Short videos to enhance student learning in microbiological laboratory exercises

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Aim
To evaluate the use of short videos to enhance learning in practical laboratory exercises in microbiology.

Introduction
Digital learning objects, such as videos, are increasingly being used as a complement to traditional text books and represents innovative tools to enhance student learning (1, 2).

The use of short videos, uploaded on YouTube, was used to introduce students in a 7.5 ECTS B. Eng., course in Biological Chemistry at the Technical University of Denmark (DTU) to basic techniques being taught during the practical laboratory exercises.

Results
- 83% of the students reported having seen the videos outside class
- All students felt that videos aided their understanding of the laboratory techniques
- Critique from students: videos too long
- Suggestion from students: produce additional videos demonstrating key concepts and cases
- Teachers: “Using videos in class allowed me to spend time on explaining the concepts and conceive misconceptions, rather than the experimental procedures”

Conclusions
- Videos explaining laboratory procedures was found to be a useful complement to the laboratory compendium
- The use of videos allowed students to focus more on conceptual understanding of the exercise and the related theory
- Additional videos explaining key concepts would be beneficial to include in the future

Table 1. Description of the main content of the 8 videos together with screenshots from YouTube and Quick Response (QR) codes that allows easy access for students using e.g. a smartphone.

<table>
<thead>
<tr>
<th>Main content of video</th>
<th>Screenshot</th>
<th>QR code</th>
</tr>
</thead>
<tbody>
<tr>
<td>How to use a pipette</td>
<td><img src="YouTube" alt="Screenshot" /></td>
<td>![QR code](QR code)</td>
</tr>
<tr>
<td>How to prepare a dilution series</td>
<td><img src="YouTube" alt="Screenshot" /></td>
<td>![QR code](QR code)</td>
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<tr>
<td>How to spread a sample on agar plate</td>
<td><img src="YouTube" alt="Screenshot" /></td>
<td>![QR code](QR code)</td>
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<tr>
<td>How to make a pure isolate by sub culturing a single colony</td>
<td><img src="YouTube" alt="Screenshot" /></td>
<td>![QR code](QR code)</td>
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</table>

Study design
- 8 short videos (3-7 min) (Table 1)
- Uploaded on YouTube and DTU’s podcast channel
- Links (URL and QR code) included in laboratory compendium
- Videos shown before each exercise

Study design
- Students encouraged to watch also outside class
- Written evaluation after end of lab course to assess the usefulness for students and teachers of using videos

Acknowledgements
Thanks to DTU Learning Lab for help with producing the videos.

References

Download the poster by scanning this QR code: