

---

# 방사선 교육 동향: 한국, 호주, 미국 방사선 교육 시스템 비교

## Changing Trends in Radiographic Education: A Comparison of Korean, Australian and the United States of America Radiographic Education Systems

---

최지원

Symbion Imaging. Strathfield Private Hospital. Australia

Ji Won Choi(medi30@yahoo.co.kr)

---

### 요약

지난 20년간 방사선 기술 분야는 비약적으로 발전하였고 확대되었다. 이를 기반으로 하는 방사선사의 역할 및 업무영역은 해를 거듭할수록 더욱 고도화, 전문화 되고 있다. 그리고 현재 대한민국의 방사선 교육을 서구화 하고자 하는 부단한 노력이 각 대학에서 활발히 진행 중이다. 이 논문은 대한민국의 방사선 교육과 면허 제도를 재조명하고, 호주와 미국의 방사선교육, 면허제도와 비교하였다. 대한민국 방사선 교육과정과 면허 제도를 호주와 미국의 동향과 비교 분석하여, 향후 전문 직업 교육과정으로서의 방사선 교육 발전 전략을 모색하고자 한다.

■ 중심어 : | 방사선교육 | 대한민국 | 호주 | 미국 |

### Abstract

This study is designed to outline the major differences between the current radiographic programs of Korean, Australian, and the American radiographic programs. Through thorough comparison of these programs, the Korean curriculum is criticized and strategies put forth to improve the current radiographic educational curriculum which is currently employed in Korea.

■ keyword : | Radiographic Education | Korea | Australia | America |

---

## I. Introduction

One of the reasons for the developments in the educational system in Korea is attributable to the increase in the size of the Korean population where there has been an increase in both the quantity and the quality of the education provided. Especially in the field of radiography, there has been a radical change with radiography being viewed as a profession in its own right. In the last two decades, the roles of

radiographers has changed dramatically as the demand for radiographic services increased as well as the roles undertaken by radiographers becoming more complex. This change has brought about a high demand for expertise and training, all of which may ultimately enhance the knowledge base, skills and training environment for students allowing them to grow as competent radiographers.

In an ideal radiographic program, there would be a balance of clinical experience, preceptorial teaching

and research with each aspect reinforcing the other to strengthen the structure of student training[1].

Unfortunately, exceeding demand compared to the current radiographers' level of knowledge and the pressure for greater responsibility are causing conflict and increased competitiveness. Current trends in radiographic education in Korea reflect the efforts to achieve a successful blend of health sciences and medical experience, whereby increasing the commitments towards the integration of research into vocational education and the clinical practice. Therefore, it is felt that this is a highly appropriate time to present a cross-cultural comparison of radiographic programs.

I will first review the empirical findings related to the Korean radiographic education system followed by a discussion of the radiographic education systems of Australia and the United States of America, highlighting the major differences to illustrate the limitations of the current Korean radiographic program. Also, this literature review will focus on comparative analysis of the different radiographic programs based on the current curriculum and accreditation process.

## II. Korean Radiographic Education

### 1. Korean Radiographic Program

The traditional program of radiography in Korea was designed to provide a basis for the general practice of diagnostic and therapeutic radiography as well as nuclear medicine. Traditionally, the study of radiography in Korea was offered as a two year private vocational college education for high school graduates. Due to educational reform, radiography changed to a 3-4 year course under the guidance of the Ministry of Education, Science and Technology (MEST)[2].

The MEST accredits formal training programs for radiography program. The MEST accredited 37 radiographic programs in 2008 and as of 2008, there is to be a total of fifteen four year programs offered at non-government universities and twenty two three year programs offered at colleges[2]. The average total number of universities and colleges graduate students are approximately 2000 per year based on education statistics of Korea in 2006[3].

Formal training programs for radiography range between three and four years and lead associate degrees or bachelor degrees. Upon satisfactory completion of the program, students are eligible to undertake the national license examination in radiography put forth by the National Health Personnel Licensing Examination Board (NHPLB)[4]. Students achieving a grade of 60 or above out of 100 on the National Licensing Examination become registered with the Ministry for Health, Welfare and Family Affairs (MHWAF) and are eligible to apply for their license allowing them to practice as radiographers in Korea[4].

The registration process which is solely based on the degree which has been granted by the college or university, are viewed as the equivalent as those of the American Registry of Radiologic Technologists (ARRT) in the United States. It is estimated that there are over 25,000 radiographers currently in Korea with approximately 1,500 being registered with the MHWAF every year[2-4].

### 2. Korean Radiographic Curriculum

The curriculum forms the basis of the educational components of radiography. The current education curriculum in Korea closely follows the curriculum which is employed in the United States of America. Despite the differences in the two curriculum models, one can say with certainty that the backbone of the

curriculum used in Korea has been built on the United States of America model[5].

The Korean radiography curriculum focuses on the theory behind the basic sciences of diagnostic imaging, nuclear medicine and radiation therapy followed by concurrent practical sessions and clinical placements[6]. The integration between the theory and clinical placements are progressive with direct patient contact throughout the duration of the course. Specialty imaging techniques such as sonography, computed tomography (CT) and magnetic resonance imaging (MRI) are obtained through in job training opportunities offered by the various imaging departments[6].

The Korean curriculum needs to be addressed in relations to the educational programs including appropriate training, performance monitoring, departmental protocol and assessment of competence [6]. All of these components are developed within a framework of audit and research undertaken by the program instructors and the MHWAF[2].

Even though the fundamental components of the Korean radiographic curriculum are based on the United States of America model, the application of the curriculum differs depending on the institutional policies of the various private colleges and non-government universities[6]. Despite the subtle differences, it has been repeatedly pointed out that the quality of teaching and the amount of research undertaken by the Korean radiographic programs are on par with radiographic programs offered at western colleges and universities[6].

### III. Australian Radiographic Education

The Commonwealth Government of Australia (Department of Education Science and Training)

states that in order to gain professional and educational recognition as a professional radiographer in Australia, one must obtain a bachelor degree in applied sciences medical radiation sciences which includes clinical placements in accredited imaging practices throughout the course followed by a Professional Development Year (PDY) upon graduation[7]. Once all the criteria have been successfully fulfilled, the radiographers are then accredited by the Australian Institute of Radiography (AIR) and are able to work as professional radiographers[7].

In the last 20 years, the education of medical radiation sciences has undergone many changes. What was once an "on-the-job" training within an imaging department in conjunction with a certificate or associate diploma level of study at a college or institute, it is now a three year full time Bachelors degree offered at a number of universities throughout Australia. Australia's move towards a Bachelors degree was brought on by an increased emphasis on education and professionalism rather than training[8].

There are currently 8 universities in Australia offering Medical Radiation Sciences (MRS) at an undergraduate level. The first formal qualification in MRS began only in 1986, with the majority of universities offering MRS degrees for students in the late 1980s and early 1990s[7].

In the discipline of Medical Radiation Sciences there are three streams available including Diagnostic Radiography, Nuclear Medicine and Radiation Therapy[7]. Due to a shortage in the number of employees, most graduates are able to gain immediate employment upon graduation with a provisional accreditation[8][9]. Therefore, a further year; PDY is required in order to receive full accreditation to practice as a professional radiographer. With the Australian radiographic program, there are no registry

examination requirements for accreditation[7].

The occupation of radiography in Australia is closely linked to the education system and the emergence of the sole professional body of radiography, the AIR[8]. The AIR is the professional body of clinical practice in radiography and has the role of education assessor through the Professional Accreditation Education Board (PAEB)[7-9].

Essential components of clinical education are undertaken during compulsory clinical placements. Clinical placements during first year (1week), second year (18weeks) and third year (6weeks) provides an opportunity for the students to integrate the theoretical knowledge which they have acquired with practical skills to offer patients a high level of service[10]. The students are required to demonstrate their level of clinical competence appropriate for their current year of study in order to progress in the unit of study[10]. Throughout second and third years of study, the students are often monitored by the university supervisors and assessed by authorized clinical assessors. Upon successfully completion of the course, the students will have been required to demonstrate competencies in clinical placements allowing them to work as radiographers with a provisional license until the satisfactory completion of the Professional Development Year[7][8].

#### IV. American Radiographic Education

In the United States of America, the Joint Review Committee on Education in Radiologic Technology (JRCERT) is the professional accrediting body that offers accreditation not only for entry level graduates but also the informatics and masters programs as well as having an oversight into the doctoral level programs[11].

There are currently approximately 622 the JRCERT

accredited radiologic programs in the United States of America[11][14]. Most of the radiography faculties rely on the American Society of Radiologic Technologists (ASRT) curriculum guide to plan out an academic curriculum for their students[12][13].

Programs accredited by the JRCERT must reflect individual program resources and facilities while having elements which are common to all accredited programs[5][11][12]. One of the primary goals of the radiographic programs accredited by the JRCERT is to graduate students who are capable of passing the ARRT certification examination[12][13].

In the United States of America, there are three levels of educational programs which are offered to the students and include certificate programs offered by hospitals, associate degree programs offered by community and junior colleges, technical vocational schools as well as 4 year bachelors degrees offered by colleges and universities[15]. Despite the different levels of radiologic education which can be undertaken by the students, they are all required to sit the same certification examination[15].

Upon satisfactory completion of the course the students are eligible to take the ARRT examination. Those students who receive a grade of 75 or above out of 99 are registered with the ARRT and are eligible to apply for a radiographers' license to work as professional radiographers in their own states[5][11][12].

#### V. Discussion

On the basis of literature findings of educational preparations in Australia and the United States of America, it is obvious that there have been significant changes in radiographic education and practice in the last two decades. Radiographer training and education

subsequently became degree based with the courses being managed by higher educational institutions [5][8][9][15]. The faculties of radiography, in a vast majority of cases, became a part of a university or a higher educational institution and now exist as departments of radiography within a larger faculty such as the faculty of health sciences[8][9][15].

The basic concept of the radiographic program is international. However, the implementations of the radiographic programs differ based on individual faculty policies and beliefs in regards to health care professionalism. There have been a few research studies which have been undertaken to provide descriptions of how radiographic programs differ internationally[15]. It has been repeatedly pointed out that the quality of teaching and the amount of research carried out by major Korean universities are not on par with the top ranked universities in the world.

In Korea, there is a lack of systematic documentary evidence that takes into account the current status of radiographic educational program standards. Furthermore, there are no strict validation committees which are present to validate and monitor the registration process of the radiographic education and radiographers. Research material in Korea have not been internationally published and is only available in Korean and to date, these studies have only focused on the differences of the radiographic programs worldwide[6].

Due to change and sub specialization within the field of radiography, a standardized radiographic program is required as the current radiographic training programs are not adequately preparing students to meet these demands. It may be necessary to produce multiple tracks and different curriculums within individual training programs in order to address these needs. When considering the needs for training, the educational curriculum and its contents

will become more important as the current curriculum standards do not incorporate these changes adequately.

The study undertaken by Pratt and Adams states that "when developing a new course, each department of radiographic education essentially considers the same ingredients" [16] and a study by Shehane states that all accredited radiologic technology programs share common content areas, and many follow a common curriculum." [17]. Both of these studies show that in their analysis of the radiographic curriculum, that its control became more centralized and unified with a validation committee rather than through separate radiographic institutions. In order to compare the accreditation process and the curriculum of the Korean radiographic programs with other nations such as Australia and the United States of America, it can be seen that there is a large difference between them. The following questions raise criticisms of the Korean Radiographic programs:

1. The contents of general radiographic education is poorly selected and organized.
2. The curriculum is departmentally fragmented and overspecialized by the faculty.
3. Which organization will control the strict accreditation of the Korean radiographic programs?
4. How the unified Korean radiographic curriculums will be organized and implemented?

Although the nature of the Korean radiographic education has been strictly controlled by the MHWAF, it is clearly visible that the private sector is the main governing domain of Korean tertiary education in relations to financing, provisions and governance.

## VI. Conclusions and suggestions

On the basis of the above discussion, I propose several approaches which may improve the Korean

radiographic program and curriculum. The Korean radiographic education should be clarified with a standardized curriculum and accreditation process which is strictly governed by a radiographic committee. Also, strategies should be developed to better balance and improve the overall quality of the radiographic program. These processes of change will not be simple. However, once these changes are successfully implemented, the radiographers' knowledge and level of skills will reach new heights with the field of radiography being able to stand firm as a profession in its own right. Radiographers will be able to become more active participants in the healthcare of Korean society. The results of this study can be used for the development of staff educational programs, national licensing examinations, competency evaluations and radiographic curriculums for the future of Radiographic education in Korea.

#### 참 고 문 헌

- [1] R. A. Preston and R. J. Comello, "Ciability of Hospital-based Radiography programs," Radiologic Technology, Vol.77, No.2, pp97-105, 2005.
- [2] <http://www.mest.go.kr>  
<http://www.english.mest.go.kr>
- [3] Korea Statistical Information System(KOSIS)  
<http://kosis.nso.go.kr/eng/index.htm>
- [4] <http://www.kuksiwon.or.kr>
- [5] J. V. Valkenburg, B. Veale, S. Caldwell, J. Lampignano and K. Hairfield, "Educational Programs in Radiologic Technology," Radiologic Technology, Vol.71, No.6 pp.526-534, 2000.
- [6] <http://www.krta.or.kr>
- [7] <http://www.air.asn.au/html>
- [8] P. Lombardo, "Concerns for medical radiation programs in Australian universities," Radiography, Vol.12 pp.332-338, 2006.

Vol.12 pp.332-338, 2006.

- [9] J. Atyeo, B. Adamson and R. cant, "Managerial skills for new practitioners in Medical Radiation Sciences in Australia: Implications for the tertiary education sector," Radiography, Vol.7, pp.235-247, 2001.
- [10] <http://www.usyd.edu.au/handbook>
- [11] [http://www.jrcert.org/acc\\_standards.html](http://www.jrcert.org/acc_standards.html)
- [12] <http://www.arrt.org/index.html>
- [13] [http://www.jrcert.org/pdfs/accreditation\\_process/standards\\_program\\_in\\_radiologic\\_sciences.pdf](http://www.jrcert.org/pdfs/accreditation_process/standards_program_in_radiologic_sciences.pdf)
- [14] [http://www.jrcert.org/pdf/monthly\\_program\\_totals.pdf](http://www.jrcert.org/pdf/monthly_program_totals.pdf)
- [15] K. A. Lawson and P. J. Ross, "R.T.s and the Baccalaureate Requirement," Radiologic Technology, Radiologic Technology, Vol.71, No.2, pp.193-208, 1999.
- [16] S. Pratt and C. Adams, "How to create a degree course in radiography: a recipe," Radiography, Vol.9, p.317, 2003.
- [17] D. Shehane, "Survey of Admission Criteria in A.S.-Degree R.T. Programs," Radiologic Technology, Vol.68, No.2, p.127, 1996.

#### 저 자 소 개

최 지 원(Ji Won Choi)

정희원



- 1998년 12월 : 호주, 시드니 대학교 진단방사선학(학사)
  - 2004년 6월 : 미국, 로스앤젤레스 시티 칼리지 방사선학 수료(면허 취득)
  - 2006년 6월: 호주, 시드니 대학교 의료방사선학(석사)
  - 1998년 12월 ~ 현재 : 호주, 시드니, 스트라스필드 사립병원 진단방사선과 근무
- <관심분야> : 보건의료, 방사선교육