Value of Podcast-Based Laboratory Learning Modules for First Year Medical Microbiology Course

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Background:
• Students in the digital age report that podcast-based learning increases their confidence with materials, and students have rated them favorably as a learning tool⁴⁻⁵.
• Other studies determined that trainees preferred learning procedural skills from podcast as opposed to textbooks⁶⁻⁷.
• The demands of quickly absorbing a large volume of information can be associated with increased stress and anxiety levels⁸⁻¹⁰.
• Literature elucidating the effects of digital-based learning, such as podcasts, on lessening student stress and anxiety levels is scarce.
• One study reported that using podcasts may help reduce student anxiety and stress¹⁰.
• We created podcasts for our first year microbiology course to augment their comprehension of the lab techniques as well as the general scientific concepts behind the wet laboratory exercises.

Methods:
1. IRB approval for study enrolling first-year medical students in mandatory M1 microbiology course (Classes of 2021 and 2022)
2. Surveyed students to collect qualitative feedback from Class of 2022 to rate podcasts as a learning tool
3. Enrolled Class of 2022 (165 students) as interventional cohort receiving podcasts and Class of 2021 (173 students) as control cohort
4. Administered quizzes with no significant results between each cohort and between labs within cohorts
5. Assigned podcasts for labs 1 and 2 but not 3 and 4 in interventional cohort. Only the standard lab manual for all labs in control cohort

Results:

Outcomes and limitations:
• Our results indicate that students preferred podcasts over the traditional lab manual in preparing for the wet labs.
• Our research demonstrates that podcasts were qualitatively more effective than a traditional laboratory manual for first-year medical microbiology.
• We also found that students report less anxiety and stress around laboratory procedures with the addition of podcasts in the curriculum.
• One limitation to our study includes the fact that we were not able to truly randomize our cohorts, as it was not feasible to completely replace the lab manual with podcasts.
• Based on our results, we plan to permanently include podcasts into our curriculum.
• Of note, our innovation was particularly helpful during the COVID-19 pandemic, as all medical education for first-year medical students was moved online.

Image 1: Word cloud depicting student feedback regarding using podcasts. Each word was used at least 4 times in students’ comments. The size of the individual word corresponds to the frequency of use by students.

Table 1: Survey questions. Percentage of students that responded positively to each item in column 1. Total number of respondents are listed in column 2. Column 3 describes the average rating on the likert scale for each question.

<table>
<thead>
<tr>
<th>Question</th>
<th>% of students</th>
<th># of total respondents</th>
<th>Mean Likert score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How many videos did you watch?</td>
<td>97.7</td>
<td>170</td>
<td>1.88</td>
</tr>
<tr>
<td>2. Rate the clarity, including audio and video of the podcasts.</td>
<td>91.1</td>
<td>170</td>
<td>4.51</td>
</tr>
<tr>
<td>3. Rate the quality of the content covered in the podcasts</td>
<td>91.6</td>
<td>168</td>
<td>4.59</td>
</tr>
<tr>
<td>4. How well did the podcasts enhance your learning?</td>
<td>88.7</td>
<td>168</td>
<td>4.52</td>
</tr>
<tr>
<td>5. Rate the length of the podcast</td>
<td>90.5</td>
<td>168</td>
<td>1.9</td>
</tr>
<tr>
<td>6. Did using podcasts with the lab manual enhance your learning?</td>
<td>93.8</td>
<td>168</td>
<td>1.96</td>
</tr>
<tr>
<td>7. How well did the video hold your attention?</td>
<td>88.1</td>
<td>168</td>
<td>4.29</td>
</tr>
<tr>
<td>8. To what extent do you agree or disagree with this statement “I feel less nervous about doing lab procedures after watching the videos”</td>
<td>97.5</td>
<td>168</td>
<td>4.30</td>
</tr>
<tr>
<td>9. To what extent do you agree or disagree with this statement “I feel more confident in my understanding of the theory of microbiology laboratory techniques after watching the podcasts”</td>
<td>92.2</td>
<td>168</td>
<td>4.30</td>
</tr>
<tr>
<td>10. Do you agree with the statement “Overall, the videos improved the quality of the lab instruction component of microbiology”</td>
<td>95.2</td>
<td>168</td>
<td>4.4</td>
</tr>
<tr>
<td>11. To what extent do you agree or disagree with this statement “I feel less nervous working in the lab, including handling equipment, after watching the videos”</td>
<td>87.5</td>
<td>168</td>
<td>4.55</td>
</tr>
</tbody>
</table>

References