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CRITICAL THINKING SKILLS, CLINICAL EXPERIENCE, AND ACADEMIC PERFORMANCE AMONG RADIOLOGIC TECHNOLOGY INTERNS

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ABSTRACT

As the healthcare landscape increasingly emphasizes the need for critical thinking in clinical decision-making and patient care, developing these skills among interns has become paramount. This study explores the relationship between critical thinking skills, clinical experience, and academic performance among radiologic technology interns.

Findings indicate that the level of critical thinking skills among radiologic technology interns is very high, with particular strengths noted in analysis, communication, observation, and problem-solving. This high level of critical thinking is complemented by an equally high level of clinical experience, as indicated by the interns' proficiency in hands-on application skills and their ability to operate and maintain radiologic equipment effectively. These results suggest a strong competency in performing imaging procedures, which is essential for success in clinical settings. Academic performance among the interns was generally rated as good, with most students achieving satisfactory grades. However, the study revealed a significant relationship between critical thinking skills and clinical experience, indicating that higher levels of critical thinking are associated with enhanced clinical competencies. Conversely, the analysis highlighted that there is no significant relationship between critical thinking skills and academic performance, nor between clinical experience and academic performance. This suggests that while critical thinking and clinical experience are interrelated, they do not directly influence academic success in this setting.

The insights gained from this study underscore the importance of emphasizing critical thinking and hands-on clinical experience in radiologic technology education. These elements are essential for developing proficient healthcare professionals. Additionally, educators are encouraged to explore various approaches to enhance academic performance, ensuring that all aspects of intern development are addressed. This study serves as a valuable contribution to the preparation of radiologic technology interns for their future responsibilities in an ever-evolving healthcare environment.

Keywords: Critical thinking skills, Clinical experience, Academic Performance, Radiologic Technology Interns.

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1. INTRODUCTION

Radiologic technology is essential in modern healthcare, forming the basis for accurate medical imaging and diagnosis. As the field evolves, the need for skilled professionals with critical thinking and technical proficiency grows. Interns in radiologic technology must link theoretical learning with hands-on experience to ensure quality patient care. Safabakhsh (2022) highlights the importance of practical skills training in clinical courses. As healthcare becomes more complex, radiologic programs focus on enhancing critical thinking for making informed clinical judgments. Alipio (2020) emphasizes that technical proficiency involves knowledge application, skillfulness, and understanding professional responsibilities. While much research has examined academic performance and clinical training in healthcare education, fewer studies have looked at the relationship between critical thinking, clinical experience, and academic success in radiologic technology. This interconnectedness is crucial for assessing program effectiveness. A gap remains in exploring how critical thinking influences clinical decision-making and problem-solving. Effective clinical experience, which depends on quality supervision and varied case exposure, is essential for developing critical thinking skills. Hsu (2021) outlines three components of critical thinking: knowledge, dispositions, and skills.

As the field of medical imaging evolves, interns need both technical expertise and the ability to make sound judgments in complex situations. This study investigates how enhancing critical thinking can improve clinical competencies and academic outcomes, ensuring interns are well-prepared for their profession. Clinical internships provide hands-on training that allows students to apply their knowledge in real-world settings under experienced supervision. Such exposure helps interns develop confidence, technical skills, and problem-solving abilities. As they encounter diverse cases, their critical thinking is refined, promoting reflective learning (Sterner et al., 2023). While academic performance, assessed through coursework and exams, reflects a student's grasp of theoretical concepts, it does not always guarantee clinical competence. The interaction between academic performance, clinical experience, and critical thinking is vital for improving radiologic technology education. This study aims to enhance the preparedness of graduates to be academically proficient and clinically competent, ensuring effective patient care. This research examines the relationships between critical thinking, clinical experience, and academic performance among radiologic technology interns. With the growing focus on competency-based education in healthcare, understanding these relationships is crucial for designing curricula that prepare students for professional practice.

2. METHODOLOGY

This study utilized a descriptive-correlational research design to examine the critical thinking skills, clinical experience, and academic performance of radiologic technology interns of Universidad de Zamboanga. This approach allowed for a systematic analysis of the interns' experiences and relationships among key variables (Olipas, 2021). Questionnaires were administered to radiologic technology interns at the Universidad de Zamboanga. From an initial target population of 80, a sample of 67 respondents was selected using the Rao soft calculator, ensuring a 95% confidence level and a 5% margin of error with a simple random sampling technique. The self-constructed questionnaire was

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validated by a panel of experts and demonstrated strong reliability through a Cronbach's alpha score, indicating internal consistency. The researcher personally administered the questionnaires while maintaining respondent confidentiality. The surveys were tabulated, and the data were encoded in Microsoft Excel and sent to the statistician for evaluation and analysis.

3. RESULTS AND DISCUSSION

Table 1
Respondents' Level of Critical Thinking Skills in terms of Analysis

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. I identify and resolves imaging artifacts	3.47	Very High	4
2. I identify anatomical structure and abnormalities	3.36	Very High	7
3. I adapt techniques for different patient conditions	3.55	Very High	3
4. I understand radiation safety principles (ALARA)	3.79	Very High	1
5. I ensure correct patient identification and procedure verification	3.76	Very High	2
6. I know how to recognize subtle abnormalities in images	3.38	Very High	5.5
7. I find potential imaging errors before they occur	3.30	Very High	8
8. I know how to handle emergency situations effectively	3.38	Very High	5.5
9. I am able to break down complex clinical problems into manageable components.	3.26	Very High	9
10. I can identify patterns in patient symptoms that inform my clinical decisions.	3.23	High	10
Overall Weighted Mean	**3.45**	Very High	

As shown in table 1, Indicator 4, which states that radiologic technology interns "Understand radiation safety principles (ALARA) ranked number 1 with a weighted mean of 3.79 and was verbally interpreted as very high. Indicator 5, which states that "Ensure correct patient identification and procedure verification," ranks number 2 with a weighted mean of 3.76 and, verbally interpreted as very high. Indicator 3, which states, "Adapt techniques for different patient conditions, ranks number 3 with a weighted mean of 3.55 and, verbally interpreted as very high. Indicator 1, which states "Identify and resolve imaging artifacts," ranks number 4 with a weighted average mean of 3.47 and, verbally

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interpreted as very high. Indicators 6 and 8, which state "Know how to recognize subtle abnormalities in images and "Know how to handle emergency situations effectively," both rank number 5 with a weighted mean of 3.38 and were verbally interpreted as very high. Indicator 2, which states "identify anatomical structure and abnormalities," ranks number 7 with a weighted mean of 3.36 and, verbally interpreted as very high. Indicator 7, which states "find potential imaging errors before they occur," ranks number 8 with a weighted mean of 3.30 and, verbally interpreted as very high. Indicator 9, which states "able to breakdown complex clinical problems into manageable components," ranks number 9 with a weighted mean of 3.26 and, verbally interpreted as very high. Indicator 10, which states, "Can identify patterns in patient symptoms that inform my clinical decisions," ranks number 10 with a weighted mean of 3.23 and, verbally interpreted as high.

To sum up, the overall weighted mean was 3.45 and verbally interpreted as very high, indicating that the radiologic technology interns have a very high level of critical thinking skills in terms of analysis and effectively analyze and interpret complex information regarding patient safety and radiation exposure and can evaluate images and situations systematically to ensure quality and accuracy, and the respondents are proficient in analyzing problems and identifying solutions.

According to Kim et al. (2022), the focus was on the factors influencing critical thinking disposition and clinical competence, highlighting the importance of fostering critical thinking skills in radiography students to ensure timely and accurate decision-making in clinical settings. The ability to think through a problem should be the outcome of learning, and therefore problem-solving abilities must be learned (Sari et al., 2021). The approach encourages successful lifelong learning and language acquisition, whereby learners start to see how the knowledge they learn helps them to solve problems in life and become lifelong learners.

Table 2
Respondents' Level of Critical Thinking Skills in terms of Communication

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. I explain the procedures clearly	3.70	Very High	5
2. I use simple and non-technical language	3.68	Very High	6
3. I speak with confidence and professionalism	3.62	Very High	8.5
4. I use facial expressions and gestures to show empathy	3.62	Very High	8.5
5. I maintain eye contact to build trust	3.67	Very High	7
6. I confidently communicate clinical findings to my peers and supervisors.	3.56	Very High	10
7. I actively listen to instructions and feedback from my supervisors during clinical placements.	3.74	Very High	3

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8. I seek clarification when I don't understand something during my clinical rotations.	3.77	Very High	1
9. I effectively collaborate with healthcare professionals through clear verbal and written communication.	3.71	Very High (	4
10. I adjust my communication style based on the audience's needs and understanding.	3.76	Very High	2
Overall Weighted Mean	**3.68**	Very High (	

As shown in table 2, indicator 8, which states that radiologic technology interns "seek clarification when they don't understand something during their clinical rotations," ranks number 1 with a weighted mean of 3.77 and, verbally interpreted as very high. Indicator 10, which states "adjust my communication style based on the audience's needs and understanding," ranks number 2 with a weighted mean of 3.76 and is verbally interpreted as very high. Indicator number 7, which states "actively listen to instructions and feedback from my superiors during clinical rotations," ranks number 3 with a weighted mean of 3.74 and is verbally interpreted as very high. Indicator 9, which states "effectively collaborate with healthcare professionals through clear verbal and written communication," ranks number 4 with a weighted mean of 3.71 and was verbally interpreted as very high. Indicator 1, which states "explain procedure clearly," ranks number 5 with a weighted mean of 3.70 and is verbally interpreted as very high. Indicator number 2, which states "use simple and non-technical language," ranks number 6 with a weighted mean of 3.68 and, verbally interpreted as very high. Indicator number 5, which states, "Maintain eye contact to build trust," ranks number 7 with a weighted mean of 3.67 and is verbally interpreted as very high. Indicator numbers 3 and 4, which state "speak with confidence and professionalism" and "use facial expressions and gestures to show empathy," both rank number 8 with a weighted mean of 3.62 and were verbally interpreted as very high. Indicator number 6, which states, "Confidently communicate clinical findings to my peers and supervisor," ranks number 10 with a weighted mean of 3.56 and, verbally interpreted as very high.

To sum up, the overall weighted mean was 3.68 and verbally interpreted as very high. This indicates that the respondents show strong critical thinking skills in communication, with strengths in clarity and active listening. This also suggests that they can articulate thoughts, ideas, and information effectively.

Communication skills were vital for building student-supervisor relationships and can be taught and acquired but must be practiced, while development was dependent on constructive professional feedback (Zimmermann et al., 2021).

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Table 3
Respondents' Level of Critical Thinking Skills in terms of Observation

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. I identify errors in positioning, contrast or exposure	3.45	Very High	6.5
2. I know how to recognize imaging artifacts and determining their errors	3.42	Very High	8
3. I notice subtle abnormalities that may indicate pathology	3.24	High	10
4. I observe signs and discomfort, pain and anxiety	3.50	Very High	4.5
5. I can identify movement that may affect image quality	3.50	Very High	4.5
6. I pay close attention to details when analyzing radiologic images.	3.55	Very High	2
7. I am able to notice subtle changes in a patient's condition during examinations.	3.41	Very High	9
8. I routinely observe safety protocols and procedures in the clinical environment.	3.62	Very High	1
9. I can identify variations in standard operating procedures during my clinical practice.	3.53	Very High	3
10. I routinely gather additional contextual information when assessing patient data.	3.45	Very High	6.5
Overall Weighted Mean	**3.47**	Very High	

As shown in Table 3, indicator 8, which states that radiologic technology interns "routinely observe safety protocols and procedures in clinical environments," ranks number 1 with a weighted mean of 3.62 and is verbally interpreted as very high. Indicator 6, which states, "Pay close attention to details when analyzing radiologic images," ranks number 2 with a weighted mean of 3.55 and is verbally interpreted as very high. Indicator number 9, which states, "Can identify variations in standard operating procedures during my clinical practice," ranks number 3 with a weighted mean of 3.53 and is verbally interpreted as very high. Indicator numbers 4 and 5, which state "observe sign and discomfort, pain, and anxiety" and "can identify movement that may affect image quality," both rank number 4 with a weighted mean of 3.50 and are verbally interpreted as very high. Indicator 1 and 10, which state "identify errors in positioning, contrast, or exposure" and "routinely gather additional contextual information when assessing patient data, rank number 6 with a weighted mean of 3.45 and are verbally interpreted as very high. Indicator number 3, which states "know how to recognize imaging artifacts and determine their errors," ranks number 8 with a weighted mean of 3.42 and is verbally interpreted as very high. Indicator 7, which states "am able to notice subtle changes in a patient's

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condition during examinations," ranks number 9 with a weighted mean of 3.41 and is interpreted as very high. Indicator number 3, which states, Notice subtle abnormalities that may indicate pathology," ranks number 10 with a weighted mean of 3.24 and is interpreted as high.

To sum up, the overall weighted mean was 3.47 and verbally interpreted as very high. This indicates that the respondents have a very high level of critical thinking skills in terms of observation. This indicates they can observe and interpret information adequately; the top indicator reflects strong skills in accurately noticing details, and this is the key trait for critical thinking because observing accurately helps in making informed decisions.

According to Miester, (2020) professional development has always been unique regarding its academic approach to teaching and learning, as well as its training approach, where knowledge and skills were developed through 'learning by doing'. Tutticci et al. (2022) highlighted the viable learning experience of both participants and observers when nurse students simulated. The observer role was undervalued, as findings have demonstrated that observers enhanced the students' reflective capacity and awareness of their own lack of knowledge.

Table 4
Respondents' Level of Critical Thinking Skills in terms of Problem Solving

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. I ask questions to clarify the problem before acting	3.76	Very High	2
2. I determine whether the issue is technical, procedural or patient-related	3.56	Very High	6
3. I investigate possible reasons behind errors or challenges	3.52	Very High	9
4. I consult with instructors or experienced technologist when needed	3.80	Very High	1
5. I apply the most effective strategy based on situation	3.65	Very High	4
6. I check if the solution successfully resolved the issue	3.55	Very High	7.5
7. I effectively analyze the outcomes of my solutions to improve future decision-making.	3.61	Very High	5
8. I seek input from colleagues and mentors when tackling difficult problems.	3.67	Very High	3
9. I can propose multiple solutions when faced with a complex clinical issue.	3.39	Very High	10
10. I remain calm and resourceful when confronted with unexpected challenges in the clinical setting.	3.55	Very High	7.5
Overall Weighted Mean	**3.60**	Very High	

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As shown in Table 4, radiologic technology interns in indicator 4 state“ that they consult with instructors or experienced technologists when needed,” ranking number 1 with a weighted mean of 3.80 and verbally interpreted as very high. Indicator number 1, which states “ask questions to clarify the problem before acting,” ranks number 2 with a weighted mean of 3.76 and is verbally interpreted as very high. Indicator 8, which states “seek input from colleagues and mentors when tackling difficult problems,” ranks number 3 with a weighted mean of 3.67 and is verbally interpreted as very high. Indicator 5, which states “apply the most effective strategy based on the situation,” ranks number 4 with a weighted mean of 3.65 and is verbally interpreted as very high. Indicator number 7, which states “effectively analyze the outcomes of my solutions to improve future decision-making,” ranks 5 with a weighted mean of 3.61 and is interpreted as very high. Indicator number 2, which states, “Determine whether the issue is technical, procedural, or patient-related,” ranks 6 with a weighted mean of 3.56 and is verbally interpreted as very high. Indicator numbers 6 and 10, which state “check if the solution successfully resolved the issue” and “remain calm and resourceful when confronted with unexpected challenges in the clinical setting,” both rank number 7 with a weighted mean of 3.55 and were verbally interpreted as very high. Indicator number 3, which states “investigate possible reasons behind errors or challenges,” ranks 9 with a weighted mean of 3.52 and, verbally interpreted as very high. Indicator number 9, which states, “Can propose multiple solutions when faced with complex clinical issues,’ ranks number 10 with a weighted mean of 3.39 and, verbally interpreted as very high.

To sum up, the overall weighted mean was 3.60 and verbally interpreted as very high. This indicates that respondents possess a very high level of critical thinking skills, especially related to problem solving, and suggests they were generally proficient at approaching and resolving problems, particularly in defining problems and generating solutions. Respondents excel in understanding and defining problems clearly before attempting to solve them; these foundation skills were crucial for effective problem solving.

According to Hsu (2021), in general, there were three parts to critical thinking: knowledge (topic knowledge, technique knowledge, self-knowledge, and environment knowledge); dispositions (logical integrity, logical humanity, logical modesty, logical bravery, logical persistence, etc.); and skills or abilities.

Table 5
Summary of the Respondents Level of Critical Thinking

Indicators	Weighted Mean	Verbal Interpretation	Rank
Analysis	3.45	Very High	4
Communication	3.68	Very High	1

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Observation	3.47	Very High	3
Problem Solving	3.60	Very High	2
Overall Weighted Mean	**3.55**	Very High	

As shown in table 5, the indicator communication ranks number one with the weighted mean of 3.68 and is verbally interpreted as very high, suggesting that respondents perceived their communication skills as the strongest aspects of their critical thinking. Effective communication skills were crucial in articulating ideas, discussing problems, and collaborating with others, emphasizing that they are likely confident in expressing their thoughts clearly and persuasively. The indicator problem-solving ranks number 2 with a weighted mean of 3.60 and, verbally, is interpreted as very high; it shows a high confidence in problem-solving capabilities. Respondents likely believed they could identify, analyze, and develop solutions for various challenges effectively. Indicator observation ranks number three with a weighted mean of 3.47 and, verbally interpreted as very high, indicates that respondents feel very capable in their observation skills, important for gathering relevant information and noticing details that might affect their analysis and conclusions. Indicator analysis ranks number four with a weighted mean of 3.45 and is verbally interpreted as very high; while still rated very high, this is the lowest indicator. It suggests that respondents have strong analytical skills but may perceive some challenges or areas for improvement in this regard compared to the other areas.

To sum up, the overall weighted mean was 3.55 and verbally interpreted as very high. The results show a very high level of critical thinking across all indicators, with communication and problem solving being particularly strong. Since every indicator was rated as "very high," it suggests a positive educational or professional environment that fosters these skills.

According to the study of Thompson et al. (2022), which discussed the impact of peer-assisted learning on critical thinking skills development, collaborative learning plays a significant role in enhancing students' problem-solving abilities.

Table 6
Respondents' Level of Clinical Experience in terms of Hands-On Application

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. I correctly position patients based on the exam type	3.71	Very High	4
2. I minimize motion blur by adjusting exposure time and instructing the patient properly.	3.62	Very High	8
3. I evaluate the final image for positioning errors, artifacts, and diagnostic clarity	3.55	Very High	10

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4. I use proper collimation to reduce unnecessary radiation exposure	3.73	Very High	3
5. I can ensure to produce optimum quality diagnostic images.	3.64	Very High	7
6. I can secure a patient's privacy and make certain that patient is informed adequately about the procedure.	3.79	Very High	1
7. I am confident in performing imaging procedures under supervision	3.67	Very High	6
8. I routinely practice imaging techniques to improve my skills.	3.74	Very High	2
9. I am prepared to handle real-life scenarios that arise during patient imaging.	3.56	Very High	9
10. I can adapt my skills and techniques as needed based on patient requirements.	3.70	Very High	5
Overall Weighted Mean	**3.67**	Very High	

As shown in Table 6, indicator 6, which states "that radiologic technology interns can secure patients' privacy and make certain that patients are informed adequately about the procedure," ranks number 1 with a weighted mean of 3.79 and is verbally interpreted as very high. Indicator 8, which states "routinely practice imaging techniques to improve my skills," ranks 2 with a weighted mean of 3.74 and is verbally interpreted as very high. Indicator 4, which states "use proper collimation to reduce unnecessary radiation exposure," ranks 3 with a weighted mean of 3.55 and is verbally interpreted as very high. Indicator number 1, which states "correctly position patients based on the exam type," has a weighted mean of 3.71 and is verbally interpreted as very high. Indicator 10, which states "can adapt my skills and techniques as needed based on patient requirements," ranks 5 with a weighted mean of 3.70 and is verbally interpreted as very high. Indicator 7, which states "confident in performing imaging procedures under supervision," ranks 6 with a weighted mean of 3.67 and is verbally interpreted as very high. Indicator number 5, which states, "Can ensure to produce optimum quality diagnostic images," ranks 7 with a weighted mean of 3.64 and is verbally interpreted as very high. Indicator number 2, which states, "Minimize motion blur by adjusting exposure time and instructing the patient properly during patient imaging," ranks number 9 with a weighted mean of 3.56 and is verbally interpreted as very high. Indicator number 3, which states "evaluate the final image for positioning errors, artifacts, and diagnostic clarity," ranks 10 with a weighted mean of 3.71 and is verbally interpreted as very high.

To sum up, the overall weighted mean was 3.67 and verbally interpreted as very high. Respondents generally demonstrate a very high level of clinical experience in hands-on applications, pointing to a high level of experience across many practical skills in a clinical setting, especially in securing patient privacy and informing about the procedures.

According to Sterner et al. (2023), simulation was a learning and teaching strategy that has an impact on participants' perceptions, emotional reactions, and interpersonal

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skills development. Simulation and skills training promote reflective learning, making real-life processes visible.

Table 7
Respondents' Level of Clinical Experience in terms of Equipment Operation and Maintenance

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. I prepare and adjust x-ray machines for different procedures	3.59	Very High	6.5
2. I check equipment functionality before and after each use	3.52	Very High	9
3. I identify and report any malfunctions or image quality issues	3.59	Very High	6.5
4. I ensure the x-ray machine is powered on and properly calibrated.	3.73	Very High	2
5. I position the x-ray tube at the correct distance and angle for optimal imaging.	3.71	Very High	3
6. I routinely inspect the equipment for possible errors and malfunctions.	3.41	Very High	10
7. I have been trained to troubleshoot common equipment malfunctions during my clinical placements.	3.95	Very High	1
8. I understand the safety procedures that must be followed when operating imaging equipment.	3.67	Very High	4
9. I am familiar with cleaning and disinfecting protocols for imaging equipment after use.	3.64	Very High	5
10. I participate in training sessions for new equipment introduced during my clinical internship.	3.53	Very High	8
Overall Weighted Mean	**3.63**	Very High	

As shown in Table 7, indicator 7, which states that the respondents "have been trained to troubleshoot common equipment malfunctioning during my clinical placements," ranks number 1 with a weighted mean of 3.95 and is verbally interpreted as very high. Indicator number 4, which states "ensure the x-ray machine is powered on and properly calibrated," ranks 2 with a weighted mean of 3.73 and is verbally interpreted as very high. Indicator number 3, which states, "Position the x-ray tube at the correct distance and angle for optimal imaging," ranks 3 with a weighted mean of 3.71 and is verbally interpreted as very high. Indicator number 8, which states "understand the safety procedures that must be followed when operating imaging equipment," ranks 4 with a weighted mean of 3.67 and is verbally interpreted as very high. Indicator number 9, which states, "I am familiar with cleaning and disinfecting protocols for imaging equipment," ranks number 5 with a weighted mean of 3.64 and is verbally interpreted as very high.

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Indicator numbers 1 and 3, which state “prepare and adjust the x-ray machine for different procedures” and “identify and report any malfunctions or image quality issues,” both rank number 6 with a weighted mean of 3.59 and were verbally interpreted as strongly agree. Indicator number 10, which states “participate in training sessions for new equipment introduced during my clinical internship,” ranks 8 with a weighted mean of 3.53 and is verbally interpreted as very high. Indicator number 2, which states “check equipment functionality before and after use," ranks 9 with a weighted mean of 3.52 and is verbally interpreted as very high. Indicator number 6, which states “routinely inspect the equipment for possible error and malfunction,” ranks 10 with a weighted mean of 3.41 and is verbally interpreted as very high.

To sum up, the overall weighted mean was 3.63 and verbally interpreted as very high. This suggests that respondents show a very high level of clinical experience in equipment operation and maintenance, with notable strengths in several areas such as troubleshooting common equipment and ensuring the x-ray machine is properly on and calibrated. The respondents also reflect competencies in various crucial areas of equipment operation and possess diverse skills necessary for effective equipment management.

According to the study of Thompson et al. (2022), which discussed the impact of peer-assisted learning on critical thinking skills development, collaborative learning plays a significant role in enhancing students’ problem-solving abilities. And Harvey et al., 2020: forcing adults to expose themselves in front of others is an ethical dilemma and requires a fine balance, even though research has identified that practicing enhances competencies.

Table 8
Summary of the Respondents Level of Clinical Experience

Indicators	Weighted Mean	Verbal Interpretation	Rank
Hands on Application Skills	3.67	Very High	1
Equipment Operation & Maintenance	3.63	Very High	2
Overall Weighted Mean	**3.65**	**Very High**	

As shown in table 8, the indicator hands on application skills rank number one with the weighted mean of 3.67 and were verbally interpreted as very high, suggesting that respondents feel most competent in applying their clinical skills in practical settings. Indicator equipment operation and maintenance rank number two with a weighted mean of 3.63, which is verbally interpreted as very high but slightly lower than hands-on application skills,, indicating strong confidence but with a marginally lower perception of experience or skills.

The overall weighted mean of 3.65 confirms that, generally, the respondents feel they possess a very high level of clinical experience across evaluated areas. This could suggest that they are well-prepared for practical applications in their field, reflecting positively on their training or educational programs.

According to the study conducted by Adonis et al. (2020), the learning preferences positively affect the clinical competencies of the radiologic interns.

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Table 9
Respondents' Academic Performance in Terms of GPA

Grade Adjectival Rating		Frequency	Percentage
95-99	(Excellent)	-	-
90-94	(Very Good)	14	20.9
85-89	(Good)	37	55.2
80-84	(Satisfactory)	16	23.9
75-79	(Fair)	-	-
N=67			

Table 9 presents the academic performance of the 67 radiologic technology interns based on their Grade Point Average (GPA) and corresponding adjectival ratings. The majority of the respondents, 37 interns or 55.2%, had a GPA ranging from 85 to 89, which falls under the "Good" category. Meanwhile, 16 interns, accounting for 23.9% of the respondents, obtained a GPA between 80 and 84, classified as a "satisfactory or "very good" rating. Notably, no respondents scored within the "excellent" category (95-99) or the "fair" category (75-79). This indicates that while some students performed exceptionally well, none reached the highest level of academic distinction, and none struggled to the point of falling into the lowest category.

Overall, the results suggest that the academic performance of the interns was generally good, with most students maintaining grades within the good level. The absence of students in the lowest category reflects a positive trend in academic achievement, though the lack of students in the highest category suggests potential areas for improvement in fostering academic excellence.

May et al. (2020) discussed their findings from the American College Health Association-National test, which stated that maladaptive effective functioning (i.e., depression, anxiety, and stress) impacts students' academic performance and success.

Table 10
Relationship between the Respondents' Level of Critical Thinking Skills in terms of Application and Level of Clinical Experience

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Analysis	Statistical Treatment (Pearson's)	p-value	Decision	Interpretation
Hands-on Application	r=.373 (low correlation)	.002**	H_0 rejected	Significant
Equipment operation and maintenance	r=.601 (moderate correlation)	.000**	H_0 rejected	Significant
*Significant @.01				

Table 10 presents the relationship between the respondents' level of critical thinking skills in terms of application and their level of clinical experience. The results show a low to moderate positive correlation between application skills and both hands-on application and equipment operation and maintenance, as analyzed using Pearson's correlation.

For hands-on application, the computed r-value of .373 indicates a low positive correlation with clinical experience. The p-value of .002 is below the .01 significance level, leading to the rejection of the null hypothesis (H_0). This suggests that students with stronger application skills tend to have better performance in hands-on clinical tasks, although the relationship is not very strong.

On the other hand, equipment operation and maintenance showed a moderate positive correlation (r = .601) with clinical experience. The p-value of .000 is below the .01 significance level, also leading to the rejection of the null hypothesis. This suggests that students who effectively apply their critical thinking skills are more proficient in handling and maintaining radiologic equipment.

Overall, this means that the higher the respondents' level of critical thinking in terms of application, the higher their level of clinical experience. The findings suggest that application skills play a role in clinical experience, particularly in equipment operation and maintenance. While the correlation with hands-on application is lower, the significant relationship implies that students who can apply their knowledge effectively tend to perform better in practical settings. Developing these skills in radiologic technology training programs can enhance students' ability to handle clinical tasks efficiently.

Kim et al. (2022) also supported these conclusions, noting that clinical competence is intricately tied to students' exposure to clinical situations, particularly when combined with effective mentorship. Mentorship was shown to be a key factor in improving students' clinical competencies, as it provides real-time feedback and guidance, allowing students to refine their decision-making processes.

Table 11

Relationship between the Respondents' Level of Critical Thinking Skills in terms of Communication and Level of Clinical Experience

Communication	Statistical Treatment	p-value	Decision	Interpretation

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	(Pearson's)			
Hands-on Application	r=.426 (moderate correlation)	.000**	H_0 rejected	Significant
Equipment operation and maintenance	r=.545 (moderate correlation)	.000**	H_0 rejected	Significant
*Significant @.01				

Table 11 presents the relationship between the respondents' level of critical thinking skills in terms of communication and their level of clinical experience. The results indicate a moderate positive correlation between communication skills and both hands-on application and equipment operation and maintenance, as analyzed using Pearson's correlation.

For hands-on application, the computed r-value of .426 suggests a moderate positive correlation with clinical experience. The p-value of .000 is below the .01 significance level, leading to the rejection of the null hypothesis (H_0). This implies that students with stronger communication skills tend to perform better in hands-on clinical tasks.

Similarly, equipment operation and maintenance showed a moderate positive correlation (r = .545) with clinical experience. The p-value of .000 is also below the .01 significance level, leading to the rejection of the null hypothesis. This suggests that students who communicate effectively are also more proficient in handling and maintaining radiologic equipment.

Overall, this means that the higher the respondents' level of critical thinking in terms of communication, the higher their level of clinical experience. The findings indicate that communication skills contribute significantly to clinical experience. Effective communication allows students to better understand instructions, collaborate with peers and supervisors, and accurately relay information, which enhances their practical performance. Strengthening communication skills in radiologic technology training programs can help improve students' hands-on competence and equipment management abilities.

According to Kocak et al. (2021), they examined if problem-solving and other 21st-century skills (such as algorithmic thinking, creativity, digital literacy, and effective communication) are related via the lens of cooperation and critical thinking.

Table 12
Relationship between the Respondents' Level of Critical Thinking Skills in terms of Observation and Level of Clinical Experience

Observation	Statistical Treatment (Pearson's)	p-value	Decision	Interpretation

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Hands-on Application	r=.511 (moderate correlation)	.000**	H_0 rejected	Significant
Equipment operation and maintenance	r=.640 (moderate correlation)	.000**	H_0 rejected	Significant
*Significant @.01				

Table 12 presents the relationship between the respondents' level of critical thinking skills in terms of observation and their level of clinical experience. The results indicate a moderate positive correlation between observation skills and both hands-on application and equipment operation and maintenance, as analyzed using Pearson's correlation.

For hands-on application, the computed r-value of .511 suggests a moderate positive correlation with clinical experience. The p-value of .000 is below the .01 significance level, leading to the rejection of the null hypothesis (H_0). This means that students with stronger observation skills tend to perform better in hands-on clinical tasks.

Similarly, equipment operation and maintenance showed a moderate positive correlation (r = .640) with clinical experience. The p-value of .000 also falls below the .01 significance level, resulting in the rejection of the null hypothesis. This indicates that students who are more skilled in observation are also more proficient in handling and maintaining radiologic equipment.

Overall, this means that the higher the respondents' level of critical thinking in terms of observation, the higher their level of clinical experience. The findings suggest that observation skills play a crucial role in enhancing clinical experience. Students who pay close attention to details and accurately interpret clinical situations tend to perform better in hands-on applications and equipment-related tasks. This highlights the need to strengthen observation skills in radiologic technology training programs to improve students' practical competence and overall clinical performance.

Studies by Chelen et al. (2021) and Castillo et al. (2020) highlight the value of simulation in creating real-world scenarios in a controlled, risk-free environment. This allows students to practice complex procedures and clinical decision-making without the potential consequences of errors in actual patient care.

Table 13
Relationship Between the Respondents' Level of Critical Thinking Skills in terms of Problem-Solving and Level of Clinical Experience

Problem Solving	**Statistical Treatment** (Pearson's)	**p-value**	**Decision**	**Interpretation**

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Hands-on Application	r=.652 (moderate correlation)	.000**	H_0 rejected	Significant
Equipment operation and maintenance	r=.534 (moderate correlation)	.000**	H_0 rejected	Significant
**Significant @.01				

Table 13 presents the relationship between the respondents' level of critical thinking skills in terms of problem-solving and their level of clinical experience. The results indicate a moderate positive correlation between problem-solving skills and both hands-on application and equipment operation and maintenance, as analyzed using Pearson's correlation.

For hands-on application, the computed r-value of .652 suggests a moderate positive correlation with clinical experience. The p-value of .000 is below the .01 significance level, leading to the rejection of the null hypothesis (H_0). This indicates that students with stronger problem-solving skills tend to perform better in hands-on clinical tasks.

Similarly, equipment operation and maintenance had an r-value of .534, also indicating a moderate positive correlation. The p-value of .000 is below the .01 significance level, resulting in the rejection of the null hypothesis. This suggests that students who are more adept at problem-solving are more proficient at operating and maintaining radiologic equipment.

Overall, this means that the higher the respondents' level of critical thinking in terms of problem solving, the higher their level of clinical experience. The findings suggest that problem-solving skills significantly contribute to clinical experience. Students who can analyze and address challenges effectively are better equipped to handle hands-on procedures and manage equipment efficiently. This highlights the importance of fostering problem-solving abilities among radiologic technology interns to enhance their practical skills and clinical competence.

According to the study of Hora et al. (2020), internships play a crucial role in improving the employability of vocational students by bridging the gap between academic knowledge and practical skills, making them more attractive to potential employers.

Table 14
Relationship between the Respondents' Level of Critical Thinking Skills and Academic Performance

Academic Performance	**Statistical Treatment** (Pearson's)	**p-value**	**Decision**	**Interpretation**

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Analysis	r=.264 (low correlation)	.034*	H_0 rejected	Significant
Communication	r=-.062 (negligible correlation)	.624	Failed to reject H_0	Not Significant
Observation	r=-.070 (negligible correlation)	.576	Failed to reject H_0	Not Significant
Problem Solving	r=-.047 (negligible correlation)	.707	Failed to reject H_0	Not Significant
*Significant @.05				

Table 14 presents the relationship between the respondents' level of critical thinking skills and their academic performance. The results indicate varying degrees of correlation between different aspects of critical thinking and academic achievement, as analyzed using Pearson's correlation.

The analysis component of critical thinking skills showed a low positive correlation (r = .264) with academic performance. The p-value of .034 is below the .05 significance level, leading to the rejection of the null hypothesis (H_0). This suggests that there is a statistically significant but weak relationship between analytical skills and academic performance, indicating that students with better analytical abilities tend to perform slightly better academically.

Communication had an r-value of -0.062 and a p-value of .624; observation had an r-value of -0.070 and a p-value of .576; and problem-solving had an r-value of -0.047 and a p-value of .707. Since all p-values exceed the .05 significance level, the null hypothesis could not be rejected for these variables, indicating no significant relationship between these aspects of critical thinking and academic performance.

Overall, the findings suggest that while analytical skills have a slight impact on academic success, other critical thinking components such as communication, observation, and problem-solving do not significantly influence GPA. This implies that academic performance may depend on other factors beyond critical thinking, such as study habits, instructional methods, and individual motivation.

According to the study conducted by Alipio (2020), in the Philippines, low academic adjustment of college students results in poor academic achievement.

According to May et al. (2020), they discussed their findings from the American College Health Association-National test, which stated that maladaptive effective functioning (i.e., depression, anxiety, and stress) impacts students' academic performance and success.

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6. Relationship between the Respondents' Level of Clinical Experience and Academic Performance

Table 15
Relationship between the Respondents' Level of Clinical Experience and Academic Performance

Academic Performance	Statistical Treatment (Pearson's)	p-value	Decision	Interpretation
Hands-on Application	r=-.092 (negligible correlation)	.460	Failed to reject H_0	Not Significant
Equipment operation and maintenance	r=-.098 (negligible correlation)	.433	Failed to reject H_0	Not Significant
*Significant @.05				

Table 15 presents the relationship between the respondents' level of clinical experience and their academic performance.

The p-value of .460 exceeds the .05 significance level, leading to the failure to reject the null hypothesis (H_0). This indicates that there is no significant relationship between hands-on clinical experience and academic performance. The p-value of .433, which is above the .05 significance level, means that the null hypothesis could not be rejected, confirming that this aspect of clinical experience does not significantly impact academic performance.

Overall, this implies that the level of clinical experience of the respondents has no bearing on their academic performance. The findings suggest that clinical experience and academic performance are not connected. This implies that a student's performance in coursework and examinations may not necessarily reflect their proficiency in hands-on clinical tasks. Other factors, such as practical exposure, learning environment, and individual skills, may play a more crucial role in clinical competence than academic grades alone.

Katz et al. (2022), who found that students with strong emotional intelligence were more likely to succeed in their clinical placements, demonstrating that EI is a crucial factor in both academic and clinical performance. Okeji et al. (2022) suggested that integrating EI into curricula could improve overall clinical performance and interpersonal relationships with patients and colleagues.

4. CONCLUSIONS

The findings indicate that radiologic technology interns possess very high levels of critical thinking skills, particularly in areas such as analysis, communication, observation,

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and problem-solving. Additionally, these interns demonstrate significant clinical experience, as evidenced by their hands-on application skills and proficiency in operating and maintaining radiologic equipment, which speaks to their competency in performing imaging procedures. Overall, the academic performance of these interns is generally regarded as good. Moreover, a positive correlation exists; the higher the level of critical thinking among the respondents, the greater their level of clinical experience. However, it should be noted that their level of critical thinking does not have a significant impact on their academic performance, nor does their level of clinical experience. In light of these findings, it is crucial to implement the proposed action plan aimed at sustaining and further enhancing the critical thinking skills, clinical experience, and academic performance of radiologic technology interns.

Proposed Action Plan to sustain critical thinking skills, clinical experience, and academic performance among radiologic technology interns.

Areas of Concern	Strategy/Task	Persons responsible	Time Frame	Resources	Sources of Budget	Budget Allocation	Success Indicators
Critical thinking in terms of Analysis	Professional Development for Educators and Integrate within syllabus some activities such as case based learning/reflection journal/simulations and role playing.	Training Coordinator Dean/Faculty and Clinical Instructor	Every Semester	Training Materials, facilitators Textbooks and Journal	Department Budget	30,000 annually	90% Competency in applying critical skills in every activities
Equipment operation and maintenance	Workshops and seminar. Hands on Training and	Training Coordinator Dean/Faculty and Clinical	Every day	Training manual/Equipment documentations	Department Budget	20,000 Annually	95% Competency

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	simulations. Problem-Based Learning Root cause Analysis	Instructor					
Academic Performance	Active Learning Techniques. Project-based Learning	Workshops and Training Programs for faculty	Every semester	Training manual/Equipment documentations	Department Budget	30,000 Annually	95% Competency

5. RECOMMENDATIONS

The study presents a valuable opportunity to deepen its insights by considering a wider array of external factors that may influence interns' performance. These factors include the diverse clinical environments they encounter, the varying qualities of mentorship they receive, and the level of institutional support available to them. By acknowledging and examining these critical elements, we can gain a more comprehensive understanding of their educational outcomes. To build upon this foundation, future research should employ more objective assessment tools, draw from larger and more diverse samples, and adopt a holistic framework that evaluates the myriad influences on critical thinking and practical skills within radiologic technology education. This enriched approach will not only enhance training efficacy but also pave the way for improved outcomes for interns embarking on their professional journeys.

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