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Embracing the Change: Lived Experiences of Expert Radiologic Technologists Transitioning From Film Screen Radiography to Digital Radiography

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Abstract

This study examined the lived experiences of seasoned Radiologic Technologists in General Santos City as they transition from film-screen to digital radiography. Employing a descriptive-phenomenological design, the study aimed to capture their attitudes, behaviors, and technological adaptations to contribute amid the evolving field of Radiologic Technology, particularly in relation to advancements in imaging technologies and diagnostic practices. A qualitative method was used, and 10 Radiologic Technologists with at least 15 years of experience and currently employed in the hospitals were selected through purposive sampling. In-depth interviews recorded their practical experiences, professional challenges, and personal perspectives, establishing confidentiality by assigning pseudonyms. The results are identified as Emergent Theme 1: Adaptation in Technology, with cluster themes Experiencing the Impact to Workload, Technical Performance , and Enhanced Professional Excellence, suggesting improved accuracy through enhanced image quality and patient outcomes. The transition increased efficiency, reduced patient waiting times, and improved workflow. Emergent Theme 2: Embracing the Change, with cluster themes, Understanding the Motivating Drives, Developed Perspective, and Influence of Technical Skills, reveals high job satisfaction from eliminating outdated film processes, which minimize physical and psychological stress despite the initial struggles with the new systems. In Emergent Theme 3: Acquired Knowledge with cluster themes, Effect of Digital Radiography to Seasoned Radiologic Technologists, and Transitioned Work Strategies, where continuous learning and institutional support eased the transition with added environmental benefit. Furthermore, findings are relevant for professional practice and suggested further research across broader regions and generations.

Keywords: *Social Science, seasoned Radiologic Technologist, Descriptive-Phenomenology, General Santos City, Philippines*

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Introduction

Development of digital radiography technology recently has allowed a number of advantages to clinicians (Tallarico, 2020), by enhancing the professional skills and creating new experiences (Ou et al., 2021). Progressed

both in the post-processing and control of radiographs (Alzahrani, 2021), such digital images allow for manipulation for optimal visualization without compromising image integrity, providing adjustable contrast, brightness, and magnification parameters to suit the individual patient's context and specific clinical requirements (Najjar, 2024). Technical adaptation proved problematic (Kapapa et al., 2024) as some public institutions do not have a Picture Archiving and Communication System (PACS) or a Digital Imaging and Communication System (DICOM), which makes seasoned Radiologic Technologists (RTs) reliant on printing films and need a consistent X-ray film supply (Naidoo & Peter, 2022), due to insufficient financial resources (Bwanga et al., 2024). Despite the advancements available, the respondents, including seasoned Radiologic Technologists, have been slow to fully adapt, hindering the adoption of improved methods by their reliance on prior experiences (O'Keefe, 2023), which could risk field progress and lead to outdated practices and suboptimal patient outcomes (Rawle et al., 2022).

Seasoned Radiologic Technologists (RTs) also play an important role in the formation and professional development of future Radiologic Technologists by acting as mentors, educators, and role models (Dunn, 2022), and if well-trained, Radiologic Technologists can interpret radiographs (Abuzaid et al., 2022). It has been reported that higher years of professional experience of seasoned Radiologic Technologists have a certain impact on how they evaluate images and assess ratings above radiological imaging criteria (Kjelle & Chilanga, 2022). For many years, Radiologic Technologists have embraced automated technology into practice, resulting in increased patient workload and harming the radiographer's morale, role satisfaction, and burnout (Hardy & Harvey, 2020).

This is supported by Piansay et al. (2024), who stated that technological advancements in the profession impacted Radiologic Technologists physical and mental well-being and produced high image reexamination that contributes to the patient's unnecessary radiation dose (Alipio & Lantajo, 2021) citing professionals without prior training do not perform well according to the standard of those who have previous training (Lantajo et al., 2022). Moreover, the longer the service period of Radiologic Technologists, the more familiar the workload, and the less they will be able to provide high-quality medical services (Agudo et al., 2019).

Considering the challenges mentioned, this study aims to address the literature gap of seasoned Radiologic Technologists (RTs) practicing in the region using a phenomenological research design and develop a comprehensive understanding of the problem. There is a gap between theory and practice in radiography, citing obstacles such as inadequate knowledge and skills (Ramazan et al., 2024). Furthermore, due to a small number of this kind of literature on imaging technology, filling gaps in this evidence could analyze research and include them in their daily practices (Rawle et al., 2022). This study is of valuable importance to Radiologic Technologists research as significant.

Seasoned Radiologic Technologists

Described by their broad experiences, seasoned Radiologic Technologists play a significant role of keeping up with these advanced medical imaging technologies while keeping excellent patient care (Rajan & Dhar, 2023). This Radiologic Technologists have been slow to completely adapt in technological advancements (O'Keefe, 2023). But they hold an important role in the honing and professional development of Radiologic Technology students by acting as advisers, teachers, and role models. They are the one responsible professionals, demonstrating proper technical imaging techniques and procedural aspects of radiologic procedures. Seasoned Radiologic Technologists provide a supportive environment promoting the improvement of their clinical skills while ensuring the safety and compliance of patient imaging protocols (Dunn, 2022).

The higher years of professional experience of seasoned Radiologic Technologists have a certain impact on how Radiologic Technologists evaluate images and assess ratings above radiological imaging criteria (Kjelle & Chilanga, 2022). They influence as well the imaging technology decisions (Rawle et al., 2022) and they have garnered higher rate in a professional behavior score (Aaron & Kelli, 2024). A study in the journal of Radiologic Technology looked at the effect of demographic factors, including years of experience, on professional behaviors exhibited among Radiologic Technologists. The result of the study showed that technologists with higher years of experience have better scores in quality patient care, ethical performance, and overall professionalism. The authors concluded that experienced Radiologic Technologists have a level of professional conduct that may be advantageous during a transition to a new technology such as digital radiography (Aaron & Haynes, 2024).

Digital Radiography

Digital Radiography revolutionized medical imaging by delivering image quality, efficient workflow, and reduced exposure to radiation (BryAir, 2024). It became a new and innovative alternative that uses a digital detector and computer, which enables immediate recording, display and storage of X-Ray images in digital format (Lieber, 2025). Recently, some of the advanced image processing algorithms applied in Digital Radiography (DR) systems features multi-frequency processing, bone suppression, and edge enhancement (Knight, 2020).

Advancement and Benefits of Digital Radiography

Recent advancements in digital radiography have provided numerous benefits for clinicians and patients, and that includes reduced procedure times (Tallarico, 2020). According to Abuzaid et al. (2023), digital radiography influences medical imaging by making possible of the fast production of

radiographs. These technological advancements have changed how Radiologic Technologists collect and process medical images of patients while reducing the repeats required to lower radiation exposures (Koehler, 2021). The innovation's major role is improving the image quality needed for diagnostic interpretation (Seeram, 2023).

The ability to manipulate and enhance digital images allows for better visualization of anatomical structures, which allows more precise diagnoses while maintaining patient safety (Varghese et al., 2024) basic image-to-image management and communication system transfer (Luharia et al., 2022), and the capability to send and electronically archive (Esmaeilian et al., 2024). Moreover, Alzahrani (2021) stated that development of advanced imaging are both progression of postprocessing and control of radiographs.

The advancement of technology enhances professional skills and offer new experiences and rapid readout times (Ou et al., 2021). Positive encounters among radiographers utilizing Digital Radiography is the enhanced patient waiting times (Kapapa et al., 2024), removing the need for film processing, and enable real-time picture evaluation (Algorbani et al., 2024). Digital images allow for manipulation for optimal visualization without damaging the image integrity, provides adjustable contrast, brightness, and magnification parameters to match the individual patient's context and specific clinical requirements (Najjar, 2024).

Digital technologies simplify healthcare processes, improves patient engagement, and contribute to better health outcomes (Alawiye, 2024). Additionally, the interconnection of advanced technology in radiography has been linked to enhanced efficiency and accuracy, reinforcing its role in professional growth (England et al., 2022). The beneficial result of increased automation and digitization in radiography are increased efficiency and throughput within the imaging sector (Hardy & Harvey, 2020).

Workflow Efficiency

Since the creation of digital radiography systems, companies have progressed in productivity (Koehler, 2021). Advanced improvements in imaging have progressed post-processing and handling of radiographs (Alzahrani, 2021), also it decreases the number of exposures (Awathale et al., 2022), and reduce the imaging process and procedural times, changing several manual tasks and enhanced workflows (Pise, et al., 2022). The automated exposure settings and post-processing streamlined imaging procedures. However, because of its efficiency, it led to dependence on technology, resulted to radiologic technologists' complacency (Balać et al., 2025).

Facilities transforming from Film Screen to integrating Digital

Radiography usually request an assigned specialist to use the machine and train one or more Radiologic Technologists, and those trained professionals will train other technologists (Koehler, 2021). According to Kamil (2023), cooperation of the machine manufacturers or certified service providers minimizes the possibility of equipment malfunctions. Additionally, fast digital image capability is a crucial advantage of digital radiography (Najjar, 2024), also the use of hard copy (International Atomic Energy Agency, 2021) or to print radiographic images in paper for any physicians (Naidoo & Peter, 2022) and send radiographs to radiologists via e-mail (Lantajo et al., 2022).

Digital radiography has significantly strengthened radiologic technologists' confidence by providing high-resolution radiographs without delay and advanced control capabilities, allowing them to make fast and well-informed decisions (Xenin, 2023). Aside from improving workflow, digital learning tools played an important role in skill development, some studies show a positive impact on performance assessment and overall satisfaction (McGee et al., 2024).

With the correct preparation and foundation, productivity in workflow can move forward (Kapapa et al., 2024). Furthermore, digital workflows and consistent networks are driving experts of adaptation, take on modern challenges, and advance in their works (Agrawal, 2023). Machine specialists train one or more Radiologic Technologists, and trained professionals will train other technologists (Koehler, 2021).

Moreover, digital radiography enhances their workflow by reducing imaging efforts, simplifying tasks, and saving time (Pise et al., 2022). A primary motivating factor is the improved capability to support patients through advanced imaging procedures. The smooth capture and analysis of digital radiographs allow speedy diagnoses and on-time interventions, resulting in improved patient care outcomes (Xenin, 2023). Digital radiography film processing and the associated delays are obsolete, allowing for immediate radiographic image availability. This transition has optimized the workflow processes, resulting to shorter patient wait times and enhanced overall productivity. Radiologic technologists have shared positive experiences on digital radiography, emphasizing its role in improving departmental operations and increasing job satisfaction (Kapapa et al., 2024). Research published emphasizes the importance of preemptive planning for system malfunctions. In situations where standard digital radiography equipment is compromised, the use of portable machines guarantees continuity of imaging services, this can lessen disruptions caused by equipment downtime (Gibney et al., 2021).

Technological Advancement Challenges

Transformation from film-screen radiography to Digital Radiography presents various challenges, that concerns the sensitivity of digital radiography equipment to several environmental conditions such as moisture, humidity, and temperature variations, highlighting the significance of maintaining suitable environmental conditions for digital radiography equipment (BryAir, 2024). Unexpected downtime or error of the equipment, can significantly stall patient diagnoses and departmental operations (Dhamija et al., 2022). Equipment breakdown often result in an increased patient waiting times and workflow difficulties. Research showed the necessity of regular maintenance for imaging devices to maintain reliability and prevent operational setbacks, as technical failures may contribute to increasing patient wait times (Chao et al., 2020; Germano, 2022).

Despite the advancements, the respondents including seasoned Radiologic Technologists, have been slow to fully adapt and hinder the adoption of improved methods. This is attributed to Radiologic Technologists reliance on prior experiences and inconsistent training between vendor application specialists and Radiologic Technologists, called as “practice creep” (O’Keefe, 2023). Well-trained, Radiologic Technologists can interpret the radiographs (Abuzaid et al., 2022), While professionals without prior training do not perform according to the standard of those who have previous training (Lantajo et al., 2022).

Due to insufficient financial resources to transform and be in digital imaging systems, some radiology departments continue to rely on film screen systems (Bwanga et al., 2024). Challenging technological adaptation have been proven (Kapapa et al., 2024) as some public hospitals did not use Digital Imaging and Communication System or Picture Archiving and Communication System, resulted to the Radiologic Technologists reliance on films and consistent X-ray films supply (Naidoo & Peter, 2022).

Digital radiography still produces high image reexamination and contributes to the patient's unnecessary radiation dose (Alipio & Lantajo, 2021). Literature is limited in this kind of topic about imaging technology, and filling gaps in this evidence could analyze research and include them in their daily routines (Rawle et al., 2022). The theory and practice gaps in radiography remain present, cited obstacles such as negative perceptions and beliefs, inadequate knowledge and skills, limited resources, and lack of support and authority (Ramazan et al., 2024)

With the introduction of a large and bulky DR image detector, image acquisition techniques have been altered by the use of technical adaptations, leading to "practice drift," described as a loss of knowledge due to technological advances and workflow pressures (Rawle

et al., 2022). Failure to maintain the medical imaging equipment regularly may cause it to malfunction, leading to expensive repairs, prolonged operational stall, and possible risks to patients. This suggests absence of technical literacy among staff can be a determinant to maintenance problems, reinforcing the importance of continuous training in equipment management (Chinyeaka et al., 2024).

However, it shows that increased patient workload speed and imaging performance speed can also have a negative effect on the Radiologic Technologists morality, role satisfaction, and burnout (Hardy & Harvey, 2020). It is supported by Piansay et al. (2024), who stated that technological advancements in the profession have a major impact on the physical and mental well-being of radiologic technologists. An article presented information on the growing burnout among radiologic technologists, and stated even seasoned professionals have difficulty handling the pace of technological advancement, including the transition to digital radiography. It is apparent that adequate training and support systems are crucial in managing stress and providing effective patient care (Fabrizio, 2021). Furthermore, the longer the service period of Radiologic Technologists, the more familiar the workload, and the less they will be able to provide high-quality medical services (Agudo et al., 2019).

The shift from Film Screen Radiography to Digital Radiography

The digital radiography adaption has made film-based imaging largely disregarded, allowing Radiologic Technologists physical films handling obsolete, reducing the time and resources previously required film processing (Xenin, 2023). With the transition to digital radiography, it is possible to remove the need for X-Ray films, lower operational costs (Kapapa et al., 2024), and reduce the environmental and health hazards posed by the chemicals (Ardelean et al., 2023).

The elimination of films and necessity for large storage spaces to archive radiographic images has significantly diminished. Radiographic images are digitally stored, which allows needed quick retrieval and productive organization Stoumpos et al., 2023). A cross-sectional study surveyed Radiologic Technologists' perceptions of medical imaging devices in different hospital settings. Most of the respondents preferred the newest technology devices, benefitting the patient and workflow. There was majority consensus that the increasing number of imaging examinations does not necessarily mean better care, indicating a more sophisticated viewpoint on the part of experienced professionals (Akyurt, 2022).

With the movement away from traditional film-screen radiography toward digital radiography, standards

have been developed to assess the consistency in image quality and safety to the patient. Current literature has made it clear that in the commitment to optimizing exposure indices in digital systems, we can achieve the goals of diagnostic acceptability and lower radiation doses (Soulis et al., 2025). A study explored how the shift to digital radiography could lessen the effect on the environment caused by high film usage and film waste. It also considered, from a sustainability perspective, how DR systems benefit the environment: for example, by decreasing chemical usage and waste produced, thereby enhancing the planet's sustainability, which contributes to a more sustainable method of clinical practice (Ohene-Botwe et al., 2024).

Best Practices to Safety and Compliance

The American Society of Radiologic Technologists (ASRT) has stated the importance of strictly maintaining exposure techniques to prevent the "dose creep," a phenomenon where there is unnecessary increase to radiation exposure due to overdependence on digital adjustments. Their advocacy is in continuous education and adherence to best practices for risk reduction (Balać et al., 2025). The Radiologic Technology often deal with heavy workloads and the rapid transition of imaging technology. Despite these challenges, their expertise to imaging principles and commitment to best practices help maximize the benefits of digital radiography while ensuring that patient safety remains a top priority (Rajan & Dhar, 2023). According to Kamil (2023), coordination with machine manufacturers or certified service providers will minimize technical malfunctions occurrence.

Furthermore, the organization emphasizes that Radiologic Technologists should plan, execute, and document activities linked to medications and radiation dose accumulation under the governing regulations. The immediate and accurate reporting of radiological equipment failures are essential to maintain a smooth workflow and patient safety (Balać et al., 2025). Implementing a structured reporting system allows the identification of shortcomings in the clinical environment and supports problem-solving (Scaggs, 2021). The challenges and strategies for improving safe practices in radiography include coordinating regulatory bodies across the health system, modernizing equipment for safe practices, and developing a culture of safety first with healthcare professionals (Rowili et al., 2024).

Professional Development

According to Sectra (2024), Radiologic Technologists play a principal part in patient care and communication since they interact specifically with patients, clarify methods, get patient histories, attend to concerns, and situate patients accurately for imaging. Moreover, effective communication

offers assistance to a patient's feelings, improve their understanding to healthcare details, and the advanced engagement in their care (Dutruel et al., 2023).

It has been reported that higher years of professional experience of seasoned Radiologic Technologists have a certain impact on how Radiologic Technologists evaluate images and assess ratings above radiological imaging criteria (Kjelle & Chilanga, 2022). Advances in imaging technology in the careers of seasoned radiologic technologists who participated influence changes in imaging technology decisions, leading to reliance on traditional practices, resulting in area progress risk, outdated practices, and suboptimal patient outcomes. They should also learn to adopt in these technology in advanced radiography, because this has been a key driver of transforming imaging techniques. Co-workers were considered reliable sources (Rawle et al., 2022).

Clinical ability is achieved by professional training of practitioners that contributes to their general effectiveness, like workplace immersion and intersecting roles, requiring experimental learning and continuous skill development to enable professionals to do independently and efficient within a team-oriented workplace. Inherent professional capabilities allow to adapt the skills in practice responsibly without affecting patient care and safety (Makanjee et al., 2023). According to a study highlighting proficient behaviors of Radiologic Technologists, when based on demographic factors (age, years as a technologist and highest degree influenced the technologist's proficient behavior), it appears that Radiologic Technologists who are seasoned or had more years of experience had the greater professional behavior scores (Aaron & Kelli, 2024) as they work in a dynamic environment, attending different patient cases, that require sharp critical thinking (Kirbach H., 2021).

Additionally, a committed investigation also enhances understanding, shapes procedures and department policies (Lepri et al., 2024b). According to Abuzaid et al. (2023), it is necessary to enhance knowledge and skills in specific areas. Furthermore, Al-Naser's (2022) study on seasoned Radiologic Technologists states that, rising advanced technologies in diagnostic imaging, practicing radiologic technologists must also develop essential digital literacy to effectively operate sophisticated imaging systems.

Methods

The study was conducted in General Santos City where participants were purposively selected using a descriptive-phenomenological design to record people's life experience (Morrow et al., 2015) particularly seasoned Radiologic Technologists (RTs) in the transition from film screen radiography to digital radiography that shape their professional behaviors and attitudes by sharing their insights with the community and colleagues. Purposive sampling was used in this study, to provide

comprehensive and detailed information (Patton, 2002) with key characteristics to meet study objectives (Bisht, 2024). The participants in the study include 10 Radiologic Technologists who are engaging in General Radiography and are experienced in film screen radiography and digital radiography. They could be either male or female Radiologic Technologists working for at least 15 years or above. Moreover, exclusion criteria are those who were working as CT-scan Technologists, Ultrasound Technologists, MRI Technologists, Nuclear Medicine Technologists, and Radiation Therapists will not be included in the study.

The study was validated by three (3) field experts prior to beginning the data collection stage. In order to record data on their thoughts, feelings, and behavior with informed consent within the ethical research context, a series of interviews was conducted with each participant. Informed consent was obtained to clarify the study purpose, use of data, confidentiality measures and participants' right to withdraw at any time.

To analyze the data, the researcher examined the responses that had been collected in transcription. Following Colaizzi's strategy, thematic analysis was used as a method of identifying, interpreting, and representing recurring patterns (themes) across qualitative data (Braum & Clarke, 2022). Once the responses were clustered within the identified meanings, the way for a central theme emerged. The authors incorporated the results into a comprehensive account of the phenomena (Primi & Thokchom, 2023).

Results and Discussion

The demographic profile of the participants includes the pseudonyms, gender, duration of service, age, and research group. Among 10 participants, seven (70%) were male, while three (30%) were female. Majority of them had a duration of service ranging from 15 to 24 years, with one participant being in service for 33 years. The participants' ages varied between 36-54 years, within the scope of 36-41 age range. All participants were part of the IDI research group.

The thematic analysis of the lived experiences of radiologic technologists in digital radiography found three major themes: Adaptation in Technology, Embracing the Change, and Acquired Knowledge.

Within the Adaptation in Technology theme, participants indicated their growing Efficiency in Evolving Work Demands, which includes Experiencing Impacts to Workload and Technical Performance. They also spoke to the importance of Building Expertise which has helped with job excellence in their area. The second theme, Embracing the Change, addresses Adaptive Organization Growth. From the perspective of the participants, Understanding their Motivational Drives encouraged their adaptation to digital radiography while developing their Perspective. They also veered into Building Expertise as part of their adaptation. Finally, the Acquired Knowledge theme is around Optimizing Radiography. In this theme, the participants shared how Recent Work has shaped the Effects of Digital Radiography and experience of adjustment.

Emergent Theme 1: Adaptation in Technology

This explored the lived experiences of Radiologic Technologists (RTs) working in digital radiography (DR) in terms of their adaptation to technology change, work processes, and the pros and cons of digital radiography. It considers how their daily work activities, professional competencies, career development, patient care, efficiency, and overall job satisfaction are adapting, and it provides information on how digital radiography has changed their work responsibilities. The three cluster themes of this are Experiencing the Impact to Workload, Technical Performance, and Enhanced Professional Excellence.

Cluster Theme 1: Experiencing the Impact to Workload

Digital Radiography positively changed the workload of seasoned Radiologic Technologists, making it fast and efficient. This is evident based on the experiences of *Phosphor, Calcium*, *Silicon*, and *Cesium*.

> *"Work is much faster with digital radiography." This is stated in Line 18 – Phosphor*
>
> *"More convenient when it comes to repeats." This is stated in Line 231 – Calcium*
>
> *"It's easier." This is stated in Line 675 - Silicon*
>
> *"things became shorter." This is stated in Line 767" -Cesium*

When handling the digital radiography, seasoned Radiologic Technologists experienced an easier and much faster work, and offer convenience when it comes to repeats due to working becomes shorter. These recent advances in digital radiography technology have led to many advantages for both clinicians and patients, including shortened treatment times (Tallarico, 2020), enhances professional skills and offers new experiences and faster readout times (Ou et al., 2021), and acquire images of patients while reducing the repeats (Koehler, 2021), Even when it comes to good image quality, adjustments made easier that leads to patient shorter waiting times. Digital images, which allow for adjustment for optimal visualization, do not alter image characteristics and have variability in contrast, brightness, or zoom to accommodate the patient context and agreed-upon clinical understanding (Najjar, 2024).

This leads to conclusive positive impact of the innovation which improve the image quality needed for diagnostic interpretation (Seeram, 2023).

Cluster Theme 2: Technical Performance

The modern environment of the seasoned Radiologic Technologists resulted in their acquired technical skills while using digital radiography. On the other hand, evolved technical skills could mean evolved responsibilities and technical difficulties. This is based on the experiences of *Calcium, Selenium,* and *Polyester.*

"now, we can send digital images via email, and we always have a soft copy, allowing us to reprint or resend as needed." This is stated in Line 231– Calcium

"You have to know how to handle the panel (detector) properly to avoid damage from moisture or other factors." This is stated in Line 78 – Calcium

" get delayed due to machine issues." This is stated in Line 573)" - Selenium

"you're not that… computer-literate. Potential equipment errors and maintenance issues are possible." This is stated in Line 442" – Polyester

Advanced imaging environment evolves the practices of seasoned Radiologic Technologists where everything is practically handed, and the capability to send images via e-mails are possible. Additionally, immediate digital image capability is an important advantage of digital radiography (Najjar, 2024), which uses hard copy (Iaea, 2021) or print paper images for doctors (Naidoo & Peter, 2022), and send radiographs to radiologists via e-mail (Lantajo et al., 2022). Facilities IT personnel handle some technical issues. According to Kamil (2023), coordination with machine manufacturers or certified service providers minimizes the possibility of technical malfunctions.

Nonetheless, we are faced with different issues as we transition from film-screen radiography to digital radiography, especially to sensitivity of digital radiography equipment to environmental factors like moisture, humidity, and temperature variations, which emphasizes the need to ensure appropriate environments for DR equipment (BryAir, 2024). Seasoned Radiologic Technologists should be knowledgeable about the proper handling of the equipment, computer literacy, and familiarity with the buttons. This is to prevent, unplanned downtime of diagnostic equipment that could delay patient diagnosis and operations in the hospital significantly (Dhamija et al., 2022).

Cluster Theme 3: Enhanced Professional Excellence

The advanced work environment of the seasoned Radiologic Technologists can be considered as additional learning and professional growth. Their effective adaptation mostly depends on how they respond to it. This is based on the experiences of *Silver, Polyester,* and *Selenium.*

"it depends on the individual's ability to observe and adapt. Yes, based on experience." This is stated in Line 92 & 94 – Silver

"Maybe… like… additional learning. For me, every day is another…

another learning opportunity. You gain more knowledge, not just what you initially knew, but more over time." This is stated in Line 453" – Polyester

"we help each other out. ." This is stated in Line 577 – Selenium

Radiologic technologists work in a fast-paced environment with various patients and cases that require acute critical thinking (Kirbach H., 2021) like vehicular accidents (VA) and bagging cases that needs to be done quickly, administrative tasks included in their job by helping each other. Their role and intersecting responsibilities, requiring hands-on learning and continuous skill development to function efficiently both independently and within a team (Makanjee et al., 2023).

Moreover, Radiologic Technologists need to learn or adapt these technological advances in radiography which has been a key driver for changing imaging techniques (Rawle et al., 2022). This depends on professional's ability to observe and adapt the technology while elevating confidence. Seasoned Radiologic Technologists had higher professional behavior scores (Aaron & Kelli, 2024) that defines their openness in additional learning opportunity.

Emergent Theme 2: Embracing the Change

This highlights the responses about a common question "How these experiences shape the behavior and attitude of Radiologic Technologist in professional practice?" that describes the adaptation of innovation, handling difficulties and advances of patient care, teamwork, problem-solving, and ongoing learning which essentially affected the professional growth, trust, and general approach to their work. The results to three cluster themes: Understanding the Motivating Drives, Developed Perspective, and Influence of Technical Skills.

Cluster Theme 1: Understanding the Motivating Drives

Seasoned Radiologic Technologists can identify motivators in their continuous adoption of digital radiography. Aside from the efficiency and optimization offered by the technology, it also lies beyond how technology helps patients and grows through modern ways of delivering diagnostic procedures. This is based on the experiences of *Silver, Polyester,* and *Silicon*.

"*Probably the fact that I can help patients. That's what motivates me." This stated in Line 10 – Silver*

"You want to reach a point where you can handle everything independently, even without a colleague." This is stated in Line 465 – Polyester

"the challenge of keeping up with technology since it keeps progressing. So, we are challenged to learn more… much further than what we usually do." This

is stated in Line 695 – Silicon

The prompt taking and interpreting digital images leads to faster diagnoses, improving clinical outcomes in patient care (Xenin, 2023), that probably helped the patients. Radiologic technologists spoke positively of their experiences with digital radiography, not only for its imaging benefits but also for its effect on department workflows and on their job satisfaction (Kapapa et al., 2024). A procedure that took long time to be performed becomes shorter, which is satisfactory for the seasoned Radiologic Technologists.

Furthermore, computerized workflows and networks have trained specialists to adapt to modernities, take on new challenges (Agrawal, 2023). This leads to their eagerness to work independently, keep up with the technology progress, and striving to learn. This all characterizes empowered professionals to work effectively and autonomously in a team-oriented environment (Makanjee et al., 2023).

Cluster Theme 2: Developed Perspectives

A professional perspective is developed during the adaptation of digital radiography. This would show how confident they are in handling and performing using the digital radiography equipment with patient care. A streamlined workflow offered by digital radiography is greatly different from traditional practices experienced by seasoned Radiologic Technologists. This is based on the experiences of *Silver, Polyester,* and *Silicon*.

"But with digital radiography, we no longer leave patients because the image appears instantly on the computer. So, our patient care remains consistent." This is stated in Line 132 – Silver

"Oh, unavoidable. There are artifacts under loading or processing; it's inevitable—scratches and such (film screen), the digital one is good. So, it's clearer you can immediately see if there are any artifacts" This is stated in Line 490 & 496 – Polyester

"it's easier to do and perform (tasks)" This is stated in Line 705 – Silicon

Inherent professional capabilities allow you to adapt your practice to an increased responsibility without affecting patient care and security (Makanjee et al., 2023). With the help of digital radiography, patient care remains consistent, patients receive positive approaches, comforting and careful patient handling, since they interact specifically with patients, clarify methods, get patient histories, attend concerns, and situate patients accurately for imaging (Sectra, 2024).

In addition, digital radiography has greatly enhanced the confidence of radiologic technologists with instant high-resolution images and advanced

processing abilities, enabling them to perform rapid and more informed judgement (Xenin, 2023) showing a positive impact on assessment performance and overall satisfaction (McGee et al., 2024) while becoming a better radiologic technology over time. Also simplify healthcare processes, enhance patient engagement, and contribute to better health outcomes (Alawiye, 2024) through reduction of committing mistakes and faster service delivery which has been linked to improved efficiency and accuracy, reinforcing its role in professional growth (England et al., 2022).

Advancements in imaging technologies have improved the post-processing and control of radiographs (Alzahrani, 2021) reducing the dependence on technique factors, immediate corrections, and repeat exposures, which is also described by Awathale et al (2022) that reduction of the number of exposures is possible while minimizing time and effort of imaging replacing the numerous manuals and optimizing workflow (Pise, et al., 2022).

As Tallarico, (2020) states in his findings, digital radiography technology greatly differs to film screen radiography including reduced procedural times, minimal costs, and enhanced efficiency in medical imaging. It allow some adjustments for optimal visualization without sacrificing image integrity, providing adjustable contrast, brightness, and magnification parameters to suit the individual patient's need and specific clinical requirements (Najjar, 2024). It presents many advantages for both clinicians and patients, such as; film screen image quality isn't uniform dependent to radiologic technologist's technique factors but digital radiography presents better image uniformity regardless of radiologic technology and technique factors. Manual processing from developing to drying in film screen radiography is tedious for the professionals and possibilities of image rejections and film wastage while digital radiography simplifies the overall manual processes and saves on cost. The film screen radiography considered an art by the seasoned Radiologic Technologist which diminishes during digital radiography processes. Furthermore, sometime unavoidable artifacts were present happens in loading and processing but in digital radiography, those undesirable artifacts can be immediately seen because the images are clear.

Cluster Theme 3: Influence of Technical Skills

Radiologic Technologists possess technical skills for them to adopt the evolving profession. The modernized equipment impacts their regular workflow and behaviors both positively and negatively, which could lead to amendments in the departmental standards. This is based on the experiences of *Calcium, Yttrium*, and *Polyester.*

> *"review existing SOPs or policies to prevent major errors in the future." This is cited in Line 269 – Calcium*

> *"the negative aspect is that some RadTechs have become complacent because everything is so*

easy now. Just click and adjust, and it's done." This is stated in Line 368 – Yttrium

" we report to the company that handles the machine… we report that it has malfunctioned " This is stated in Line 510 & 512 – Polyester

More experienced or seasoned radiologic technologists have an influence to care for patients and can help keep the public up to date on the changes occurring during this rapid technological evolution. But they tend to be more complacent and dependent and could make a mistake like marker place incorrectly that could tarnish the departments reputation. Rajan and Dhar (2023) suggest that seasoned radiologic technologists tend to experience the more difficulties, and can be confronted with a more workload, coupled with the speed and modified scope of imaging technology changes, because they cater more patients compared before.

Moreover, to handle such difficulties, management-based solutions developed to have an organized reporting system can permit the identification of deficiencies in surroundings (Scaggs, 2021) such as reviewing the existing Standard Operating Procedures (SOP). When it comes to malfunctions, Kamil (2023) suggests working closely with machine manufacturer groups and/or certified engineers to optimize functionality, therefore the potential risk of machinery malfunction is reduced. If machine issues happened, they use portable machine, as stated in the recent study published in Radiographics that encourages early planning for device failure, portable equipment can allow continuity of imaging during down time, thus not creating undo disruption or delays to the patients. (Gibney et al., 2021).

Emergent Theme 3: Acquired Knowledge

This addresses the question "what insights can the participants share with the community and their colleagues?" that delves into the knowledge on how to overcome challenges, and advice that can be provided to improve workflow, teamwork, patient care, and technical skills. This aims to partake findings that could benefit the radiography community and future Radiologic Technologists adapting to advanced technologies. Then, it is separated into two cluster themes: Effect of Digital Radiography to Seasoned Radiologic Technologists and Transitioned Work Strategies.

Cluster Theme 1: Effect of Digital Radiography to Seasoned Radiologic Technologists

Certain changes and transitions happened in the field of medical imaging that affect the professional environment of seasoned Radiologic Technologists. From the impact in profession, image production, and realizations, this is considered as an eye-opener of the possibilities and door of opportunities for future Radiologic Technologists. This is based on the experiences of *Yttrium, Polyester*, and *Cesium.*

"we don't need as much physical storage for films anymore." This is stated in Line 374 – Yttrium

"makes results and feedback faster." This is stated in Line 514 - Polyester

"we saw how it evolved—the technologist role, how our skills and knowledge about DR have been enhanced." This is stated in Line 839 – Cesium

In optimizing radiography, participants expressed the impact of digital radiography on the profession making them no longer need to handle physical films (Kapapa et al., 2024), which reduces the time and resources previously required for film processing (Xenin, 2023) resulted to save money. The elimination of physical films, and the necessity for large storage spaces to archive radiographic images has significantly diminished. Digital images are stored electronically, allowing for efficient organization and quick retrieval when needed (Stoumpos et al., 2023), like printing paper images for doctors (Naidoo & Peter, 2022). Radiographic images are now stored electronically, they can be systematically organized and retrieved swiftly whenever required (Stoumpos et al., 2023) noting the obsolete need of physical storage rooms and minimize toxic waste, as hazard posed in the environment and health from the chemicals and agents (Ardelean et al., 2023).

Moreover, Digital radiography has markedly improved image quality (Seeram, 2023), for faster result and feedback. The ability to manipulate and enhance digital images allows for better visualization of anatomical structures, which allows more precise diagnoses while maintaining patient safety (Varghese et al., 2024) and for more accurate interpretations by Radiologists. Simple image-to-image management, and communication system transfer (IMAC) (Luharia et al., 2022), and the ability to send and archive electronically (Esmaeilian et al., 2024) or by saving in a single disk to provides efficient and easy retrieval of images.

Furthermore, seasoned Radiologic Technologists share some reflections about loving our work and provide the right service to people by adapting to these technological advances in radiography, which have been a key driver for changing imaging techniques (Rawle et al., 2022). Workflow productivity can move forward (Kapapa et al., 2024) by never become complacent and not allowing learning to stagnate in evolving profession. Computerized workflows and consistent networks are driving experts to adjust, take on modern challenges, and advance in their work (Agrawal, 2023) as it becomes much easier and enhanced compared before.

Cluster Theme 2: Transitioned Work Strategies

Digital radiography improves the recent work of the Radiologic Technologists and will continuously enhance the future. This helps seasoned Radiologic Technologists to think of unlocking new skills and approaches to properly utilize the advanced equipment and benefit from it. This is based on the statements of *Selenium, Cesium,* and *Substrate*.

"one good strategy is observing—especially the senior staff." This is stated in Line 658 - Selenium

> *"learn even the technical aspects of engineering… service engineering tasks… or even the work of electrical specialists" This is stated in Line 827 – Cesium*

> *"How to use digital in special procedures… I still want to expand my knowledge on other examinations" This is stated in Line 1163 - Substrate*

In their current work, it is necessary to improve knowledge and skills in certain areas (Abuzaid et al., 2023). The need to learn or adapt to this technological advancement through x-rays was an important factor in changing imaging techniques (Rawle et al., 2022) such as improving computer skills so we can work faster. Seasoned Radiologic Technologists states that, with the rise of advanced technologies in diagnostic imaging, practicing radiologic technologists must develop essential computational and technical literacy to effectively operate high-tech imaging systems (Al-Naser, 2022) to help them learn even the technical aspects of engineering tasks to expand their knowledge to use in digital special procedures.

New approaches has been developed by training one or more Radiologic Technologists, and trained professionals will train other technologists (Koehler, 2021). Co-workers were considered reliable sources (Rawle et al., 2022). They should be assigned to productive shift to perform frequent exposures which could help them improve over time. Clinical ability is achieved through the professional training of practitioners that contributes to general effectiveness, like workplace immersion and intersecting roles, requiring experimental learning and continuous skill development to enable professionals to work efficiently and independently in a team-oriented environment (Makanjee et al., 2023) and one good strategy is observing-especially the senior staff. According to Kamil (2023), coordination with machine manufacturers or certified service providers, minimizes the possibility of technical malfunctions, such as implementing the advice to only turn it off during power outage.

Implications and Recommendations of the Study

The transition from film-screen radiography to digital radiography has significantly changed the work of Radiologic Technologists One of the most significant improvements is the increase in the quality of images. The confidence of Radiologic Technologists in the provision of diagnostic support for doctors increased with the ability to produce images in clearer and sharper details. In addition, the workflow in radiology departments is easier as there is no longer a need to develop the film and practice work in the darkroom, which lessens the physical and mental stress because of the improved working conditions. At the same time, there are also problems associated with the transition.

Digital radiography introduced some challenges for Radiologic Technologists since they need to learn new software and how to troubleshoot the system. Most of the time, software systems are built to be intuitive, but there will always be a learning curve with so much sometimes leading to initial frustrations. Additionally, workflows are sometimes interrupted by system errors and technical failures, which calls for immediate troubleshooting skills. Regardless of the challenges, the benefits to digital radiography outnumber the disadvantages, which include less radiation, more efficiency, and better overall patient care.

It is important to study the long-term impacts of digital radiography on workplace productivity and patient care for future research. Digital adoption gaps in healthcare institutions with different technological infrastructures can be addressed with comparative studies. Moreover, investigating the age gap in adapting to digital radiography could help design specific training courses that cater to varying educational needs. Wider research outside Region XII of the Philippines will also aid in understanding the complexity of local issues and healthcare systems as well as the coping strategies employed.

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