

Comparative Analysis of Scrollable DICOM Images and Static CT Images in Teaching Thoracic Imaging Anatomy to First Year Medical Students

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Introduction

Radiology plays a vital role in training future physicians (1). Traditional methods, such as didactic lectures and static images, are limited in conveying the intricacies of three-dimensional anatomical structures (2). With the evolution of medical education, the adoption of innovative teaching modalities becomes increasingly important. This study explores the effectiveness of scrollable DICOM images, via a cloud-based PACS system, compared to traditional static CT images in teaching thoracic imaging anatomy to first-year medical students.

Aims and Objectives

1. Assess the comparative effectiveness of scrollable DICOM images and static CT images in radiology education.
2. Optimize learning experiences in radiology education through technology advancements.
3. Promote the adoption of diverse teaching modalities in radiology education.

Results

Group A (23 students) scored an average of 82.61% on the quiz, while Group B (24 students) scored 83.71% (Figure 3). An unpaired T-test showed no statistically significant difference in scores ($P = 0.6454$). The mean difference between Group A and Group B was -0.16, with a 95% confidence interval ranging from -0.88 to 0.55. Eleven students opted to offer optional feedback. Survey results indicated a preference for static images for exam preparation, while scrollable images were preferred for enhancing engagement and understanding of anatomical structures (Figure 4).

Methods

Our team developed a PACSBIN case with nearly 800 scrollable DICOM images across axial, coronal, and sagittal planes, annotated for thoracic anatomy learning. This interactive module allowed image manipulation (scroll, zoom, pan, window) (Figure 1). Additionally, 16 key static CT images from this collection were annotated and presented in a PowerPoint, without interactive functions.

First-year medical students at OUWB were randomly divided into two groups. Group A commenced with a traditional teaching module with static CT images, completed a graded quiz, then transitioned to the module featuring scrollable DICOM images. Group B initiated with the scrollable DICOM module, then took a graded quiz, and concluded the module using static CT images. Both groups completed the same quiz to assess initial comprehension (Figure 2). Additionally, students were offered an opportunity to provide optional feedback on their experience with the modules through a survey, with the aim to gather insights into their preferences and perceptions regarding the teaching modalities used.

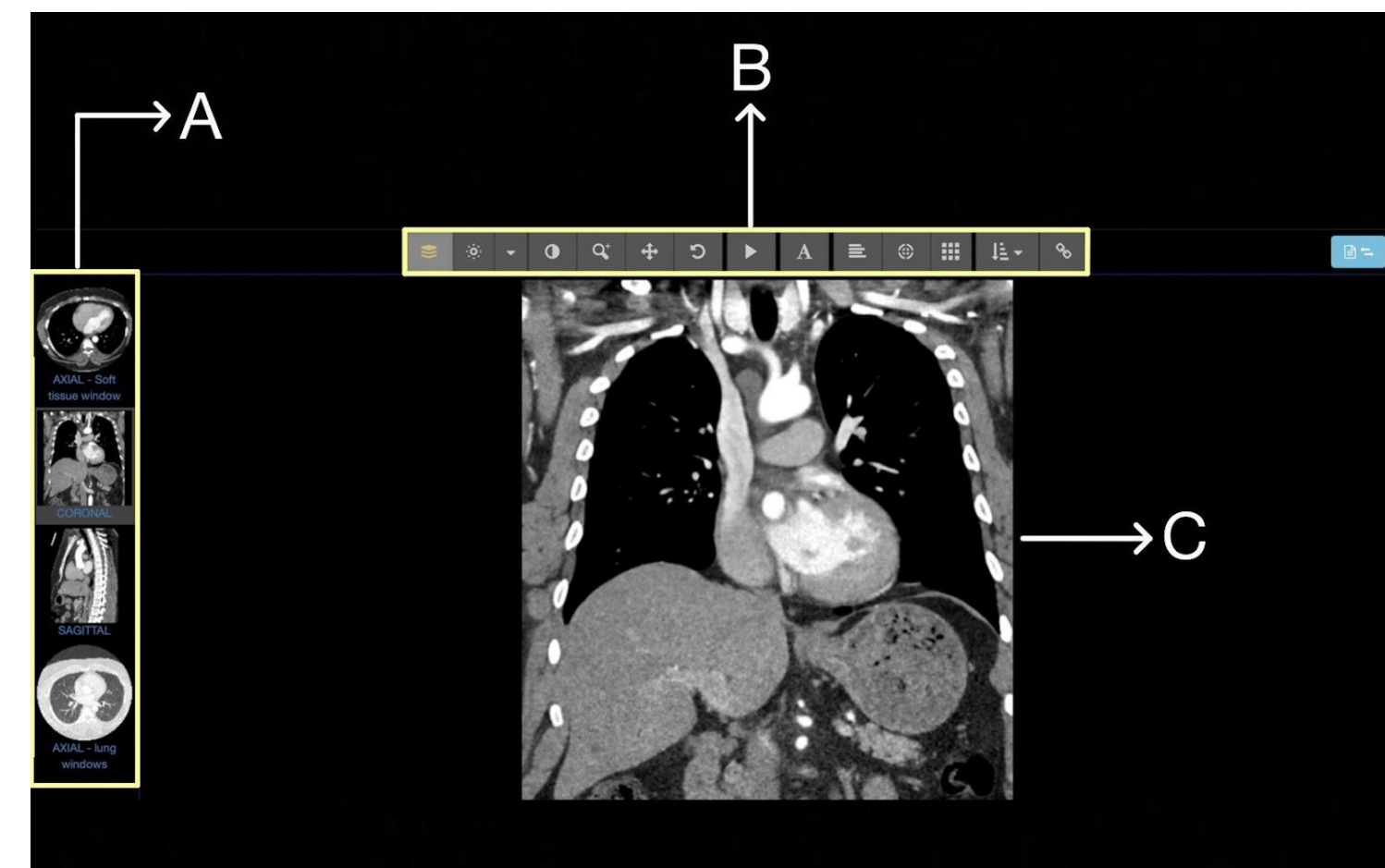
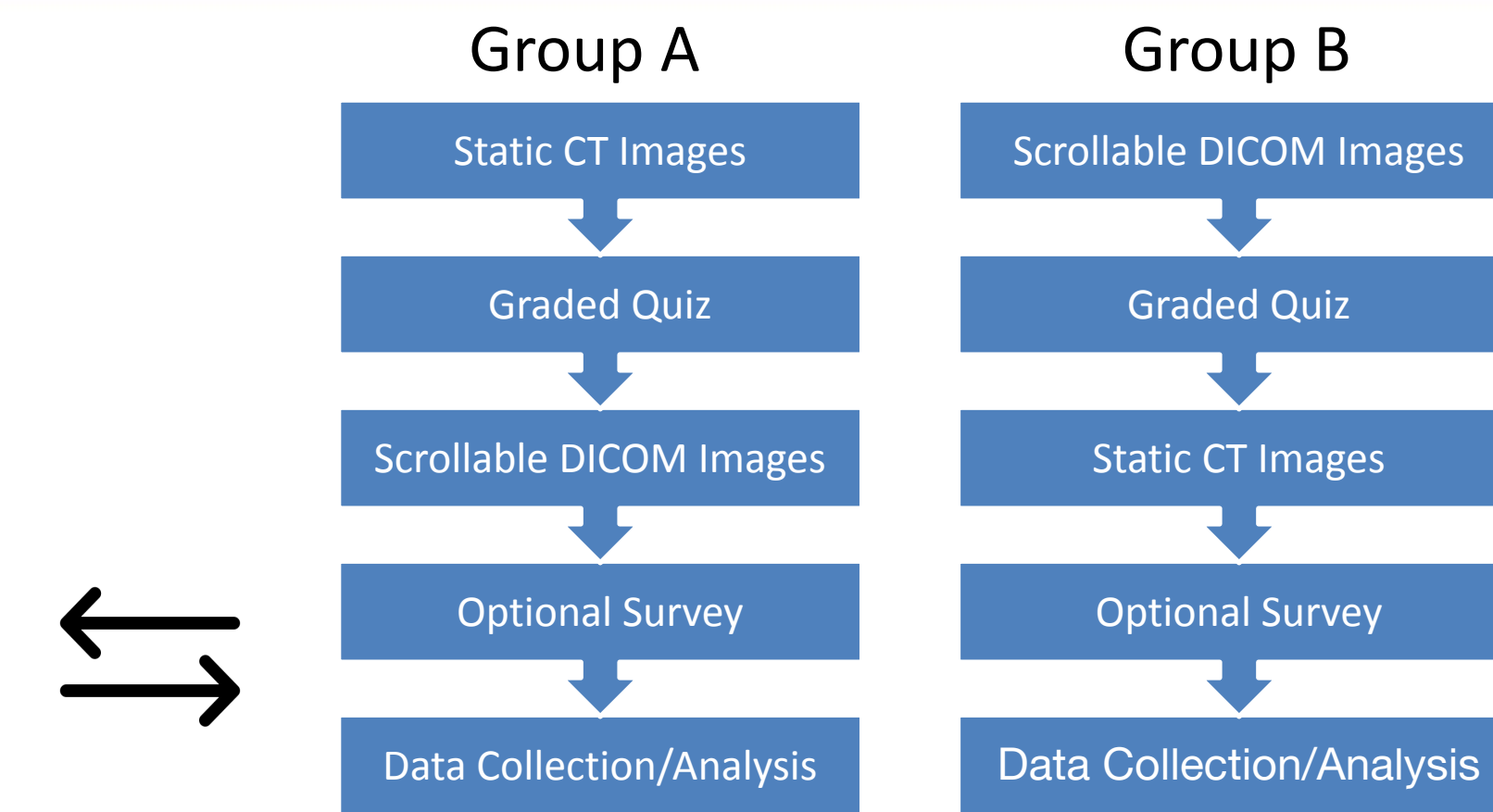
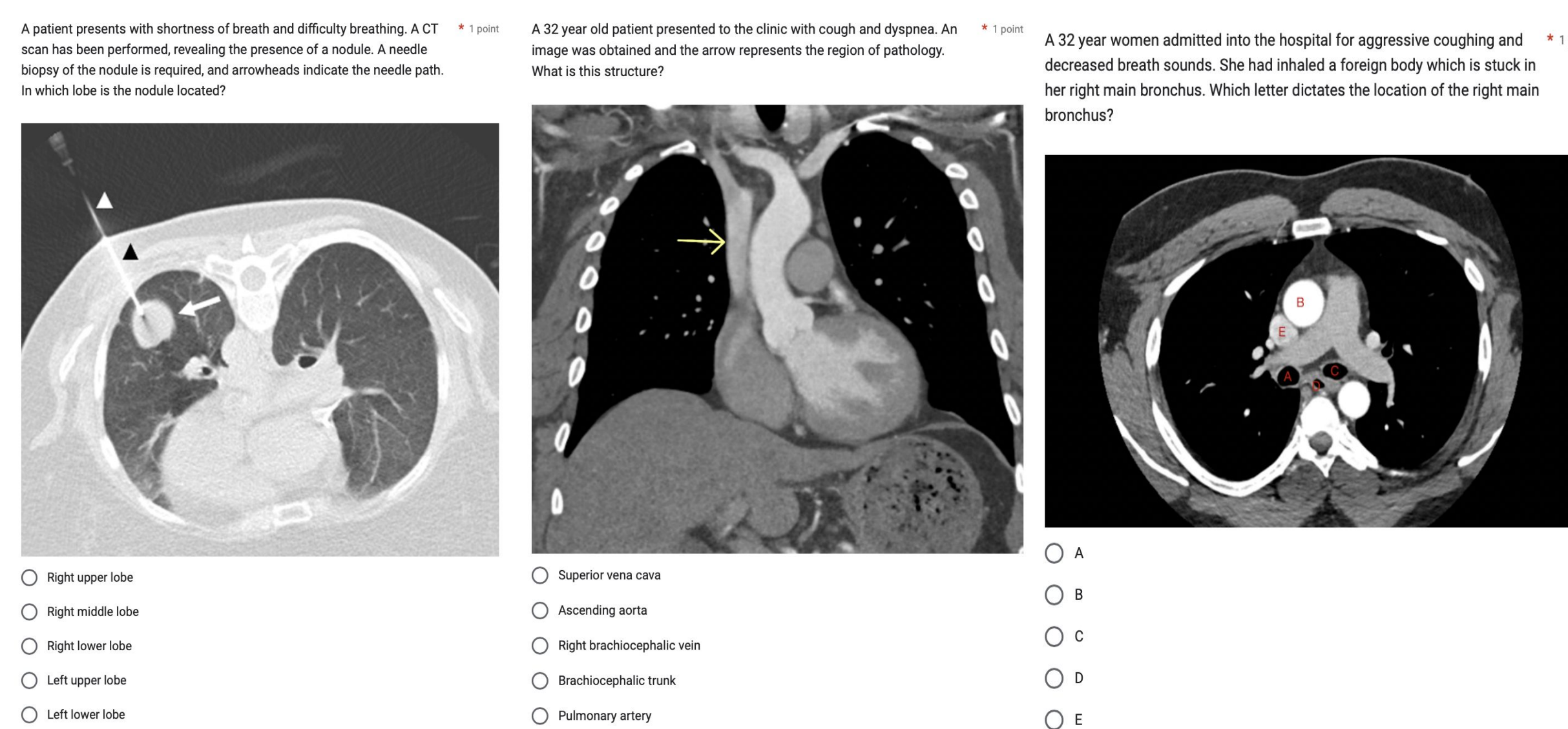


Figure 1. Pacsbins module. (A) Thoracic imaging case in various planes. (B) Pacsbins functionality tools. (C) Active window for viewing the case.

Figure 2. Sample quiz questions from graded quiz.



Conclusions

The study suggests that scrollable DICOM images and static CT images are comparably effective in teaching thoracic imaging anatomy to first year medical students. However, preferences in learning styles emerged, with static images favored for exam preparation and scrollable images for engagement and understanding. This study underscores the need for diverse teaching modalities in radiology education, catering to varied learning styles.

Discussion

Our research advocates for a balanced approach in radiology education, integrating both traditional and modern teaching tools. The use of diverse educational resources provides a comprehensive learning experience, allowing students to be better prepared for various scenarios in clinical practice. Future research should explore long-term retention and clinical application to further improve educational strategies. The goal remains to ensure future medical professionals are well equipped for the evolving field of medical diagnostics and patient care.

References

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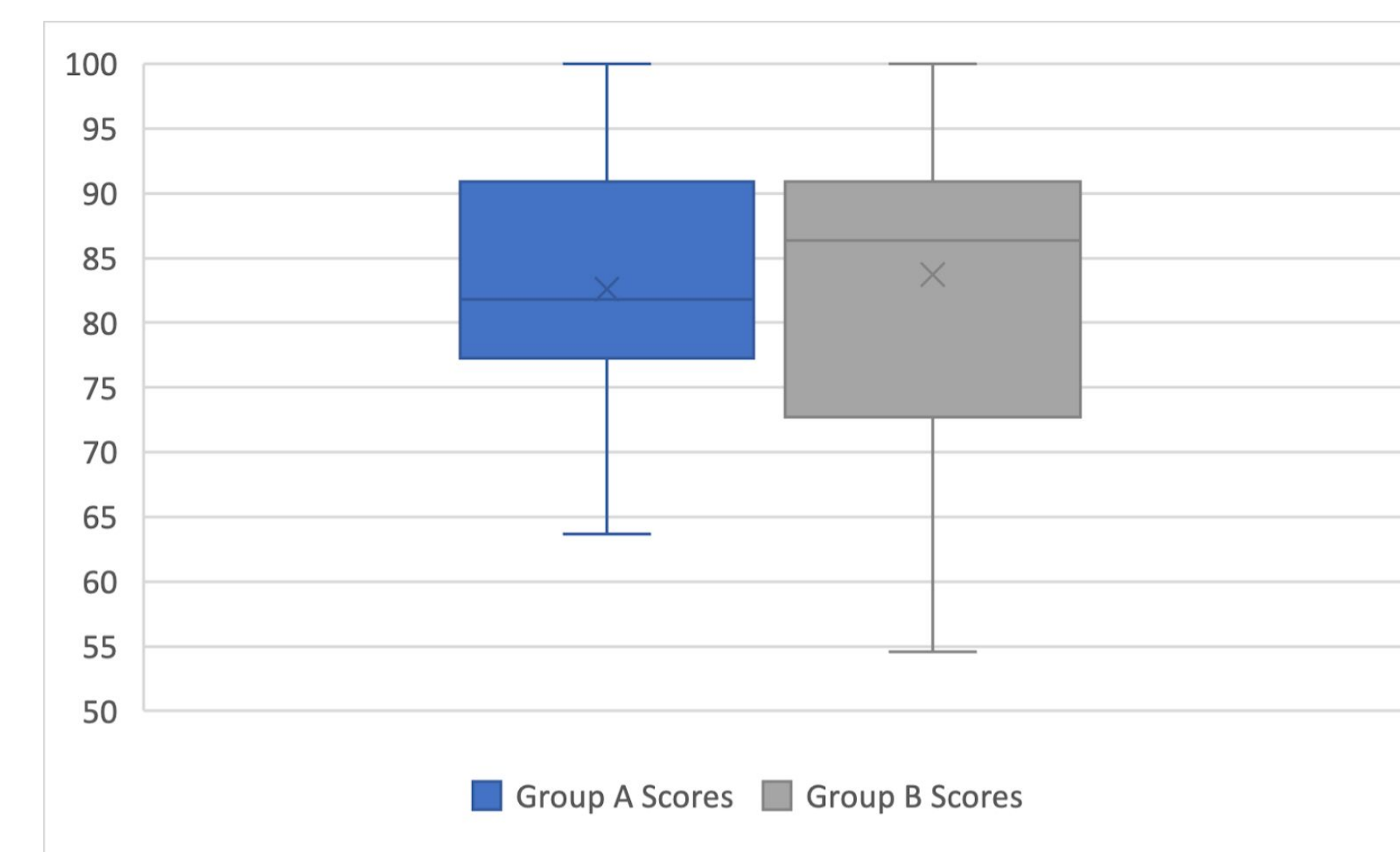


Figure 3: Percentile scores (y-axis) of Group A and Group B.

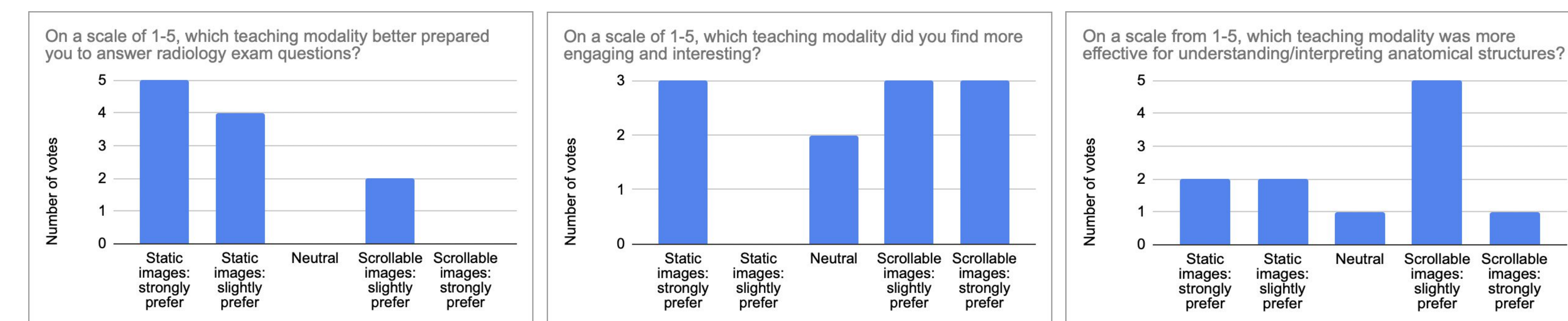


Figure 4: Survey responses.