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**RADIOLOGY TEACHING FILES IN RESIDENT RADIOLOGY EDUCATION-  
ASSESSMENT OF THEIR ROLE AND NEED**


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**Abstract:** The radiology imaging technology evolution has the predominant place among all affiliated sciences. There is an urgent need for knowledge and skills development of our radiology residents. Thus developing critical thinking skills of residents is imperative in an era of rapidly advancing technology.

A radiology teaching file is a collection of cases with teaching benefit. Given the wide range of teaching files available, we comprised an institutional survey with a list of relevant queries to understand the need for implementation, utilization and preferences of teaching files among residents.

The survey included and was completed by 40 attending residents at our Institution. Teaching files were appointed to one of three categories: personal, shared, and public teaching files. Fifty percent of residents kept a personal teaching file using a variety of media, and 45% used a shared teaching file. Most popular public teaching files were those requiring paid subscriptions. The quality residents valued most, provided efficient querying of cases, simulated basic PACS functionality, enabled self-directed learning, and facilitated case submissions. There is a tendency toward exploiting electronic media for teaching files.

**Keywords:** Teaching file, resident, education, radiology

**РАДИОЛОШКИ НАСТАВНИ МАТЕРИЈАЛИ ВО ЕДУКАЦИЈАТА НА  
СПЕЦИЈАЛИЗАНТИ ПО РАДИОЛОГИЈА-АНАЛИЗА НА УЛОГАТА И ПОТРЕБАТА**

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**Резиме:** Еволуцијата на радиолошката имиджинг технологија забележува најбрзо темпо од сите сродни науки. Постои зголемена потреба за развој на знаењата и вештините кај специјализантите по радиологија. Императив во оваа ера на развојна технологијата е формирање на критично размислување кај студентите.

Радиолошкиот наставен материјал е колекција на случаи со едукативна вредност. Земајќи во предвид дека постојат бројни и достапни наставни материјали, направивме институционална анкета со листа на релевантни прашања за да ја откриеме потребата од имплементација, утилизација и префериенци на истите кај нашите специјализанти.

Анкетата беше комплетирана од 40 активни специјализанти на нашата Институција. Наставните материјали беа класифицирани во една од три категории: персонални, споделени и јавни. Педесет проценти од студентите користеа персонални наставни материјали, 45% споделени. Најпопуларни, јавни наставни материјали беа оние коиседостапни сопретплатна. Најважната карактеристика на наставниот материјал се ефикасните прашања од случаи, симулирана, основна функционалност на ПАКС, овозможено самостојно учење и олеснето презентирање случаја. Тенденцијата за користење на електронските медиуми како наставен материјал е во подем.

**Клучни зборови:** Наставен материјал, специјализант, едукација, радиологија

## INTRODUCTION

Radiology science is a relatively novel field transitioning between being avocation or a profession. While the field meets many of the criteria applied toward professionalization, one fundamental omission is that individuals in the field practice autonomously and have authority over independent decision making (Tilson, 2005). Autonomous, independent decision making requires both the skills and dispositions to think critically (Francis, 2008).

A teaching file represents a collection of cases with teaching value and can serve multiple functions, such as: (a) a reminder of important findings not to be missed, (b) an archive of cases needed for clinical follow-up, and (c) a reference in understanding the spectrum of a disease. Teaching files were once represented by printed films with hand-written diagnoses, and they evolved by taking the advantage of digital technologies, including PACS, file sharing services, and web-based collections [1–3].

Teaching files are divided into: personal, shared, and public. Personal files are designated for the general use of the owner and they can be shifted into a shared teaching file environment, whereby the owner can add additional

content to a case and make it available for viewing with their colleagues, institution, or beyond. Public teaching files rely on the shared model, are often more comprehensive and sometimes charge a subscription fee. Teaching file archives can be diverse. The simplest design may be a list of cases in a notebook or spreadsheet to more sophisticated implementations.

Radiology education is a life-long process, occurring at any level, including those of a medical student, resident, and attendees. Critical thinking is vital to the achievement of many goals expressed by those in the radiologic sciences as well as other allied health professions.

## MATERIALS/METHODS

We conducted an institutional survey with a list of relevant queries to understand the need for implementation, utilization and preferences of teaching files among residents. The survey included and was completed by 40 attending residents at our Institution and was sent by email. The 25 questions in the survey inquired into the demographics of respondents, if they use and how they use the teaching files, accessible technologies for creating teaching files, and specific features they aspire to.

Teaching files were appointed to one of three categories: personal, shared, and public teaching files.

## RESULTS

Fifty percent of residents kept a personal teaching file using a variety of media such as notebooks, computing devices, internet, PACS and PowerPoint presentations not accessible to others, and 45% used a shared teaching file within our institutional department. The most favored means for storing personal files was through the institutional PACS (65 % of personal file users), followed by PowerPoint presentation (29 %) and storage of images to personal computers (25 %) and least favored was storing files on the internet (20%). Then residents were asked to rate the importance of some features of teaching files such as viewing cases with hidden diagnosis, categorizing and searching cases by diagnosis, subspecialty, modality or body part and including supplementary information such as history, findings, diagnosis and discussion, as very important, somewhat important and not important. Best rated features of personal teaching files by 50 to 70% of respondents were the inclusion of supplementary information and the ability to scroll through images. The two least favored features were storing patients' names and medical record numbers and rating and commenting on cases.

Among those residents who use shared teaching files, only few submit their own cases on regular basis and when asked to rate the difficulty of the process and the frequency of submitting cases only 20% of users never submit a case and 32% of users submit 1–3 cases per month.

Residents were asked to rate a variety of public teaching files and the list included three that required paid subscriptions such as StatDx (Amirsystech, Salt Lake City, UT), RadPrimer (Amirsystech, Salt Lake City, UT) and ACR Learning Files (American College of Radiology, Reston, VA). Among all public files, StatDx was regarded as most valuable by 50 %, followed by RadPrimer (45 %) and ACR Case in Point (25 %).

Teaching files are beneficial components in radiology education. Their reshaping from film-based and printed to digital format and picture storing to hospital computer archives was necessary for maintaining the pace of new technologies and their evolution. There continues to be a trend toward exploiting electronic media for teaching files and high demands on more functionality from present-day solutions.

Teaching files come in a variety of forms and are a highly valued tool utilized by trainees and faculty. Individuals and institutions should ensure that they are stored and secured properly and their future development should focus on features that provide efficient querying, simulate basic PACS functionality, enable self-directed and assessed learning, and facilitate case submissions.

## REFERENCES

- [1] Wiggins 3rd, RH, Davidson HC, Dilda P, Harnsberger HR, Katzman GL: The evolution of filmless radiology teaching. *J Digit Imaging* 14:236–237, 2001
- [2] Rosset A, Ratib O, Geissbuhler A, Vallee JP: Integration of a multimedia teaching and reference database in a PACS environment. *Radiographics Rev Publ Radiol Soc N Am Inc* 22:1567–1577, 2002
- [3] Bhargava P, Dhand S, Lackey AE, Pandey T, Moshiri M, Jambhekar K: Radiology education 2.0—on the cusp of change: part 2. eBooks; file sharing and synchronization tools; websites/teaching files; reference management tools and note taking applications. *Acad Radiol* 20:373–381, 2013
- [4] Aaron, L., & Haynes, K. (2005). Critical thinking: A method for program evaluation. *Radiologic Science and Education*, 10(2), 5 - 11.
- [5] Adler, A. M., & Carlton, R. R. (2007). Introduction to radiologic sciences and patient care (4<sup>th</sup> ed.). St. Louis, Missouri: Elsevier.
- [6] Ennis, R. H. (2002). A super streamlined conception of critical thinking. Retrieved October 20, 2007, from <http://faculty.ed.uiuc.edu/rhennis/SSConcCTApr3.html>

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- [7] Foran DJ, Noshier JL, Siegel R, Schmidling M, Raskova J: Dynamicquiz bank: a portable tool set for authoring and managing distributed, web-based educational programs in radiology. *AcadRadiol* 10:52–57, 2003
- [8] Grunewald M, Heckemann RA, Gebhard H, Lell M, Bautz WA:COMPARE radiology: creating an interactive web-based trainingprogram for radiology with multimedia authoring software. *AcadRadiol* 10:543–553, 2003
- [9] Marker DR, BansalAK, Juluru K, Magid D:Developing a radiologybasedteaching approach for gross anatomy in the digital era. *AcadRadiol* 17:1057–1065, 2010