

The use of digital video to produce practical microbiological demonstrations, to be delivered via the Wolverhampton On Line Framework

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Background and rationale

The aim of the project was to provide digital video sequences of microbiological experimental procedures, to support learning on the Module Introductory Microbiology (AB1101). The video sequences were of selected experimental exercises for eventual student access via WOLF. The intention was to digitally record experimental procedures, digitally edit the video with incorporation of explanatory text annotation and develop animations using Flash and animated gif. The intention was to integrate video sequences with animation, to reinforce experimental procedures and skills.

The innovation

Currently within Biosciences there is an efficiency based move to reduce experimental laboratory “wet” practical classes within taught modules at all undergraduate levels. There is also, however, the need to maintain student experience of practical skills, and to facilitate laboratory based problem solving. A number of alternative approaches to “wet” laboratory investigations are therefore consequently taking place, to maximise the skills based learning occurring during laboratory practical sessions and maintain the skills level of Biosciences students and those who access Biosciences modules.

One approach, is the production of experimental demonstrations using digital video equipment, which would be made available to students via the WOLF system. Within the Biosciences Division, considerable effort has been invested in the provision of web based learning material via WOLF, for a number of modules including Introductory Microbiology.

Within this module, the practical component develops from basic aseptic techniques, through bacterial isolation and purification, to more involved techniques such as bacterial identification and virology. This module is usually the first experience of practical microbiology encountered by students and is consequently most likely to benefit from support and supplemental practical demonstrations.

The outcomes

The approach was to decide upon the most applicable practical exercises to be filmed, to storyboard the sequence, shoot the video, digitally edit, re-shoot where necessary and then to produce supportive animation. Filming and editing was greatly assisted by Steve Jeffs of CeLT.

To-date within the Introductory Microbiology topic of WOLF are seven video sequences and four animations, as detailed below:

Video

How to flame a transfer loop
How to use a Finn pipette
Preparation of Gram stained bacteria
Preparation of a dilution series
The pour plate technique
The spread plate technique
The Miles and Misra technique

Animation

Flaming a transfer loop and spread plating
Preparing a dilution series
Viable counting
Gram staining

Below are a selection of still pictures which illustrate the content of some of the videos and animations.

Picture 1: All videos have an introductory audio sequence to explain the background to the procedure.



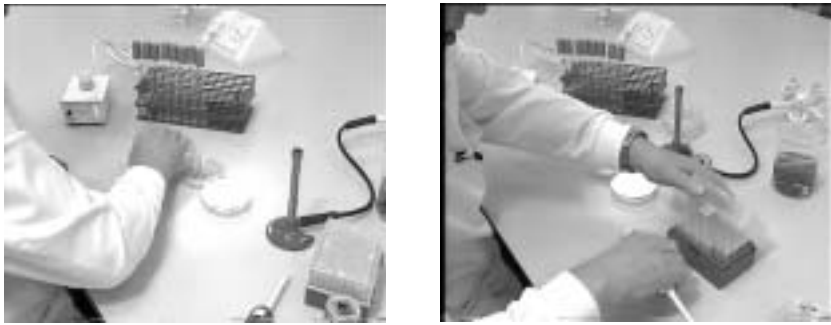
Pictures 2 and 3: Video close-ups of Finn pipettes and a pipetting procedure.



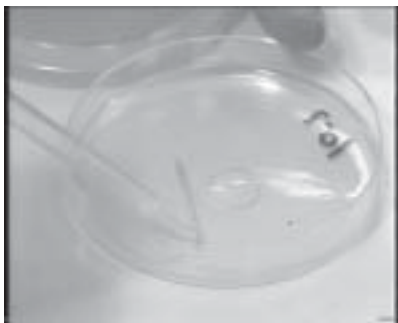
Pictures 4 and 5: Video of Gram staining procedure and microscopic examination.



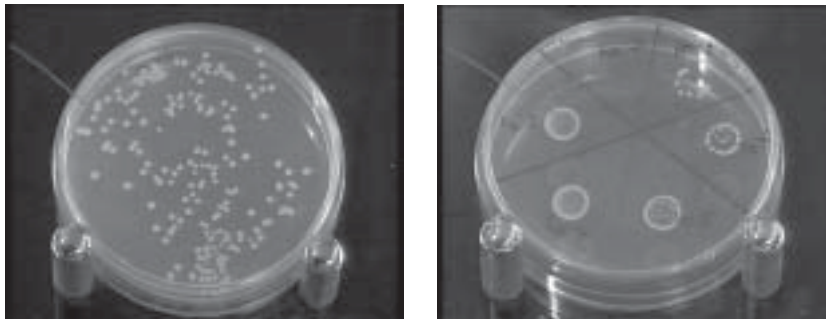
Pictures 6 and 7: Video of preparing a dilution series.



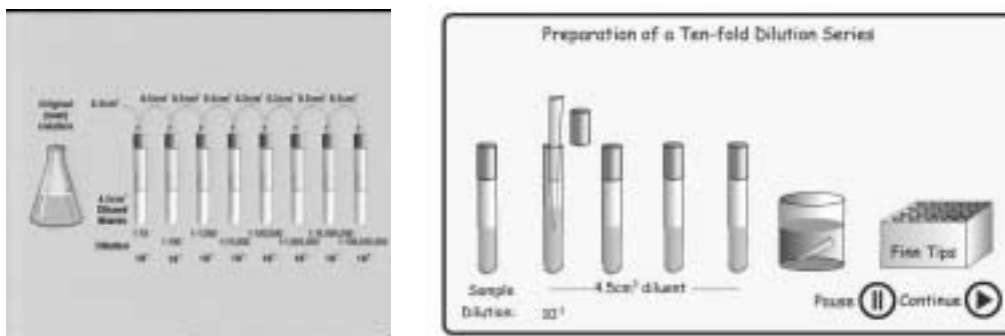
Picture 8: Video of spread plating.



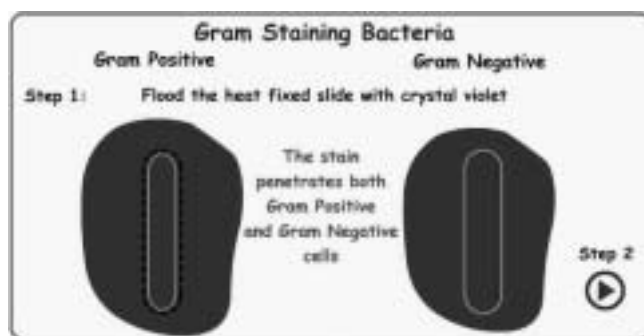
Pictures 9 and 10: Video of colony counting.



Pictures 11 and 12: Animation of serial dilution.



Picture 13: Animation of Gram staining.



Evaluation

Evaluation will be undertaken during Semester 1 2003/2004, when WOLF access will be monitored and the usefulness of the strategy, in the opinion of students, will be assessed by questionnaire.

Benefits

The actual and potential benefits include:

- Provide readily accessible video of practical exercises to improve the quality of experimental skill learning, initially on Introductory Microbiology (AB1101), and potentially for expansion onto related modules at all levels
- The opportunity for students to watch experimental procedures in addition the somewhat limited time available within practical sessions
- To enable efficiency gains by reduction in practical sessions, yet maintain exposure to practical techniques
- To support widening access by making practical experience available via WOLF, thereby supporting distance based learning.
- To facilitate access to practical activities for students with disabilities

Future developments

The video sequences and animations have been installed onto WOLF for the start of Semester 1, 2003. It is intended that such material would significantly support practical provision on the module, with scope for further expansion and development onto related modules at all levels.