate because pragmatism supports the use of multiple methods to determine the most effective ways of addressing curriculum gaps and improving student performance. This perspective focuses on generating actionable and evidence-based findings that can validate effective preparatory programs and help graduates improve their chances of successfully passing the licensure examination on their first attempt.

Theoretical Lens

This study is based on Human Capital Theory (Becker, 1964) and Constructivist Learning Theory (Vygotsky, 1978). These theories help explain how Radiologic Technology enhancement programs can improve licensure examination performance.

The Human Capital Theory (Becker, 1964) states that education, training, and skill development can improve a person's performance and productivity. In radiologic technology education, enhancement programs such as review classes, mock board examinations, remediation, and other learning activities are considered important investments for students. These programs help students improve their knowledge and technical skills, which may lead to better performance in the Radiologic Technology Licensure Examination (RTLE). This theory supports the study because it explains how enhancement programs may affect licensure examination results.

Meanwhile, the Constructivist Learning Theory (Vygotsky, 1978) explains that students learn by gaining experience, reflecting, and interacting with learning materials. Enhancement programs that use practice tests, case activities, feedback, and guided review support active learning and understanding. This theory supports the qualitative part of the study because it explains how students experience and understand the benefits of enhancement programs.

By combining Human Capital Theory and Constructivist Learning Theory, the study gains a stronger foundation. Human Capital Theory explains why enhancement programs may improve RTLE performance, while Constructivist Learning Theory explains how these programs help students learn effectively. These theories also support the convergent parallel mixed-methods design of the study by helping explain both the quantitative and qualitative findings.

Review of Related Literature

The scholarly context for investigating Radiologic Technology Enhancement Programs (RTEP) and their impact on licensure success serves as a critical synthesis of existing knowledge. As the healthcare landscape evolves, the demand for highly competent Radiologic Technologists has intensified, placing significant pressure on academic institutions to ensure their graduates are prepared for professional practice. This review is structured to explore the intersection of institutional interventions and individual performance, specifically addressing the persistent challenge of low national Radiologic Technology Licensure Examination (RTLE) passing rates.

Enhancement Program. A study conducted by Rabino (2025) revealed that mock board examination scores significantly predicted success in the Radiologic Technology Licensure Examination (RTLE). The study highlighted that regular examinations and preparatory assessments function as effective academic interventions that enhance students' readiness for licensure examinations. Rabino (2025) further explained that mock examinations familiarize students with the structure and format of board examinations, help reduce examination anxiety, and improve test-taking strategies.

Consequently, the study recommended the continuous implementation of enhancement programs that incorporate regular examinations and review activities to improve RTLE performance. In addition, studies on examination preparation among radiologic technology graduates indicated that educational preparation strategies, including review classes, long quizzes, examinations, and study reinforcement activities, significantly contribute to board examination readiness, Ha et al. (2022). Furthermore, long quizzes and monthly examinations were specifically identified as beneficial in strengthening theoretical knowledge and monitoring students' academic progress prior to taking the actual licensure examination.

A supportive learning environment in health professions is associated with higher student satisfaction, better well-being, improved academic performance, and stronger collaboration (Farokhzadian et al., 2024; Alghamdi et al., 2022). Research also shows that students who perceive their learning environment as supportive are more likely to develop professional identity, competence, and interpersonal skills (Alghamdi et al., 2022; Samaniego-Mananghaya, 2025). Studies show that students' perceptions of a supportive learning environment positively correlate with their professional identity development, affirming that the environment is effective in developing competence and interpersonal skills (Alghamdi et al., 2022; Samaniego-Mananghaya, 2025).

It is an essential area that would assist schools of radiologic technology in recognizing their potential and learning what actions the concerned schools would take to maintain their standards as radiologic technology institutions (Samaniego-Mananghaya, 2025). Faculty members have focused on developing learning resources to better prepare students for their final year clinical placements. These resources are designed to become part of the curriculum so students can receive continuous and updated learning experiences. Preparatory activities were also expanded to include different and specialized clinical situations to improve students' readiness and professional

competence (Jimenez et al., 2024). These activities also help strengthen communication and teamwork skills, which are important for students' future careers and professional development (Sait & Tombs, 2021).

According to Lianza (2025), academic interventions such as refresher lectures and weekly assessments help students build exam-taking stamina and improve preparation for licensure examinations. A mixed-methods study on professional licensure showed that graduates who joined institutional enhancement programs achieved 15–20% higher passing rates compared to those who depended only on self-study. Greater student involvement in the learning environment also improves academic resilience, helping students connect clinical concepts, develop skills, and strengthen professional values.

Because of this, providing meaningful engagement opportunities is important when planning early clinical exposure (ECE). Continuous improvement of ECE activities can increase learning value by using design-based research approaches and constructivist experiential learning theories (Al-Jayyousi et al., 2025). Educational methods should also adapt to the changing ways students learn. Studies show that the proper and strategic use of technologies, such as simulation, can improve learning and serve as an effective educational tool (Wertz et al., 2020).

Furthermore, expanding preparatory activities to include different clinical scenarios supports consistent and updated learning experiences, helping students become more prepared for clinical placements and professional practice (Jimenez et al., 2024). Research also found that Student Internship Grade (SIG), College Admission Test (CAT), and Terminal Competency Assessment (TCA) scores significantly influence licensure examination performance. These factors should therefore be considered in creating educational intervention or enhancement programs to improve student outcomes (Talaroc et al., 2021).Radiologic Technology Licensure Exam. Graduates of regulated professions are required to pass a licensure examination before they can be officially registered and allowed to practice. Without successfully passing this examination, they are not legally permitted to perform their professional duties. To maintain the quality and standards of graduates in this field, individuals are mandated to take and pass the Radiologic Technologist Licensure Examination conducted by the Professional Regulation Commission (PRC) (Republic Act No. 7431, § 20 (1992) (Philippines); Gallardo & Sison, 2025). Recent studies in the Philippines highlight that mock board examinations are among the most reliable predictors of actual board performance. A study by Dante et al. (2025) specifically on Radiologic Technology graduates found that mock board scores significantly predicted RTLE outcomes, increasing the likelihood of passing by approximately 21.5%. The study emphasized that these simulations help students identify content gaps in the five major clusters.

Obtaining board certification is essential, as it verifies that a practitioner has met all necessary qualifications, possesses the required credentials, and demonstrates the competence and expertise needed to practice in the profession (Torrey, 2023). Achieving the desired licensure exam outcome

depends much on the mock board performance, emphasizing the importance of planning and supervision for this preparation phase (Dante et al., 2024).

Although there are not many studies on radiologic technology professionals' success, one study by Alipio (2020) discovered that the four best indicators of success in the Philippines' national Radiologic Technology licensing exam were grades in all year levels of Radiologic Technology courses. Seven important predictors were found by the study after analyzing 12 factors; these predictors could correctly classify 99.9% of all passing graduates and 99.8% of failing graduates. This study emphasizes how crucial academic achievement during the Radiologic Technology program is in predicting passing the licensing exam (Alipio, 2020). Cancel, et al. (2021) found that personal factors (studying habits, time management, dedication) were rated as the most highly associated factor with passing the licensure examination, over school, peer, or home factors.

Radiation Physics, Equipment, Biology, and Protection. It remains among the most essential foundations in Radiologic Technology education because they develop students' understanding of radiation production, biological effects, imaging equipment operation, and safety protocols. According to Radiologic Science for Technologists by Stewart C. Bushong, mastery of radiation physics and radiation protection principles is necessary for students to produce quality images while minimizing radiation exposure to patients and healthcare personnel. Recent RTLE coverage released by the Professional Regulation Commission consistently includes radiologic physics, equipment, radiobiology, and radiation protection as major examination areas, emphasizing their importance in licensure preparation. Furthermore, recent discussions among radiologic technology examinees revealed that radiation protection concepts, exposure factors, and quality assurance are frequently identified as difficult yet high-yield topics in board examinations, indicating the need for intensive review classes and mock examinations in these areas. These findings suggest that enhancement programs focusing on radiation physics and protection may contribute positively to examination performance by strengthening theoretical knowledge and critical thinking skills.

Image Production and Evaluation. It is considered a critical component of radiologic education because it focuses on image quality, exposure factors, digital imaging, and radiographic analysis. According to Principles of Radiographic Imaging: An Art and a Science by Arlene Adler and Richard Carlton, students who develop competence in image evaluation are more capable of identifying radiographic errors and producing diagnostic-quality images. The RTLE examination framework also identifies image production and evaluation as one of the major domains assessed during the licensure examination. Recent board examination preparation materials and review discussions emphasize image critique, image artifacts, contrast resolution, and digital image acquisition as common focus areas in review programs and mock examinations. This implies that enhancement activities such as practice examinations, image analysis workshops, and guided review sessions may improve examinees' analytical skills and readiness for the licensure examination.

Radiographic Positioning and Radiologic Procedures. These are fundamental competencies required in clinical radiography because they ensure accurate image acquisition and patient safety. According to Bontrager's Textbook of Radiographic Positioning and Related Anatomy by John Lampignano and Leslie Kendrick, proper positioning techniques and procedural accuracy are necessary to obtain diagnostic-quality images and reduce repeat exposures. Similarly, Merrill's Atlas of Radiographic Positioning and Procedures highlights the importance of mastering anatomical landmarks, patient positioning, and procedural modifications in radiologic practice. Recent RTLE coverage continuously includes radiographic procedures and positioning as one of the primary subject areas in the board examination. In online discussions among recent examinees, positioning scenarios and procedural analysis were commonly described as challenging components of mock board examinations due to the need for both theoretical understanding and practical application. These findings indicate that enhancement programs involving laboratory demonstrations, simulation activities, and mock practical examinations may help improve examinees' competence and confidence in this area.

Patient Care Management. It plays a significant role in Radiologic Technology because radiologic technologists are expected to provide safe, ethical, and patient-centered care during imaging procedures. According to Patient Care in Radiography with an Introduction to Medical Imaging by Ruth Ann Ehrlich and Dawn Coakes, patient care competencies include communication skills, infection control, patient preparation, emergency response, and contrast media administration. The PRC board examination coverage also includes patient care, ethics, jurisprudence, anatomy, physiology, and department management as essential competencies evaluated in the RTLE. Recent examination preparation discussions among Radiologic Technology graduates identified patient interaction, contrast reaction management, and ethical responsibilities as recurring topics in review sessions and mock examinations. This suggests that enhancement programs emphasizing patient care simulations, case analysis, and review lectures may improve both clinical competence and examination preparedness among Radiologic Technology graduates.

Radiological Science. It encompasses specialized imaging modalities and advanced diagnostic procedures, including computed tomography, magnetic resonance imaging, ultrasonography, nuclear medicine, and radiation therapy. According to Comprehensive Radiographic Pathology by Ronald Eisenberg and Nancy Johnson, understanding disease processes and imaging interpretation is important in developing competent radiologic technologists. Additionally, recent RTLE coverage identifies radiological sciences as a major examination component that measures students' understanding of advanced imaging modalities and radiographic pathology. Review resources and board preparation discussions further indicate that examinees often encounter difficulty in integrating theoretical concepts with clinical applications in advanced imaging sciences. Consequently, enhancement programs that provide comprehensive review materials, case-based discussions, and mock board examinations may contribute to better comprehension and improved performance in radiological science subjects.

Theoretical Framework

This study delineates the structured relationships between three primary constructs: enhancement programs, mechanisms of learning, and performance in the Radiologic Technology Licensure Examination (RTLE). The framework integrates Human Capital Theory by Schultz (1971), which identifies enhancement program components as critical predictors of professional readiness, and Constructivist Learning Theory by Bruner (1961, 1966), which elucidates the internal cognitive processes mediating these effects.

Within this conceptualization, Radiologic Technology enhancement programs function as both strategic human capital investments and dynamic learning environments that facilitate knowledge construction. These initiatives are designed to improve student outcomes by fortifying foundational knowledge, refining task-taking strategies, and increasing both self-confidence and familiarity with the examination format.

Grounded in these dual theories, the identified mechanisms are hypothesized to directly influence RTLE success, specifically regarding the probability of passing on the initial attempt. Structurally, the enhancement program characteristics serve as the independent variables, learning mechanisms act as mediating processes, and licensure performance constitutes the dependent variable.

Ultimately, this theoretical foundation supports the study's convergent parallel mixed-methods design. It guides the selection of quantitative variables for predictive analysis while simultaneously providing a lens for the qualitative exploration of how students perceive the efficacy of these enhancement programs in their professional preparation.

Conceptual Framework

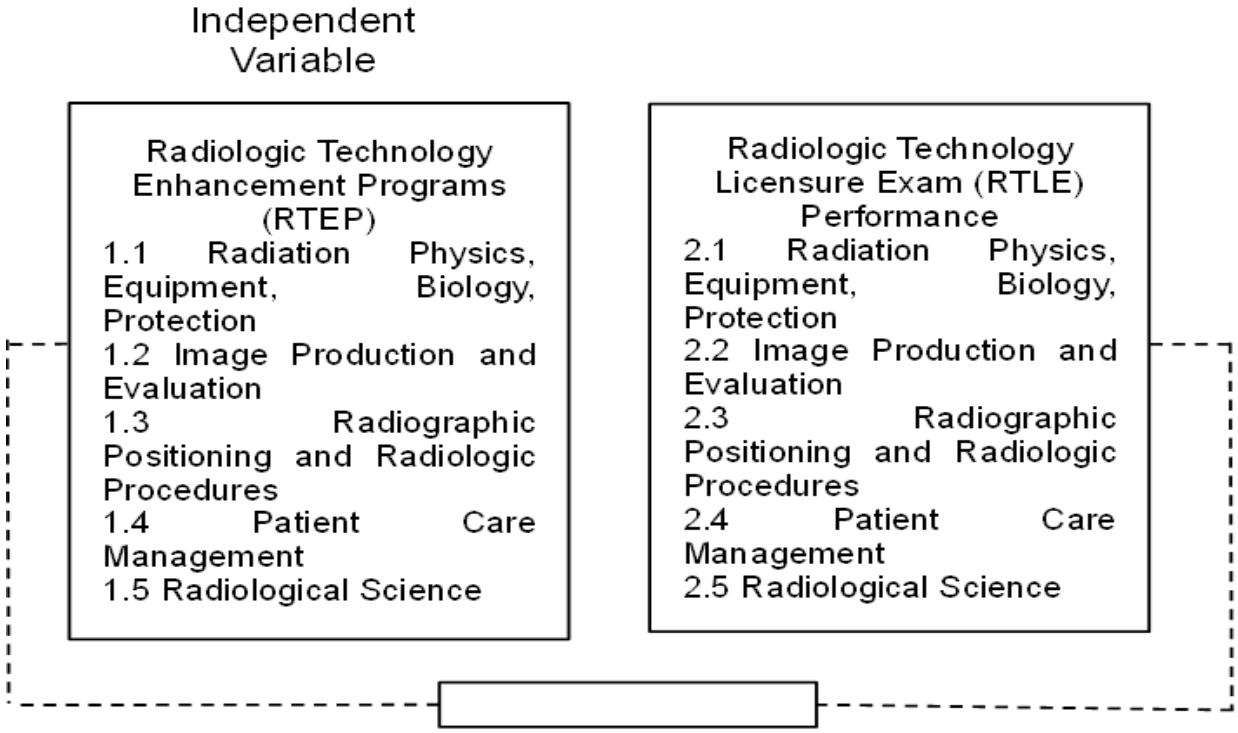

Figure 1. Conceptual Framework

Statement of the Problem

This study intends to seek answers to the following questions:

1. What is the level of performance on the Radiologic Technology Enhancement Program performance among Radiologic Technology graduates in terms of:

   1.1 Radiation Physics, Equipment, Biology, Protection

   1.2 Image Production and Evaluation

   1.3 Radiographic Positioning and Radiologic Procedures

   1.4 Patient Care Management

   1.5 Radiological Science

2. What is the level of Radiologic Technology Licensure Examination performance among graduates in terms of:

   2.1 Radiation Physics, Equipment, Biology, Protection

   2.2 Image Production and Evaluation

   2.3 Radiographic Positioning and Radiologic Procedures

   2.4 Patient Care Management

   2.5 Radiological Science

3. Is there a significant correlation between the graduates' level of RTEP and the graduates' subsequent RTLE performance?
4. Do the Radiologic Technology Enhancement Program significantly predict Radiologic Technology Licensure Exam performance?
5. What are the lived experiences of Radiologic Technology graduates in terms of Enhancement Program (RTEP) prior to review sessions?
6. How do the graduates' experience contribute to their behaviour in taking the Radiologic Technology Licensure Exam?
7. What are the insights of the graduates that they can share in the Radiologic Technology community?
8. To what extent do the qualitative interviews with the graduates corroborate with the quantitative data?

Hypothesis

The study will test the following set of null hypotheses:

H_{01}: There is no significant relationship between participation in Radiologic Technology Enhancement Programs (RTEP) and performance in the Radiologic Technology Licensure Examination (RTLE).

H_{02}: Participation in Radiologic Technology Enhancement Programs (RTEP) significantly predicts success and performance in the Radiologic Technology Licensure Examination (RTLE).

Purpose of the Study

The purpose of this mixed-methods study is to assess the impact of Radiologic Technology enhancement programs by holistically exploring the lived experiences of participating Radiologic Technology graduates and quantitatively correlating their participation such as enhancement program and licensure exam performance. By integrating these quantitative outcomes with qualitative experiences, the study generates robust, actionable evidence that guides program administrators in strengthening curriculum quality, enhancing retention practices, and assuring professional competence to meet public health standards and maintain accreditation.

Importance of the Study

Radiologic Technology Students and Graduates

The significance of this convergent mixed-methods study extends beyond simple performance improvement by establishing a foundational, ethically sound model for high-stakes professional education research in resource-constrained settings. By validating the most effective preparatory models and training components, the research immediately benefits graduates, allowing them to strategically allocate their study efforts and resources toward programs scientifically proven to maximize their likelihood of passing the Radiologic Technology licensure exam on the first attempt. Crucially, the study also ensures that the program's curriculum remains up-to-date and relevant to current industry demands. This preparedness allows graduates to confidently enter the workforce with skills actively sought by modern healthcare facilities, ready to deliver high-quality patient care, thereby securing a competitive edge in the job market and simultaneously upholding the quality and reputation reflected in the institution's performance metrics.

Radiologic Technology Educators and Clinical Instructors

The study provides evidence-based feedback that directly assists educators and instructors in refining their teaching strategies and course design. Specifically, it identifies the content areas, review approaches, and instructional methods within enhancement programs that most effectively contribute to student success in the licensure examination. This enables educators to improve syllabi, emphasize high-impact competencies, and integrate more effective pedagogical

approaches into classroom and review instruction. Furthermore, the findings may validate existing teaching practices or identify areas that require instructional enhancement and professional development to improve student learning outcomes.

Institutional Administrators and Accreditation Boards

High licensure pass rates and strong employment outcomes are essential for program accreditation. The study offers concrete data to demonstrate the program's effectiveness and commitment to continuous improvement during accreditation reviews and cyclical program assessments. Moreover, successful graduates and high performance metrics directly boost the institution's reputation in the healthcare community, making the program more attractive to prospective students and fostering stronger partnerships with clinical sites.

Global Educational Administrators and Policy Makers

For educational leaders, policymakers, and administrators overseeing multiple academic programs or educational systems, the study offers valuable insights into the development and standardization of effective Radiologic Technology enhancement programs. The findings may serve as a basis for establishing evidence-based review and remediation models that can be implemented across institutions or regions to promote consistent educational quality and licensure examination performance. Moreover, the study may contribute to policy formulation and strategic planning aimed at improving professional healthcare education and workforce preparedness.

Definition of Terms

Bachelor of Science in Radiologic Technology. This refers to the four-year allied health program completed by the respondents, which involves the application of medical imaging techniques and radiation science. In this study, it serves as the academic foundation upon which enhancement interventions are applied to ensure professional readiness.

Enhancement Programs. These are the structured, institutional interventions designed to reinforce students' knowledge and skills. Operationally, this includes Review Classes, Mock Board Examinations across five major subject areas, Remediation sessions for at-risk learners, and the provision of specialized Learning Resources.

Radiologic Technology Licensure Exam (RTLE). This refers to the national professional certification examination conducted by the Professional Regulation Commission (PRC). In this study, it is the primary measure of student achievement, quantified through overall ratings, passing rates, subject area scores, and first-time performance.

Radiologic Technology (RT) Students. This refers specifically to the graduates or graduating seniors of a Private Higher Education Institution in Davao City who are currently enrolled in or have recently completed the institution's Radiologic Technology Enhancement Program (RTEP) in preparation for the licensure examination.

II. METHODS

This chapter comprehensively presents the study's methodology and procedures. It covers the overall research design, the setting, and the selection and characteristics of the participants. Furthermore, it describes the data collection process, the data analysis methods, measures taken to ensure validity and reliability, and the ethical considerations that guided the research.

Design

The study utilized a convergent parallel mixed-methods design to comprehensively examine the influence of Radiologic Technology Enhancement Programs (RTEPs) on Radiologic Technology Licensure Examination (RTLE) performance. According to Creswell and Plano Clark (2018), a convergent parallel design enables researchers to collect quantitative and qualitative data concurrently while assigning equal priority to both strands of data.

In this study, the quantitative component involved the collection and analysis of numerical data obtained from institutional records to determine the relationship between participation in RTEPs and RTLE performance indicators through appropriate statistical techniques. Simultaneously, the qualitative component employed in-depth interviews with graduates to gather detailed accounts of their experiences, perceptions, motivations, and challenges encountered during their participation in the enhancement programs.

The qualitative data were analyzed using thematic analysis to identify recurring patterns, themes, and insights across participants' responses. Following the separate analyses of the quantitative and qualitative data, the findings were integrated during the interpretation phase. This integration allowed for the comparison, convergence, and corroboration of results from both data strands, thereby providing a more comprehensive understanding of the effectiveness of RTEPs beyond numerical outcomes alone. As emphasized by Creswell and Poth (2018), the integration of quantitative and qualitative findings strengthens the interpretation of results by offering a deeper understanding of the phenomenon under investigation through both statistical evidence and participants' lived experiences.

Setting

The study involved private higher education institutions (HEIs) in Davao City offering the Bachelor of Science in Radiologic Technology (BSRT) program. These institutions were selected due to the researcher's affiliation with a private HEI in Davao City, which facilitated the acquisition of institutional clearance and access to participants and program data through established professional networks within the allied health education community. The proximity of the participating institutions also improved the efficiency of the research process by reducing travel time and expenses. Moreover, the accessibility of the study sites supported the simultaneous

collection of quantitative and qualitative data required in the convergent mixed-methods design, allowing timely coordination of interviews, data gathering, and administrative procedures.

Figure 2. Site Map of the Study

Participants

Quantitative Strand

In the quantitative phase, the study involved 100 recent graduates of the Radiologic Technology program of the academic year 2024 to 2025. The sample size was determined through power analysis using the guidelines established by Jacob Cohen for multiple regression and correlational research. According to Cohen (1992), a sample size of approximately 85 to 100 respondents is considered adequate to detect a medium effect size ($f^2 = 0.15$) at a 0.05 level of significance with a statistical power of 0.80, which is the minimum acceptable standard for behavioral and educational research. The use of 100 participants therefore provided sufficient statistical power to identify significant relationships between participation in Radiologic Technology Enhancement Programs (RTEPs) and Radiologic Technology Licensure Examination (RTLE) performance while minimizing the risk of Type II error.

Participants were selected through a total population sampling technique to ensure that all eligible graduates had an equal chance of selection and to enhance the representativeness of the sample. The primary criterion for inclusion was prior participation in at least one enhancement program offered or endorsed by the institution. Quantitative data gathered from the respondents focused on objective and measurable indicators, including participation in review classes, mock board

examinations, remediation activities, learning resource utilization, and RTLE performance outcomes such as overall ratings, passing rates, subject area scores, and first-time passing performance.

Qualitative Strand

For the qualitative phase, the study involved a smaller and more focused sample of 10 participants to obtain rich, detailed, and experiential data regarding the effectiveness of the Radiologic Technology Enhancement Programs (RTEPs). The participants were selected through purposive sampling, a non-probability sampling technique commonly utilized in qualitative research to identify individuals who possessed relevant knowledge, experiences, and insights related to the phenomenon under investigation. According to Patton (2015), purposive sampling enables researchers to intentionally select information-rich cases that can provide substantial and meaningful contributions to a study. Similarly, Creswell (2014) emphasized that purposive sampling is appropriate in qualitative inquiry because it facilitates the selection of participants who can best describe and explain their lived experiences.

The qualitative sample was strategically composed of high-performing graduates, graduates with challenging or complex examination experiences, and selected program stakeholders involved in the implementation of enhancement activities. This deliberate selection process allowed the study to capture diverse perspectives regarding the perceived effectiveness of review classes, mock board examinations, remediation programs, and learning resources. By including participants with varying levels of success and experiences, the study developed a comprehensive understanding of how enhancement programs contributed to RTLE preparation and performance. Furthermore, the inclusion of program stakeholders provided additional contextual insights into the planning, implementation, and perceived strengths and limitations of the enhancement initiatives.

Data Gathering Procedure

The data gathering process for this convergent parallel mixed methods study involved the concurrent collection of quantitative and qualitative data, followed by separate analyses and the integration of findings to provide a comprehensive understanding of the impact of the Radiologic Technology Enhancement Programs (RTEPs).

For the quantitative phase, the researcher identified and selected the target sample using an appropriate total population sampling technique to ensure representativeness. The primary component of this phase involved the administration of validated survey instruments that measured key variables related to enhancement program participation and RTLE performance among the selected participants. Data collection was conducted in a standardized manner, primarily through electronic survey platforms, while ensuring participant anonymity and obtaining informed consent. Upon completion of data collection, the quantitative data were systematically organized, coded, cleaned, and analyzed using appropriate statistical techniques to test the study hypotheses and

determine the magnitude and significance of the relationship between enhancement program participation and RTLE performance.

Simultaneously, the qualitative data gathering procedure was conducted through semi-structured, in-depth interviews with purposively selected participants who possessed relevant experiences and insights regarding the enhancement programs. The researcher utilized a flexible interview protocol to explore participants' experiences, perceptions, motivations, and challenges related to the study topic while allowing opportunities for emergent discussions. All interviews were conducted in private and comfortable settings, audio-recorded with participants' consent, and transcribed verbatim for analysis. The qualitative phase aimed to provide a rich and detailed understanding of participants' experiences that complemented the quantitative findings.

Following the separate analysis of the quantitative and qualitative data, the study proceeded to the integration or convergence phase. This process involved merging the findings from both data strands to generate a more comprehensive understanding of the phenomenon under investigation. The researcher systematically compared and contrasted the statistical results with the themes that emerged from the qualitative analysis. Through triangulation, the findings were examined to identify areas of convergence, divergence, and complementarity. The integrated interpretation of results enabled the researcher to develop a deeper understanding of the effectiveness of the enhancement programs and to draw conclusions based on the combined evidence from both quantitative and qualitative data. This process ultimately produced a richer and more robust explanation of how the enhancement programs influenced RTLE preparation and performance.

Trustworthiness of the Study

Concepts such as credibility, confirmability, dependability, and transferability were utilized to demonstrate the trustworthiness and rigor of the qualitative thematic content analysis (Creswell, 2017). Credibility in qualitative research aimed to establish confidence in the findings by ensuring that the results accurately reflected the participants' experiences and perspectives. The study employed strategies that enhanced the consistency and authenticity of the data, thereby strengthening the overall validity of the qualitative findings.

The establishment of trustworthiness in the content analysis began with meticulous preparation prior to data collection. This process required proficiency in data gathering, data management, outcome reporting, and the identification and resolution of reliability concerns throughout the analysis. Furthermore, careful attention was given to the systematic coding and interpretation of data to ensure that the themes generated were grounded in the participants' narratives and accurately represented the phenomenon under investigation.

Credibility. This was achieved by ensuring that the study's findings faithfully reflected the viewpoints and experiences of the participants. The researcher established credibility through rigorous data collection methods, including in-depth interviews. Furthermore, the credibility of the

data was enhanced through the use of information from various sources and careful verification of participants' responses during the analysis process. These strategies helped minimize bias and reduce the risk of misinterpretation, thereby strengthening the trustworthiness of the study's findings.

Dependability. It encompassed the ethical treatment of participants, including maintaining confidentiality and demonstrating respect throughout the research process. It played a crucial role in safeguarding the sensitive personal and professional experiences shared by the participants. Ethical considerations in the study required transparency in the research methods, data collection procedures, and data analysis processes. Dependability was reflected in these practices by ensuring consistency, transparency, and the potential for replication of the research process. By adhering to a systematic and reliable approach, the researcher established trust with both the participants and the intended audience, thereby fulfilling the ethical responsibility of accurately representing participants' experiences.

Transferability. Referred to the extent to which the study's findings could be applied to other contexts or settings. To enhance transferability, the researcher provided detailed descriptions of the research context, participants, sampling procedures, and methods of data collection and analysis. These rich descriptions enabled readers to determine the applicability of the findings to their own settings and circumstances. The results of the study may serve as valuable references for policymakers, school administrators, program coordinators, and other stakeholders interested in strengthening Radiologic Technology Enhancement Programs and improving RTLE performance.

Confirmability. This was concerned with the objectivity of the research findings and the extent to which they were shaped by the participants' experiences rather than the researcher's personal biases or assumptions. To ensure confirmability, the researcher adopted a reflexive stance by acknowledging potential biases and maintaining transparency throughout the research process. Research decisions, analytical procedures, and interpretations were carefully documented to establish an audit trail. In addition, member checking was conducted by allowing participants to review and validate the findings, thereby enhancing the objectivity, accuracy, and trustworthiness of the study.

Reflexivity

The researcher occupied a specific insider position within this study as a registered radiologic technologist and an educator. This professional background provided an emic perspective, allowing for a nuanced understanding of the technical competencies required in radiologic technology enhancement programs and the high-stakes nature of the licensure examination. According to Dwyer and Buckle (2009), being a member of the group under study offered the advantage of pre-understanding, which facilitated deeper rapport with participants and a more sophisticated interpretation of the institutional dynamics affecting student success. The researcher's familiarity with the specific curricular challenges, such as the theory–practice gap in

clinical education, enabled a more targeted inquiry into how enhancement programs functioned as an intervention. However, the researcher recognized that this professional immersion carried the risk of projecting personal experiences onto the participants.

Having successfully navigated the licensure process, the researcher may have unconsciously harbored a pro-intervention bias, with an assumption that enhancement programs were inherently beneficial or that student failure was solely attributed to a lack of academic diligence. To maintain axiological integrity, the researcher acknowledged the potential for social desirability bias, where student-respondents might have offered favorable feedback on the enhancement programs to align with perceived institutional expectations (Saldana, 2021).

Role of the Researcher

The researcher was pivotal in structuring the study using a mixed methods design. This process entailed establishing focused research questions that leveraged the strengths of both numerical and narrative data. The researcher constructed comprehensive questions and then selected methodologies to effectively capture the process's intricacies. The researcher was responsible for choosing and applying integrated data collection methods for example, conducting a quantitative survey followed by qualitative interviews or using observations alongside document analysis to achieve a complete picture.

Because the research focused on students' sensitive experiences and institutional performance data, the researcher adhered rigorously to ethical principles. This involved ensuring confidentiality for all participants and maintaining transparency throughout the study's execution. The goal was to safeguard the well-being and respect the autonomy of the radiologic technology students while accurately assessing the enhancement programs.

Ethical Considerations

This study was conducted in accordance with established ethical standards to protect the dignity, welfare, rights, and privacy of all participants. The research adhered to the principles of respect for persons, beneficence, and justice as stipulated in the National Ethical Guidelines for Health and Health-Related Research (NEGHHR, 2017) and the Data Privacy Act of 2012 (Republic Act No. 10173). Prior to data collection, ethical clearance was obtained from the Institutional Research Ethics Committee (IREC) of the participating private higher education institution. Formal permission was also secured from the institutional administrators and program coordinators to access the necessary academic records and recruit participants for the study.

The ethical considerations of the study included social value, informed consent, voluntary participation, privacy and confidentiality, risks and benefits, and proper management of research data.

Social Value. This study aimed to determine the extent to which the Radiologic Technology Enhancement Program (RTEP) predicts Radiologic Technology Licensure Examination (RTLE) performance and to explore the lived experiences of graduates who participated in the enhancement program. The findings were expected to contribute to the improvement of institutional review programs, remediation strategies, and educational interventions that may strengthen licensure examination preparedness among Radiologic Technology graduates.

The dissemination of the findings primarily benefits Radiologic Technology students, graduates, educators, clinical instructors, academic administrators, and future researchers by providing evidence-based insights regarding effective enhancement program strategies. Ultimately, the study contributes to improving professional competence, examination readiness, and institutional quality assurance in radiologic technology education.

Risk and Benefits. The study involved minimal risk to the participants. Quantitative data collection utilized academic records related to RTEP and RTLE performance, while qualitative data were gathered through interviews regarding the graduates' experiences in the enhancement program. Although no major risks were anticipated, participants might have experienced slight discomfort or anxiety while discussing their academic challenges and examination experiences.

The study was conducted strictly for academic purposes. The findings were expected to benefit educational institutions and the radiologic technology profession by identifying effective enhancement strategies, strengthening review interventions, and improving student preparedness for the licensure examination.

Voluntary Participation. Participation in the study was entirely voluntary. Participants were informed about the nature, purpose, procedures, and objectives of the study prior to their involvement. They were also informed of their right to refuse participation or withdraw from the study at any time without penalty, coercion, or academic consequences. This voluntary participation ensured respect for the autonomy and freedom of the participants in deciding their level of involvement in the research process.

Privacy and Confidentiality. In compliance with the Data Privacy Act of 2012, the researcher strictly observed the principles of transparency, legitimate purpose, and proportionality in the collection, storage, and processing of participants' personal and academic data.

All information gathered from the participants was treated with utmost confidentiality. Codes and pseudonyms were used in place of names to protect participants' identities. Academic records, interview transcripts, and other research documents were securely stored and were accessible only to the researcher and authorized personnel. Furthermore, no identifying information was disclosed in any part of the written report or future publication of the study.

Data Analysis

The data analysis plan, based on the research design, was clearly organized as follows:

Mean was used to determine the level of RTEP and RTLE performance across the five subject clusters. The mean was used to represent the average performance score for each cluster.

Spearman's RHO Correlation was used to determine the significant relationship between the RTEP scores and RTLE performance.

General Linear Model was used to determine whether the RTEP variables significantly predicted RTLE performance.

Thematic Content Analysis was the primary method, providing a systematic approach for identifying and interpreting patterns of meaning within participants' narratives according to Braun and Clarke (2006). In this study, thematic analysis was used to examine students' experiences in Radiologic Technology Enhancement Programs and their influence on RTLE preparation and performance. Data were coded, categorized, and organized into themes that reflected key patterns in participants' perceptions, challenges, and behavioral responses during licensure exam preparation.

Integration or Convergence Phase of the study employed a consistent convergent parallel mixed-methods design. According to Creswell (2018), integrating quantitative and qualitative findings enhanced the depth and validity of interpretation by combining statistical outcomes with experiential evidence. In this phase, quantitative results were compared with qualitative themes derived from interviews. Through triangulation, the study identified convergence, divergence, and complementarity between datasets, enabling a more comprehensive understanding of the relationship between enhancement programs and Radiologic Technology Licensure Examination performance.

Scope and Limitations of the Study

The study was deliberately delimited to enhancement programs defined as review seminars, readiness exams, or mandatory remediation rather than attempting a comprehensive restructuring of the core Radiologic Technology (RT) curriculum. The primary outcome variable was restricted to licensure examination performance on the Philippine Regulation Commission certification exam (for example, first-time pass rate or scaled scores), and did not include evaluation of long-term professional success or clinical competence years after graduation. The analysis intentionally focused on a specific set of academic and non-academic variables, such as course grades and participation rates, thereby excluding less quantifiable factors like detailed student–instructor interactions or particular psychological stressors. The study utilized a convergent mixed-methods design in which quantitative and qualitative data were collected independently and subsequently

integrated for comparison, thereby excluding the use of sequential and other mixed-method approaches.

The study was subject to several limitations that may affect the certainty and broad applicability of the findings. The study utilized a relatively small sample size of 100 respondents, which may limit the statistical power and generalizability of the results. Also, the respondents were limited to only one batch of Bachelor of Science in Radiologic Technology (BSRT) graduates. Since the participants came from a single graduating cohort, the findings may not fully reflect the experiences and performance trends of graduates from other batches who may have been exposed to different academic conditions, institutional policies, or review practices. Moreover, the study was conducted in only one institution, which restricts the applicability of the results to other higher education institutions with different educational environments, resources, enhancement programs, and student populations. Finally, the study focused on only one primary which is the RTEP in examining RTLE performance, which may not fully capture the multiple factors influencing licensure examination outcomes.

III. RESULTS AND DISCUSSIONS

This chapter presents, analyzes, and interprets the data that were collected, collated and statistically treated. This pertains to Radiologic Technology Enhancement Program (RTEP) and Radiologic Technology Licensure Examination (RTLE) performance.

1. What is the level of performance on the Radiologic Technology Enhancement Program among Radiologic Technology graduates in terms of:
1.1 Radiation Physics, Equipment, Biology, Protection
1.2 Image Production and Evaluation
1.3 Radiographic Positioning and Radiologic Procedures
1.4 Patient Care Management
1.5 Radiological Science

Table 1. Level of performance on the Radiologic Technology Enhancement Program (RTEP) Among Radiologic Technology Graduates in Terms of the Five Examination Clusters

	Mean	SD	Minimum	Maximum
Radiation Physics, Equipment, Biology, Protection	79.1	4.29	68.0	94.0
Image Production and Evaluation	79.5	5.34	71.0	95.0
Radiographic Positioning and Radiologic Procedures	84.8	6.10	69.0	96.0
Patient Care Management	84.9	5.29	71.0	95.0
Radiological Science	82.5	4.73	70.0	95.0
RTEP_AVERAGE	82.2	4.04	75.0	94.8

Legend: 90.00–100.00 = Very High; 85.00–89.99 = High; 80.00–84.99 = Moderate; 75.00–79.99 = Low; Below 75.00 = Very Low.

The findings presented in Table 1 indicate that the overall level of the Radiologic Technology Enhancement Program (RTEP) among Radiologic Technology graduates was moderate (M = 82.2, SD = 4.04). Among the five examination clusters, Patient Care Management obtained the highest mean score (M = 84.9, SD = 5.29), followed closely by Radiographic Positioning and Radiologic Procedures (M = 84.8, SD = 6.10), both interpreted as moderate. Likewise, Radiological Science demonstrated a moderate level (M = 82.5, SD = 4.73). In contrast, Image Production and Evaluation (M = 79.5, SD = 5.34) and Radiation Physics, Equipment, Biology, Protection (M = 79.1, SD = 4.29) obtained comparatively lower mean scores and were interpreted as low. Overall, the results suggest that the graduates demonstrated satisfactory preparation across the major content areas of the enhancement program, with stronger performance observed in patient care and radiographic procedures than in physics- and imaging-related domains.

The findings support previous literature emphasizing the importance of institutional enhancement programs in strengthening students' academic preparation and examination readiness. Studies have shown that enhancement activities such as refresher lectures, mock examinations, weekly assessments, clinical simulations, and guided review sessions contribute to improved competence, examination preparedness, and professional readiness among health profession students. Lianza (2025) reported that structured academic interventions help develop examination stamina and readiness, while Dante et al. (2025) highlighted the role of mock examinations in identifying knowledge gaps across the major RTLE content domains. Similarly, Jimenez et al. (2024) emphasized that preparatory activities and specialized learning experiences improve students' readiness for clinical practice and professional responsibilities. The moderate overall performance observed among the graduates suggests that the enhancement program may have provided adequate opportunities for knowledge reinforcement and skills development across the five examination clusters.

The results may also be explained through the lens of Human Capital Theory and Constructivist Learning Theory, which serve as the theoretical foundation of the study. Human Capital Theory posits that educational investments, such as enhancement programs, increase individuals' competencies and professional preparedness, thereby improving performance outcomes. Meanwhile, Constructivist Learning Theory suggests that learners actively construct knowledge through meaningful learning experiences, practice, and engagement. The moderate levels across all clusters indicate that the enhancement program functioned as an educational investment that facilitated knowledge acquisition, reinforced learning, and strengthened graduates' preparedness for the licensure examination. Consistent with these theories, the enhancement activities likely contributed to the development of both theoretical understanding and practical competencies necessary for success in the Radiologic Technology Licensure Examination.

2. What is the level of Radiologic Technology Licensure Examination performance among graduates in terms of:

2.1 Radiation Physics, Equipment, Biology, Protection
2.2 Image Production and Evaluation
2.3 Radiographic Positioning and Radiologic Procedures
2.4 Patient Care Management
2.5 Radiological Science

Table 2. Level of the Radiologic Technology Licensure Examination (RTLE) Performance Among Radiologic Technology Graduates in Terms of the Five Examination Clusters

	Mean	SD	Minimum	Maximum
Radiation Physics, Equipment, Biology, Protection	78.3	4.61	64.2	88.0
Image Production and Evaluation	78.4	6.53	60.0	95.0
Radiographic Positioning and Radiologic Procedures	83.9	7.91	59.0	95.0
Patient Care Management	84.4	6.11	65.6	94.0
Radiological Science	81.3	6.50	58.0	95.0
RTLE_AVERAGE	81.3	5.43	64.4	92.6

Legend: 90.00–100.00 = Very High; 85.00–89.99 = High; 80.00–84.99 = Moderate; 75.00–79.99 = Low; Below 75.00 = Very Low.

The results presented in Table 2 reveal that the overall Radiologic Technology Licensure Examination (RTLE) performance of the graduates was moderate (M = 81.3, SD = 5.43). Among the five examination clusters, Patient Care Management recorded the highest mean score (M = 84.4, SD = 6.11), followed by Radiographic Positioning and Radiologic Procedures (M = 83.9, SD = 7.91) and Radiological Science (M = 81.3, SD = 6.50), all of which were interpreted as moderate. On the other hand, Image Production and Evaluation (M = 78.4, SD = 6.53) and Radiation Physics, Equipment, Biology, Protection (M = 78.3, SD = 4.61) obtained lower mean scores and were interpreted as low. These findings suggest that the graduates demonstrated stronger performance in patient care and procedural competencies, while relatively lower performance was observed in the more technical and physics-oriented components of the licensure examination,

The findings are consistent with previous studies emphasizing that performance in licensure examinations is influenced by both academic preparation and mastery of core professional competencies. Dante et al. (2025) reported that mock board examination performance significantly predicts RTLE outcomes because it allows students to identify weaknesses across the major examination clusters and focus their preparation efforts accordingly. Similarly, Alipio (2020) found that academic achievement in Radiologic Technology courses serves as a strong predictor of success in the national licensure examination, highlighting the importance of sustained

competency development throughout the program. The relatively higher scores in Patient Care Management and Radiographic Positioning and Radiologic Procedures may reflect graduates' stronger familiarity with competencies that are frequently reinforced during clinical training and internship experiences, while the lower scores in Physics and Image Production may indicate areas requiring additional instructional support and review interventions.

From a theoretical perspective, the results support the propositions of Competency-Based Education Theory and Experiential Learning Theory. Competency-Based Education Theory emphasizes that students achieve success when they demonstrate mastery of specific competencies and learning outcomes required in professional practice. The paragraph highlighted that higher performance in Patient Care Management and Radiographic Positioning may be attributed to repeated exposure and reinforcement during clinical training and internships. This supports the idea that mastery of competencies developed through continuous practice and assessment contributes to improved RTLE performance. Meanwhile, Experiential Learning Theory posits learning occurs through concrete experiences, reflection, conceptualization, and application. Clinical internships, review sessions, mock board examinations, and practical activities provide students with experiential opportunities that strengthen their understanding and application of Radiologic Technology concepts. It indicates that students performed better in competencies reinforced during clinical exposure. Because students learn more effectively through hands-on clinical experiences and repeated application of knowledge. The stronger performance in clinically oriented domains may reflect the cumulative effect of classroom instruction, laboratory activities, clinical exposure, and enhancement programs that enabled graduates to apply and consolidate their learning. Consequently, the findings underscore the importance of providing diverse learning experiences that support both theoretical mastery and practical competence in preparation for professional licensure examinations.

3. Is there a significant correlation between the graduates' level of RTEP and the graduates' subsequent RTLE performance?

Table 3. Correlation Between Radiologic Technology Enhancement Program (RTEP) Performance and Radiologic Technology Licensure Examination (RTLE) Performance by Examination Cluster

RTEP Cluster	RTLE Cluster	Spearman's rho (ρ)	df	p-value	Interpretation	Decision to H0
Radiation Physics, Equipment, Biology, Protection	Radiation Physics, Equipment, Biology, Protection	0.914	97	< .001	S	Reject
Image Production and Evaluation	Image Production and Evaluation	0.859	97	< .001	S	Reject

RTEP Cluster	RTLE Cluster	Spearman's rho (ρ)	df	p-value	Interpretation	Decision to H0
Radiographic Positioning and Radiologic Procedures	Radiographic Positioning and Radiologic Procedures	0.967	97	< .001	S	Reject
Patient Care Management	Patient Care Management	0.987	97	< .001	S	Reject
Radiological Science	Radiological Science	0.937	97	< .001	S	Reject

Legend: p-value <0.05 = significant

The results presented in Table 3 reveal statistically significant positive correlations between the Radiologic Technology Enhancement Program (RTEP) clusters and the corresponding Radiologic Technology Licensure Examination (RTLE) clusters. The strongest relationships were observed between matching content domains, particularly Patient Care Management ($\rho = .987$, $p < .001$), Radiographic Positioning and Radiologic Procedures ($\rho = .967$, $p < .001$), Radiological Science ($\rho = .937$, $p < .001$), Radiation Physics, Equipment, Biology, Protection ($\rho = .914$, $p < .001$), and Image Production and Evaluation ($\rho = .859$, $p < .001$). Moreover, the overall RTEP average demonstrated an exceptionally strong positive correlation with the overall RTLE average ($\rho = .990$, $p < .001$). These findings indicate that graduates who performed better in the enhancement program also tended to obtain higher scores in the licensure examination, suggesting a strong association between enhancement program performance and subsequent RTLE outcomes.

The observed relationships support previous studies emphasizing the value of institutional enhancement and preparatory programs in improving licensure examination performance. Dante et al. (2025) reported that mock board examination scores significantly predict RTLE outcomes by helping students identify content deficiencies and strengthen mastery of the major examination domains. Similarly, Lianza (2025) found that structured interventions, including refresher lectures and periodic assessments, enhance examination readiness and improve performance in professional licensure examinations. The strong correlations across all clusters suggest that competencies developed during enhancement activities are reflected in graduates' performance during the actual licensure examination. These findings further support the assertions of Alipio (2020), who identified academic performance as one of the strongest predictors of success in the national Radiologic Technology Licensure Examination.

The results may also be explained through Human Capital Theory and Constructivist Learning Theory, which posit that educational investments and meaningful learning experiences contribute to improved performance outcomes. Human Capital Theory suggests that enhancement programs serve as investments that increase students' knowledge, skills, and professional competence, thereby improving their likelihood of success in high-stakes assessments. Likewise, Constructivist Learning Theory emphasizes that learners actively construct understanding through repeated engagement, practice, and reflection. The exceptionally strong correlations observed between

RTEP and RTLE performance indicate that the knowledge and competencies reinforced through enhancement activities were successfully transferred and applied during the licensure examination. Consequently, the findings provide empirical support for the theoretical proposition that structured educational interventions contribute to improved professional examination performance among Radiologic Technology graduates.

4. Do the Radiologic Technology Enhancement Program significantly predict Radiologic Technology Licensure Exam performance?

Table 4. Test of Prediction of Radiologic Technology Licensure Examination (RTLE) Performance Based on Radiologic Technology Enhancement Program (RTEP) Cluster Scores

Predictor	B	SE	β	t	p	Decision
Constant	81.261	0.211	—	384.812	< .001	
Radiation Physics, Equipment, Biology, Protection	0.223	0.068	.176	3.266	.002	Reject
Image Production and Evaluation	0.158	0.049	.156	3.230	.002	Reject
Radiographic Positioning and Radiologic Procedures	0.265	0.059	.298	4.481	< .001	Reject
Patient Care Management	0.332	0.070	.324	4.716	< .001	Reject
Radiological Science	0.225	0.072	.196	3.109	.002	Reject

Note. The General Linear Model was statistically significant, $F(5, 93) = 112.13$, $p < .001$, explaining 85.8% of the variance in RTLE performance ($R^2 = .858$, Adjusted $R^2 = .850$). The model demonstrated a large effect size ($\eta^2p = .858$).

The results presented in Table 4 indicate that the Radiologic Technology Enhancement Program (RTEP) clusters significantly predicted Radiologic Technology Licensure Examination (RTLE) performance. Among the five predictors, Patient Care Management demonstrated the strongest predictive effect ($\beta = .324$, $t = 4.716$, $p < .001$), followed by Radiographic Positioning and Radiologic Procedures ($\beta = .298$, $t = 4.481$, $p < .001$). Radiological Science ($\beta = .196$, $t = 3.109$, $p = .002$), Radiation Physics, Equipment, Biology, Protection ($\beta = .176$, $t = 3.266$, $p = .002$), and Image Production and Evaluation ($\beta = .156$, $t = 3.230$, $p = .002$) likewise emerged as significant predictors of RTLE performance. These findings suggest that higher performance in each RTEP cluster was associated with higher licensure examination scores, indicating that competencies developed during the enhancement program contribute meaningfully to the examination outcomes.

The predictive relationships observed in the study are consistent with previous research highlighting the effectiveness of enhancement and preparatory programs in improving licensure examination performance. According to Pascual and Navalta (2021), intensive review programs enhance students' retention of theoretical knowledge and improve their ability to apply clinical concepts during board examinations. Dante et al. (2025) emphasized that mock board examinations serve as strong predictors of RTLE success by identifying areas requiring further reinforcement and enhancing examination readiness. Similarly, Lianza (2025) reported that refresher lectures, periodic assessments, and structured review activities strengthen students'

preparedness and examination stamina. Furthermore, Alipio (2020) found that academic achievement in Radiologic Technology courses significantly predicts success in the national licensure examination, underscoring the role of sustained academic competence in professional certification outcomes. In addition, Villena (2021) emphasized that institutional enhancement initiatives, such as competency-based assessments and periodic evaluations, contribute to higher licensure examination passing rates by promoting continuous learning and self-assessment among students. The significance of all five RTEP clusters in the present study suggests that comprehensive preparation across multiple content domains is essential for achieving favorable licensure examination results.

The findings may further be explained through Human Capital Theory and Constructivist Learning Theory, which collectively posit that educational investments and active learning experiences contribute to improved performance outcomes. Human Capital Theory views enhancement programs as strategic investments that develop the knowledge, skills, and competencies necessary for professional success. In parallel, Constructivist Learning Theory suggests that learning occurs through continuous engagement, practice, and the integration of new knowledge with prior experiences. The significant predictive effects of all RTEP clusters indicate that the competencies acquired and reinforced through enhancement activities were translated into measurable gains in licensure examination performance. Consequently, the results provide empirical support for the proposition that structured educational interventions play a vital role in preparing Radiologic Technology graduates for successful professional licensure.

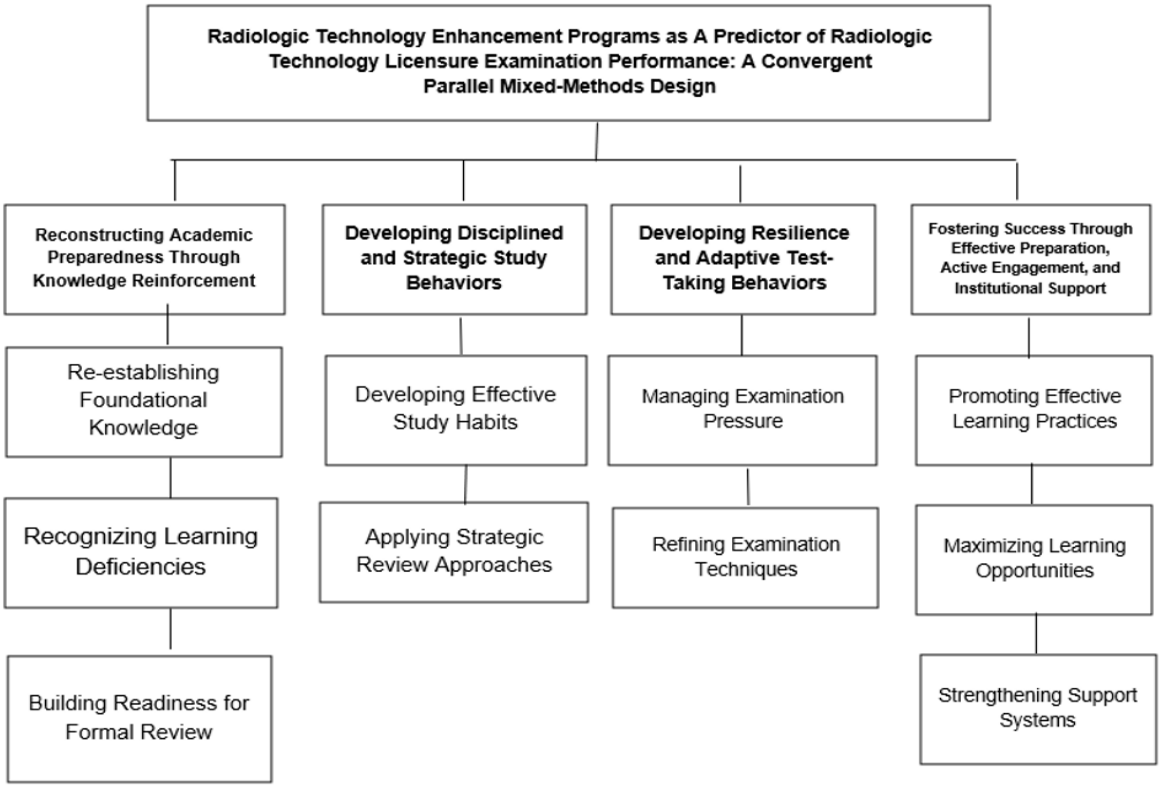

Figure 3. Thematic Map of the Study

5. What are the lived experiences of Radiologic Technology graduates in terms of Enhancement Program (RTEP) prior to review sessions?

Table 5. Lived Experiences of Radiologic Technology Graduates in the Radiologic Technology Enhancement Program (RTEP) Prior to Review Sessions

Significant Statements (Verbatim)	Core Idea	Codes	Essential Theme
"It made me recall all the lessons from my year 1 to year 4, including extra knowledge." (R1)	Recalling previously learned lessons	Re-establishing Foundational Knowledge	Reconstructing Academic Preparedness Through Knowledge Reinforcement
"The program helped me refresh my knowledge." (R6)			
"The program allowed me to refresh foundational concepts." (R3)			
"It helped me build my basics." (R2)	Strengthening foundational understanding		
"Remember the basic fundamentals of each subject." (R1)			
"It essentially forced us to go back to the basics and relearn the fundamental concepts we had forgotten." (R4)			
"It helped me identify areas that required improvement." (R2)	Identifying weaknesses	Recognizing Learning Deficiencies	
"I realized there were still many concepts and procedures that I needed to strengthen." (R3)			
"I realized the areas where I was weak and needed more improvement." (R10)			
"I felt academically unprepared." (R7)	Becoming aware of learning gaps		
"I was worried about how prepared I really was for the board exam." (R5)			
"It exposed how much we had forgotten." (R4)			
"It helped me bridge knowledge gaps and made review sessions a lot more easier." (R2)	Preparing for intensive review	Building Readiness for Formal Review	
"The program became a valuable stepping stone before the actual review sessions began." (R3)			

"The program helped me become more prepared and motivated for the review sessions." (R6)			
"It gave me a satisfactory experience." (R2)	Developing academic confidence		
"I gradually became more confident and motivated to study harder." (R10)			
"It helped me build confidence and improve my test-taking strategies." (R10)			

Essential Theme 1: Reconstructing Academic Preparedness Through Knowledge Reinforcement

The essential theme reflects the lived experiences of Radiologic Technology graduates who viewed the Radiologic Technology Enhancement Program (RTEP) as an important opportunity to rebuild their academic preparedness prior to formal review sessions. Participants described the program as a means of recalling previously learned lessons, strengthening foundational knowledge, identifying learning gaps, and developing confidence before entering the formal review process. Through lectures, assessments, and review activities, graduates became more aware of their strengths and weaknesses while reinforcing essential concepts in major Radiologic Technology subjects. This theme may be understood through Human Capital Theory and Constructivist Learning Theory. Human Capital Theory explains that investments in education, training, and skill development enhance an individual's competence and future performance, suggesting that participation in the RTEP served as a valuable educational investment that strengthened the knowledge and skills necessary for success in the Radiologic Technology Licensure Examination (RTLE). Likewise, Constructivist Learning Theory explains how learners actively construct knowledge through experience, reflection, and engagement with learning activities. The graduates' experiences of revisiting concepts, recognizing deficiencies, and reinforcing understanding demonstrate how meaningful learning occurred through active participation in the enhancement program. Together, these theories suggest that the RTEP contributed to improved academic preparedness by strengthening foundational knowledge, promoting active learning, and enhancing readiness for the RTLE.

Re-establishing Foundational Knowledge. This code reflects the experiences of Radiologic Technology graduates who utilized the Radiologic Technology Enhancement Program (RTEP) as an opportunity to rebuild their academic foundation prior to formal review sessions. Participants described the program as a valuable refresher that enabled them to revisit concepts learned throughout their undergraduate education and reconnect with previously acquired knowledge.

The first core idea, recalling previously learned lessons, emerged from participants' experiences of revisiting topics encountered during their first to fourth years in the Radiologic Technology program. Graduates shared that the enhancement program helped them remember concepts that had gradually faded over time and allowed them to refresh important lessons before entering

formal review sessions. These experiences suggest that the RTEP served as a mechanism for reinforcing prior learning and promoting knowledge retention.

"It made me recall all the lessons from my year 1 to year 4, including extra knowledge." (R1)

"The program helped me refresh my knowledge." (R6)

"The program allowed me to refresh foundational concepts." (R3)

The second core idea, strengthening foundational understanding, reflects participants' realization that success in the licensure examination depends heavily on mastery of basic concepts. Graduates emphasized the importance of returning to fundamental principles and rebuilding their understanding of core subject areas. Through continuous exposure to lectures, discussions, and assessments, they developed a stronger foundation that facilitated subsequent learning during the review period.

"It helped me build my basics." (R2)

"Remember the basic fundamentals of each subject." (R1)

"It essentially forced us to go back to the basics and relearn the fundamental concepts we had forgotten." (R4)

The findings support previous studies indicating that enhancement activities serve as refresher mechanisms that strengthen foundational knowledge and academic preparedness. Lianza (2025) reported that refresher lectures and structured review activities improve examination readiness and strengthen knowledge retention among licensure examinees. Similarly, Jimenez et al. (2024) emphasized that preparatory learning resources and structured review experiences enhance students' readiness for professional practice and assessment. Moreover, Talaroc et al. (2021) identified competency-based assessments as important educational interventions that contribute to improved academic outcomes and licensure examination performance. Furthermore, these findings may be understood through Human Capital Theory, which posits that educational investments contribute to the development of knowledge and competencies that improve future performance. Participation in the enhancement program strengthened graduates' foundational knowledge, thereby increasing their preparedness for the Radiologic Technology Licensure Examination. Similarly, Constructivist Learning Theory explains that learners actively construct understanding by connecting prior knowledge with new experiences. Through recalling previous lessons and reinforcing foundational concepts, participants reconstructed their knowledge and developed deeper understanding of essential Radiologic Technology principles.

Recognizing Learning Deficiencies. This code reflects the experiences of Radiologic Technology graduates who became increasingly aware of their academic limitations and areas requiring

improvement through participation in the Radiologic Technology Enhancement Program (RTEP). The enhancement activities exposed participants to various assessments, discussions, and review exercises that allowed them to evaluate their level of preparedness and identify deficiencies that could affect their performance in the Radiologic Technology Licensure Examination (RTLE).

The first core idea, identifying weaknesses, emerged from participants' experiences of recognizing specific subject areas and concepts that required further improvement. Through examinations, drills, and review activities, graduates were able to determine which topics they struggled with, and which competencies required additional attention. This process enabled them to prioritize areas needing improvement and develop more focused review strategies. The participants perceived the enhancement program as a valuable mechanism for evaluating their academic strengths and weaknesses before entering the formal review process.

"It helped me identify areas that required improvement." (R2)

"I realized there were still many concepts and procedures that I needed to strengthen." (R3)

"I realized the areas where I was weak and needed more improvement." (R10)

The second core idea, becoming aware of learning gaps, reflects participants' realization that their existing knowledge was insufficient for the demands of the licensure examination. Many graduates acknowledged feelings of academic unpreparedness and recognized that relying solely on knowledge acquired during undergraduate education would not be enough to ensure examination success. Through their participation in the enhancement program, they became more conscious of forgotten concepts, misconceptions, and inadequately mastered subject areas. This awareness encouraged them to take a more proactive approach toward strengthening their understanding and improving their preparedness for the RTLE.

"I felt academically unprepared." (R7)

"I was worried about how prepared I really was for the board exam." (R5)

"It exposed how much we had forgotten." (R4)

The participants' recognition of weaknesses and learning gaps aligns with findings that assessment activities help learners identify areas requiring improvement. Beam et al. (2022) highlighted that structured advice and feedback mechanisms enable students to recognize strengths and weaknesses, facilitating targeted academic improvement. Similarly, Dante et al. (2025) found that mock board examinations assist examinees in identifying content deficiencies across major RTLE subject areas, allowing them to focus on topics needing reinforcement. Moreover, these findings may be explained through Human Capital Theory, which suggests that identifying deficiencies is an important step in improving knowledge, skills, and future performance. The recognition of

weaknesses and learning gaps motivated participants to invest additional effort in developing competencies necessary for licensure examination success. Likewise, Constructivist Learning Theory emphasizes that learning occurs when individuals actively reflect on their existing knowledge and recognize areas that require modification or enhancement. By identifying weaknesses and becoming aware of learning gaps, participants reconstructed their understanding and developed a stronger foundation for subsequent learning experiences.

Building Readiness for Formal Review. This code reflects the experiences of Radiologic Technology graduates who perceived the Radiologic Technology Enhancement Program (RTEP) as an important preparatory stage that enhanced their readiness for formal review sessions and the Radiologic Technology Licensure Examination (RTLE). Through continuous participation in enhancement activities, graduates reported feeling more prepared academically, mentally, and emotionally for the challenges associated with board examination preparation.

The first core idea, preparing for intensive review, emerged from participants' experiences of using the enhancement program as a bridge between undergraduate education and formal review sessions. Graduates described the program as a stepping stone that helped them transition into a more rigorous review environment by refreshing essential concepts, strengthening foundational knowledge, and developing effective study habits. The enhancement activities enabled them to enter formal review sessions with greater familiarity and preparedness, making the transition less overwhelming and more manageable.

"It helped me bridge knowledge gaps and made review sessions a lot more easier." (R2)

"The program became a valuable stepping stone before the actual review sessions began." (R3)

"The program helped me become more prepared and motivated for the review sessions." (R6)

The second core idea, developing academic confidence, reflects the participants' experiences of gaining greater confidence in their abilities as they progressed through the enhancement program. Through repeated exposure to assessments, discussions, and review activities, graduates became more assured of their knowledge and capabilities. The opportunity to monitor their progress, address weaknesses, and strengthen their understanding contributed to increased motivation and self-belief. As a result, participants developed a more positive outlook toward formal review sessions and the eventual licensure examination.

"It gave me a satisfactory experience." (R2)

"I gradually became more confident and motivated to study harder." (R10)

"It helped me build confidence and improve my test-taking strategies." (R10)

The findings corroborate studies suggesting that enhancement programs contribute to examination readiness and confidence. Lianza (2025) reported that enhancement activities improve examination stamina and preparation, while Dante et al. (2024) emphasized that successful licensure outcomes are strongly influenced by preparation and supervision during review activities. Furthermore, Dante et al. (2025) demonstrated that mock board examination performance is a significant predictor of RTLE success, highlighting the value of preparatory programs in developing readiness for licensure examinations.

These findings may be understood through Human Capital Theory, which posits that educational investments contribute to the development of competencies that improve future performance outcomes. Participation in the enhancement program strengthened graduates' preparedness and confidence, thereby increasing their potential for success in the RTLE. Similarly, Constructivist Learning Theory explains that learners gain confidence and readiness through active engagement with meaningful learning experiences. By participating in review activities, reflecting on their progress, and integrating new knowledge with prior learning, graduates developed a stronger sense of preparedness and confidence for the demands of formal review and licensure examination preparation.

6. How do the graduates' experience contribute to their behaviour in taking the Radiologic Technology Licensure Exam?

Table 6. Significant Statements, Core Ideas, Codes, and Essential Theme on Developing Disciplined and Strategic Study Behaviors Among Radiologic Technology Graduates in Preparing for the Radiologic Technology Licensure Examination

Significant Statements (Verbatim)	Core Idea	Codes	Essential Theme
"We expand and adjust our time management always." (R1)	Practicing time management	Developing Effective Study Habits	Developing Disciplined and Strategic Study Behaviors
"I learned how to manage my time effectively." (R10)			
"I became more disciplined in studying." (R6)			
"I developed a habit of reviewing lessons regularly." (R10)	Establishing consistent review routines		
"It improved my discipline." (R1)			
"Study more consistently and in a more structured manner." (R3)			
"I used my low scores to identify my weak subject clusters." (R4)	Targeting weak areas	Applying Strategic Review Approaches	

"I focused more on subjects that needed improvement." (R10)			
"Identify which topics I needed to focus more." (R9)			
"Focusing on high-yield topics." (R2)	Prioritizing important content		
"Question-based studying became my primary study method." (R4)			
"I focus on one subject at a time." (R7)			
"RTEP acted like a stress simulation." (R4)	Learning to function under pressure	Managing Examination Pressure	Developing Resilience and Adaptive Test-Taking Behaviors
"The program helped me stay calm under time pressure." (R7)		Managing Examination Pressure	
"I learned how to stay calm under pressure." (R10)			
"I learned to slow down my thinking and avoid panicking." (R3)	Regulating emotional responses		
"The repeated exposure desensitized me to the stress of testing." (R10)			
"I didn't freeze when I encountered difficult questions." (R4)			
"I learned to analyze questions carefully before answering." (R7)	Applying analytical test-taking strategies	Refining Examination Techniques	
"Master the elimination method." (R4)			
"I carefully analyze questions first before choosing an answer." (R3)			
"I read questions twice or thrice if needed." (R8)	Using deliberate answering strategies		
"I skip difficult questions and return later." (R8)			
"I pace myself during examinations." (R3)			

Essential Theme 1: Developing Disciplined and Strategic Study Behaviors

The essential theme reflects how the experiences of Radiologic Technology graduates in the Radiologic Technology Enhancement Program (RTEP) contributed to the development of disciplined and strategic study behaviors in preparation for the Radiologic Technology Licensure Examination (RTLE). Participants described becoming more organized, consistent, and purposeful in their study practices as a result of the demands and learning experiences provided by the enhancement program. Through regular assessments, structured review activities, and continuous exposure to examination-oriented learning, graduates developed effective study habits and strategic review approaches that enabled them to prepare more efficiently for the licensure examination. This theme may be understood through Human Capital Theory and Constructivist Learning Theory. Human Capital Theory suggests that investments in education and training improve an individual's competencies and performance, while Constructivist Learning Theory explains how learners actively construct knowledge and strategies through experience and reflection. Collectively, these theories suggest that participation in the RTEP facilitated the development of disciplined learning behaviors and strategic preparation practices that contributed to RTLE readiness.

Developing Effective Study Habits. This code reflects the experiences of graduates who developed more organized and disciplined study behaviors through participation in the enhancement program. The structured nature of the RTEP encouraged participants to adopt consistent learning practices and improve their ability to manage academic responsibilities while preparing for the RTLE.

The first core idea, practicing time management, emerged from participants' experiences of learning how to organize their schedules and allocate sufficient time for studying. Graduates recognized that effective preparation required balancing review activities, internship responsibilities, and personal commitments. Through the enhancement program, they became more conscious of the importance of managing their time wisely to maximize learning and minimize stress.

> *"We expand and adjust our time management always." (R1)*
>
> *"I learned how to manage my time effectively." (R10)*
>
> *"I became more disciplined in studying." (R6)*

The second core idea, establishing consistent review routines, reflects participants' experiences of developing regular study habits and maintaining structured learning schedules. Rather than relying on irregular or last-minute studying, graduates learned the value of consistency and continuous review. These experiences contributed to the development of more disciplined approaches toward examination preparation.

"I developed a habit of reviewing lessons regularly." (R10)

"It improved my discipline." (R1)

"Study more consistently and in a more structured manner." (R3)

The development of disciplined study behaviors supports the findings of Cancel et al. (2021), who identified study habits, time management, and dedication as among the strongest factors associated with licensure examination success. Their study demonstrated that personal preparation behaviors contribute more significantly to examination outcomes than environmental factors. These findings may be explained through Human Capital Theory, which suggests that disciplined learning behaviors and consistent educational efforts contribute to improved competence and performance. Likewise, Constructivist Learning Theory emphasizes that learners develop effective learning strategies through active engagement and reflection on their experiences. By practicing time management and establishing consistent review routines, participants constructed study behaviors that enhanced their preparedness for the RTLE.

Applying Strategic Review Approaches. This code reflects how graduates adopted more purposeful and targeted review strategies as a result of their experiences in the enhancement program. Through examinations, assessments, and feedback mechanisms, participants learned to direct their efforts toward areas that required improvement and maximize the effectiveness of their preparation.

The first core idea, targeting weak areas, emerged from participants' experiences of identifying deficiencies and prioritizing subjects that required additional attention. Graduates used assessment results and performance feedback to recognize their weaknesses and develop focused study plans. This allowed them to allocate their efforts more efficiently and address areas that could affect their RTLE performance.

"I used my low scores to identify my weak subject clusters." (R4)

"I focused more on subjects that needed improvement." (R10)

"Identify which topics I needed to focus more." (R9)

The second core idea, prioritizing important content, reflects participants' experiences of concentrating on high-yield topics and adopting review methods that maximized learning efficiency. Rather than attempting to study all materials equally, graduates learned to focus on concepts that were frequently tested and essential for board examination success.

"Focusing on high-yield topics." (R2)

"Question-based studying became my primary study method." (R4)

"I focus on one subject at a time." (R7)

Strategic review approaches observed among participants are consistent with previous studies emphasizing the importance of targeted preparation. Dante et al. (2025) found that mock examinations help students identify specific content gaps, while Alipio (2020) reported that academic performance across Radiologic Technology courses is a strong predictor of RTLE success, highlighting the importance of focusing review efforts on identified areas of weakness. These findings support Human Capital Theory, which explains that strategic allocation of learning resources and effort contributes to greater competence and performance outcomes. Furthermore, Constructivist Learning Theory suggests that learners actively construct effective learning strategies through experience, self-assessment, and reflection. By targeting weak areas and prioritizing important content, graduates developed personalized review approaches that enhanced their preparation for the RTLE.

Essential Theme 2: Developing Resilience and Adaptive Test-Taking Behaviors

The essential theme reflects how the experiences of Radiologic Technology graduates in the Radiologic Technology Enhancement Program (RTEP) contributed to the development of resilience and adaptive test-taking behaviors during preparation for the Radiologic Technology Licensure Examination (RTLE). Participants described how repeated exposure to assessments, mock examinations, and examination-oriented activities helped them become more capable of managing pressure, controlling anxiety, and responding effectively to challenging examination situations. Through these experiences, graduates developed emotional resilience and practical examination strategies that enhanced their confidence and performance during testing.

This theme may be understood through Human Capital Theory and Constructivist Learning Theory. Human Capital Theory suggests that educational experiences and training contribute to the acquisition of competencies necessary for successful performance, while Constructivist Learning Theory explains that learners develop knowledge and skills through active engagement, reflection, and adaptation to experiences. Together, these theories suggest that the RTEP contributed to the development of psychological preparedness and adaptive examination behaviors necessary for RTLE success.

Managing Examination Pressure. This code reflects the experiences of graduates who learned to cope with the psychological demands associated with examination preparation and testing situations. Through repeated exposure to assessment activities and simulated examination environments, participants developed greater emotional control and resilience when facing stressful academic situations.

The first core idea, learning to function under pressure, emerged from participants' experiences of adapting to high-pressure academic environments. Through continuous participation in mock examinations and review activities, graduates learned how to remain focused and productive despite examination-related stress. Lianza (2025) reported that regular assessments and

enhancement activities contribute to examination stamina and preparedness by exposing students to challenging testing situations. Such experiences help students develop resilience and improve their ability to perform effectively under pressure. These findings suggest that repeated assessment experiences can reduce the negative effects of examination stress and improve students' ability to function in demanding situations.

"RTEP acted like a stress simulation." (R4)

"The program helped me stay calm under time pressure." (R7)

"I learned how to stay calm under pressure." (R10)

The second core idea, regulating emotional responses, reflects participants' experiences of controlling anxiety, nervousness, and fear during examinations. Graduates described learning how to remain calm and focused even when confronted with difficult questions. Lianza (2025) emphasized that enhancement activities improve not only academic preparedness but also psychological readiness by helping students become accustomed to examination stress. Through repeated exposure to testing situations, students develop emotional regulation skills that enable them to respond more effectively to examination challenges. These findings indicate that resilience develops through experience and contributes significantly to examination performance.

"I learned to slow down my thinking and avoid panicking." (R3)

"The repeated exposure desensitized me to the stress of testing." (R10)

"I didn't freeze when I encountered difficult questions." (R4)

These findings may be understood through Human Capital Theory, which suggests that educational experiences contribute not only to knowledge acquisition but also to the development of competencies necessary for effective performance under pressure. Similarly, Constructivist Learning Theory explains that learners develop coping mechanisms and emotional regulation strategies through repeated experiences and reflective learning. By learning to function under pressure and regulate emotional responses, graduates developed resilience that contributed to their readiness for the RTLE.

Refining Examination Techniques. This code reflects the experiences of graduates who developed practical examination strategies that enabled them to answer questions more effectively and manage testing situations more efficiently. Through participation in mock examinations, drills, and assessment activities, participants refined their approach to answering questions and navigating the demands of the RTLE.

The first core idea, applying analytical test-taking strategies, emerged from participants' experiences of learning how to carefully evaluate questions before selecting answers. Graduates reported becoming more analytical and deliberate in their approach to examinations. Dante et al. (2025) emphasized that repeated exposure to mock board examinations strengthens students' familiarity with examination formats and promotes the development of effective answering strategies. These experiences enable examinees to approach questions more critically and improve decision-making during examinations.

"I learned to analyze questions carefully before answering." (R7)

"Master the elimination method." (R4)

"I carefully analyze questions first before choosing an answer." (R3)

The second core idea, using deliberate answering strategies, reflects participants' experiences of developing practical approaches to answering examination questions efficiently and accurately. Graduates described strategies such as pacing themselves, revisiting difficult questions, and carefully reviewing answer choices before making decisions. Dante et al. (2025) noted that mock examinations provide opportunities for students to refine examination techniques and develop behaviors that improve performance during the actual licensure examination. These findings suggest that repeated assessment experiences contribute to the development of adaptive test-taking behaviors that enhance examination effectiveness.

"I read questions twice or thrice if needed." (R8)

"I skip difficult questions and return later." (R8)

"I pace myself during examinations." (R3)

These findings support Human Capital Theory, which emphasizes that educational training contributes to the development of practical competencies that improve performance outcomes. Likewise, Constructivist Learning Theory suggests that learners refine their strategies through active engagement and reflection on previous experiences. By applying analytical test-taking strategies and utilizing deliberate answering techniques, graduates developed adaptive examination behaviors that enhanced their effectiveness during the RTLE.

7. What are the insights of the graduates that they can share in the Radiologic Technology community?

Table 7. Insights Shared by Radiologic Technology Graduates for Success in the Radiologic Technology Licensure Examination and Professional Practice

Significant Statements (Verbatim)	Core Idea	Code	Essential Theme
"Study consistently and avoid last-minute cramming." (R7)	Maintaining disciplined study habits	Promoting Effective Learning Practices	Fostering Success Through Effective Preparation, Active Engagement, and Institutional Support
"Start reviewing as early as possible and be consistent." (R5)			
"Discipline yourself." (R8)			
"Always remember the Basic Fundamentals." (R1)	Building strong academic foundations		
"Focus heavily on the fundamentals early on." (R4)			
"Make sure you understand the concepts." (R5)			
"Take the enhancement program seriously." (R5)	Actively participating in enhancement activities	Maximizing Learning Opportunities	
"Actively participate in all activities." (R7)			
"Treat it like the actual board exam from day one." (R4)			
"Expose oneself to as many questions and tests as possible." (R2)	Utilizing assessments as learning tools		
"Take mock exams seriously." (R9)			
"Practice questions as soon as possible." (R4)			
"The institution can help by becoming more supportive." (R2)	Enhancing academic support	Strengthening Support Systems	
"Continue guiding students academically." (R6)			
"Strengthening mentorship programs." (R7)			
"Prioritize the mental health of the RadTech students." (R2)	Supporting student well-being		
"Support students' mental well-being." (R7)			
"Stress-management workshops." (R10)			

Essential Theme: Fostering Success Through Effective Preparation, Active Engagement, and Institutional Support

The essential theme reflects the collective insights shared by Radiologic Technology graduates regarding factors that contribute to success in the Radiologic Technology Licensure Examination (RTLE). Participants emphasized that achieving favorable examination outcomes requires a combination of disciplined study practices, active engagement in learning opportunities, and adequate academic and institutional support. Drawing from their experiences in the Radiologic Technology Enhancement Program (RTEP) and licensure examination preparation, graduates highlighted the importance of consistency, commitment, effective utilization of learning resources, and supportive educational environments. These insights suggest that RTLE success is not solely dependent on individual effort but is also influenced by meaningful participation in enhancement activities and the availability of institutional support systems. This theme may be understood through Human Capital Theory and Constructivist Learning Theory. Human Capital Theory explains that investments in education, training, and skill development contribute to improved competence and future performance, while Constructivist Learning Theory emphasizes that meaningful learning occurs through active engagement, reflection, and interaction with learning experiences. Together, these theories suggest that effective preparation, active participation, and supportive learning environments collectively contribute to RTLE readiness and success.

Promoting Effective Learning Practices. This code reflects the graduates' insights regarding the importance of developing effective learning behaviors throughout the review process. Participants consistently emphasized that success in the RTLE requires discipline, consistency, and a strong understanding of fundamental concepts.

The first core idea, maintaining disciplined study habits, emerged from participants' emphasis on consistency, time management, and sustained effort throughout the review process. Graduates encouraged future examinees to establish structured study schedules and avoid relying on last-minute preparation. This finding supports Cancel et al. (2021), who found that study habits, time management, and dedication were among the strongest factors associated with licensure examination success. The findings also support Alipio (2020), who identified academic performance as one of the strongest predictors of RTLE outcomes. Together, these studies suggest that disciplined learning behaviors contribute significantly to examination performance.

> *"Study consistently and avoid last-minute cramming." (R7)*
>
> *"Start reviewing as early as possible and be consistent." (R5)*
>
> *"Discipline yourself." (R8)*

The second core idea, building strong academic foundations, reflects graduates' recommendations that students prioritize understanding fundamental concepts before progressing to more advanced

topics. Participants believed that mastery of foundational knowledge is essential for success in the RTLE. Alipio (2020) emphasized the importance of strong academic performance throughout the Radiologic Technology program as a predictor of licensure examination success. These findings suggest that students who establish strong academic foundations are more likely to perform successfully in the RTLE.

"Always remember the Basic Fundamentals." (R1)

"Focus heavily on the fundamentals early on." (R4)

"Make sure you understand the concepts." (R5)

These findings may be understood through Human Capital Theory, which suggests that continuous investment in learning and competency development contributes to improved performance outcomes. Likewise, Constructivist Learning Theory explains that meaningful learning occurs when individuals actively build upon existing knowledge and strengthen conceptual understanding. By maintaining disciplined study habits and developing strong academic foundations, graduates believed that future examinees would be better prepared for the demands of the RTLE.

Maximizing Learning Opportunities. This code reflects graduates' insights regarding the importance of actively engaging in enhancement activities and utilizing available learning opportunities during RTLE preparation. Participants emphasized that meaningful participation in review activities and assessment experiences can significantly improve examination readiness.

The first core idea, actively participating in enhancement activities, emerged from participants' belief that meaningful engagement in review sessions, discussions, and enhancement activities improves learning outcomes. Lianza (2025) reported that enhancement programs contribute positively to examination preparation through structured learning activities and continuous assessments. Similarly, Al-Jayyousi et al. (2025) emphasized that meaningful engagement in educational experiences promotes deeper learning and greater academic development. These findings suggest that active participation enhances the benefits gained from enhancement programs.

"Take the enhancement program seriously." (R5)

"Actively participate in all activities." (R7)

"Treat it like the actual board exam from day one." (R4)

The second core idea, utilizing assessments as learning tools, reflects graduates' recognition of examinations and mock boards as valuable opportunities for learning rather than merely evaluative activities. Participants emphasized the importance of taking assessments seriously and using

feedback to guide future learning. Lianza (2025) found that regular assessments improve examination stamina and readiness, while Dante et al. (2025) reported that mock examinations help students identify content gaps and strengthen areas requiring improvement. These findings demonstrate the importance of assessment-based learning in RTLE preparation.

"Expose oneself to as many questions and tests as possible." (R2)

"Take mock exams seriously." (R9)

"Practice questions as soon as possible." (R4)

These findings support Human Capital Theory, which posits that educational experiences and repeated practice contribute to the development of knowledge and competencies necessary for success. Similarly, Constructivist Learning Theory suggests that learners construct understanding through active engagement and reflection on their experiences. By participating actively in enhancement activities and utilizing assessments as learning tools, students can strengthen their preparedness and confidence for the RTLE.

Strengthening Support Systems. This code reflects graduates' insights regarding the importance of institutional and psychosocial support in promoting successful RTLE preparation. Participants emphasized that educational institutions play a significant role in creating environments that facilitate learning, academic development, and student well-being.

The first core idea, enhancing academic support, emerged from participants' suggestions that institutions strengthen mentorship, guidance, and academic assistance programs. These findings are supported by Farokhzadian et al. (2024), who reported that supportive learning environments contribute to improved academic performance and student satisfaction. Similarly, Alghamdi et al. (2022) found that supportive educational environments enhance competence development and professional growth. Samaniego-Mananghaya (2025) further emphasized the importance of institutional support in maintaining educational quality and student success.

"The institution can help by becoming more supportive." (R2)

"Continue guiding students academically." (R6)

"Strengthening mentorship programs." (R7)

The second core idea, supporting student well-being, reflects graduates' recognition that mental health and emotional well-being influence academic performance and examination readiness. Participants recommended stress-management initiatives and mental health support programs for future examinees. Farokhzadian et al. (2024) reported that supportive learning environments positively influence student well-being and academic achievement, while Alghamdi et al. (2022) highlighted the relationship between supportive educational environments and student

development. These findings underscore the importance of holistic support systems that address both academic and psychological needs during RTLE preparation.

> *"Prioritize the mental health of the RadTech students." (R2)*
>
> *"Support students' mental well-being." (R7)*
>
> *"Stress-management workshops." (R10)*

These findings may be explained through Human Capital Theory, which recognizes that educational success is influenced not only by knowledge acquisition but also by the availability of resources and support systems that facilitate learning. Furthermore, Constructivist Learning Theory suggests that supportive learning environments encourage active engagement, reflection, and meaningful knowledge construction. By strengthening academic support and promoting student well-being, institutions can create conditions that enhance RTLE preparedness and overall student success.

8. To what extent do the qualitative interviews with the graduates corroborate with the quantitative data?

Table 8. *Joint Display of Salient Quantitative and Qualitative Findings on the Extent of Corroboration Between the Radiologic Technology Enhancement Program (RTEP) performance and Radiologic Technology Licensure Examination (RTLE) Performance*

Aspect or Focal Point	Quantitative Findings	Qualitative Findings	Nature of Data Integration
Level of the Radiologic Technology Enhancement Program (RTEP)	Overall RTEP performance was moderate (M = 82.2). Higher scores were observed in Patient Care Management and Radiographic Positioning and Radiologic Procedures.	Reconstructing Academic Preparedness Through Knowledge Reinforcement (Re-establishing Foundational Knowledge; Recognizing Learning Deficiencies; Building Readiness for Formal Review)	Merging–Converging
Level of the Radiologic Technology Licensure Examination	Overall RTLE performance was moderate (M = 81.3). Higher scores were observed in Patient Care Management and	Developing Disciplined and Strategic Study Behaviors (Developing Effective Study Habits; Applying Strategic Review Approaches) and Developing Resilience and	Merging–Converging

(RTLE) Performance	Radiographic Positioning and Radiologic Procedures.	Adaptive Test-Taking Behaviors (Managing Examination Pressure; Refining Examination Techniques)	
Significant Relationship Between RTEP and RTLE Performance	Significant positive correlations were observed between RTEP and RTLE performance across all examination clusters. Overall RTEP and RTLE averages demonstrated a very strong positive correlation ($\rho = .990$, $p < .001$).	Reconstructing Academic Preparedness Through Knowledge Reinforcement, Developing Disciplined and Strategic Study Behaviors, and Developing Resilience and Adaptive Test-Taking Behaviors	Merging–Converging
Significant Predictive Effect of RTEP on RTLE Performance	All RTEP clusters significantly predicted RTLE performance. The model explained 85.8% of the variance in RTLE scores ($R^2 = .858$, $p < .001$).	Reconstructing Academic Preparedness Through Knowledge Reinforcement, Developing Disciplined and Strategic Study Behaviors, and Developing Resilience and Adaptive Test-Taking Behaviors	Merging–Converging
Implications for RTLE Preparation and Professional Success	Quantitative findings demonstrated the importance of enhancement activities in improving examination readiness and licensure examination performance.	Fostering Success Through Effective Preparation, Active Engagement, and Institutional Support (Promoting Effective Learning Practices; Maximizing Learning Opportunities; Strengthening Support Systems)	Merging–Expanding

Note. M = Mean; ρ = Spearman's rho correlation coefficient; β = standardized regression coefficient; R^2 = coefficient of determination. Data integration was guided by Creswell and Plano Clark's mixed methods integration framework. Merging–Converging denotes agreement between quantitative and qualitative findings, whereas Merging–Expanding denotes qualitative findings that extended the interpretation of quantitative results by providing additional context and insights.

Data Integration of Salient Quantitative and Qualitative Findings

The data integration demonstrates substantial corroboration between the quantitative and qualitative findings regarding the effectiveness of the Radiologic Technology Enhancement Program (RTEP) in improving Radiologic Technology Licensure Examination (RTLE) performance. The quantitative findings revealed moderate levels of both RTEP performance ($M = 82.2$) and RTLE performance ($M = 81.3$), significant positive correlations between RTEP and RTLE scores ($\rho = .990$, $p < .001$), and significant predictive effects of all RTEP clusters on RTLE performance ($R^2 = .858$, $p < .001$). These findings were further enriched by the qualitative experiences and insights of the graduates, providing a comprehensive understanding of how the enhancement program contributed to examination readiness and performance.

Merging–Converging. The quantitative and qualitative findings demonstrated substantial convergence regarding the effectiveness of the Radiologic Technology Enhancement Program (RTEP) in preparing graduates for the Radiologic Technology Licensure Examination (RTLE). Quantitatively, graduates attained moderate levels of performance in both the RTEP ($M = 82.2$) and RTLE ($M = 81.3$), while significant positive correlations ($\rho = .990$, $p < .001$) and predictive relationships ($R^2 = .858$, $p < .001$) were observed between enhancement program performance and licensure examination outcomes. These findings were corroborated by the qualitative themes Reconstructing Academic Preparedness Through Knowledge Reinforcement, Developing Disciplined and Strategic Study Behaviors, and Developing Resilience and Adaptive Test-Taking Behaviors. Graduates consistently described how the enhancement program helped them revisit foundational concepts, identify learning deficiencies, strengthen study habits, improve examination strategies, and develop confidence in handling examination-related pressures. Collectively, these experiences support the quantitative evidence that participation in enhancement activities contributed to improved examination readiness and performance.

The convergence of findings further reinforces existing literature on licensure examination preparation. Studies by Lianza (2025) and Dante et al. (2025) emphasized that structured review activities, refresher lectures, mock examinations, and periodic assessments improve examination readiness by helping students identify content gaps and strengthen mastery of core competencies. Similarly, Alipio (2020) reported that academic performance is a strong predictor of RTLE success, highlighting the importance of sustained competency development throughout the Radiologic Technology program. These findings may also be explained through Human Capital Theory, which views educational interventions as investments that enhance knowledge and professional competence, and Constructivist Learning Theory, which posits that meaningful learning occurs through active engagement, reflection, and the integration of prior and new knowledge. The strong agreement between the quantitative and qualitative findings therefore suggests that the RTEP served as an effective mechanism for strengthening graduates' preparedness and increasing their likelihood of success in the RTLE.

Merging–Expanding. While the quantitative findings established the significant contribution of the enhancement program to RTLE performance, the qualitative findings expanded the interpretation of these results through the theme Fostering Success Through Effective Preparation, Active Engagement, and Institutional Support. Graduates highlighted the importance of maintaining disciplined study habits, actively participating in enhancement activities, maximizing learning opportunities through mock examinations and assessments, and receiving continuous academic and psychosocial support from the institution. These insights provided a broader understanding of factors that contribute to licensure examination success beyond what was measured quantitatively.

The expanded findings are consistent with previous studies emphasizing the importance of supportive learning environments and active student engagement in promoting academic achievement. Farokhzadian et al. (2024) and Alghamdi et al. (2022) reported that supportive educational environments enhance competence development, professional growth, and student well-being. Likewise, Samaniego-Mananghaya (2025) emphasized the role of institutional support in maintaining educational quality and promoting student success. These findings align with the participants' experiences regarding mock examinations, repeated assessments, disciplined preparation strategies, and active involvement during the enhancement program. In addition, active learning and assessment strategies can help students improve their academic achievement and engagement (Atalla et al., 2025). From the perspective of Human Capital Theory, these support mechanisms represent institutional investments that enhance students' competencies and professional readiness. Similarly, Constructivist Learning Theory suggests that meaningful learning is facilitated through active participation and interaction within supportive learning environments. Thus, the qualitative findings extended the quantitative results by identifying practical strategies and institutional factors that may further strengthen RTLE preparation and professional success among Radiologic Technology graduates.

IV. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of Findings

Based on the analysis and interpretation of the data gathered, the following findings were obtained:

1. The level of the Radiologic Technology Enhancement Program (RTEP) among Radiologic Technology graduates was moderate, this implies that the average percentage ranged from eighty to eight four-point ninety nine percent, with an overall mean score of eighty-two point two. Among the examination clusters, Patient Care Management and Radiographic Positioning and Radiologic Procedures obtained the highest mean scores that ranged from eighty-five to eighty-nine point ninety-nine, followed by Radiological Sciences. Meanwhile, Image Production and Evaluation and Radiation Physics, Equipment, Biology, Protection recorded comparatively lower mean scores that ranged from seventy-five to seventy-nine point nine.
2. The level of Radiologic Technology Licensure Examination (RTLE) performance among the graduates was likewise moderate, this implies that the average percentage ranged from eighty

to eight four-point ninety nine percent, with an overall mean score of eighty-one point three. Among the clusters, Patient Care Management and Radiographic Positioning and Radiologic Procedures demonstrated the highest mean scores that ranged from eighty-five to eighty-nine point ninety-nine, followed by Radiological Sciences. Lower mean scores were observed in Image Production and Evaluation and Radiation Physics, Equipment, Biology, Protection that ranged from seventy-five to seventy-nine point nine.

3. The Spearman correlation analysis revealed a significant positive relationship between RTEP performance and RTLE performance across all examination clusters. The overall RTEP average was strongly and positively associated with the overall RTLE average, indicating that graduates who performed better in the enhancement program also tended to perform better in the licensure examination.
4. The General Linear Model analysis showed that the RTEP significantly predicted RTLE performance. The model explained eight five-point eight percent of the variance in RTLE scores. All five RTEP clusters emerged as significant predictors of RTLE performance. Among these, Patient Care Management and Radiographic Positioning and Radiologic Procedures demonstrated the strongest predictive effects which are statistically significant.
5. The lived experiences of the graduates regarding the enhancement program prior to formal review sessions were synthesized into the essential theme Reconstructing Academic Preparedness Through Knowledge Reinforcement. This theme consisted of the codes Re-establishing Foundational Knowledge, Recognizing Learning Deficiencies, and Building Readiness for Formal Review, highlighting how the enhancement program served as a preparatory mechanism that strengthened graduates' academic foundations before entering review programs.
6. The graduates' experiences contributed to their behavior in taking the licensure examination through two essential themes: Developing Disciplined and Strategic Study Behaviors and Developing Resilience and Adaptive Test-Taking Behaviors. The first theme consisted of the codes Developing Effective Study Habits and Applying Strategic Review Approaches, while the second theme comprised Managing Examination Pressure and Refining Examination Techniques. These experiences shaped graduates' approaches toward examination preparation and performance.
7. The insights shared by the graduates were represented by the essential theme Fostering Success Through Effective Preparation, Active Engagement, and Institutional Support. This theme included the codes Promoting Effective Learning Practices, Maximizing Learning Opportunities, and Strengthening Support Systems, reflecting the graduates' recommendations for future examinees and academic institutions.
8. The quantitative and qualitative findings were integrated using a joint display through the merging-converging and merging-expanding approaches. The moderate levels of RTEP and RTLE performance, the significant relationship between the variables, and the predictive effect of the enhancement program were corroborated by the qualitative themes Reconstructing Academic Preparedness Through Knowledge Reinforcement, Developing Disciplined and

Strategic Study Behaviors, and Developing Resilience and Adaptive Test-Taking Behaviors. Furthermore, the theme Fostering Success Through Effective Preparation, Active Engagement, and Institutional Support expanded the quantitative findings by providing practical insights and recommendations for strengthening enhancement program implementation and licensure examination preparation.

V. CONCLUSIONS

Based on the findings of the study, it is concluded that the Radiologic Technology Enhancement Program contributed positively to the academic preparedness and licensure examination performance of Radiologic Technology graduates. The moderate levels of both RTEP and RTLE performance indicate that graduates demonstrated satisfactory competency across the major examination domains, particularly in Patient Care Management and Radiographic Positioning and Radiologic Procedures. These findings suggest that the enhancement program was effective in reinforcing knowledge and competencies necessary for professional examination preparation.

The significant positive relationship between RTEP and RTLE performance indicates that achievement in the enhancement program is closely associated with success in the licensure examination. Likewise, the significant predictive effects of all RTEP clusters demonstrate that enhancement program performance serves as an important determinant of RTLE outcomes. These findings support the proposition of Human Capital Theory that educational investments contribute to improved performance outcomes and professional competence.

The qualitative findings further revealed that graduates perceived the enhancement program as an essential mechanism for strengthening foundational knowledge, identifying learning gaps, developing disciplined study behaviors, and improving examination readiness. Through their experiences, graduates developed resilience, confidence, and adaptive examination strategies that facilitated their performance during the RTLE. These findings are consistent with Constructivist Learning Theory, which emphasizes the active construction of knowledge through meaningful learning experiences.

The integration of the quantitative and qualitative findings demonstrated substantial convergence, indicating that the statistical results were supported by the lived experiences of the graduates. Collectively, the findings affirm that the Radiologic Technology Enhancement Program serves as a valuable institutional strategy for strengthening examination preparedness and improving licensure examination performance among Radiologic Technology graduates.

VI. RECOMMENDATIONS

Based on the foregoing findings and conclusions, the following recommendations are offered:

1. For the Radiologic Technology Department, enhancement activities should be continuously strengthened, particularly in the areas of Radiation Physics, Equipment, Biology, Protection and Image Production and Evaluation, which obtained comparatively lower mean scores in

both the RTEP and RTLE. Additional review sessions, competency assessments, and targeted interventions may be implemented to improve graduates' mastery of these domains.

2. For enhancement program coordinators and faculty members, regular mock examinations, diagnostic assessments, structured review sessions, and feedback mechanisms should be sustained and further enhanced to reinforce foundational knowledge, identify learning deficiencies, and strengthen examination readiness among students.
3. For Radiologic Technology students and future examinees, active participation in enhancement activities, disciplined study habits, strategic review approaches, and effective examination management techniques are highly encouraged, as these were identified by graduates as important contributors to licensure examination success.
4. For higher education institutions, institutional support mechanisms such as academic mentoring, counseling services, peer-support programs, and learning resource enhancement should be strengthened to promote student engagement, well-being, and examination preparedness.
5. For future researchers, additional variables such as academic motivation, self-efficacy, learning engagement, clinical performance, review center participation, and psychological readiness may be explored to provide a more comprehensive understanding of factors influencing RTLE performance.
6. Future studies may employ larger and more geographically diverse samples from multiple institutions to improve the generalizability of findings and provide broader insights into the effectiveness of enhancement programs among Radiologic Technology graduates.
7. Future mixed methods studies may incorporate focus group discussions, longitudinal designs, or follow-up investigations to gain deeper insights into how enhancement programs influence academic preparedness, professional competence, and long-term licensure examination outcomes.

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