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Research Article

**COMPARISON OF TRADITIONAL AND WEB-BASED  
MEDICAL STUDENT TEACHING BY RADIOLOGY  
RESIDENTS**<sup>1</sup>Dr Izza Naeem,<sup>2</sup>Dr Muhammad Huzaifa,<sup>3</sup>Dr Hamna Iqbal<sup>1</sup>MBBS, Quaid e Azam Medical College, Bahawalpur., <sup>2</sup>MBBS, Hebei North University P.R.C.,<sup>3</sup>MBBS, Fatima Jinnah Medical University, Lahore.**Article Received:** October 2020    **Accepted:** November 2020    **Published:** December 2020**Abstract:**

Literature has reported that a multi-center study was conducted of flipped classroom method which has rapid academic achievement with greater task value and more positive achievement emotions as compared with traditional didactic instructions. Radiopaedia.org has section named "Playlist Feature" with open access for the students and learners to study a curated mix of cases and reference material before a classroom session. An open-edit and free radiology source known as Radiopaedia.org was originated by some radiologists and other health professionals. After Google (a largest search engine), Radiopaedia.org has been reported the single largest source of information for radiology learners. Ultimately it is a natural choice of flipped classroom approach. Web-based learning tools are increasingly available for use and have been described in the pedagogical literature. For better understanding and before and after the classroom session review new program has been introduced to the students knows E-learning also called web based learning.

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## INTRODUCTION:

For medical education there has installed didactic teaching methods with all the materials for review before and after classroom sessions since ages. But recently web-based materials have demonstrated superiority in teaching and have becoming increasingly popular. Students are encouraged to complete the preparatory work at home by developing a specific web-based application also known as flipped classroom. However students can go through the material before appearing in the classroom and later can apply those principles in the classroom while setting with the teacher present. Literature has reported that a multi-center study was conducted of flipped classroom method which has rapid academic achievement with greater task value and more positive achievement emotions as compared with traditional didactic instructions. Radiopaedia.org has section named "Playlist Feature" with open access for the students and learners to study a curated mix of cases and reference material before a classroom session. An open-edit and free radiology source known as Radiopaedia.org was originated by some radiologists and other health professionals. After Google (a largest search engine), Radiopaedia.org has been reported the single largest source of information for radiology learners. Ultimately it is a natural choice of flipped classroom approach. It gives access to shared medical knowledge of a large number of practicing radiologists as well as it is a decentralized design which saves time and costs. In this study a randomized controlled trial of Radiopaedia.org playlist feature has compared with traditional learning in the undergraduate medical setting. The aim of the study is to evaluate whether the web-based teaching improve the educational outcomes as compared to the traditional teaching.

## METHODS:

It was a randomized study. The third year students who were on rotations in pediatric ward were recruited into the study. Two groups were made on the basis of blind randomization. Group A was supposed to get access to Radiopaedia.org playlist of several classic cases in pediatric radiology with questions and links to additional reading and the other group was offered with lectures made on power point presentations, some PDF material, having limited cases and information. Both of the groups were offered on start of month. PG residents of second year specialist in radiology took 60 min in class interactive teaching session while going through their study period. Radiopaedia.org playlist feature had some great additional sections such as assignment and quizzes based upon the cases already

available on Radiopaedia.org database. The playlist feature allowed the display of still and cine images, embedded questions, and present images with and without annotations. Important topics were highlighted with basic concepts pediatric radiology. It contains identifying the location of a lobar pneumonia, understanding the role of imaging in evaluating an infant with vomiting, and recognizing common fractures in the pediatric population, including identifying potential non-accidental trauma. A questionnaire was administered to both groups during their one month long pediatrics rotations; one in the initial journey of clinical rotation and again at the end of in-class sessions. This questionnaire had 10 questions related to radiology knowledge whereas other 6 were based upon student's opinion of radiology and their own ability to interpret radiology studies. Demographic data, including age, gender, number of years between medical school and undergraduate studies, were also collected.

Opinion question responses were gathered using a Likert scale from 1 to 5 with 1 being the lowest (strongly disagree or very uncomfortable) and 5 being the highest (strongly agree or very comfortable). To evaluate the differences in test performance between the groups; student's t-test and Wilcoxon rank-sum were used. For the evaluation of Likert scale the analysis was performed by assessing the median and mode. The margin of error was 0.05.

## RESULTS:

60 participants were enrolled in the study. Two groups were made in group there were 30 students and in 30 in group B as well. There was no significantly difference of demographic data in both the groups. The mean of Vaseline knowledge was almost similar in e-learning group and traditional group (62% versus 58%). Out of total only four students marked the statement of "I am comfortable interpreting radiology studies on this rotation." E-learning group has high overall score on the knowledge of knowledge portion of the quiz as compare to the traditional group. However improvement for specific quiz questions varied between the groups, notable areas of improvement in the Radiopaedia.org arm included increased awareness of the ACR Appropriateness Criteria, correct identification of the silhouette sign in chest radiography, and correct identification of the frog-leg lateral projection in hip radiography. Meanwhile both groups had increased interest in radiology as a career, there were no significant differences between the two groups and interest remained low overall. There was positive association of both the groups with seeing the radiographs that positively contributes to patient

care. There was more interest developed in both groups in radiology as a career.

### DISCUSSION:

Web-based learning tools are increasingly available for use and have been described in the pedagogical literature. For better understanding and before and after the classroom session review new program has been introduced to the students knows E-learning also called web based learning. Web-based learning contains materials such as textbooks, online web modules, and web-based learning tools. The current study has shown that participants who used Radiopaedia.org have improved knowledge test scores which were significant. Test score gains in the Radiopaedia.org group were lead by increased knowledge of subtle radiology signs (correctly identifying a lingular consolidation silhouetting the heart), correctly identifying radiographic projections (frog-leg lateral for slipped capital femoral epiphysis), and increased recognition of the ACR Appropriateness Criteria. These high achievements suggest that E-learning tool is advantageous for teaching radiology at the undergraduate medical school level. In the practice of radiology.org it has becoming increasingly important to practice the radiology and reports cited by radiopaedia.org as it is the single largest source of information for radiology learners after Google. As soon as they access the radiology media and go through hundred thousands of radiology pictures they start getting familiarizing with real life radiographs. It allows the learner to have full access with images in a dynamic manner. By scrolling through a complicated CT scan, viewing a dynamic fluoroscopy or ultrasound cinematic cine clip, students are immersed in a learning environment that more closely simulates the “viewbox” environment. The study has turned out positive for second year residents to lead an effective curriculum in radiology by having the advantages of the website. While one hour classroom sessions residents had the ability to reinforced important topics. There were many limitations came in the way of this study. The main limitations, the current study was not enough to publish the long term educational efficacy of intervention because medical student pediatric rotation is only a month long We believe that radiology learners who are exposed to freely available and engaging web content will have more positive long-term learning outcomes, but we did not specifically evaluate this. The current study has revealed the tension in medical students regarding the attitudes toward radiology. Even after dedicated exposure to radiology, the average score for the following statement “Radiologists rarely, if ever, interact with patients and their families” was 3.03,

indicating neutral to slight agreement. After the completion of this project, additional information was added to the Radiopaedia.org website, including photographs of a radiologist in the fluoroscopy and ultrasound suites in an attempt to improve this misconception. However the efficacy of educational intervention was no tested.

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