

Supplementing Instruction on Heart Sound Identification With a Downloadable MP3 File Improves Student Performance

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Background

The 2005 AAMC Recommendation for Clinical Skills Curricula for Undergraduate Medical Education included identification of normal and abnormal heart sounds.

Proficiency at discriminating the characteristics of heart sounds is enhanced by repetitive exposure to the sounds (Barrett et al., American Journal of Medicine 119: 73-75, 2006).

Creighton University medical students learn theory of identification of heart sounds in the physiology and cardiology lectures of the Cardiovascular Systems Course in the second year curriculum. This is followed by a small group laboratory session using a heart sounds simulator. Students also have access to a multimedia heart sounds tutorial, licensed from Blaufuss Multimedia, on the School of Medicine computers, and to web-based tutorials.

While the multimedia tutorials are comprehensive and excellent, they are not well suited to repetitive comparison of different sounds because each sound is part of a module that includes explanations of theory and accompanying graphics. This requires the student to be in front of a computer, which limits the students' opportunity to repeatedly listen to the sounds.

In contrast, MP3 files on a portable player, such as an iPod, facilitate listening to the sounds repeatedly during the course of other activities.

Purpose

To evaluate the effectiveness of a portable MP3 file in improving acquisition of heart sound identification skills by second year medical students.

Methods

MP3 file made using Garage Band software (Apple Computer)



Eight basic heart sound patterns; each segment consisted of

- 30 second sound samples
- 30 second commentary by Cardiology faculty member

Total time 8 minutes



File distributed

- by download from course websites
- on pre-loaded "loaner" iPod nanos

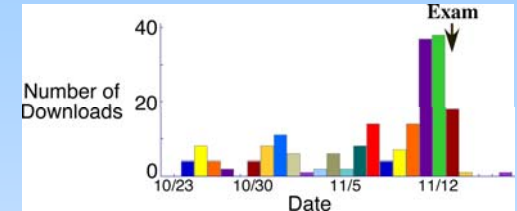
Evaluation

Use: counted number of downloads and iPod checkouts
Effectiveness: Measured student performance of four heart sound based item bank questions used on the course final exam for three previous years.

Student feedback: Two items included in the course evaluation:
"The MP3 files of the heart sounds helped me learn to identify the sounds"
"I found listening to heart sounds on an iPod a convenient way to review them."

Results

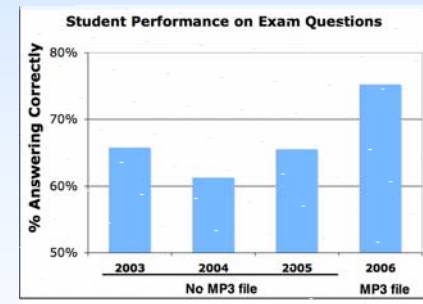
1. Most Students Used the MP3 Files.



Two-thirds of the class downloaded the file from the Blackboard course website. (An unknown additional number may have used a second server that did not have a counter).

Ten of the students borrowed preloaded iPods that had the narrated file as well as the individual sounds without narration. The *Music Quiz* game (part of the iPod software) creates a multiple choice identification quiz from the individual sound files.

2. Mastery of Heart Sound Identification Improved.



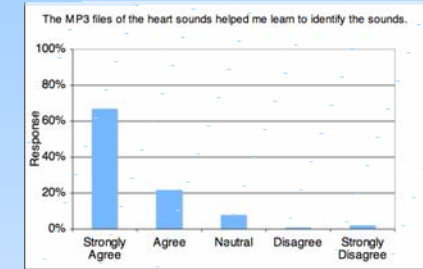
Average performance (as % answering correctly) improved by 10% on a set of four questions testing heart sound identification that appeared on the course final exam over the last four years.

Other than the availability of the MP3 file in 2006, instruction (faculty and resources) was the same each year and the overall class performance on the 100 question final exam was similar (mean score was 0.4% higher in 2006).

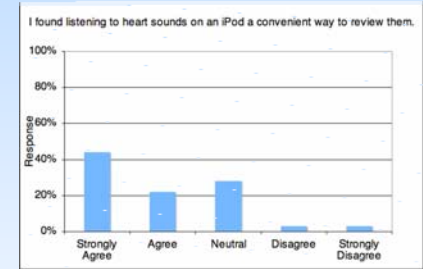
The sound files used in the final exam questions were not the same as those used in the instructional file.

Results

3. Students Found the Resource Helpful.



Responses of 103/126 students on course evaluation



This suggests that about a third of the students did not use the file on portable players.

Conclusions

1. A short MP3 file reviewing heart sound identification is a useful supplement to other methods of instruction.
2. The portability of the sound file on an iPod allows rehearsal of listening skill in varied locations.

Acknowledgements

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