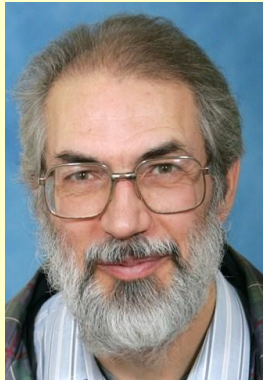


# The effectiveness of video in developing ecological and laboratory skills in biological science students

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# QAA (2007, p7)

*‘It is impossible for students to demonstrate a satisfactory understanding of ES3 without significant exposure to field based learning and teaching’*

# Practical work

## 'Striking the right balance'

- Authentic student experience
- Research informed teaching
- Student expectations

### **BUT....**

- Expensive
- Time consuming for staff
- Inclusivity

# Theoretical Background

- Students' perceptions of practical work:
  - Investigative practical work promotes greater sense of professional scientific identity (MacKenzie & Ruxton, 2007)
  - Students have adverse perceptions of laboratory practical work (Collis *et al.*, 2007).
- Learning from visualisations is dependent on:
  - Interactivity (Schwan & Riempp, 2004)
  - Students' prior experience (Bouchieux & Schneider, 2009)
  - Degree of realism (Scheiter *et al.*, 2009)

# Research Questions

- What benefits do Level 5 students perceive from video demonstrations of a) fieldwork and b) laboratory techniques?
- How do such videos affect students' biological thinking and their view of themselves and as professional biologists?

# Methodology

- Setting
  - Staffordshire University is a post 1992 university.
- Participants
  - Second year undergraduates within Biological Sciences
- Instruments
  - 7 Focus groups with 4-6 participants derived from 4 cohorts of Marine Zoology students
  - Questionnaires distributed to the whole of one cohort of Biomedical Analysis students
- Procedure
  - Focus groups (with identical Marine Zoology participants for each cohort) conducted prior and post exposure to videos and field trip
  - Questionnaires distributed and completed in final session of Biomedical Analysis module
- Analysis
  - Thematic analysis of interview transcripts. Representative quotes selected
  - Frequency of questionnaire responses

# Focus groups

Date	Videos	Field Course
26-Feb-10	x	x
24-Mar-11	x	x
19-Mar-09	✓	x
01-Apr-11	✓	x
24-Apr-08	x	✓
23-Apr-10	x	✓
09-May-11	✓	✓

# Results

## Motivation of students for practical work

*'It's all well and good talkin' about somethin' that you can only see under a microscope...'* (Student R4, 24Mar11-1305)

*'...Or on a video!'* (Student R3, 24Mar11-1306)

*'Ermm ...yeah or from a distance, but when you've got it...almost in your hands at the time, I erm, I think it gives yer a different response to it, and when you can, when you can link somethin' in with somethin' you know already, you – know you come on in leaps and bounds'* (Student R4, 24Mar11-1309)



# Results

Videos were not seen as authentic

*'Well no, this person what was on the video was obviously doin' it for educational purposes.'* (Student R2, 1Apr11-249)

*'It's not like they were researchin'!'* (Student R3, 1Apr11-270)

# Results

## Prior experiences and tutors were influential

- *‘Oh, for me personally it’s volunteering...like woodland management and grassland management, I’ve picked up a lot of ahhh, helpful techniques...from that.’* (Student R4, 24Apr08-248+250)
- *‘I actually remember it better if I can see somebody...actually performin’ it an’ doin’ it, because you produce a picture in your mind don’t yer!’* (Student R3, 24Mar11-1362+1365)
- *‘Er, um - well John...mentioned about it he said, that you – know ecologists tend to be, er quite a practical bunch, an’ if...an’ if a stick...will do the same job...you’ll use a stick...’* (Student R5, 24Mar11-165+167+169)

# Results

## Practice used to interpret prior experiences

*'...ahumm.. well learning the literature before I went up there and looking at the dead examples that we'd got and you suddenly find yourself going 'Oh yeah-hh, that's why it's there...'* (Student R4, 24Apr08-1420)

*'And they're more colourful live than dead.'* (Student R2, 24Apr08-1424)

# Results

Data analysis was seen as problematic

*'...we could almost do with a statistics module or a...not a marked one! Just like a...like a tutor course or something like a crash-course'* (Student R2, 23Apr10-130+133)

*'...its useful to have someone to say ...or help you with your weak points which maybe probably be my statistics ...I could do the research by myself but I'm going to need help at the end, to make it make any sense. .'* (Student R4, 26Feb10-142)

*'Yeah like Jo said I'll probably need help with, statistics so, I'll have to ask someone or research...probably go to project tutor.'* (Student R3, 26Feb10-154+156)

# Results

## Students' view of themselves as biologists

- *'Don't know!...I've learned a lot more, while I've been at University...it's made me more of bi-, of a biologist, than what I was'* (Student R1, 1Apr11-130+132)
- *'...an' during, during the practical I – I really sensed...no, you're not right about this an' I'll show you why you're not right, an' I really didn't expect myself to say that.'* (Student R5, 9May11-529+531)
- *'...you've got less control over things like what you're measuring then it's difficult to erm, say how much er-of-er, how much of a scientific judgement you can make...'* (Student R6, 19Mar09-204)

# Results

## Student Questionnaire Responses

How did you use the video demonstrations on Blackboard?  
We would like to know what you thought of them, and what you think we should add next.

- 29 students responded (67% return rate)
- 18 students found them helpful

### Reasons for non-engagement:

- Download time too long
- Not all available
- Not explicitly linked to practical sessions
- Still like to be shown as well

# Conclusions

- Student concerns regarding the implementation of practical techniques were overshadowed by their worries with data analysis.
- Prior practical experience and peer discussion may have a greater impact on learning than the videos
- Differing results obtained from the two modules may reflect
  - a) Different perceived complexity of the practical procedures
  - b) Placement of the videos within the curriculum

# Further studies

- How do students' concerns regarding data handling affect their 3rd year project choice?
- What are the effective and ineffective strategies of student involvement in communities of practice.



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