Longitudinal investigation of medical student perception of a video-based intervention to facilitate laboratory teaching

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Keywords

- Video-based Learning Object;
- Guided Study;
- Medical Education;
- Web 2.0.

Nature of Intervention

Keele University School of Medicine have used a bespoke series of guided study video resources to aid medical student laboratory learning, called "Keele Basic Bites" (KBB).

Focus of Intervention

This intervention is academic and professional in nature. The intervention is aimed at both enhancing the student experience and improving practice.

Description of Intervention

Using video technology to aid medical education is an idea that has been around for a number of years and in varying degrees of sophistication, from polished CAL programs to low budget teaching aids. In an interesting recent report on using multimedia learning objects in medical education, Ruiz *et al.,* (2006) argued "digital learning objects, which can be stored electronically, allow a new approach to instructional activity, making medical education more efficient, and potentially more cost-effective. They are reusable and can incorporate text, graphics, animations, audio, and video to support and enhance learning". Keele University School of Medicine have developed "Keele Basic Bites" (KBB), a series of guided study video resources currently being used to aid medical student learning as a response to our

observation that students consult a wide variety of video resources to inform their learning (YouTube, Google videos etc.). Many of these resources can be unsuitable due to a lack of local context and poor quality control (non-professional authors, international variations in techniques etc.). The "Keele Basic Bites" project provides both local context and rigorously quality controlled resources delivered by professional teachers using an informal and multi-faceted delivery style. In this study, we have compiled medical student feedback data and perceptions from three consecutive year cohorts of medical students, who experienced a KBB video learning object used to facilitate their learning in a microbiology laboratory session. The students participating in this study were from the second year of the Keele MBChB course. The session targeted was teaching the cohort the correct procedure to perform nasal and pharyngeal swabs to sample microbial flora. The class also taught them the correct technique to perform a Kirby-Bauer antibiotic disk diffusion assay to assess antimicrobial sensitivity. Video resources were recorded and edited in-house with each clip aimed at demonstrating a specific, practical part of the class. Each clip was played through once, with the session lead describing the procedure as it appeared on screen. Subsequently, as the students performed the task, the clip played in a continuous loop on screens throughout the laboratory.

The student's attitude to the videos was assessed by an anonymised, voluntary questionnaire using a five point Likert scale and free text comments. The questions are shown in the table 1.

No'	Question
1	This video would be useful for microbiology/OSSE revision
2	I would like to see more of this technology-based teaching in the future
3	A video-tutorial approach was the best way to teach this class
4	Watching the video made the technical procedures easier to perform

Table 1: Questions to Assess the Student's Attitude to Videos

Students ranked their response to four questions on a scale of "strongly agree" (1) to "strongly disagree" (5) (Figure 1). A total of 84 surveys were completed for each cohort taught (252 in total), across three years (2009-2011). Assuming that a positive can be seen by a score of "strongly agree" or "agree", all three cohorts had over 90% positive responses to all four questions, with the exception of the 2011 cohort's answer to Q2 (89.2%)

Data were analysed by use of a Kruskal-Wallis test and a Dunn's multiple comparison post-test at an alpha of $P<0.05$. Between the cohorts 2009 and 2010 we found a significant difference in the scores for all four questions (Q1, $P<0.05$ Q2,

P<0.001 Q3, *P*<0.01 Q4, *P*<0.01). We found no difference between scores for 2009 *vs*. 2011. There was, however, a difference between scores for Q2 between the cohorts from 2010 and 2011 (*P*<0.05) (Figure 1).

How the Intervention Engages Students

As additional evidence of the success of this intervention, we present representative comments provided by medical students across all three years of this study:

"Video was easy to follow"

"Good format – it meant everyone kept up and (the class) ran efficiently"

"Much easier to follow when given verbally and by video presentation"

"It was very helpful because it gives everyone the opportunity to see exactly what to do and close up, which we could not get from a demonstration (at the bench)"

"Talk through with video made it clear how to carry out procedures"

"Good that the video was left running throughout the class as it allowed me to recheck things I was unsure of"

"Very useful way of illustrating procedure"

Clearly, student perception of this approach is highly positive. It should also be noted that we did not receive any negative comments over the three year duration of this study.

Link to the "What Works" Findings

Our approach with the KBB intervention in this study links to the "What Works" findings in a number of ways. Our longitudinal data indicates that medical students value our video resources as revision tools and strongly suggest that video learning objects have an increasing role to play in supporting learning in the laboratory. The "What Works" findings centred on student retention and touches on the themes of departmental culture and methods and effective staff relationships link with our project in that KBB promotes student motivation whilst encouraged effective lifelong learning (Project 4). The "What Works" report also notes that effective learning relationships are dependent on students being interested in their subject areas (critical for effective engagement with HE) and our data would also support this. Our KBB project very clearly aligns with one of the central themes from Project 7 in that our project approach integrates both social and academic elements and is the result of a student-centred collaborative team teaching approach.

Evidence of Effectiveness/Impact

Our rationale for running this class using KBB video objects was to increase the clarity of student learning in a demonstrably illustrative way in the laboratory.

Each plot shows the median score, interquartile range (box) and range (whiskers) for each cohort, plotted against the Likert score. The significance values are shown above the data (where relevant) by asterisks (* = P<0.05, **=*P*<0.01, *** *P*<0.001). Cohort 2010 showed significant differences in score to cohort 2009 for all four questions (red asterisks). Cohort 2010 also showed a difference to cohort 2011 for question 2 (blue asterisks). All other data showed no difference in scores.

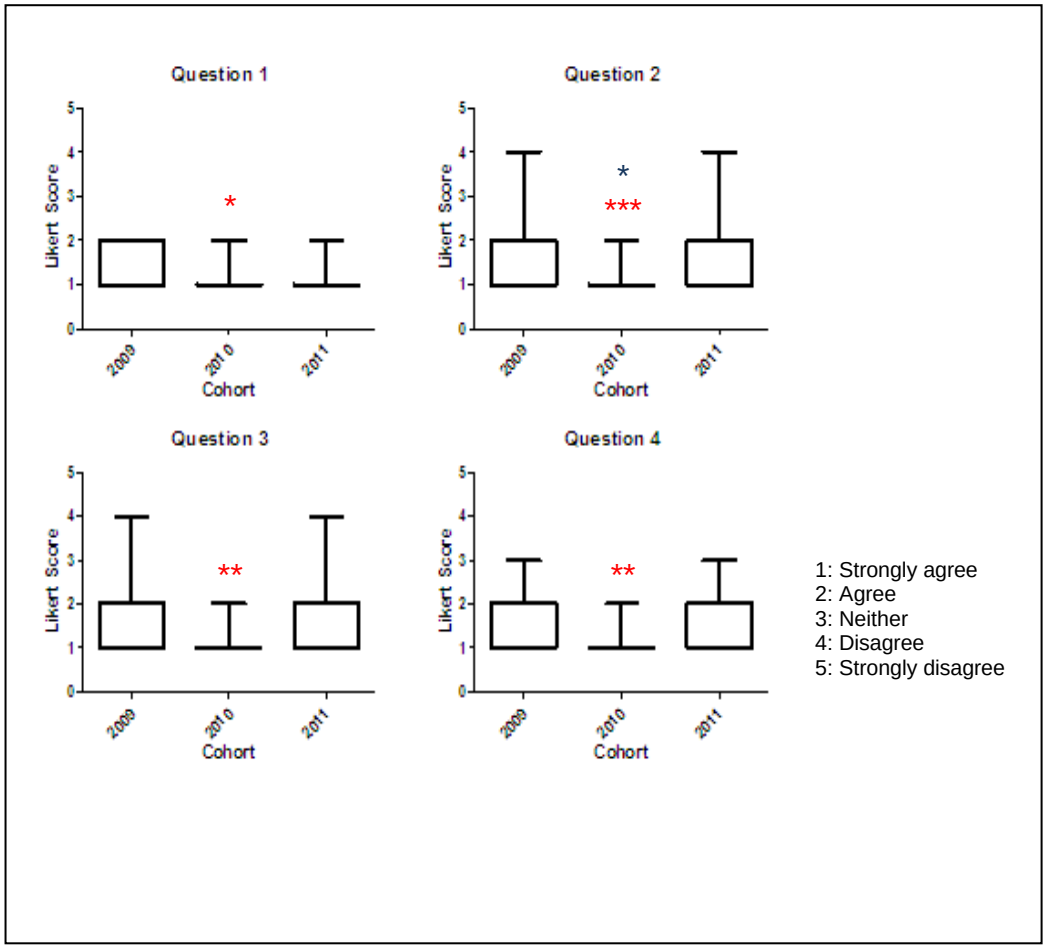

Figure 1: Box and whisker plots of student feedback data for questions 1-4 for each cohort:

We observed an overwhelmingly positive response to all questions (Figure 1) across all three cohorts with only one question showed a response of less than 90% positive feedback. With the exception of the very positive difference between 2009 and 2010, there were no significant changes in the level of positive feedback year on year. This is perhaps not surprising, given the current trend of many medical students towards use of both online and more traditional video resources to help their learning and revision (Ruiz *et al.,* 2006).

The lowest scoring area was the second question (positive feedback at 89.2% in 2011 and 91.7% in 2009). This suggested that a small sub-group of students did not feel this was a good way to teach the class, even if they did feel it was a potentially useful revision tool. It is known that students will adopt different learning styles and so is

likely to be an indication that some simply prefer to see procedures demonstrated manually (Rubinstein *et al.,* 2009).

The fourth question revealed that students felt strongly that the video had made the procedure easier to perform. This has been shown to happen in other, similar projects to our own, such as a study where emergency medical service providers were shown a video on assessing head injury by the Glasgow Coma Scale (Lane *et al.,* 2002). This report concluded that post-video performance was better than performance without the video. Our findings are further supported in a study showing that video learning resources enhanced performance in a neurological test (Raijmakers *et al.,* 1991). Unlike these, however, our study lacked the option for a "without video" control, as this was the first year the class had been run and this option will be included in future research to control for this variable.

Conclusion

- This study presents three years of longitudinal data which shows positive student perceptions of video-based learning objects in the laboratory setting
- These data also indicate that students identify the value of video-based learning objects as later revision tools when first used to facilitate laboratory sessions

Through the use of bespoke video learning objects to facilitate laboratory teaching sessions, our longitudinal data shows an extremely positive student perception of this approach. As this opinion was conserved across all three years of the study we do not believe it was due to cohort factors. Further, our data and student comments indicate that medical students value these video resources as revision tools and feel that they have a place in supporting learning of technical scientific procedures in the laboratory.

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Website

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