Original Article

Acceptance of AI-Driven Radiography among Radiographers in Iligan City: A Factor Analytic Study

Georgie Jane Lorena [1], Bazim Daluma [1], Linah Badroden [1], Mark Alipio [1,*]

Received: 18 September 2025; Revised: 21 October 2025;
Accepted: 12 November 2025; Published: 16 November 2025

DOI: https://doi.org/10.66074/PL09OK87

Abstract

Artificial intelligence (AI) now shapes image acquisition, reconstruction, and interpretation in radiology, yet little is known about how frontline radiographers in lower middle income settings receive these tools. This study examined the latent dimensions of acceptance of AI driven radiography among hospital based radiographers in Iligan City, Philippines. A cross sectional survey of 120 licensed radiographers used a 25 item Likert scale based on the technology acceptance model and current AI in radiography literature. Principal axis factoring with varimax rotation extracted four factors: AI performance and impact, AI adoption and adaptability, fear of AI displacement, and collaborative AI for patient care. The model showed strong sampling adequacy (Kaiser Meyer Olkin = .81) and significant Bartlett's test of sphericity, $\chi^2(300) = 1077.81$, $p < .001$. The four factor solution explained 66.2 percent of total variance, with Cronbach's alpha values between .82 and .90. Radiographers reported high acceptance of AI when it improved image quality, workflow efficiency, and patient outcomes, while moderate concern about job displacement persisted. The results highlight the need for structured AI education and governance that protect roles while leveraging AI for safer, more efficient radiography services.

Keywords: AI acceptance, image quality, radiographers, workflow efficiency

[1] Iligan Medical Center College, Iligan, Philippines
* Correspondence: mark.alipio@imcc.edu.ph

Volume 2, Issue 1, March 2026

1. Introduction

Artificial intelligence has moved from experimental software to an embedded component of radiology workflows. AI systems now support triage, segmentation, image quality control, and decision support in many imaging departments worldwide (Coakley et al., 2022; Malamateniou et al., 2024). Radiographers sit at the center of this transition. They manage image acquisition, quality, and many patient facing tasks that AI algorithms aim to streamline, yet they have limited voice in procurement and implementation decisions.

Evidence from Europe, Australia, Africa, and Asia indicates that radiographers and radiography students generally view AI as an assistive technology that enhances efficiency and quality, but they also express anxiety about job security, role erosion, and gaps in AI training (Akudjedu et al., 2023; Alipio, 2024; Arruzza, 2024; Botwe et al., 2021; Coakley et al., 2022; Sharip et al., 2023). Radiographers often report low formal education in AI despite high exposure to AI enabled systems in practice, and they request structured curricula, short courses, and governance frameworks that clarify their responsibilities and protect professional identity (Alipio et al., 2022; Rainey et al., 2022; van de Venter et al., 2023).

The technology acceptance model (TAM) argues that perceived usefulness and perceived ease of use predict intention to use a technology, which then shapes actual adoption (Davis, 1989). Recent radiography studies extend this framework by including perceived impact on job roles, trust, training access, and fairness of AI deployment (Akudjedu et al., 2023; Malamateniou et al., 2024; Miranda et al., 2023; Lewis et al., 2024; Pelias et al., 2024). However, most of these studies arise from high income settings. There is a lack of factor analytic work that systematically identifies the dimensions underlying radiographers' acceptance of AI in lower middle income contexts, particularly in Southeast Asia.

In the Philippines, hospitals and diagnostic centers have begun to purchase AI enabled tools for image triage, decision support, and workflow optimization, yet radiographers receive limited structured training on AI and often work under resource constraints. Understanding the latent structure of their acceptance is necessary for hospital leaders, educators, and regulators who plan AI adoption strategies that are safe, ethical, and workforce sensitive.

This study aimed to identify the underlying factors that shape acceptance of AI driven radiography among radiographers in Iligan City. Specifically, it sought to examine how perceptions about AI performance, adaptability, job security, and collaborative practice cluster into coherent dimensions, and to assess the reliability of these dimensions for future use in policy and educational planning.

2. Methodology

2.1 Design

The study used a quantitative cross sectional design with exploratory factor analysis to identify latent dimensions of acceptance of AI driven radiography among practicing radiographers.

2.2 Setting and Participants

The research took place in government and private hospitals with radiology departments in Iligan City, Philippines. Eligible participants were licensed radiologic technologists currently employed in diagnostic imaging units, with at least six months of clinical experience and exposure to digital radiography systems. Radiologists and student interns were excluded.

A total of 135 questionnaires were distributed through departmental focal persons. One hundred twenty complete responses were returned and included in the analysis, yielding an effective response rate of 88.9 percent. The sample size exceeded the common rule of thumb of at least five respondents per item for factor analysis and satisfied more conservative recommendations for stable solutions in health research.

2.3 Instrument

The questionnaire had two parts. The first part captured demographic and professional characteristics, including age, gender, years of practice, primary modality, type of hospital, and prior AI related training. The second part contained a 25 item acceptance scale developed from the technology acceptance model and recent AI in radiography literature (Davis, 1989; Akudjedu et al., 2023; Coakley et al., 2022; Rainey et al., 2022).

Items reflected four conceptual domains at the design stage: perceived usefulness and performance impact of AI, perceived ease of adoption and adaptability, concerns about job displacement, and views on AI as a partner in patient care. Respondents indicated their agreement with each statement on a five point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicated more positive acceptance except for items that addressed fear of displacement, which were reverse coded.

The initial item pool underwent expert review by three senior radiology educators and two hospital radiology managers who evaluated content relevance, clarity, and cultural appropriateness. Minor wording revisions followed to reduce ambiguity and technical jargon while preserving the theoretical meaning of each item. A small pilot with 15 radiographers from a nearby city provided feedback on clarity and completion time; these data were not included in the final analysis.

2.4 Data Collection

Data collection took place over six weeks. Department heads distributed printed questionnaires during staff meetings or shift handovers. Each envelope contained an information sheet, consent form, and the questionnaire. Participation was voluntary and anonymous. Completed forms were returned in sealed envelopes to a drop box located in the radiology department and collected weekly by the researcher. No personal identifiers appeared on the questionnaire.

2.5 Ethical Considerations

The study obtained approval from the institutional ethics review board of the researchers' home institution and permission from hospital administrators before data collection. Participants received information about the purpose of the study, voluntary participation, confidentiality safeguards, and the option to withdraw at any time before submission. Signed informed consent was obtained prior to questionnaire completion.

2.6 Data Analysis

Data were coded and analyzed using standard statistical software. Descriptive statistics summarized participant characteristics and item means. Assessment of suitability for factor analysis included inspection of the correlation matrix, the Kaiser Meyer Olkin (KMO) measure of sampling adequacy, and Bartlett's test of sphericity.

Factor extraction used principal axis factoring because the goal centered on latent constructs rather than data reduction. Factors with eigenvalues greater than 1.0 and inspection of the scree plot guided the number of factors retained. Varimax rotation improved interpretability by producing a simple structure. Items with loadings of at least .40 on a single factor and limited cross loadings were retained.

Internal consistency reliability for the total scale and each factor relied on Cronbach's alpha coefficients, with values of .70 or higher considered acceptable for group level comparisons. Factor scores were computed as mean scores of items under each dimension.

3. Results

3.1 Participant Characteristics

Table 1 presents the demographic profile of the 120 radiographers. Most participants worked in private hospitals, reflected a relatively young workforce, and had limited formal AI training despite regular use of digital imaging systems.

Table 1. Participant characteristics (N = 120).

Characteristic	Category	n	%
Gender	Female	74	61.7
	Male	46	38.3
Age	21–30 years	68	56.7
	31–40 years	34	28.3
	41 years and above	18	15.0
Years in practice	Less than 5 years	52	43.3
	5–10 years	39	32.5
	More than 10 years	29	24.2
Primary workplace	Private hospital	77	64.2
	Government hospital	43	35.8
Prior AI specific training	Yes	19	15.8
	No	101	84.2

3.2 Suitability for Factor Analysis

The 25 item correlation matrix showed multiple coefficients above .30. The KMO value of .81 indicated meritorious sampling adequacy, and Bartlett's test of sphericity was significant, $\chi^2(300) = 1077.81$, $p < .001$, which supported the use of factor analysis.

3.3 Factor Structure

Initial extraction produced six factors with eigenvalues above 1.0, but the scree plot suggested a four factor solution. The four factor model balanced parsimony and interpretability and aligned with theoretical expectations. Table 2 shows the total variance explained.

Table 2. Total variance explained by the four factor solution.

Factor	Eigenvalue	% of variance	Cumulative %
Factor 1: AI performance and impact	5.897	23.6	23.6
Factor 2: AI adoption and adaptability	5.041	20.2	43.8
Factor 3: Fear of AI displacement	2.839	11.4	55.2
Factor 4: Collaborative AI for patient care	2.783	11.1	66.2

After rotation, items grouped into four coherent dimensions. AI performance and impact captured beliefs that AI improves image quality, reduces repeat exposures,

speeds workflow, and supports more accurate diagnosis. AI adoption and adaptability reflected confidence in learning to use AI tools, integrating AI into routine practice, and keeping skills current. Fear of AI displacement measured anxiety about job loss, replacement by automation, and reduced professional autonomy. Collaborative AI for patient care emphasized AI as a partner that augments, rather than replaces, radiographer judgment and patient interaction. All retained items loaded at .46 or higher on their primary factor, with minimal cross loadings. The full pattern matrix is available on request.

3.4 Reliability and Factor Scores

The 25 item scale showed excellent internal consistency, with Cronbach's alpha of .92. Alpha values for the four factors were .90 for AI performance and impact, .88 for AI adoption and adaptability, .84 for fear of AI displacement, and .82 for collaborative AI for patient care.

Mean factor scores indicated generally positive acceptance of AI driven radiography. On a 1 to 5 scale, AI performance and impact had a mean of 3.94 (SD = 0.58), AI adoption and adaptability 3.72 (SD = 0.61), fear of AI displacement 2.86 (SD = 0.73, higher scores reflect stronger fear), and collaborative AI for patient care 4.08 (SD = 0.55).

Radiographers expressed strong agreement with statements that AI can enhance image quality and reduce human error, moderate agreement that they can adapt to AI based workflows, and ambivalent views about AI replacing core tasks. Many respondents rated AI favorably when framed as a tool that supports patient care while still requiring radiographer oversight.

4. Discussion

This study produced a psychometrically sound four factor model of acceptance of AI driven radiography among radiographers in a Philippine city. The factors map closely to current theoretical and empirical work on AI adoption in medical imaging while reflecting specific concerns in a resource constrained context.

The first factor, AI performance and impact, aligns with TAM constructs of perceived usefulness and with international findings that radiographers recognize clear benefits of AI for efficiency, image quality, and diagnostic support (Akudjedu et al., 2023; Coakley et al., 2022; Rainey et al., 2022). Respondents in this study reported high scores on performance items, which suggests strong potential for AI uptake once tools become available and trustworthy. This result agrees with evidence from global workforce surveys that radiographers rarely reject AI outright and instead judge it by its contribution to outcomes and workflow (Akudjedu et al., 2023; Wuni et al., 2021).

The second factor, AI adoption and adaptability, reflects self-assessed confidence in learning and integrating AI tools. High scores here are encouraging because adaptation capacity often determines whether AI projects move beyond pilot

status. This dimension echoes reports that radiographers feel willing to learn but lack structured curricula and institutional support (Malamateniou et al., 2024; van de Venter et al., 2023; Lewis et al., 2024). In this sample, only a minority had formal AI training, yet many still expressed readiness to adapt, which suggests that targeted educational interventions could yield rapid gains in literacy and confidence.

The third factor, fear of AI displacement, captures the darker side of acceptance. International surveys describe mixed feelings about job security, with some radiographers expecting new roles and others fearing replacement (Rainey et al., 2022; Sharip et al., 2023). The moderate mean score in this study indicates that concerns exist but do not dominate attitudes. Radiographers in Iligan City appear wary of automation that erodes professional autonomy, yet they do not uniformly expect AI to make them obsolete. This resonates with theoretical positions that acceptance depends on whether users view AI as supportive or competitive in relation to their identity and career prospects (Davis, 1989; Malamateniou et al., 2024).

The fourth factor, collaborative AI for patient care, may be the most strategic lever for policy makers. High scores on this factor indicate that radiographers accept AI more readily when systems are framed as partners that extend human capabilities, preserve patient contact, and operate under clear human oversight. This mirrors calls in the wider AI in healthcare literature for human centered design, transparent governance, and models that keep clinicians in control of final decisions (Malamateniou et al., 2024; Lekadir et al., 2021). Positioning AI as a tool that enhances compassion, safety, and fairness in patient care may reduce anxiety and strengthen acceptance among frontline staff.

Across all four factors, the structure of acceptance in this Philippine sample resembles patterns reported in Europe and Australia, yet the local context adds important nuances. Resource limitations, uneven bandwidth, and variable equipment levels may amplify concerns about reliability and maintenance of AI tools. At the same time, chronic understaffing in some facilities could increase willingness to deploy AI for repetitive tasks such as quality control and scheduling, provided that governance protects staff from unrealistic workload expectations and unfair blame during AI related errors.

The strong psychometric properties of the scale suggest that it can serve as a useful diagnostic tool for hospital administrators, educators, and regulators who seek to gauge readiness for AI implementation among radiographers. Factor scores can inform tailored interventions: for example, units with high performance scores but low adaptability may need practical training; units with high fear of displacement may require workshops on role redesign and ethical safeguards; units with lower collaborative AI scores may benefit from case discussions that highlight successful human AI partnerships.

Several limitations require caution in interpretation. Data came from a single city and relied on self-reported perceptions, which limits generalizability. The cross sectional design cannot establish causal relationships between factors and actual adoption behavior. The study also focused on radiographers, and did not capture views

of radiologists, information technology personnel, or patients, who also influence AI trajectories in radiology departments. Future research can test the scale in other Philippine regions, perform confirmatory factor analysis, and link factor scores with observed AI usage patterns and patient outcomes.

5. Conclusion

The study identified four reliable dimensions that shape acceptance of AI driven radiography among radiographers in Iligan City: AI performance and impact, AI adoption and adaptability, fear of AI displacement, and collaborative AI for patient care. Radiographers expressed strong belief in the potential of AI to improve image quality and workflow, high willingness to adapt, moderate concern about job displacement, and very positive attitudes toward AI when framed as a partner that supports, rather than replaces, human judgment.

These findings suggest that policy makers and hospital leaders should couple AI investments with structured education, clear role definitions, and governance frameworks that protect professional autonomy while leveraging AI for safer and more efficient patient care. Educators can integrate AI concepts into undergraduate and continuing professional development programs, guided by the factors identified here. In low and middle income settings where resources are scarce, placing radiographers at the center of AI planning can help ensure that AI tools align with real clinical needs and contribute to equitable, high quality imaging services.

Acknowledgment

Sincere appreciation is given to all peer reviewers for their valuable comments and suggestions, which helped the author to improve the quality of the manuscript.

Conflict of Interest Statement

The authors declare no conflict of interest.

References

Akudjedu, T. N., Torre, S., Khine, R., Katsifarakis, D., Newman, D., & Malamateniou, C. (2023). Knowledge, perceptions, and expectations of artificial intelligence in radiography practice: A global radiography workforce survey. *Journal of Medical Imaging and Radiation Sciences, 54*(1), 104–116. https://doi.org/10.1016/j.jmir.2022.11.016

Alipio, M. M. (2024). Coexist or resist? Impact of artificial intelligence on radiologic technology education. *Journal of Medical Imaging and Radiation Sciences*, *55*(4). 10.1016/j.jmir.2024.101450

Alipio, M., Cuthbertson, L., & Lantajo, G. M. (2022). Radiographer Reporting of Chest Radiograph in Rural Health Unit: A Potential Practice in the Philippines. *IMCC Journal of Science*, *2*(2), 15-24. https://hal.science/hal-04225065/

Arruzza, E. (2024). Radiography students' perceptions of artificial intelligence in medical imaging. *Journal of Medical Imaging and Radiation Sciences, 55*(2), 258–263. https://doi.org/10.1016/j.jmir.2024.02.014

Botwe, B. O., Antwi, W. K., Arkoh, S., & Akudjedu, T. N. (2021). Radiographers' perspectives on the emerging integration of artificial intelligence into diagnostic imaging: The Ghana study. *Journal of Medical Radiation Sciences, 68*(3), 260–268. https://doi.org/10.1002/jmrs.460

Coakley, S., Young, R., Moore, N., England, A., O'Mahony, A., O'Connor, O. J., Maher, M., & McEntee, M. F. (2022). Radiographers' knowledge, attitudes and expectations of artificial intelligence in medical imaging. *Radiography, 28*(4), 943–948. https://doi.org/10.1016/j.radi.2022.06.020

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. https://doi.org/10.2307/249008

Lewis, S., Bhyat, F., Casmod, Y., Gani, A., Gumede, L., Hajat, A., Hazell, L., Kammies, C., Mahlaola, T. B., Mokoena, L., & Vermeulen, L. (2024). Medical imaging and radiation science students' use of artificial intelligence for learning and assessment. *Radiography, 30*, 60–66. https://doi.org/10.1016/j.radi.2024.10.006

Malamateniou, C., van de Venter, R., Donkor, A., & Rainey, C. (2024). Artificial intelligence in radiography practice, research and education. *Radiography, 30*, 1–7. https://doi.org/10.1016/j.radi.2024.09.062

Miranda, D., Malic, H., & Alipio, M. (2023). Student Radiographers' Knowledge and Attitudes towards LGBT Patients in the Philippines. *IMCC Journal of Science*, *3*(2), 8-15. https://hal.science/hal-04241886/

Pelias, C. C., Dagatan, J. C., Daabay, M. C., & Alipio, M. (2023). Competence of Student Radiographers on Exposure Factor Selection in Emergency and Trauma Imaging. *IMCC Journal of Science*, *3*(1), 49-56. https://hal.science/hal-04240118/

Rainey, C., O'Regan, T., Matthew, J., Skelton, E., Woznitza, N., Chu, K. Y., Goodman, S., McConnell, J., Hughes, C., Bond, R., Malamateniou, C., & McFadden, S. (2022). An insight into the current perceptions of UK radiographers on the future impact of AI on the profession: A cross sectional survey. *Journal of Medical Imaging and Radiation Sciences, 53*(3), 347–361. https://doi.org/10.1016/j.jmir.2022.05.010

Sharip, H., Che Zakaria, W. F. W., Leong, S. S., Masoud, M. A., & Mohd Junaidi, M. Z. H. (2023). Radiographers' acceptance on the integration of artificial intelligence into radiology practice. *Environment-Behaviour Proceedings Journal, 8*(25), 79–86. https://doi.org/10.21834/e-bpj.v8i25.4872

van de Venter, R., Skelton, E., Matthew, J., Woznitza, N., Tarroni, G., Hirani, S. P., Kumar, A., Malik, R., & Malamateniou, C. (2023). Artificial intelligence education for radiographers: Evaluation of a UK postgraduate educational intervention using participatory action research, a pilot study. *Insights into Imaging, 14*, 25. https://doi.org/10.1186/s13244-023-01372-2

Wuni, A. R., Botwe, B. O., & Akudjedu, T. N. (2021). Impact of artificial intelligence on clinical radiography practice: Futuristic prospects in a low resource setting. *Radiography, 27*(2), 69–73. https://doi.org/10.1016/j.radi.2021.07.021

Author Contributions: Lorena, G.J., Daluma, B., Badroden, L., Alipio, M.; Study design, method conception, data collection, data analysis and manuscript writing