The Impact of Clinical Practices on the Professional Approach of Imaging Students: From the Classroom to the Cabinet

Dr. Blerina Saraci (QIRINXHI)
Department of clinical and images semiotic,
University of Medicine Albania, Radiology Service,
University Hospital Centre Mother Tereza
Tirana, Albania
Email: saraci.blerina@gmail.com

Msc. Anxhela BUSHI
Corresponding author: Anxhela Bushi
Radiology Service University Hospital Centre Mother Tereza
Tirana, Albania
Email: anxh.bushi@yahoo.com

Abstract

Introduction: Bridging the gap from lectures in the classroom to clinical practices is one of the most crucial moments in the life of a radiology student, and it impacts their career development and satisfaction level with their work, especially for the desired career. This research aims to assess how clinical practice influences the career choices of radiology students, looking at their practical exposure to the profession and perceptions.

Objective: The study investigates whether practical radiology experiences support or contradict students' initial career motivations by contrasting their attitudes and expectations before and after clinical exposure.

Methodology: The study includes interviews and surveys with radiology students at various educational stages, as well as the analysis of both qualitative and quantitative data. Two interviews were conducted with the students: one prior to and one subsequent to their clinical exposure.

Results: According to the findings, clinical exposure is essential for fostering students' enthusiasm for the field, for 79% of first-year students and 94% of third-year students. Important elements like patient interaction, innovation in technology, and workplace culture affect their long-term job satisfaction.

Conclusion: Given that radiology is one of the most popular field among high school graduates and that approximately 200 imaging technicians graduate annually only from the Faculty of Medical Technical Sciences Tirana, this study also offers insightful information for new educational strategies and program development aimed at improving curriculum design, to better support students during clinical training, and ultimately to help them make informed decisions about their future in radiology.

Keywords: Clinical practice, students, professional development, imaging.

Introduction

Technical Medical Imaging field in Albania

In 1948, the "First Medical Technical School" was opened, which in 1996 was named the "Higher School of Nursing". During the period of modernization of higher education, new opportunities were created for the opening of new branches that were related to the latest developments in the field of medicine and technology.

In the 1990s, the Faculty of Medicine at "University of Tirana" began offering specializations and study programs in radiology, including the use of modern imaging technology, as well as training young professionals to work with equipment such as radiography, ultrasound, tomography and magnetic resonance imaging (MRI) initially offered at the School of Nursing, which was later expanded and renamed as the Faculty of Medical and Technical Sciences (Faculty of Medicine brochure, 2004).

Considering the significant growth that this branch experienced after the year 2000, due to technological advances and the increasing demand for qualified professionals in this field, the Imaging Technician Program was widely expanded to the private university system as well.

Imaging students at both state and private universities are offered professional internships ranging from two weeks to three months at University Hospital Centers and beyond. Among large centers in which students can practice their theoretical knowledge, we mention: "Mother Teresa University Hospital", Shefqet Ndroqi University Hospital, and the University Trauma Hospital. In addition to them, small private clinics have been an added help for students by giving them the opportunity to witness their job positions requirements across both state and private establishments.

Challenges and opportunities

Facing the reality of their professional choice during hospital internships, is considered by students as the best way to find themselves in the field of radiology. Thanks to the large number of modalities, each student has the opportunity to choose to specialize in one or several of them during the study years, resulting in a easier choice when entering the labor market.

In addition to choosing the modality where the student best finds himself, due to the possibility of being exposed to different departments such as: the noisy emergencies, chaotic Intensive Care Unit Department, oncology service with its social and psychological challenges, or private offices, each personality can easily perceive in which environment their abilities reach its full potential.

Although this type of approach is one of the most important components of medical education, it is full of barriers to its effective implementation.

Clinical teaching faces challenges such as a lack of time for teaching, multiple responsibilities, limitations due to the number of students, lack of structure, heavy workload, among others. In order to achieve high-quality teaching, there is a need of identifying not only the present challenges but also the solutions that would provide better services by increasing teaching effectiveness triggering student's satisfaction, also something reflected in a study conducted in Albania for the challenges and opportunities of Medical Education in our country that states that comprehensive curricula evaluation is needed both in undergraduate and postgraduate training, as well as application of best evidence-based educational strategies that will enable students to develop the competencies identified as appropriate for healthcare professionals in Albania (Rrrumbullaku et al, 2002).

Juggling tasks on a daily basis has mentors feeling worn out, however, when the students part of our study were asked about whether they felt welcomed in the cabinets, the tones were nothing but positive.

One of the proposals offered by mentors was to have students focus on one modality at a time. The first-year students can direct their energy toward X-ray and its many varieties (Trauma, Emergency, Oncology, Pediatrics, Operating room). As years go by, attention can shift to more advanced modalities such as CT-scan, Magnetic Resonance (MRI), Radiotherapy. In their final year, students can prioritize PET (Positron Emission Tomography), SPECT (Single Photon Emission Computed Tomography), and Interventional Radiology.

However, considering these types of modalities are hard to grasp for the students, but also tough to navigate for mentors, a well-thought-out program should be the next big step.

TABLE 1. Summary table of the clinical education system

Clinical education system			
STRUCTURAL CHALLENGES	Infrastructure defects	Lack of educational space	Lack of educational and treatment facilities
TIME PRESSURE	Information overload under time pressure	High-demand shifts	
ORGANIZATIONAL PROBLEMS	Multiple students scheduled together		
MULTIPLE RESPONSIBILITIES	Supervisors juggle several tasks concurrently		

Method

Sample

The study included 119 Imaging students, whose participation was voluntary after they were well-informed about the purpose of the study.

Instrument

The questionnaire used in this study is structured, self-reported, and anonymous, while fully preserving the confidentiality of the participants. The questionnaire consists of two parts.

1. The first part includes socio-demographic data of the population studied (gender, age, year of study).
2. The second part of the questionnaire aims to assess the impact of clinical exposures on first-year and third-year students before and after teaching practices.

The distribution of the questionnaire was carried out through Google Forms combined with one-on-one interviews with students in the auditoriums and during practice in the cabinets. The format of the questionnaire used was similar to the one used in a study conducted in 2009 by Emma-Jane Berridge, Della Freeth, Judi Sharpe, C. Michael Roberts (Berridge Emma et al, 2007).

Results

Demographic data

Among 119 students included in the study, it resulted that in the first academic year (n=56) 69% of them belong to the female gender and 31% to the male gender. The same dominance of values is also observed among third-year students (n=63), where female students account for 66% while male students 34%. This trend has been echoed in previous studies on related topics. (Berridge Emma et al, 2007**,** Walaa M Alsharif et al, 2022**,** Mazaheri F. et al, 2024).

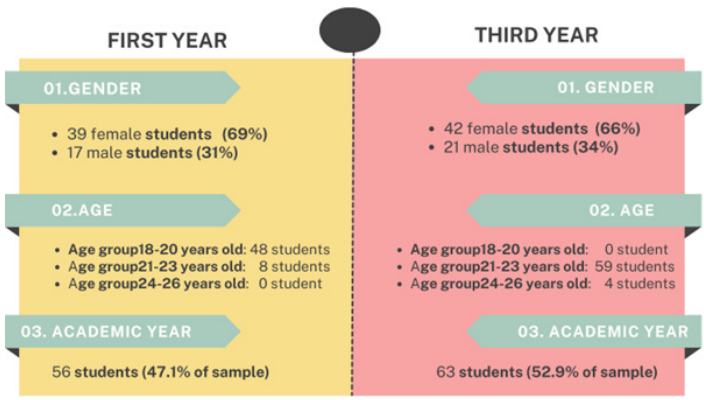
The age of participants in the first-year student group varies from 18 to 23 years old, with a mean (±SD) of 19.43 (±1) years old. The majority of students are 19, specifically 84% (48 of them). In this group, we do not have any students who belong to the age group 24-26 years old, part of the questionnaire alternatives.

The age of the participants in the group of third-year students ranges from 21 to 26 years old, with a mean (±SD) of 22.1 (±1) years old. The majority of students correspond to the age group 21-23 years old, specifically 93% (59 of them).

Based on the academic profile, all participants are found to be students of the first cycle of Bachelor studies, in the field of radiologic imaging, among whom 56 students (47.1%) are in the first year of studies, while 63 students (52.9%) are in the third year.

The above-mentioned data are summarized.

TABLE 2. Summary of demographic data

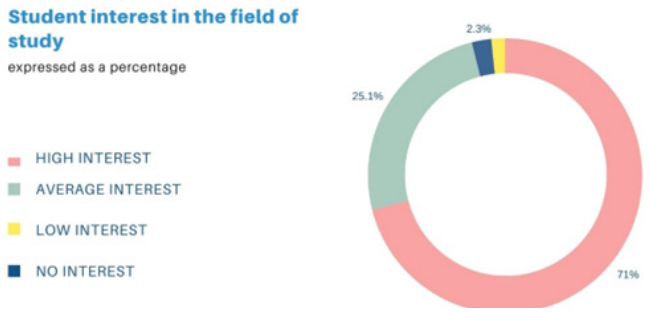


Study Findings

Through a combination of surveys and interviews, the research captures the attitudes and expectations of students before and after facing the reality of their professional choice.

Asked about their interest in the field of study, it results that 70.9% (83) of them have a high interest, 25.2% (28) have an average interest, 2.3% (4) have a low interest. Comparable studies have similarly highlighted this trend (Berridge Emma et al, 2007**,** Walaa M Alsharif et al, 2022**,** Hizzett K et Snaith B, 2022, Mazaheri F. et al, 2024). Only 1.6% of them have said that they have no interest in the field of study. From later information it was discovered that 2 of the first-year students had dropped off and had decided to perceive another field of study before finishing the first semester.

TABLE 3. Summary of students' interest data.



Following the course of the interviews, in addition to the results of the questionnaire, several points of convergence were noted in their attitudes between first year and third-year students, as well as many challenges that were encountered by new students had later disappeared over the years in students on the verge of graduation.

Preclinical Exposure

Students, after graduating High School, are full of perceptions and expectations about the field of study they will join. The main perceptions regarding the profession of imaging technician before clinical exposure and after having completed the first cycle of practice often bring clashes of opinions to students.

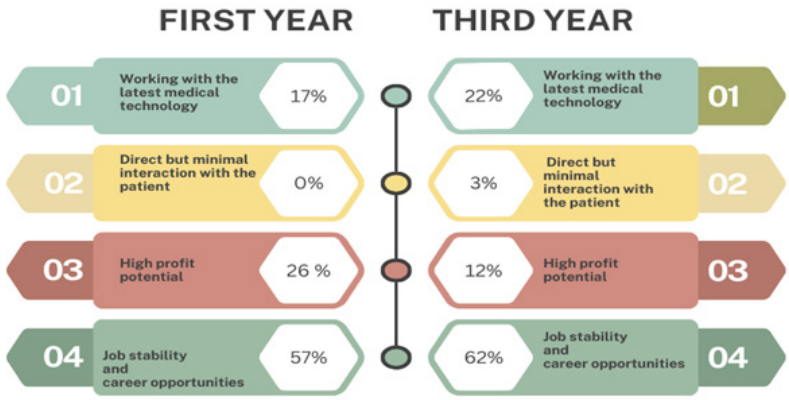
First-year students stated that among factors such as: Working with the latest medical technology, direct but minimal interaction with the patient, high

earning potential, job stability and career opportunities or working in a Teamwork environment with healthcare professionals, by being under the influence of relatives and family members, they joined Radiology with the concept of a profession with career growth opportunities and high earning potential.

None of the students in this group chose the factor of direct but minimal interaction with the patient as a significant element of their choice. Previous studies in the literature (Walaa M Alsharif et al, 2022) showed that the top-ranked motivational factors for the majority of students to choose a profession are social status and security factors. This indicates that the desire to help and serve the public is not the most important motivational factor for choosing imaging as profession, stating a meeting point with our findings.

Job stability and career opportunities were the most chosen aspects among third-year students, with 62% of the questionnaire results, and the least chosen aspect continued to be that of direct but minimal interaction with the patient.

TABLE 4. Summary of students' perceptions before clinical exposure.



In the curriculum, clinical practices always accompany subjects in which the knowledge acquired in the classroom is applied in practice. Trying to keep theory and practice in parallel, each year follows practices dedicated to the subjects developed up to that point.

Since, in addition to the reality of their professional choice as Imaging Technicians, our students also encounter the risk of radiation both during clinical hours and throughout their careers, a contributor to the study questionnaire was related to the safety of students in the cabinets (Nur Nişancı Bengüsu & Çakına Suat., 2024).

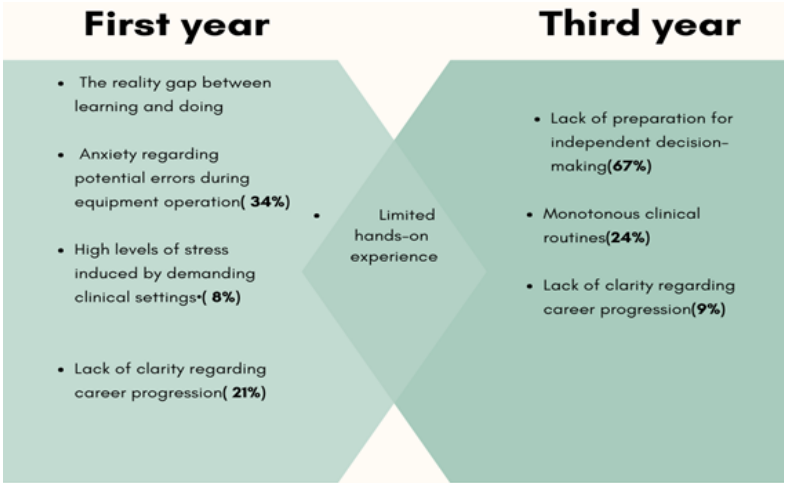
82% of them responded that they felt very safe, and 18% somewhat safe.

The first-year students stated that they had not yet taken a subject based on radiation protection, but their mentors made sure to introduce them to the risks of the imaging cabinets they participated for practice.

This early exposure not only raises awareness but also reinforces the importance of safety protocols from the very beginning of their training. As students progress through the program, their understanding of radiation protection is expected to deepen, enhancing both their confidence and competence in clinical environments. The study listed below affirms the importance of extensive awareness when it comes to radiation safety (Nur Nişancı Bengüsu & Çakına Suat., 2024).

During clinical exposure

TABLE 5. Summary of students' perceptions during clinical exposure.



With their expectations in mind, Imaging students from both study groups stated that the welcome they received in the cabinets was describes as truly gratifying for the majority of them (82%) and acceptable for the rest (18%).

The challenges that first-year students faced during clinical practices that influenced their perception of radiology were mostly stress and pressure in fast-paced clinical environments, in addition to uncertainty about career advancement.

In the third-year group, the option of uncertainty about career advancement was selected significantly less by the students, showing once again the positive effect of the combination of theoretical and practical knowledge on the students' self-confidence as they advance in their studies. On the other hand, they did not feel quite adequate for independent decision-making.

Both years have expressed that they would like to complete professional internships during their years of study for a longer period than previously available.

Studies have shown that clinical rotations have the most considerate impact on medical students' attitudes and abilities. A study by Tegel et al. (2016) found that radiology students reported a marked improvement in their self-confidence after completing clinical rotations, particularly in their ability to use imaging

technologies effectively (Watson, S. et al., 2018). In a similar study of Gjergji and bp. (Gjergji V., Kola V. and Roshi E., 2011) clinical rotations in psychiatry impacted positively on medical students' attitudes.

Post-clinical Exposure (Current Perceptions)

The findings suggest that all students who participated in the study had a positive attitude before and after clinical exposure in terms of their self-confidence as future professionals. The opportunity to face the work environment during their academic studies facilitates their advancement in the labor market for what lies ahead.

TABLE 6. Summary of students' perceptions after clinical exposure.

Among the factors that would make one more confident in its decision to pursue radiology as a career, students brought attention to the possibility of being exposed to a greater diversity of radiology modalities during their studies to avoid repetition of the same experiences over and over again, and that they would like to be mentored and guided by professionals for a longer period of time. Conversely, challenges such as stress, workload, and complexity of the profession often result in a lack of adequate attention and time from clinical supervisors to students.

Jackson et al. (2019) found that students experienced a shift in their perceptions of radiology as a "technical" profession to a more " patient-centered " profession after engaging in direct patient interactions during clinical placements (Jackson, L. et al., 2019). However, this alteration was not seen among our students.

Discussions

The overall response rate for the study was reasonably high, although there was lower engagement from the first-year students, perhaps reflecting their limited knowledge of the profession at that stage of their studies.

Secondly, as universities are focusing their work in developing the best programs not only to attract students to join their classes but also making sure they are offering top - notch experiences that will result in qualified specialist in the long run, the core of a well-trained imaging technician lays in the hands of their mentors. Part of the discussion had with both groups of students, the need for a longer and deeper connection between students and their practice coach was heavily mentioned. If the universities do not invest more time and funds into creating a team of technicians that plays both roles, that of the lecturer in class and the mentor in the hospital, the end result of these practice hours will perhaps not be the one they aim for.

Conclusions

Both first year and third-year students' feedback reveals important patterns about their mentor relationships, self-confidence, clarity of career goals, and difficulties encountered while studying. Notably, 63% of third-year students reported feeling a close bond with their mentors; many even grew close to them while they progressed in their studies since 2 of the mentors were also part of the academic staff of the university. Nevertheless, only a shocking 13% of first – year students shared the same opinion.

38% of first-year students reported having no difficulties during their practice hours, 11% reported having fewer difficulties, and 7% reported having significant difficulties. Third-year students, on the other hand, were more confident, with 70% reporting feeling confident in completing their tasks assigned to them during practice hours, compared to 28% who faced some difficulties and 2% even weeks away from graduating lacked confidence.

While 17% of the first year students were unsure if they had made the right choice, the majority, 69%, believed they had clear ideas about their future careers. Values that were even more positive among third year students , where more than 82% of them said they saw themselves succeeding professionally in the field they had chosen three years ago.

As radiology is among the most popular areas of study for recent high school grads, and seeing that with every year more and more students are enrolling in

our university, a more well detailed and thought through scheme between the academical and practical aspects of Radiology should be put in motion. This study brings valuable insights into new educational strategies and programs of how to better shape the curriculum to enable better student support during clinical training and consequently improve the tools students need to make an informed decision when it comes to their future in radiology.

Limitations and recommendations

A limitation of this study relates to the fact that it involved only radiology students who study at "Aldent University" in Tirana. Therefore, the results may not be confidently generalized to the radiology students who study at other universities across the country. An additional potential limitation is the lack of published research that focuses on the radiography profession, and this caused difficulties in comparing the study's findings; however, some of the more relevant studies for other professions, such as nursing and medicine, were identified. Therefore, further research in these areas is recommended. Such research could focus on the role of career counsellors in High School and/or universities in assisting students to identify appropriate professional options. A number of significant changes are suggested in order to improve the clinical experience of radiology students. First, by exposing students to a range of modalities over the course of their academic careers, they will be able to acquire a well-rounded skill set as they progressively become proficient in various imaging techniques.

Additionally, it is essential to monitor occupational exposure during clinical hours in order to protect students. Regular evaluations are conducted to track radiation exposure and ensure that safety procedures are being followed.

By exposing them to a variety of working hours and clinical settings, the use of intermediate shifts in the clinical training schedule would enhance their experience and better prepare them for practice in the real world. Lastly, the inclusion of technician staff to assist students both in the faculty and hospital would help streamline operations, provide necessary technical support, and ensure that students receive hands-on guidance throughout their clinical rotations.

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