

The transition to competency: Assessing professional development needs of Radiologic Technology (RT) educators in Outcome-Based Education

Jhelet A. Jacob, RRT, MSPH^{*1}, Maegan L. Balisi, RRT², Princess Eunice O. Escosio, RRT³,
Peter John M. Ventura, RRT, MSPH⁴, Roy Son D. Jang, RRT, MSPH⁵, Marifel O. Sison, RRT, PhD⁶

^{1, 2, 3, 4, 5, 6} University of Perpetual Help System - Laguna

*Corresponding Author e-mail: c25-3161-450@uphsl.edu.ph

Received: 24 May 2026

Revised: 25 June 2026; 29 June 2026; 30 June 2026

Accepted: 30 June 2026

Available Online: 01 July 2026

Volume 1 (2026), Issue 3, P-ISSN – 3116-3769; E-ISSN - 3116-3777

<https://doi.org/10.63498/injelps90>

Abstract

Aim: This study aimed to assess the professional development needs and implementation challenges of Radiologic Technology (RT) educators in the transition to Outcome-Based Education (OBE) in selected higher education institutions in Northern Luzon, Philippines. Specifically, it examined educators' development needs, the challenges they encountered in OBE implementation, and the relationships among their profile characteristics, identified needs, and experienced challenges in relation to teaching, curriculum delivery, and faculty development.

Methodology: A descriptive–correlational research design was employed. Data were collected from 44 RT educators using a validated structured questionnaire through convenience sampling. Descriptive statistics were used to determine the educators' profile, professional development needs, and implementation challenges, while Chi-square test of independence and Pearson r correlation were used to examine significant relationships among the variables.

Results: Findings revealed that most RT educators were early-career faculty members with limited teaching experience but with strong clinical backgrounds and graduate-level education. Overall, RT educators demonstrated high professional development needs ($M = 3.82$), particularly in simulation training, clinical skills updating, and leadership and management in education. They also experienced a moderate level of implementation challenges ($M = 3.28$), with time and resource management emerging as the most prominent barrier. Significant relationships were found between educators' profile characteristics and both their professional development needs and implementation challenges ($p \leq 0.05$). Positive correlations were likewise identified between several professional development needs and the challenges encountered in OBE implementation.

Conclusion: The findings indicate that RT educators recognize the competencies necessary for effective OBE implementation but continue to face institutional and instructional constraints that affect teaching, curriculum delivery, and educational practice. The study underscores the need for targeted faculty development programs, stronger institutional support mechanisms, and enhanced instructional leadership to improve educator preparedness, strengthen OBE-based curriculum implementation, and promote better teaching and learning outcomes in Radiologic Technology education.

Keywords: Outcome-Based Education, Radiologic Technology educators, professional development, implementation challenges, higher education, Philippines

INTRODUCTION

The global transformation of higher education toward Outcome-Based Education (OBE) has fundamentally reshaped how educational institutions design curricula, deliver instruction, assess learning, and prepare graduates for professional practice. Unlike traditional content-driven approaches that emphasize instructional inputs and time-based learning, OBE focuses on measurable learning outcomes, competency attainment, authentic assessment, and continuous quality improvement. This educational paradigm responds to the growing demand for graduates who possess not only disciplinary knowledge but also the practical competencies, critical thinking abilities, ethical values,



communication skills, and lifelong learning capacities required in increasingly complex professional environments (Gruppen et al., 2016; Er, 2019). More recent scholarship likewise recognizes OBE as a dynamic framework that continues to evolve through learner-centered pedagogies, digital technologies, competency-based assessment, and continuous curriculum enhancement to improve educational quality and graduate employability.

Within health professions education, OBE has expanded the role of educators beyond the delivery of disciplinary knowledge. Faculty members are expected to design constructively aligned curricula, facilitate learner-centered instruction, implement authentic assessment, integrate educational technologies and simulation, supervise clinical learning, and evaluate student outcomes. Consequently, effective OBE implementation depends largely on educators' pedagogical competence, assessment literacy, instructional leadership, and ability to adapt to evolving educational practices.

These developments are particularly significant in Radiologic Technology (RT) education, where instructional quality directly influences the preparation of imaging professionals capable of delivering safe, ethical, and high-quality patient care. Contemporary radiologic practice requires graduates to demonstrate technical proficiency in diagnostic imaging, sound clinical judgment, radiation protection, patient-centered communication, digital imaging competence, and adherence to professional standards within technologically advanced healthcare environments (McDonagh, 2026). Accordingly, RT educators must possess both current clinical expertise and effective pedagogical competencies to ensure that curriculum delivery and competency assessment remain aligned with contemporary professional standards.

In the Philippines, Outcome-Based Education has been institutionalized through the policies of the Commission on Higher Education (CHED), particularly Commission on Higher Education Memorandum Order (CMO) No. 07, series of 2018, which prescribes outcome-based curricula, competency-oriented instruction, quality assurance mechanisms, research engagement, and strengthened clinical education for Radiologic Technology programs. These reforms require higher education institutions to produce graduates with clearly defined professional competencies while ensuring that educators are equipped to facilitate effective teaching, learning, and assessment.

Despite these policy initiatives, OBE implementation across Philippine higher education institutions remains uneven. Previous studies have reported challenges related to instructional innovation, assessment practices, technology integration, workload management, and faculty preparedness, particularly within health professions education (Janssens et al., 2023). Such challenges are often more evident in regional higher education institutions where access to instructional technologies, simulation facilities, research opportunities, and other educational resources may be limited. These conditions may affect curriculum implementation, instructional quality, and ultimately students' competency development.

These concerns are particularly relevant in selected higher education institutions in Northern Luzon, where Radiologic Technology programs operate under diverse institutional conditions characterized by varying levels of educational resources, clinical affiliations, and technological infrastructure. RT educators in these institutions frequently balance classroom instruction, clinical supervision, student assessment, research, extension activities, and administrative responsibilities. Understanding their professional development needs and the challenges they encounter in implementing OBE is therefore essential for designing responsive faculty development initiatives that address regional needs while remaining aligned with national educational policies and international standards.

Although Outcome-Based Education has been widely investigated across disciplines such as medicine, nursing, engineering, and teacher education, relatively little empirical evidence specifically examines Radiologic Technology educators. Existing studies have primarily focused on curriculum implementation, student competency, institutional compliance, and educational reform, with comparatively fewer investigations examining educators' professional development needs and the implementation challenges they experience. Moreover, findings from other health professions cannot be readily generalized to Radiologic Technology because RT education integrates specialized competencies involving diagnostic imaging, radiation safety, advanced technologies, simulation-based instruction, and technology-intensive clinical practice.

Within the Philippine context, published evidence focusing specifically on Radiologic Technology educators remains limited, particularly among higher education institutions in Northern Luzon. Likewise, previous investigations have seldom examined educators' profile characteristics, professional development needs, and implementation challenges within a single analytical framework. This gap limits the availability of evidence needed to develop targeted faculty development initiatives and strengthen OBE implementation in Radiologic Technology education.

Addressing this gap is important not only for Philippine higher education but also for the broader field of health professions education. As institutions continue transitioning toward competency-based and learner-centered educational models, understanding educators' experiences provides valuable evidence for curriculum enhancement, instructional leadership, faculty development planning, and educational policy. The findings of this study are therefore expected to contribute to the growing body of knowledge on Radiologic Technology education by providing discipline-

specific evidence that may assist teacher educators, curriculum developers, academic leaders, quality assurance practitioners, and policymakers in strengthening Outcome-Based Education implementation.

Review of Related Literature and Studies

Policy Framework and Faculty Roles in Outcome-Based Radiologic Technology Education

Outcome-Based Education (OBE) has become a widely adopted framework for curriculum design and quality assurance in higher education because it emphasizes clearly defined learning outcomes, competency attainment, learner-centered instruction, and continuous curriculum improvement. Rather than serving merely as a curriculum model, OBE aligns instructional planning, teaching, assessment, and graduate competencies with the expectations of professional practice and societal needs (Hamidi et al., 2024; Japee & Oza, 2021). Effective implementation therefore requires constructive alignment among intended learning outcomes, instructional strategies, learning activities, and assessment methods.

In the Philippine context, OBE is institutionalized through the policies and standards of the Commission on Higher Education (CHED), which require higher education institutions offering Radiologic Technology programs to implement competency-based curricula, strengthen clinical education, promote research engagement, and adopt quality assurance mechanisms (Commission on Higher Education, 2018). These reforms have expanded the responsibilities of Radiologic Technology educators beyond classroom instruction to include curriculum development, competency-based assessment, clinical supervision, and educational leadership (Mincu, 2022).

International evidence likewise indicates that successful OBE implementation depends not only on curriculum design but also on educator preparedness and institutional readiness. Chen et al. (2023) emphasized that competency-based education should be viewed through the lens of implementation science because sustainable educational reform requires organizational support, effective change management, and faculty capability. Similarly, Acevedo-De-los-Ríos and Rondinel-Oviedo (2022) highlighted that accreditation systems increasingly recognize faculty competence as an essential indicator of educational quality.

Challenges in Outcome-Based Education Implementation

Although OBE has been widely adopted, its implementation continues to present challenges for many higher education institutions. Common barriers include limited faculty preparedness, assessment literacy, curriculum alignment, technology integration, workload demands, and resource constraints (Mistamiruddin & Mohamad Nasri, 2024; Darmawati et al., 2024). These issues are particularly evident during the transition from traditional content-based instruction to competency-oriented educational models.

International studies likewise report that educators often experience difficulty redesigning courses, implementing authentic assessment strategies, integrating competency-based evaluation methods, and balancing teaching, research, and administrative responsibilities (Jaya et al., 2025). Within health professions education, these challenges become more complex because educators must simultaneously maintain clinical competence while responding to evolving educational standards and rapidly advancing healthcare technologies.

Radiologic Technology education presents additional instructional demands due to continuous developments in diagnostic imaging, radiation safety, and digital health technologies. Consequently, educators must regularly update instructional materials, laboratory activities, simulation exercises, and clinical teaching approaches to ensure that students develop competencies consistent with current professional practice (Lopez, 2025; Stewart & Clark, 2026; McDonagh, 2026).

Professional Development Needs of Health Professions Educators

Professional development plays an important role in improving teaching effectiveness and supporting educational quality in higher education. Systematic reviews have consistently shown that well-designed professional development programs enhance instructional competence, assessment capability, research productivity, curriculum implementation, and student learning outcomes (Ambon et al., 2024; Darling-Hammond et al., 2022).

Current literature suggests that faculty development should extend beyond disciplinary expertise to include curriculum development, assessment literacy, instructional leadership, educational technology, mentoring, collaborative learning, and reflective teaching practice. Effective technology integration requires educators to develop sound pedagogical competence rather than technological proficiency alone.

Within health professions education, faculty development has become increasingly important because educators are expected to facilitate competency-based learning while ensuring that graduates attain measurable professional competencies. Espartero et al. (2025) demonstrated that comprehensive faculty development positively

influences teaching quality, learning outcomes, and research productivity. Likewise, Jimeno et al. (2025) emphasized that regular assessment of faculty development needs enables institutions to design interventions that remain responsive to educators' changing professional responsibilities.

Assessment, Simulation, and Technology Integration in Competency-Based Education

Competency-based education requires assessment approaches that evaluate learners' ability to apply knowledge, demonstrate clinical reasoning, perform professional skills, and exhibit appropriate professional behaviors within authentic learning environments. Consequently, assessment has shifted from traditional knowledge-based examinations toward competency-oriented and performance-based evaluation methods.

Foundational frameworks such as Miller's Pyramid, Entrustable Professional Activities (EPAs), and the RIME (Reporter-Interpreter-Manager-Educator) model continue to guide competency assessment in health professions education. Cheng et al. (2016) further demonstrated that structured debriefing enhances learning during technology-enhanced simulation by promoting reflective practice and clinical reasoning.

Recent literature likewise recognizes simulation-based instruction and digital technologies as integral components of contemporary Radiologic Technology education. Lopez (2025) emphasized the increasing use of digital imaging technologies, virtual learning environments, and simulation platforms in RT education, while McDonagh (2026) highlighted the importance of educators possessing both advanced clinical expertise and effective pedagogical competence to support competency-based clinical education.

Instructional Leadership and Institutional Support

Educational reform requires institutional environments that support effective teaching and continuous improvement. Instructional leadership promotes curriculum enhancement, collaborative learning communities, faculty engagement, and instructional innovation, thereby contributing to successful educational reform (Naguit, 2024). Likewise, teacher leadership encourages shared decision-making and sustainable organizational improvement (Schott et al., 2020).

Institutional support further enables educators to implement OBE effectively by providing access to instructional technologies, simulation facilities, research opportunities, mentoring, and administrative assistance. Adequate organizational support allows educators to adapt to changing educational demands while maintaining instructional quality and reducing implementation barriers.

Radiologic Technology Education and Contemporary Educational Demands

Radiologic Technology education continues to evolve alongside advances in artificial intelligence, digital radiography, computed tomography, magnetic resonance imaging, and other medical imaging technologies. These developments require educators to continually update both their clinical knowledge and instructional practices to prepare graduates for increasingly technology-driven healthcare environments (Harcus et al., 2026; Stewart & Clark, 2026).

Recent Philippine evidence likewise highlights the importance of quality clinical learning environments in supporting competency development among Radiologic Technology students. These findings reinforce the responsibility of RT educators to integrate classroom instruction, laboratory simulation, clinical experiences, and competency-based assessment to achieve intended graduate outcomes.

Synthesis of Literature and Research Gap

The reviewed literature demonstrates that Outcome-Based Education has reshaped higher education by emphasizing competency development, learner-centered instruction, authentic assessment, and continuous quality improvement. Previous studies have extensively examined OBE implementation in medicine, nursing, pharmacy, engineering, teacher education, and other professional disciplines (Chen et al., 2023; Janssens et al., 2023). Likewise, numerous investigations have established the positive contribution of faculty development to instructional quality, curriculum implementation, educational technology integration, and educator effectiveness (Ambon et al., 2024; Espartero et al., 2025).

Despite these advances, important gaps remain. Existing studies have primarily examined curriculum implementation, institutional accreditation, educational reform, or student outcomes, with relatively limited attention given to the professional development needs of Radiologic Technology educators. Furthermore, studies have seldom investigated educators' profile characteristics, professional development needs, and implementation challenges within a single analytical framework.

This gap is particularly evident in the Philippine context, where empirical studies focusing specifically on Radiologic Technology educators remain limited, especially among higher education institutions in Northern Luzon. Because Radiologic Technology education integrates specialized competencies involving diagnostic imaging, radiation safety, simulation-based instruction, and advanced medical technologies, findings from other health professions cannot be directly generalized to RT educators.

Accordingly, the present study addresses this gap by examining the relationships among educators' profile characteristics, professional development needs, and implementation challenges during the transition to Outcome-Based Education. The findings are expected to provide evidence that may inform faculty development planning, instructional leadership, curriculum enhancement, institutional policy, and continuous quality improvement in Radiologic Technology education.

Theoretical Framework

This study is anchored on three complementary theoretical perspectives that collectively explain how Radiologic Technology (RT) educators develop professional competencies and respond to the transition toward Outcome-Based Education (OBE). These perspectives provide the theoretical foundation for understanding the relationships among educators' profile characteristics, professional development needs, and implementation challenges.

Outcome-Based Education Theory

The primary theoretical foundation of this study is William Spady's Outcome-Based Education (OBE) Theory, which emphasizes that educational systems should be organized around clearly defined learning outcomes that specify the knowledge, skills, attitudes, and professional competencies learners are expected to demonstrate upon completion of a program. Rather than emphasizing instructional inputs or the amount of time spent in learning activities, OBE focuses on measurable student achievement, constructive curriculum alignment, learner-centered instruction, authentic assessment, and continuous quality improvement (Spady, as cited in Gruppen et al., 2016; Er et al., 2019).

Within health professions education, OBE requires educators to align curriculum objectives, instructional strategies, clinical experiences, learning resources, and assessment methods to ensure that graduates attain competencies required for safe and effective professional practice (Chen et al., 2023). Consequently, educators play a pivotal role in designing learning experiences that develop clinical competence, critical thinking, ethical practice, communication skills, and professional decision-making.

The present study adopts OBE Theory as its principal framework because the identified professional development needs of Radiologic Technology educators—including curriculum development, competency-based assessment, simulation-based instruction, technology integration, instructional leadership, and clinical teaching—represent essential competencies required for effective implementation of Outcome-Based Education. Likewise, the implementation challenges experienced by educators may influence their ability to successfully translate intended learning outcomes into effective teaching and learning practices.

Adult Learning Theory (Andragogy)

The second theoretical foundation is Malcolm Knowles' Adult Learning Theory, commonly referred to as Andragogy. Knowles proposed that adult learners differ from younger learners because they are self-directed, internally motivated, experience-oriented, and more likely to engage in learning that is immediately relevant to their professional responsibilities. Adult learners actively seek educational opportunities that enable them to solve workplace problems, improve professional competence, and respond to changing occupational demands.

Within higher education, faculty members themselves are considered adult learners who continuously develop their knowledge and instructional competence throughout their professional careers. As educational reforms introduce new pedagogical approaches, assessment methods, digital technologies, and competency-based curricula, educators identify professional development opportunities based on their perceived learning needs and workplace experiences. Consequently, variations in educators' teaching experience, educational attainment, clinical exposure, and institutional context may influence both their professional development priorities and their readiness to implement educational innovations.

In this study, Adult Learning Theory provides the theoretical explanation for why Radiologic Technology educators recognize differing professional development needs and actively pursue learning opportunities that enhance their instructional competence, assessment capability, technology integration, and leadership skills during the transition to Outcome-Based Education.

Competency-Based Professional Development as a Conceptual Lens

Rather than treating Competency-Based Professional Development as an independent formal theory, this study adopts it as a contemporary conceptual lens supported by current literature on faculty development in higher education and health professions education (Darling-Hammond et al., 2022; Ambon et al., 2024; Espartero et al., 2025).

Competency-based professional development emphasizes that educators should engage in continuous, systematic, and evidence-informed learning to acquire the competencies necessary for effective teaching, curriculum implementation, assessment, educational leadership, research, and professional practice. Unlike traditional professional development activities that often focus on participation alone, competency-based faculty development prioritizes measurable improvements in educator performance and instructional effectiveness.

Contemporary studies consistently demonstrate that well-designed faculty development programs significantly improve teaching quality, instructional innovation, technology integration, curriculum implementation, assessment literacy, and research productivity (Ambon et al., 2024; Espartero et al., 2025). These findings support the premise that identifying educators' professional development needs provides an evidence-based foundation for designing targeted faculty development interventions capable of strengthening institutional implementation of Outcome-Based Education.

Accordingly, this conceptual lens explains why systematic assessment of educators' professional development needs is essential for developing responsive institutional programs that improve faculty capability, instructional quality, and curriculum implementation.

Integration of the Theoretical Framework

Collectively, these theoretical perspectives provide a comprehensive explanation of the variables examined in this study. Outcome-Based Education Theory explains the competencies educators must demonstrate to implement OBE effectively. Adult Learning Theory explains why educators' profile characteristics influence their perceived professional development needs and willingness to participate in continuous learning. Competency-based professional development provides the conceptual basis for understanding how targeted faculty development initiatives enhance educator competence and facilitate successful implementation of Outcome-Based Education.

Taken together, these theoretical perspectives support the assumption that educators' profile characteristics influence both their professional development needs and the implementation challenges they encounter. Furthermore, they provide the theoretical justification for examining the relationships among these variables using a descriptive-correlational research design, thereby guiding the interpretation of the study findings and the formulation of evidence-based recommendations for faculty development in Radiologic Technology education.

Conceptual Framework

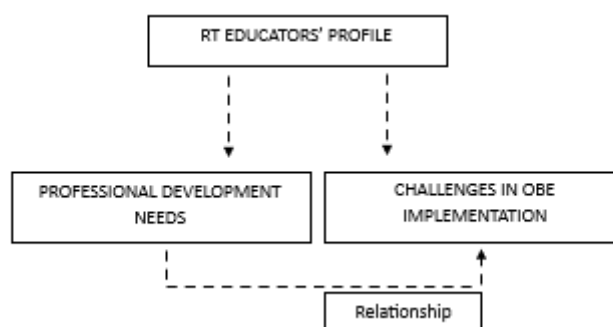


Figure 1. Research Paradigm

Figure 1 presents the conceptual framework of the study. The framework illustrates the hypothesized relationships among the independent, intervening, and dependent variables that guided the investigation.

The independent variables consist of the profile characteristics of Radiologic Technology educators, including age, sex, highest educational attainment, years of teaching experience, clinical experience, academic rank, employment status, and other relevant demographic and professional characteristics. These profile variables are expected to influence educators' preparedness, instructional experiences, and professional learning priorities.

The second component of the framework comprises the professional development needs of RT educators. These include competencies related to curriculum planning and alignment, competency-based assessment, simulation-based instruction, technology integration, clinical supervision, instructional leadership, research capability, communication, and other faculty development domains necessary for effective implementation of Outcome-Based Education.

The third component consists of the implementation challenges encountered by educators during the transition to OBE. These challenges include time constraints, workload, limited instructional resources, technology-related concerns, institutional support, faculty readiness, curriculum implementation issues, and other organizational factors that may affect effective teaching and learning.

The conceptual framework assumes that educators' profile characteristics significantly influence both their professional development needs and the implementation challenges they experience. Likewise, it posits that educators with greater professional development needs may also experience greater implementation challenges because the competencies required for successful OBE implementation have not yet been fully developed. Conversely, effective institutional support and targeted faculty development programs may reduce implementation challenges by strengthening educators' instructional competence.

The relationships illustrated in the conceptual framework are consistent with the study's research questions and objectives and provide the basis for the statistical analyses employed. Descriptive statistics were used to describe educators' profile characteristics, professional development needs, and implementation challenges, while Chi-square test of independence and Pearson r correlation were utilized to determine significant relationships among these variables. Ultimately, the findings serve as the basis for developing a responsive faculty development program designed to strengthen educator competence, improve instructional quality, and enhance the implementation of Outcome-Based Education in Radiologic Technology programs.

Statement of the Problem

The transition to Outcome-Based Education (OBE) has significantly reshaped instructional practices in health professions education by requiring educators to adopt competency-based approaches in teaching, assessment, and curriculum design. In Radiologic Technology (RT) education, this transition presents both opportunities and challenges, as educators are expected to integrate clinical expertise, emerging technologies, learner-centered pedagogies, and outcomes-based assessment strategies into their instructional practice. Despite policy mandates supporting OBE implementation, many RT educators continue to encounter difficulties related to assessment practices, curriculum alignment, time and resource constraints, and the effective integration of educational technologies.

Moreover, the extent to which RT educators are prepared to meet these demands remains unclear, particularly in relation to their professional development needs. Variations in teaching experience, clinical background, and educational attainment may influence both the competencies required and the challenges encountered in implementing OBE. While studies in other health disciplines have examined educator readiness and faculty development in relation to competency-based education, there remains limited empirical evidence focusing specifically on RT educators and their experiences in the context of OBE implementation.

Addressing this gap is essential to ensure that faculty development programs are responsive, targeted, and aligned with the instructional, curricular, and assessment demands of Outcome-Based Education in Radiologic Technology programs. Therefore, this study seeks to examine the profile, professional development needs, and implementation challenges of RT educators in the context of OBE, and to determine the relationships among educators' profile characteristics, identified development needs, and challenges encountered in implementing OBE.

General Objective

To determine the professional development needs and implementation challenges of Radiologic Technology (RT) educators in the context of Outcome-Based Education (OBE), and to examine the relationships among their profile characteristics, identified development needs, and challenges encountered in OBE implementation.

Specific Objectives

This study aims to:

1. Determine the profile of Radiologic Technology (RT) educators in terms of:
 - 1.1 length of service in teaching;
 - 1.2 length of service in clinical experience; and
 - 1.3 highest educational attainment.

2. Determine the professional development needs of RT educators in relation to the implementation of Outcome-Based Education (OBE) in terms of:
 - 2.1 curriculum and course design;
 - 2.2 classroom management;
 - 2.3 use of technology in education;
 - 2.4 assessment and evaluation methods;
 - 2.5 research and publication;
 - 2.6 clinical skills updating;
 - 2.7 simulation training;
 - 2.8 leadership and management in education; and
 - 2.9 mentoring and coaching students.
3. Determine the challenges encountered by RT educators in implementing OBE in terms of:
 - 3.1 assessment and feedback mechanisms;
 - 3.2 time and resource management;
 - 3.3 curriculum alignment; and
 - 3.4 integration of educational technologies.
4. Examine the significant relationship between the profile of RT educators and their professional development needs.
5. Examine the significant relationship between the profile of RT educators and the challenges they encounter in OBE implementation.
6. Analyze the significant relationship between the professional development needs of RT educators and the challenges they encounter in OBE implementation.

Research Questions

This study sought to answer the following questions:

1. What is the profile of Radiologic Technology (RT) educators in terms of:
 - 1.1 length of service in teaching;
 - 1.2 length of service in clinical experience; and
 - 1.3 highest educational attainment?
2. What professional development needs do RT educators identify in relation to the implementation of Outcome-Based Education (OBE) in terms of:
 - 2.1 curriculum and course design;
 - 2.2 classroom management;
 - 2.3 use of technology in education;
 - 2.4 assessment and evaluation methods;
 - 2.5 research and publication;
 - 2.6 clinical skills updating;
 - 2.7 simulation training;
 - 2.8 leadership and management in education; and
 - 2.9 mentoring and coaching students?
3. What challenges do RT educators encounter in implementing Outcome-Based Education (OBE) in terms of:
 - 3.1 assessment and feedback mechanisms;
 - 3.2 time and resource management;
 - 3.3 curriculum alignment; and
 - 3.4 integration of educational technologies?
4. Is there a significant relationship between the profile of RT educators and their professional development needs?
5. Is there a significant relationship between the profile of RT educators and the challenges they encounter in OBE implementation?
6. Is there a significant relationship between the professional development needs of RT educators and the challenges they encounter in OBE implementation?

Hypotheses

H₀₁: There is no significant relationship between the profile of Radiologic Technology (RT) educators, in terms of length of service in teaching, length of service in clinical experience, and highest educational attainment, and their professional development needs in the implementation of Outcome-Based Education (OBE).

H₀₂: There is no significant relationship between the profile of Radiologic Technology (RT) educators and the challenges they encounter in implementing Outcome-Based Education (OBE).

H₀₃: There is no significant relationship between the professional development needs of Radiologic Technology (RT) educators and the challenges they encounter in implementing Outcome-Based Education (OBE).

METHODOLOGY

Research Design

This study employed a quantitative descriptive–correlational survey research design to determine the professional development needs and implementation challenges of Radiologic Technology (RT) educators in the context of Outcome-Based Education (OBE) and to examine the relationships among educators' profile characteristics, identified professional development needs, and implementation challenges. The descriptive component of the design was utilized to systematically describe the respondents' profile, assess their professional development needs across identified competency domains, and determine the extent of the challenges they encountered in implementing OBE. This component provided a comprehensive needs assessment that served as an empirical basis for identifying priority areas for faculty development, instructional enhancement, and institutional planning.

The correlational component was employed to determine whether significant relationships existed among the variables investigated in the study. Specifically, it examined the relationship between the profile characteristics of RT educators and their professional development needs, the relationship between educators' profile characteristics and the challenges they encountered during OBE implementation, and the relationship between professional development needs and implementation challenges. Determining these relationships provided evidence regarding factors that may influence educator preparedness and informed the development of responsive faculty development initiatives.

The survey approach was considered appropriate because the study relied on standardized responses collected from a group of Radiologic Technology educators using a structured questionnaire. This approach enabled the collection of quantitative data from multiple higher education institutions simultaneously while facilitating objective statistical analysis of educators' perceptions, experiences, and professional development priorities. Overall, the quantitative descriptive–correlational survey design was deemed appropriate because it aligned with the study's objectives, research questions, hypotheses, theoretical framework, and planned statistical analyses.

Population and Sampling

The target population of this study consisted of Radiologic Technology (RT) educators employed in six (6) higher education institutions (HEIs) offering Commission on Higher Education (CHED)-recognized Bachelor of Science in Radiologic Technology programs in Northern Luzon, Philippines. These institutions comprised five (5) private higher education institutions and one (1) State University and College (SUC), thereby representing diverse institutional settings, administrative structures, instructional practices, and educational environments within the region.

The primary source of data was the survey responses obtained from Radiologic Technology educators who were actively involved in classroom instruction, laboratory teaching, and/or clinical supervision during the second semester of Academic Year 2025–2026. Eligible participants included both full-time and part-time faculty members who possessed direct teaching responsibilities within their respective Radiologic Technology programs.

The six participating higher education institutions employed a total of fifty-eight (58) Radiologic Technology educators, all of whom were invited to participate in the study. Of these, forty-four (44) educators voluntarily consented and completed the survey questionnaire, yielding a response rate of 75.86%. These respondents constituted the final study sample used for statistical analysis.

A convenience sampling technique, a non-probability sampling method, was employed in selecting the respondents. This sampling technique was considered appropriate because the population of Radiologic Technology educators within the participating institutions was relatively limited, institutional access depended upon administrative approval, and participation was based on the educators' availability and willingness during the data collection period. Consequently, educators who satisfied the inclusion criteria and voluntarily agreed to participate were included in the study.

Although convenience sampling limited the generalizability of the findings beyond the participating institutions, it enabled the researchers to obtain relevant data from a substantial proportion of the accessible target population.

The inclusion of respondents from both private higher education institutions and a State University and College provided representation of diverse institutional contexts and strengthened the practical relevance of the findings. Accordingly, the results should be interpreted within the context of the participating institutions while providing valuable evidence for faculty development planning, instructional improvement, and Outcome-Based Education implementation in Radiologic Technology programs.

Research Instrument

The study utilized a self-administered structured questionnaire that was adapted and modified from the faculty development needs assessment instrument developed by Jimeno et al. (2025). Permission to adapt the instrument was obtained from the original source whenever applicable. The instrument was selected because its conceptual domains on faculty development were closely aligned with the objectives of the present investigation. However, to ensure its relevance to Radiologic Technology education and the implementation of Outcome-Based Education (OBE), the instrument underwent contextual modification based on the study objectives, conceptual framework, and current literature on competency-based education and faculty development.

Specifically, the original instrument was reviewed to determine its applicability to Radiologic Technology educators. Several items were retained because they directly measured general faculty development competencies, while selected statements were reworded to reflect the instructional, clinical, and assessment responsibilities of RT educators under Outcome-Based Education. Additional items addressing simulation-based instruction, competency-based assessment, educational technology integration, clinical skills updating, leadership and management in education, mentoring, and curriculum alignment were incorporated to ensure comprehensive coverage of the professional competencies expected of Radiologic Technology educators.

The final questionnaire consisted of three major sections.

Section I gathered the demographic and professional profile of the respondents, including length of service in teaching, length of service in clinical experience, and highest educational attainment.

Section II measured the professional development needs of Radiologic Technology educators in relation to Outcome-Based Education across nine competency domains:

1. Curriculum and course design;
2. Classroom management;
3. Use of technology in education;
4. Assessment and evaluation methods;
5. Research and publication;
6. Clinical skills updating;
7. Simulation training;
8. Leadership and management in education; and
9. Mentoring and coaching students.

Section III assessed the implementation challenges encountered by RT educators during the implementation of Outcome-Based Education in four domains:

1. Assessment and feedback mechanisms;
2. Time and resource management;
3. Curriculum alignment; and
4. Integration of educational technologies.

Both Sections II and III utilized a five-point Likert scale to measure respondents' perceptions.

For the Professional Development Needs scale, the response categories were:

Table 1.

Professional Development Needs scale

Scale	Verbal Interpretation
5	Very High Need
4	High Need
3	Moderate Need
2	Low Need

The mean scores were interpreted using the following intervals:

Table 2.*Mean Scores Interpretation for Professional Development Needs*

Mean Range	Interpretation
4.21–5.00	Very High Need
3.41–4.20	High Need
2.61–3.40	Moderate Need
1.81–2.60	Low Need
1.00–1.80	Very Low Need

For the Implementation Challenges scale, respondents indicated the extent to which they experienced each challenge using the following response categories:

Table 3.*Implementation Challenges Scale*

Scale	Verbal Interpretation
5	Very High Challenge
4	High Challenge
3	Moderate Challenge
2	Low Challenge
1	Very Low Challenge

The corresponding mean interpretation followed the same interval classification:

Table 4.*Mean Scores Interpretation for Implementation Challenges*

Mean Range	Interpretation
4.21–5.00	Very High Challenge
3.41–4.20	High Challenge
2.61–3.40	Moderate Challenge
1.81–2.60	Low Challenge
1.00–1.80	Very Low Challenge

These interpretation ranges served as the basis for describing the magnitude of educators' professional development needs and the level of implementation challenges reported in the Results and Discussion sections.

Content Validation

Prior to data collection, the adapted questionnaire underwent content validation to determine its suitability for the present investigation. The adapted questionnaire underwent content validation by two experts in educational research and higher education instruction. The validators examined the questionnaire with respect to content relevance, alignment with the study objectives, appropriateness to Outcome-Based Education, applicability to Radiologic Technology education, clarity of language, organization of items, and adequacy of domain coverage.

The comments and recommendations provided by the validators were carefully reviewed and incorporated into the final version of the questionnaire. Revisions included refinement of item wording, improvement of clarity and readability, enhancement of domain alignment, and modification of selected statements to better reflect the instructional and clinical responsibilities of Radiologic Technology educators implementing Outcome-Based Education.

Reliability Testing

Prior to the actual conduct of the study, the revised questionnaire was pilot-tested among twenty (20) Radiologic Technology educators who possessed characteristics similar to those of the target respondents but were not included in the final study sample. The pilot test was conducted to determine the internal consistency and reliability of the instrument before its administration to the actual participants.

The responses obtained during the pilot test were analyzed using Cronbach's alpha coefficient, one of the most widely accepted measures of internal consistency for Likert-type instruments. The questionnaire obtained an overall Cronbach's alpha coefficient of 0.80, indicating good internal consistency and demonstrating that the items reliably measured the constructs investigated in the study.

The reported reliability coefficient pertains to the overall research instrument, encompassing both the Professional Development Needs and Implementation Challenges sections. Based on commonly accepted standards for educational research, a Cronbach's alpha coefficient of 0.80 indicates that the instrument possesses satisfactory reliability for descriptive and correlational analyses. Following the pilot testing and minor revisions recommended during content validation, the questionnaire was finalized and administered to the actual study respondents.

Data Collection Procedure

Prior to the conduct of the study, the researchers secured formal approval and permission from the administrators and authorized officials of the participating higher education institutions offering Radiologic Technology programs in Northern Luzon. After institutional permission had been obtained, eligible Radiologic Technology educators were identified in coordination with the respective college administrators or program heads.

Potential participants were informed of the objectives, significance, procedures, voluntary nature, and expected duration of the study. Each eligible educator was invited to participate and was provided with an informed consent form explaining the purpose of the research, the confidentiality of responses, and their rights as research participants. Only those who voluntarily agreed to participate were included in the study.

Data were collected during the second semester of Academic Year 2025–2026 using the validated self-administered structured questionnaire. Depending on institutional preference and participant accessibility, the questionnaire was administered either personally in printed form or electronically through Google Forms. The online questionnaire was identical in content and structure to the printed version to ensure consistency in data collection. To prevent duplicate submissions, each respondent was allowed to complete the questionnaire only once. Access to the online questionnaire was restricted to invited participants through a designated survey link.

Respondents were given sufficient time to accomplish the questionnaire at their convenience. Upon retrieval of the completed questionnaires, the responses were reviewed for completeness and consistency. Incomplete questionnaires were excluded whenever necessary, while completed responses were encoded, verified, and organized using appropriate statistical software for subsequent analysis.

Throughout the data collection process, confidentiality and anonymity were maintained. No identifying personal information was included in the data file, and all responses were treated with strict confidentiality. The collected data were securely stored and used exclusively for the purposes of the present investigation.

Treatment of Data

The quantitative data gathered from the structured questionnaire were analyzed using both descriptive and inferential statistical techniques consistent with the objectives of the study.

Frequency counts and percentages were used to describe the profile characteristics of the respondents, specifically their length of service in teaching, length of service in clinical experience, and highest educational attainment.

Weighted mean was utilized to determine the level of professional development needs and the extent of implementation challenges experienced by Radiologic Technology educators across the identified competency domains. The computed mean scores were interpreted using the predetermined verbal interpretation ranges presented in the Research Instrument section.

For inferential statistical analysis, the Chi-square Test of Independence was employed to determine whether significant relationships existed between the categorical profile characteristics of Radiologic Technology educators and their professional development needs, as well as between their profile characteristics and the implementation challenges they encountered. For purposes of Chi-square analysis, the composite scores for professional development needs and implementation challenges were categorized according to their corresponding verbal interpretation levels based on the established mean interval classifications.

The Pearson Product-Moment Correlation Coefficient (Pearson r) was used to determine the strength and direction of the relationship between the composite professional development needs scores and the composite implementation challenges scores. These composite mean scores were treated as continuous variables, making Pearson r an appropriate statistical technique for examining the degree of linear association between the two constructs.

All inferential statistical analyses were performed using a 0.05 level of significance. The computed p -values served as the basis for accepting or rejecting the null hypotheses. Whenever the computed probability value (p) was less than or equal to 0.05, the null hypothesis was rejected, indicating a statistically significant relationship. Conversely, when the computed p -value exceeded 0.05, the null hypothesis was accepted, indicating no statistically significant relationship between the variables.

Ethical Considerations

The study was conducted in accordance with generally accepted ethical principles governing educational research involving human participants. Prior to the conduct of the study, approval to undertake the research was obtained from the appropriate institutional authorities of the participating higher education institutions. Permission to administer the survey was likewise secured from the respective college administrators, program heads, or other authorized institutional officials before the commencement of data collection.

Participation in the study was entirely voluntary. All prospective respondents received a clear explanation of the purpose of the research, the procedures involved, the expected duration of participation, the voluntary nature of their involvement, and their right to decline participation or withdraw from the study at any stage without penalty or adverse consequences. Written informed consent was obtained from respondents prior to their participation.

Confidentiality and anonymity were strictly maintained throughout the study. Participants were not required to disclose personally identifiable information in the questionnaire, and no names of individual respondents or participating institutions were included in the research database or in the presentation of the findings. All completed questionnaires and electronic datasets were assigned identification codes solely for data management purposes.

For questionnaires administered electronically through Google Forms, access to the survey was restricted to invited respondents using a designated survey link. Responses were stored in password-protected electronic files accessible only to the researchers. Likewise, printed questionnaires and encoded datasets were securely stored in locked and password-protected storage facilities to prevent unauthorized access.

The data collected were used exclusively for academic and research purposes. All information obtained from the respondents was treated with strict confidentiality and was reported only in aggregated form to prevent the identification of individual participants or institutions. In accordance with institutional research practices, the research data will be securely retained for an appropriate period following publication and will thereafter be permanently disposed of through secure electronic deletion and confidential destruction of printed documents.

RESULTS and DISCUSSION

This section presents and discusses the results of the study based on the research questions.

Research Question 1.

What is the profile of Radiologic Technology (RT) educators in terms of length of service in teaching, length of service in clinical experience, and highest educational attainment?

Table 5.

Frequency and Percentage of the Demographic Profile of the Radiologic Technology Educators

Length of Service in Teaching	F	%
Less than a year	12	27.3%
1-5 years	20	45.5%
6-10 years	3	6.8%
11-15 years	7	15.9%
More than 15 years	2	4.5%
Length of Service in Clinical Experience	F	%

Less than a year	7	15.9%
1-5 years	19	43.2%
6-10 years	14	31.8%
11-15 years	2	4.5%
More than 15 years	2	4.5%
Highest Level of Education	F	%
Baccalaureate	17	38.6%
Master's Degree	26	59.1%
Doctorate Degree	1	2.3%

As presented in Table 5, the majority of the respondents were relatively early-career educators. Nearly half (45.5%) had one to five years of teaching experience, while 27.3% had less than one year of teaching experience. Only a small proportion of the respondents had more than ten years of teaching experience. These findings indicate that the Radiologic Technology educator workforce in the participating institutions is largely composed of novice and early-career faculty members.

In terms of clinical experience, most respondents possessed practical exposure prior to entering academia. Approximately 43.2% reported one to five years of clinical practice, while 31.8% had six to ten years of clinical experience. This suggests that although many educators are relatively new to teaching, they entered higher education with substantial professional experience in clinical radiologic practice.

Regarding educational attainment, the majority of respondents (59.1%) had completed a master's degree, while 38.6% possessed only a bachelor's degree and only one respondent (2.3%) had earned a doctoral degree. Although the findings indicate that many educators have already pursued graduate education, the relatively limited number of doctorate degree holders suggests continuing opportunities for advanced academic preparation and leadership development within Radiologic Technology education.

The profile observed in this study reflects a common pattern reported internationally in health professions education, wherein experienced clinicians transition into academic positions with strong disciplinary expertise but comparatively limited formal preparation in pedagogy, curriculum development, and educational assessment (McDonagh, 2026). Clinical competence provides educators with authentic professional experiences that enrich classroom instruction; however, effective teaching in competency-based education requires additional expertise in instructional design, learner-centered pedagogies, assessment strategies, educational leadership, and curriculum alignment (Er et al., 2019; Gruppen et al., 2016).

The findings further imply that faculty development initiatives should recognize the differing needs of educators according to their career stages. Early-career faculty members may require structured mentoring, instructional coaching, and orientation to Outcome-Based Education (OBE), whereas more experienced educators may benefit from advanced professional development focusing on curriculum innovation, educational leadership, research productivity, and institutional quality assurance. Such differentiated faculty development strategies are consistent with contemporary recommendations for strengthening educator competence within competency-based health professions education (Ambon et al., 2024; Espartero et al., 2025).

Overall, the demographic profile demonstrates that the participating institutions possess a relatively young faculty workforce supported by meaningful clinical experience and graduate-level qualifications. While these characteristics provide a strong foundation for implementing Outcome-Based Education, they also underscore the importance of sustained professional development programs that strengthen educators' pedagogical competence, instructional leadership, and capacity to facilitate competency-based learning.

Research Question 2.

What are the professional development needs of Radiologic Technology educators in relation to the implementation of Outcome-Based Education?

Table 6.

Professional Development Needs of RT Educators in Relation to the Implementation of Outcome-Based Education (OBE)

Professional Development	N	Mean	SD	Interpretation
Curriculum and Course Design	44	3.88	0.52	High Need
Classroom Management	44	3.77	0.66	High Need
Use of Technology in Education	44	3.64	0.66	High Need
Assessment and Evaluation Methods	44	3.78	0.60	High Need
Research and Publication	44	3.84	0.46	High Need
Clinical Skills Update	44	3.98	0.66	High Need
Simulation Training	44	4.03	0.59	High Need
Leadership and Management in Education	44	3.98	0.62	High Need
Mentoring and Coaching Students	44	3.32	0.34	Moderate Need
Overall	44	3.82	0.40	High Need

Table 6 presents the professional development needs of Radiologic Technology educators across nine competency domains. The overall mean score of 3.82 indicates a High Need, suggesting that the respondents recognized the necessity for continuous professional development to effectively implement Outcome-Based Education. This finding demonstrates that RT educators are aware of the evolving competencies required to deliver learner-centered, competency-based, and outcomes-oriented instruction.

Among the identified domains, simulation training obtained the highest mean score ($M = 4.03$), followed closely by clinical skills updating ($M = 3.98$) and leadership and management in education ($M = 3.98$). These findings highlight the growing importance of simulation-based instruction and continuously updated clinical competencies in preparing students for contemporary healthcare environments. As Radiologic Technology increasingly incorporates sophisticated imaging equipment, artificial intelligence applications, and digital health technologies, educators likewise recognize the necessity of continuously updating both their technical expertise and instructional approaches (Stewart & Clark, 2026; McDonagh, 2026).

The high need for simulation training further reflects the increasing reliance on simulation as a safe and effective instructional strategy for developing clinical competence before direct patient interaction. Contemporary health professions education identifies simulation as a fundamental component of competency-based education because it provides opportunities for repetitive practice, clinical decision-making, reflective learning, and authentic performance assessment within controlled learning environments (Harcus et al., 2026).

Similarly, the high ratings for leadership and management indicate that educators recognize that successful implementation of Outcome-Based Education extends beyond classroom teaching. Faculty members are increasingly expected to participate in curriculum development, quality assurance activities, instructional supervision, accreditation preparation, faculty mentoring, and institutional change initiatives. These expanded professional responsibilities require educators to develop leadership competencies that support continuous educational improvement (Melinamani, 2026; Naguit, 2024).

Other competency areas—including curriculum and course design, classroom management, educational technology, assessment and evaluation methods, and research and publication—were likewise rated as high professional development needs. These findings are consistent with international studies reporting that educators frequently require additional preparation in constructive curriculum alignment, competency-based assessment, digital learning technologies, scholarly productivity, and instructional innovation during the implementation of Outcome-Based Education (Ali & Jamin, 2025; Chen et al., 2023; Jaya et al., 2025).

Interestingly, mentoring and coaching students obtained the lowest mean score ($M = 3.32$) and was interpreted as a Moderate Need. Although respondents considered mentoring important, it appeared to be less urgent than the technical and institutional competencies required for successful OBE implementation. One possible explanation is that educators perceived greater immediate need for competencies directly related to curriculum delivery, assessment, and instructional technology as institutions continue transitioning toward competency-based education.

Overall, the findings indicate that Radiologic Technology educators prioritize professional development opportunities that strengthen both their clinical expertise and pedagogical competence. The results support the proposition of Adult Learning Theory that educators, as adult learners, actively identify learning needs that are directly relevant to their professional responsibilities and workplace demands. Consequently, faculty development programs should be strategically designed to address the competencies most critical for successful Outcome-Based Education implementation, particularly simulation-based instruction, competency-based assessment, curriculum development, educational leadership, and technology-enhanced teaching.

Research Question 3.

What challenges do Radiologic Technology educators encounter in implementing Outcome-Based Education?

Table 7.

Challenges Encountered by RT Educators in Implementing Outcome-Based Education (OBE)

Challenges	N	Mean	SD	Interpretation
Assessment and Feedback Mechanism	44	3.30	0.62	Moderate Challenge
Time and Resource Management	44	3.45	0.71	High Challenge
Curriculum Alignment	44	3.16	0.59	Moderate Challenge
Integration of Educational Technologies	44	3.22	0.57	Moderate Challenge
Overall	44	3.28	0.51	Moderate Challenge

Table 7 presents the challenges encountered by Radiologic Technology educators during the implementation of Outcome-Based Education. The overall mean score of 3.28, interpreted as a Moderate Challenge, indicates that while educators have generally adapted to OBE implementation, they continue to experience institutional and instructional barriers that influence effective curriculum delivery.

Among the identified challenge domains, time and resource management obtained the highest mean score ($M = 3.45$) and was interpreted as a High Challenge. This finding suggests that workload demands, competing professional responsibilities, and limitations in institutional resources remain the most significant constraints affecting OBE implementation. Faculty members in health professions education frequently balance classroom instruction, laboratory teaching, clinical supervision, student assessment, research, extension services, and administrative assignments. Consequently, limited time for instructional preparation and professional development may reduce educators' capacity to fully implement competency-based instructional strategies (Mistamiruddin & Mohamad Nasri, 2024; Darmawati et al., 2024).

The remaining domains—assessment and feedback mechanisms ($M = 3.30$), integration of educational technologies ($M = 3.22$), and curriculum alignment ($M = 3.16$)—were all interpreted as Moderate Challenges. These findings indicate that although educators generally understand the principles of Outcome-Based Education, they continue to encounter practical difficulties in translating those principles into effective instructional practice. Competency-based assessment, authentic feedback, constructive curriculum alignment, and technology integration require specialized pedagogical competencies that often develop through continuous professional learning and institutional support.

The moderate challenge associated with educational technology is particularly noteworthy given the increasing digitalization of Radiologic Technology education. Contemporary RT programs increasingly utilize learning management systems, virtual simulation platforms, digital imaging software, and technology-enhanced clinical instruction. Consequently, educators require continuous opportunities to strengthen their digital pedagogical competence while institutions simultaneously invest in technological infrastructure and instructional resources (Lopez, 2025).

Likewise, curriculum alignment remains an important concern because Outcome-Based Education requires careful alignment among learning outcomes, instructional activities, clinical experiences, and assessment methods. Successful implementation therefore depends upon collaborative curriculum planning, faculty engagement, and ongoing quality assurance processes that ensure consistency between intended learning outcomes and actual educational practice (Chen et al., 2023; Ali & Jamin, 2025).

Overall, the findings demonstrate that the challenges encountered by Radiologic Technology educators are not solely attributable to individual capability but are likewise influenced by institutional conditions, organizational support, workload management, and resource availability. These findings reinforce the importance of comprehensive

faculty development initiatives accompanied by sustained institutional investments in instructional resources, educational technologies, leadership support, and workload policies that facilitate effective implementation of Outcome-Based Education.

Research Question 4.

Is there a significant relationship between the profile of Radiologic Technology educators and their professional development needs?

Table 8.

Chi-Square Test of Independence on the Relationship Between the Profile of RT Educators and their Professional Development Needs

Profile		Professional Development Needs								
		Curriculum and Course Design	Classroom Management	Use of Technology in Education	Assessment and Evaluation Methods	Research and Publication	Clinical Skills Update	Simulation Training	Leadership and Management in Education	Mentoring and Coaching Students
Length of Service in Teaching	χ^2	36.388	42.511	34.44	18.136	17.511	33.988	37.354	37.258	2.466
	Df	8	12	12	12	8	12	8	8	4
	p-value	<0.001	<0.001	0.001	0.112	0.025	0.001	<0.001	<0.001	0.651
Length of Service in Clinical Experience	χ^2	35.957	32.741	33.514	30.647	13.748	36.072	40.044	32.552	6.169
	Df	8	12	12	12	8	12	8	8	4
	p-value	<0.001	0.001	0.001	0.002	0.089	<0.001	<0.001	<0.001	0.187
Highest Educational Attainment	χ^2	19.692	22.91	16.877	16.229	9.374	16.601	27.845	19.981	1.175
	Df	4	6	6	6	4	6	4	4	2
	p-value	0.001	0.001	0.010	0.013	0.052	0.011	<0.001	0.001	0.556

Table 8 presents the results of the Chi-square Test of Independence examining the relationship between the profile characteristics of Radiologic Technology educators and their professional development needs. The findings indicate that educators' profile characteristics significantly influence several dimensions of their perceived professional development needs.

Length of service in teaching demonstrated statistically significant relationships with curriculum and course design, classroom management, use of technology in education, research and publication, clinical skills updating, simulation training, and leadership and management in education ($p \leq 0.05$). These findings suggest that teaching experience influences how educators perceive their professional learning priorities. As educators progress through their teaching careers, they acquire broader instructional responsibilities and become increasingly aware of the competencies required to implement Outcome-Based Education effectively. Conversely, assessment and evaluation methods ($p = 0.112$) and mentoring and coaching students ($p = 0.651$) were not significantly associated with teaching experience, indicating that these competencies remain important regardless of the number of years spent in teaching.

Similarly, length of service in clinical experience was significantly associated with most professional development domains, including curriculum design, classroom management, technology integration, assessment, clinical skills updating, simulation training, and leadership. However, no statistically significant relationships were observed for research and publication ($p = 0.089$) and mentoring and coaching students ($p = 0.187$). This finding implies that while clinical experience contributes substantially to educators' technical and instructional competencies, it does not necessarily translate into increased research capability or mentoring proficiency. These competencies often require formal academic preparation, institutional support, and structured faculty development rather than clinical exposure alone.

Highest educational attainment likewise demonstrated significant relationships with nearly all professional development domains, including curriculum development, classroom management, educational technology, assessment practices, clinical skills updating, simulation training, and leadership ($p \leq 0.05$). However, educational attainment did not significantly influence research and publication ($p = 0.052$) or mentoring and coaching students

($p = 0.556$). Although graduate education strengthens educators' pedagogical knowledge and instructional competence, scholarly productivity and mentoring effectiveness may depend more heavily on institutional research culture, faculty mentoring systems, workload allocation, and continuing professional development opportunities.

These findings collectively suggest that professional development needs are multidimensional and are influenced by educators' professional backgrounds and career experiences. Faculty members at different career stages are likely to require varying forms of professional support. Early-career educators may prioritize instructional competence, curriculum development, and classroom management, whereas more experienced educators may require advanced preparation in educational leadership, curriculum innovation, and institutional quality assurance. Consequently, faculty development initiatives should be differentiated according to educators' professional profiles rather than adopting a uniform approach for all faculty members.

The results further support Adult Learning Theory, which posits that adult learners identify learning priorities based on their professional experiences and immediate workplace responsibilities. As Radiologic Technology educators assume increasingly complex instructional roles within Outcome-Based Education, their perceived professional development needs likewise evolve. These findings reinforce the importance of conducting regular faculty needs assessments to ensure that professional development programs remain responsive to educators' changing responsibilities and institutional expectations.

Research Question 5.

Is there a significant relationship between the profile of Radiologic Technology educators and the challenges they encounter in implementing Outcome-Based Education?

Table 9.

Chi-Square Test of Independence on the Relationship Between the Profile of RT Educators and the Challenges Encountered in the OBE Implementation

Profile		Challenges Encountered in OBE Implementation			
		Assessment and Feedback Mechanisms	Time and Resource Management	Curriculum Alignment	Integration of Educational Technologies
Length of Service in Teaching	χ^2	27.602	30.354	28.015	30.806
	df	12	12	8	12
	p-value	0.006	0.002	<0.001	0.002
Length of Service in Clinical Experience	χ^2	22.627	35.364	30.153	28.245
	df	12	12	8	12
	p-value	0.031	<0.001	<0.001	0.005
Highest Educational Attainment	χ^2	21.346	21.024	15.091	16.837
	df	6	6	4	6
	p-value	0.002	0.002	0.005	0.010

Table 9 presents the results of the Chi-square Test of Independence examining the relationship between the profile characteristics of Radiologic Technology educators and the challenges they encountered during the implementation of Outcome-Based Education. The findings reveal statistically significant relationships across all profile variables and all identified challenge domains, as evidenced by p -values below the 0.05 level of significance.

The significant relationships indicate that educators' teaching experience, clinical experience, and educational attainment influence how they perceive and respond to the challenges associated with Outcome-Based Education. Faculty members with differing professional backgrounds are likely to encounter varying levels of difficulty in implementing competency-based instruction, authentic assessment, curriculum alignment, educational technology integration, and resource management.

Teaching experience appears to influence educators' ability to manage assessment and feedback mechanisms, instructional resources, curriculum implementation, and technology-enhanced learning. More experienced educators may possess greater familiarity with curriculum planning and institutional processes, whereas less experienced faculty members may require additional guidance in adapting instructional practices to competency-based educational

frameworks. Likewise, educators with more extensive clinical experience may demonstrate stronger confidence in integrating authentic clinical learning experiences but may still encounter challenges related to educational technologies and institutional resource limitations.

Educational attainment also demonstrated significant relationships with all identified challenge domains, suggesting that advanced academic preparation contributes to educators' capacity to understand, interpret, and implement the principles of Outcome-Based Education. Graduate education often provides educators with greater exposure to curriculum development, educational assessment, instructional leadership, and educational research, thereby enhancing their readiness to respond to institutional reforms and quality assurance requirements.

Despite these significant relationships, the findings also emphasize that implementation challenges are not solely determined by individual educator characteristics. Institutional factors—including workload distribution, administrative support, faculty development opportunities, technological infrastructure, simulation facilities, and organizational culture—also substantially influence educators' experiences during educational reform. Consequently, successful implementation of Outcome-Based Education requires both individual professional competence and institutional commitment to creating supportive learning environments.

These findings reinforce contemporary literature emphasizing that educational reform is a shared institutional responsibility rather than an individual faculty obligation. Strengthening faculty capability through continuing professional development must therefore be accompanied by organizational policies that provide educators with adequate instructional resources, protected time for professional learning, collaborative curriculum planning, and sustained administrative support.

Research Question 6.

Is there a significant relationship between the professional development needs of Radiologic Technology educators and the challenges they encounter in implementing Outcome-Based Education?

Table 10.

Relationship Between Professional Development Needs and Challenges Encountered in OBE Implementation

Professional Development Needs		Challenges Encountered in OBE Implementation			
		Assessment and Feedback Mechanisms	Time and Resource Management	Curriculum Alignment	Integration of Educational Technologies
Curriculum and Course Design	r	0.336	0.180	0.343	0.384
	p-value	0.026	0.241	0.023	0.010
Classroom Management	r	0.566	0.46	0.562	0.569
	p-value	<0.001	0.002	0.000	0.000
Use of Technology in Education	r	0.533	0.613	0.595	0.566
	p-value	<0.001	<0.001	<0.001	<0.001
Assessment and Evaluation Methods	r	0.234	0.106	0.290	0.282
	p-value	0.127	0.493	0.056	0.064
Research and Publication	r	0.364	0.202	0.143	0.359
	p-value	0.015	0.189	0.353	0.017
Clinical Skills Update	r	0.242	0.268	0.314	0.331
	p-value	0.113	0.079	0.038	0.028
Simulation Training	r	0.509	0.594	0.620	0.566
	p-value	<0.001	<0.001	<0.001	<0.001
Leadership and Management in Education	r	0.339	0.249	0.531	0.566
	p-value	0.025	0.103	<0.001	<0.001
Mentoring and Coaching Students	r	0.149	-0.031	0.071	-0.011
	p-value	0.334	0.842	0.649	0.942

Table 10 presents the Pearson Product-Moment Correlation analysis examining the relationships between educators' professional development needs and the challenges encountered during the implementation of Outcome-

Based Education. The findings reveal varying degrees of positive relationships across the different competency domains, indicating that educators who experience greater implementation challenges also tend to report greater professional development needs.

Curriculum and course design demonstrated statistically significant positive relationships with assessment and feedback mechanisms, curriculum alignment, and integration of educational technologies. These findings suggest that educators experiencing greater difficulty in aligning curricula, implementing competency-based assessment, and integrating instructional technologies also recognize a greater need for professional development in curriculum planning and course design. Effective curriculum alignment remains one of the central principles of Outcome-Based Education because intended learning outcomes, instructional activities, and assessment strategies must function cohesively to support competency development.

Classroom management, educational technology, and simulation training exhibited moderate to strong positive correlations across all implementation challenge domains ($p < 0.001$). These findings indicate that educators who experience greater challenges in implementing Outcome-Based Education likewise express stronger needs for professional development in these areas. The strong association between technology integration and implementation challenges reflects the increasing dependence of Radiologic Technology education on digital instructional tools, virtual learning environments, simulation platforms, and rapidly evolving imaging technologies. Similarly, the strong relationship involving simulation training underscores its growing importance in competency-based clinical education, where simulation provides opportunities for authentic skills development, clinical reasoning, and patient safety without compromising actual patient care.

Clinical skills updating also demonstrated significant positive relationships with curriculum alignment and educational technology integration. As advances in diagnostic imaging, artificial intelligence, and digital radiography continue to transform professional practice, educators recognize that maintaining current clinical competence is essential for ensuring that instruction remains relevant to contemporary healthcare environments. Continuous updating of clinical knowledge therefore becomes closely linked with effective curriculum implementation and instructional innovation.

Research and publication, as well as leadership and management in education, demonstrated selective but statistically significant relationships with several implementation challenges. These findings suggest that strengthening educators' scholarly capability and leadership competence may contribute to more effective curriculum development, instructional improvement, institutional quality assurance, and evidence-informed educational decision-making.

Conversely, assessment and evaluation methods did not demonstrate statistically significant relationships with the identified implementation challenges. This finding may indicate that educators consistently recognize assessment competence as an essential professional requirement regardless of the level of challenges encountered during Outcome-Based Education implementation. Likewise, mentoring and coaching students exhibited very weak and non-significant relationships with all challenge domains, suggesting that educators perceive mentoring as an enduring professional responsibility that remains relatively stable irrespective of institutional barriers.

Overall, the correlation analysis demonstrates that professional development needs and implementation challenges are closely interconnected. Rather than existing as separate educational concerns, they mutually influence one another during the implementation of Outcome-Based Education. Educators who encounter greater instructional and organizational challenges consequently identify greater needs for targeted faculty development. These findings reinforce the importance of implementing evidence-based professional development programs that directly address educators' identified needs while simultaneously reducing institutional barriers that hinder effective competency-based education.

Furthermore, the results support the study's theoretical framework by demonstrating that educators' professional learning needs emerge from their instructional experiences and workplace realities, consistent with Adult Learning Theory. Likewise, the findings affirm the principles of Outcome-Based Education by emphasizing that successful curriculum implementation depends upon competent educators supported by responsive institutional systems, sustained faculty development, and continuous organizational improvement. Such evidence highlights the importance of integrating faculty development planning with institutional policy, instructional leadership, and quality assurance initiatives to strengthen Radiologic Technology education under Outcome-Based Education.

Conclusions

Based on the findings of the study, the following conclusions were drawn:

1. Radiologic Technology educators demonstrated a generally high level of professional development needs, particularly in simulation-based instruction, clinical skills updating, leadership and management, curriculum development, competency-based assessment, educational technology integration, and research capability.

These findings indicate that educators recognize the expanding competencies required to effectively implement Outcome-Based Education and remain responsive to the evolving demands of Radiologic Technology education.

2. Although the educators reported only a moderate level of implementation challenges, time and resource management emerged as the most significant barrier to effective Outcome-Based Education implementation. This suggests that institutional factors, including workload demands, limited instructional resources, technological infrastructure, and organizational support, continue to influence educators' ability to fully implement competency-based instructional practices.
3. The significant relationships observed between educators' profile characteristics and both their professional development needs and implementation challenges indicate that faculty members' instructional experience, clinical background, and educational attainment influence their preparedness for Outcome-Based Education. These findings highlight the importance of designing differentiated faculty development initiatives that respond to educators' varying professional backgrounds and career stages.
4. The significant positive relationships identified between professional development needs and implementation challenges demonstrate that educators who experience greater instructional and institutional challenges likewise express greater need for continuing professional development. This finding underscores the interdependent nature of faculty capability and institutional support in achieving successful Outcome-Based Education implementation.

Overall, the study concludes that successful implementation of Outcome-Based Education in Radiologic Technology programs requires a comprehensive institutional approach that integrates continuous faculty development, instructional leadership, organizational support, curriculum enhancement, educational technology, and evidence-based quality assurance mechanisms. Strengthening educator competence while simultaneously addressing institutional constraints will contribute to more effective teaching, improved curriculum implementation, enhanced student learning outcomes, and sustained educational quality within Radiologic Technology programs.

Recommendations

In light of the findings and conclusions of the study, the following recommendations are offered:

1. For Radiologic Technology Educators

Radiologic Technology educators may actively participate in continuing professional development programs focusing on simulation-based instruction, competency-based assessment, curriculum design, instructional technology integration, clinical skills updating, educational leadership, and scholarly research. Participation in workshops, certification programs, mentoring initiatives, and professional learning communities may further enhance educators' pedagogical competence and readiness for Outcome-Based Education implementation.

2. For Higher Education Institutions

Higher education institutions offering Radiologic Technology programs may strengthen institutional support for Outcome-Based Education by developing comprehensive faculty development plans that are informed by periodic training needs assessments. Institutions may allocate protected time for professional development activities, strengthen mentoring systems for early-career educators, invest in simulation laboratories and instructional technologies, and provide adequate administrative support to facilitate effective curriculum implementation.

3. For College Administrators and Academic Leaders

College administrators, department chairpersons, and program coordinators may establish sustainable faculty development initiatives that address both instructional competence and educational leadership. Collaborative curriculum review, peer coaching, instructional mentoring, classroom observation, and evidence-based instructional improvement activities may be integrated into institutional quality assurance systems to strengthen Outcome-Based Education implementation.

4. For the Commission on Higher Education (CHED) and Accrediting Bodies

The Commission on Higher Education (CHED), accrediting agencies, and other educational policymakers may continue strengthening policies that support competency-based faculty development, instructional innovation, curriculum enhancement, and educational quality assurance. Funding opportunities for simulation facilities, educational technologies, faculty research, and collaborative professional development initiatives may further assist Radiologic Technology programs in implementing Outcome-Based Education more effectively.

5. For Professional Organizations

Professional organizations representing Radiologic Technology educators may develop regional and national faculty development networks that promote collaboration, resource sharing, benchmarking of best practices,

interdisciplinary learning, and continuing professional education. Such collaborative initiatives may strengthen professional competence while promoting consistency in Outcome-Based Education implementation across institutions.

6. For Future Researchers

Future researchers may conduct similar investigations involving larger and more geographically diverse samples of Radiologic Technology educators to improve the generalizability of the findings. Comparative studies involving public and private institutions, longitudinal investigations examining changes in educators' professional development needs over time, and mixed-methods studies exploring educators' lived experiences during Outcome-Based Education implementation may provide deeper insights into faculty development and educational reform within health professions education.

REFERENCES:

- Acevedo-De-los-Ríos, A., & Rondinel-Oviedo, D. R. (2022). Impact, added value and relevance of an accreditation process on quality assurance in architectural higher education. *Quality in Higher Education*, 28(2), 186-204. <https://doi.org/10.1080/13538322.2021.1977482>
- Ali, R., & Jamin, H. (2025). *Curriculum development strategy based on outcome-based education (OBE) to improve the quality of education in higher education*. Journal of Education and Religious Studies. <https://doi.org/10.57060/jers.s9w3x850>
- Ambon, J., Alias, B. S., Komariah, A., & Mansor, A. N. (2024). *The impact of continuous professional development on teaching quality: A systematic review*. *International Journal of Evaluation and Research in Education*, 13(6), 3838-3847. <https://doi.org/10.11591/ijere.v13i6.30427>
- Chen, A. M. H., Kleppinger, E., Churchwell, M. D., & Rhoney, D. H. (2023). *Examining competency-based education through the lens of implementation science: A scoping review*. *American Journal of Pharmaceutical Education*. <https://doi.org/10.1016/j.ajpe.2023.100633>
- Cheng, A., Eppich, W., Grant, V., Sherbino, J., Zendejas, B., & Cook, D. A. (2016). *Debriefing for technology-enhanced simulation: A systematic review and meta-analysis*. *Medical Education*, 50(7), 656-666. <https://doi.org/10.1111/medu.12432>
- Commission on Higher Education (2018). CMO No. 07, series of 2018, Outcome-Based Education. <https://legacy.ched.gov.ph/wp-content/uploads/2018/07/CMO-No-07-s.-2018-PSG-for-BS-Radiologic-Technology.pdf>
- Darmawati, D., Widya, H., Parinduri, L., & Hernawati, T. (2024). *Integrated approach to resolving outcome-based education implementation issues in higher education*. *Proceedings of the International Conference on Science and Technology UISU*.
- Er, H. M., Nadarajah, V. D., Chen, Y. S., Misra, S., Perera, J., Ravindranath, S., & Hla, Y. Y. (2019). *Twelve tips for institutional approach to outcome-based education in health professions programmes*. *Medical Teacher*. <https://doi.org/10.1080/0142159X.2019.1659942>
- Espartero, R. P., Amparado, M. C. P., & Tubola, C. J. S. (2025). *The impact of faculty development on teaching, learning, and research*. *International Journal of Research and Innovation in Social Science*, 9(9), 2772-2785. <https://doi.org/10.47772/IJRISS.2025.909000238>
- Gruppen, L. D., Burkhardt, J. C., Fitzgerald, J. T., Funnell, M., Haftel, H. M., Lypson, M. L., Mullan, P. B., Santen, S. A., Sheets, K. J., Stalburg, C. M., & Vasquez, J. A. (2016). *Competency-based education: Programme design and challenges to implementation*. *Medical Education*. <https://doi.org/10.1111/medu.12977>
- Hamidi, H., Hejran, A. B., Sarwari, A., & Edigeevna, S. G. (2024). The effect of outcome based education on behavior of students. *European Journal of Theoretical and Applied Sciences*, 2(2), 764-773. [https://doi.org/10.59324/ejtas.2024.2\(2\).68](https://doi.org/10.59324/ejtas.2024.2(2).68)
- Harcus, J., Hizzett, K., Clarkson, M., & Snaith, B. (2026). *Advancing practice radiography education in the UK*. *Radiography*, 32(3), 103344. <https://doi.org/10.1016/j.radi.2026.103344>
- Janssens, O., Embo, M., Valcke, M., & Haerens, L. (2023). *Implementation of competency-based education at healthcare workplaces*. *BMC Medical Education*. <https://doi.org/10.1186/s12909-023-04446-3>
- Japee, G., & Oza, P. (2021). Curriculum and evaluation in outcome-based education. *Psychology and Education Journal*, 58(2), 5620-5625. <https://pdfs.semanticscholar.org/f661/d91dcd0c48bbfc41ed00a6f40d8163a722cf.pdf>
- Jaya, A., Saputri, K., Budiyo, D., & Mujahidah, N. F. (2025). Implementing outcome-based education. *Indonesian EFL Journal*, 11(3), 553-556. <https://doi.org/10.25134/qj9v1v18>

- Jimeno, R. C., Aguinaldo, K. M. S., & Condat, K. A. S. (2025). Assessment of faculty development needs. *Ignatian International Journal for Multidisciplinary Research*, 3(8), 528-563 <https://doi.org/10.17613/0n7k1-xy574>
- Lopez, P. D. (2025). Digital shift in radiologic technology education. *Journal of Medical Imaging and Radiation Sciences*, 56(4), 101895. <https://doi.org/10.1016/j.jmir.2025.101895>
- McDonagh, D. (2026). Clinical competency-based education in radiation science. *Journal of Medical Imaging and Radiation Sciences*, 57(3), 102337. <https://doi.org/10.1016/j.jmir.2026.102337>
- Melinamani, S. S. (2026). Outcome-based education and skill-based curriculum development under CBCS: Issues, programme objectives, challenges and policy implications. *International Journal of Research and Scientific Innovation*, 13(2), 1081-1088. <https://dx.doi.org/10.51244/IJRSI.2026.13020097>
- Mincu, M. (2022). Why is school leadership key to transforming education? Structural and cultural assumptions for quality education in diverse contexts. *Prospects*, 52(3), 231-242. <https://doi.org/10.1007/s11125-022-09625-6>
- Mistamiruddin, E., & Mohamad Nasri, N. (2024). Challenges in OBE implementation. *International Journal of Academic Research in Progressive Education and Development*, 13(4), 1135–1150. <https://doi.org/10.6007/IJARPED/v13-i4/23378>
- Naguit, J. Z. (2024). Instructional leadership practices. *International Journal of Advanced Multidisciplinary Studies*, 4(7), 193–200. <https://www.ijams-bbp.net/wp-content/uploads/2024/07/15.-JENNIFER-Z.-NAGUIT.pdf>
- Stewart, K. L., & Clark, K. R. (2026). Emerging medical imaging technologies. *Radiologic Technology*, 97(3), 154–166. <https://pubmed.ncbi.nlm.nih.gov/41490693/>