

Improving undergraduate Education in Radiology

Saeed Nadhim Younis

**Department of Surgery, College of Medicine, University of Hawler Medical, arpil,
Iraq**

Received 12/ 9/2011 Accepted 22/11/2011

Abstract

Objectives: to evaluate the effectiveness of small group teaching in the radiology undergraduate training program and to assess the type of examination and the examination scores. Materials and methods: 5th year medical students in college of medicine of Hawler medical university for the academic year 2007-2008 included in this study and the effectiveness of the program assessed by a written and practical test at the end of the course. Results: 100 students enrolled in this program. The effectiveness of the program was assessed by administering a written and practical testing. Conclusion: the importance of small group teaching and objective assessment of the students are stressed and implementation of new examination scores suggested.

سعيد ناظم يونس

المخلص

الهدف من هذه الدراسة هو لتقييم فعالية المجاميع الصغيرة في تدريس و تدريب طلبة كلية الطب. شمل البحث طلبة الصف الخامس من كلية الطب للعام الدراسي 2007-2008 و تم تقييم هذه الطريقة في التدريس و التدريب العملي باجراء اختبار نظري و عملي في نهاية الكورس. شمل البحث 100 طالبا . اثبتت الدراسة اهمية المجاميع الصغيرة و تقترح استخدام اختبارات جديدة لتقييم الطلبة.

Introduction

Despite over 30 years of rapid technological development and growing clinical demand, the specialty of Radiology or Medical Imaging continues to receive scant attention in most medical curricula. The aim of this study is to enhance the students ability to interpret radiographs to diagnose common conditions such as pneumonia, cardiac failure, intestinal obstructions, perforations, fractures and dislocations, second to impart some understanding of how the various imaging modalities work including the associated hazards. It is also important for the student to have some idea about more invasive tests and procedures and how this may impact on the patient. (1). The ingredients of successful medical student teaching include providing students with clear objectives, enabling them to function as members of a team, granting them substantial control over their success or failure, offering them constructive feedback, providing them challenging learning tasks, and allowing them to contribute meaningfully to patient care. This article reviews these ingredients and provides practical hints that radiology educators can use to teach and assess the student learning, (2).

Methods

The study was conducted on 100 medical students enrolled in our radiology training program during the academic year 2007-2008. A small-group teaching program with 10 students was designed to teach medical students clinical radiology theory and practical sessions concurrently with their course in surgery during their fifth year medical college.

The effectiveness of the program was examined by administering a written and practical testing.

Requirements of training

A common requirement is attendance. Students attended lectures and the clinical sessions to which they are assigned. To help students come away from radiology with more than a perfect attendance record, students were told to understand what they are expected to learn when they are there. A simple list of learning objectives was given. One such item might be: *"Through this course, students will be able to assess chest radiographs according to such technical factors as inflation, penetration, rotation, and motion. We could ask students to carry out independent learning tasks as individuals or members of groups. For example, students might develop case write-ups to be used in educating other students."* An ideal system of feedback would provide students with actionable suggestions on a weekly or even daily basis tried.

The small group learning program

A variety of small group formats have been invented to enhance stimulation and to reduce fatigue. Cluster learning used, a cluster of similar cases presented for viewing together, the students being asked to find the similarities and contrasts between them. For example the students would be shown four or five films of patients with lobar pneumonia with consolidations of various parts of the lung, and they would be asked to find the involved lobe or segment of each case and to predict the history and physical findings. Conversely the students might be shown air space

disease to contrast with interstitial lung disease; all viewed simultaneously, a short clinical description being given to each patient. The group is asked to make certain decisions and then supplied with answers and discussions.

Assessing the effectiveness of trainings

From the material taught, both written and practical radiology tests were prepared. These were administered to 100 students enrolled in our radiology training during the 2007-2008 academic year. The tests were administered on the last day, of their training. The written test composed of multiple choice or true/false questions (test items), fill-in-the-blanks” and “short answer essay” tests. The practical test consisted of image interpretation. The students were examined with both the written and practical tests. The test items included the basic principles of radiological interpretation, radiological anatomy, constructing decision trees for common clinical problems involving imaging, and related topics in pathology, medicine, and surgery. Questions were drawn from each of the radiological subspecialties. The radiology educators were careful to make certain that the students would be able to answer the test items from the information presented in lectures, assigned reading, audio-visual programs, and teaching film collections. The practical tests were produced in, power point (data show) format. The slides (none of which the students have seen before) were arranged and the patient histories and the true/false questions about each slide were recorded. The students allowed enough time to interpret the image and to write the radiological appearances and provisional or radiological differentiatial diagnosis. All the students underwent the same

questions. At the completion of testing, the answer sheets were collected and test items were reviewed with the students. This review provided an additional teaching exercise which reinforced the topics covered in the written.

Results

For the students were examined with the written test, the range scores was (60-100%). The mean was 82% with a standard deviation of 7.9%. , the “honors rate” determined by adding two standard deviations to the mean. This equaled 97.8% and 6.3% of students received this score. The “failure rate” (mean less two standard deviations) was 66%, and 6.7% of students scored less than 66%. For the written and practical test, the range of the scores was tighter, 65-96%, and the mean of 80.5% and standard deviation of 5.3%. With written and practical testing combined, the honors and failure rates were approximately 5% and a bell-shaped distribution of scores fulfilled the criteria for a good test. The students were asked their thoughts about the examination. Nearly all agreed that any radiological examination for students should include image interpretation test items in addition to written questions. They uniformly enjoyed the review session which followed the post-test.

Discussion

The reasons are numerous to enhance the experiences of medical students in radiology courses. Such improvements can enhance the department's teaching reputation, help faculty members find more fulfillments in their academic careers, and improve the respect for radiology of future referring physicians. To achieve such objectives, radiology departments must make a commitment

to medical student education, through the:

- 1- Judicious use of new educational technology and careful planning of the curriculum, the evaluation process, and teacher scheduling.⁽³⁾
- 2- The overarching goal of educational reform should be to transform medical students from passive observers to active participants whose contributions are both welcomed and appreciated.⁽⁴⁾
- 3- The small group learning program: the recommendations of the American association of the medical colleges in its report on the general professional education of the physician in 1984 have stressed the essential inefficiency of the lecture as a learning format and urges the development of small group learning programs⁽⁵⁾
- 4- The role of programming: programming is a term used to signify the arrangement of instructional material in such a way that the student group studies the material in a prescribed order, working problems as they progress and achieving assigned tasks that lead to learning. The material that is too easy will bore the able student group whereas the too difficult material will result in frustration for the group.⁽⁶⁾
- 5- The use of cluster learning: Cluster learning provides students with a large volume of material viewed, building the students confidence in their ability to make basic decisions.⁽⁷⁾
- 6- It is feasible, useful and easy to test medical students in radiology. Testing can provide a more objective and accurate assessment of knowledge and skills gained during a radiology course than observation of performance alone. Radiology tests should include practical, image-interpretation segments. Testing can evaluate the quality of the course itself so that weak areas can be identified and strengthened.⁽⁸⁾
- 7- each test should have its minimum passing mark depending on the mean of the marks obtained minus two standard deviations and the honor rate is by adding two standard deviations to the mean, so the results will be more logic and fair instead of considering 50% or 60% as the minimum passing mark for all examinations and for all grades and a bell-shaped distribution of scores fulfilled the criteria for a good test in the current study.⁽⁹⁾

References

- 1- Lisle D, imaging for medical students, 3rd edition, Hodder Arnold, 2007 pages 1-5.
- 2- Michael B, Teaching radiology to medical students ,Editorial, AJR, 1980,134:1089-1090
- 3- Felson B, Weinstein AS, and Spitz H, programmed learning in radiology: A preliminary education, Editorial, Radiology, 1963,81:890-892.
- 4- Squire LF, teaching diagnostic radiology to medical students ,scientific exhibition at first

- scientific assembly and annual meeting of the RSNA, Chicago, Nov 28- December 3,1965.
- 5- Squire LF, Novelline RA, Radiology should be a required part of the medical school curriculum, *Radiology* 1985, 156:243-244.
 - 6- JaccobyCG, Smith WL,Albanese MA, An evaluation of computer assisted instruction in radiology, *Radiology*, 1982,143:547
 - 7- Squire LF, on teaching radiology to medical students, perspective, *AJR*, 1989 152:457
 - 8- The place of clinical radiology and imaging in medical education: objectives, content and delivery of teaching, adopted by royal college of radiologists, UK. Accessed on 18 June 2010 at <http://www.radiology.ie/education/undergradCurrFinalcopy14.005.07pdf>.
 - 9- Normal distribution-Wikipedia, the free encyclopedia, accessed on 18 june 2010 at <http://en.wikipedia.org/wiki>