Student self-assessment of records of practical work in biology

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Background to module

Lectures

24 delivered over 12 weeks

Associations
Diversity
Free-living to parasitism
Host specificity
Transmission, life cycles
Animal parasites in humans
Behavioural aspects
Host responses
Vertebrate defences
Control: public health
A combined approach

Plant galls
Hosts as habitats
Complex parasite life cycles
Parasite in environment
Infection, establishment
Structural, nutrient exchanges
Modified host behaviour
Regulatory interactions
Immune response
Eradication, anthelmintics

Practical classes

Aim : quality practical work, see range of living parasites

Practical 1 PLANT GALLS

Practical 2 THE VERTEBRATE HOST

Practical 3 THE INVERTEBRATE HOST

run over six weeks, 3 hours per week
three projects
each with laboratory class (3 hours)
class data interpretation/poster session (3 hours)
following week
two internet practicals (NOT CONSIDERED HERE)

Key skills for practicals

accurate record of observations

full collection of data

ability to interpret results

proficiency in reaching evidence-based conclusions

self-assessment of quality of work

Evaluating these skills

collect laboratory record books after practicals

mark them

provide constructive comments on each book

Increasing student numbers, now about 100 each year, make marking and commenting **very** time-consuming

Two markers, 100 books
equals
all free time in about 15 working days

Self-instruction

students learn
- practical record keeping
- data appreciation and analysis
- interpretation and conclusions

Self-assessment

saves marker time, fewer comments on record books
self-learning process for student
onus of responsibility for quality on student
invaluable training

most graduates responsible for quality of own work in future employment

Self-assessment - clear aims and objectives

Oral presentation from lecturer about

- purpose of laboratory record books
- importance of recording work at time done
- self-assessing own laboratory record books

Marking

- 20% from laboratory record book
- 10% from web project
- 70% from 2 hour theory examination

Format of scientific journals used in laboratory record book

1. Introduction (including aims of exercise)
2. Materials and methods
3. Results (drawings, data and observations)
4. Discussion (evaluation of findings)
5. Conclusions

We specify

sections 1 to 3 written ***during*** practical classes
work stamped to certify done in laboratory

not rewritten, to keep primary observations

scientific layout: model applicable to most reports

expect drawings, tables, interpretative text

students **complete** Discussion and Conclusions later using check list
need own **plus** class results (supplied as printed handout)

Self-assessment Criteria and Self-selection of Content

Need criteria to judge quality of work

School of Biological Sciences criteria

List of items for each heading of laboratory record book

check list (Table)

each part posed as question
every part not needed for each project

students learn by **self-selection** of appropriate parts

Self-assessment : entry in module handbook

"You should examine the criteria for the degree classes and the questions in the check list. The questions give you a guide to expectations of content in each part of an account. The criteria measure the work in terms of understanding of topic, context, layout, and quality of drawings, diagrams, graphs, data analysis and writing. If, for example, the context is correct, and the quality falls within the upper second degree class criteria, then the work will be within this class. A decision whether the work is at the top, the bottom or at some intermediate point within the class, is made, allocating a mark using odd numbers only. This is more difficult, but if all the class criteria are fulfilled plus all the relevant components, you will be looking for a mark at the top of the class. If the account does not fulfil all the class criteria, but does not drop to the class below, and omits relevant components, then the mark will be at the bottom of the class range. It is worth stating that in biology it is unusual to give marks much over 80% or significantly under 30%."

Self-Assessment

started 1990

1996-97 **66** students (78%) self-assessed work

until 1995 conducted by **printed forms**

forms submitted with laboratory record book

from 1996 **computer-based** (Macromedia's Authorware)

2000-01 back to **forms** - simpler, easier, more effective

Computer-based questionnaire

design - simple and attractive
questions - "friendly" style
sound - emphasise user-friendly nature
colour - attractive
student can complete at own pace
prompts to enter proper detail
feed back alerts student of errors
errors ignored up to file submission
    written to a locked folder on LAN
    protected from unauthorised scrutiny
    stored - user name entered at “log-on”
printed for evaluation with laboratory record book

Self-Assessment - positive aspects

marked **improvement in quality** of laboratory record books since introduction (1990-91 to 2001-02)

number of **comments** necessary on books during marking significantly reduced

self-assessment gives **format** for making comments

saves marking time (estimated at 25%)

enhances student learning by personal involvement

puts onus of **responsibility** on student

Comparison of predicted with actual marks

compared predicted with actual mark (n = 66)

26 (39%) actual mark **lower** than self-assessment

17 (26%) predicted **actual** mark

23 (35%) actual mark **higher**

Figure 1 **actual marks**

Figure 2 **self-assessment predictions**

both distributions similar mean, standard error

gap in **predictions** between 45% and 55% (Figure 2) suggests students unwilling to predict low 2.2 or high 3 marks

actual marks show spread through fifties (Fig 1)

so there is a **discrepancy** between the self-assessment **predictions** and **actual marks**

Figure 1 Marks awarded in conventional assessment (n=85) using School of Biological Sciences criteria (Table 1)

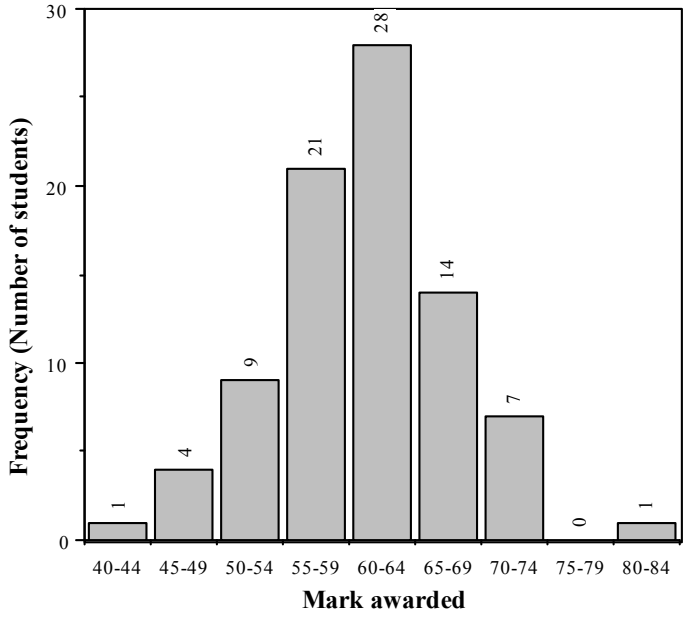
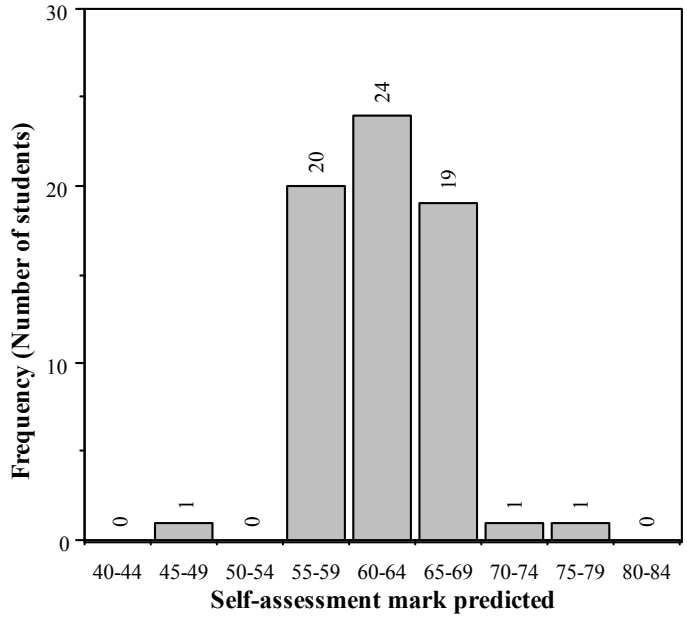


Figure 2 Predicted marks from self-assessment exercise undertaken by students (n=66)



The discrepancy

Figure 3 shows **difference** between **self-assessment predictions** and **actual marks** by reference to the mark awarded

students with mark **under 60%** predict a higher mark

discrepancy increased as mark awarded fell

students with mark **over 60%** almost always predict a lower mark

Interpretation of data

Data interpreted in **two** ways

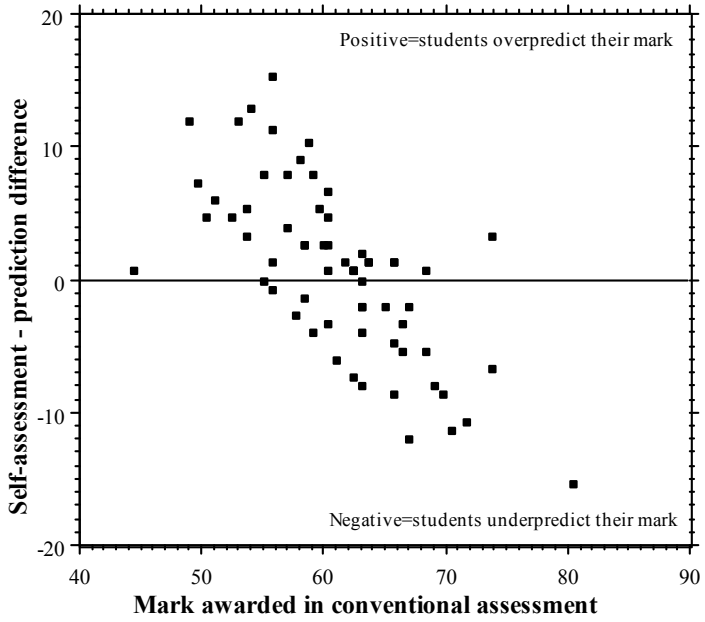
stronger students reluctant to accept their work as good, so assess it harshly

better students **recognise good work** and realise shortcomings in own

less capable peers overly generous with assessment i.e. do not understand criteria for good work, so **over value** their efforts

Students who get low marks do so because they have not understood what makes a good piece of work and have not put in **effort** to learn

Figure 3 Mark awarded in conventional assessment compared to self-assessment prediction (n=66)



A second explanation relates to **peer pressure**

students **“play safe”**, follow friends or avoid appearing confident in front of others

predict a "safe" mark around 60%
if awarded higher actual marks are pleased
if fall short of prediction not embarrassed

this concept applies adequately for stronger students, with **actual marks** over 60%

but for those who score under 60% it is not a good tactic as they will over predict their mark

Both explanations may apply

those students who perform well most likely to realise that they have done well because they understand what contributes to a good piece of work. However, they assess their work lower than this out of self-criticism

those students who do not perform well have not grasped what is required to produce good work, and therefore cannot predict their mark accurately, or are too lazy to bother learning

In conclusion - **Self-Assessment**

probably of **maximum value** to weaker students

forces them to look at their work using criteria by which the **actual mark** will be awarded

helps them to **understand** why work is deficient

self-assessment **quantifies** recognition of level of achievement for all students

for academic staff gives some **modest** saving of time in marking

major gain seen as **enhancement** of quality of written work and learning

student **satisfaction** when submitting competent laboratory record books