

Moving towards constructive alignment in First Year Biology

Fiona L. Bird
Department of Zoology
La Trobe University

Talk plan

1. Discuss the poor learning outcomes in BIO1AD
2. Outline the idea of Constructive Alignment
3. Look at some examples of constructively aligned teaching/learning activities in BIO1AD

Student performance 2004-2006. Mean mark (pass rate).

Assessment task	2004	2005	2006
Theory exam	51 (55%)	52 (57%)	50 (46%)
Practical exam	44 (35%)	42 (29%)	48 (42%)
Scientific reports	71	68	68
Laboratory work	80	77	82
Final mark	55 (70%)	53 (65%)	53 (68%)

One student's perception of the practical exam

The practical examination assessed...*One's capacity to draw excellent specimens in an incredible limited time frame, labelling, lots of memory work and a small amount of the actual understanding of what we are labelling. All of which to be done under great pressure.*

Response to an email survey sent out after the practical exam.

Why remove the practical exam?

- Students have little experience with practical examinations
- Duplicates assessment of dissection & drawing
- Questions assess ability to memorise facts and low levels of understanding
- Logistically difficult to organise

The new assessment scheme

Assessment task	Value in 2006	Value in 2007	Breakdown of marks
Practical exam	30	0	
Final exam	50	70	
Theory section	50	50	
Practical section	0	20	
Scientific reports	10	15	1 st attempt = 5, 2 nd attempt =10
Dissections	3.3	5	1 st attempt =1.7, 2 nd attempt =3.3
Drawings	3.3	5	1 st attempt =1.7, 2 nd attempt =3.3
Homework Ass.	3.3	5	

Learning objectives were developed for the practical course

Phylum Porifera

Examples of objectives of this practical class

Practical skills

To practise using a compound light microscope and dissecting microscope.
To draw various sponges accurately, clearly and neatly.
sections relate to the whole animal.

Conceptual learning

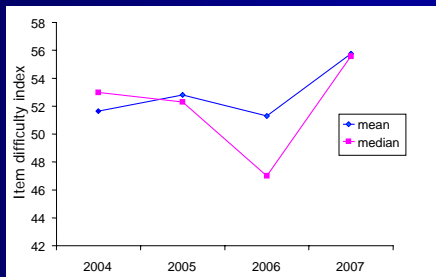
To recognise the diagnostic characteristics of the Phylum Porifera.
To identify external features and internal structures of a sponge which are involved in feeding.

Mean mark (pass rate) for each assessment task

Assessment task	2004-2006	2007	Change?
Final mark	54 (53%)	55 (79%)	Pass rate inc by 26%
Final exam			
Theory section	51 (53%)	55 (67%)	Pass rate inc by 14%
Practical section	37 (21%)*	37 (23%)	Little change
Practical work	69	68	Little change
Scientific reports	80	78	Little change

* Mean mark and pass rate for 2006 only.

Theory questions were easier in 2007



Mean mark (pass rate) for each assessment task

Assessment task	2004-2006	2007	Change?
Final mark	54 (53%)	55 (79%)	Pass rate inc by 26%
Final exam			
Theory section	51 (53%)	55 (67%)	Pass rate inc by 14%
Practical section	37 (21%)*	37 (23%)	Little change
Practical work	69	68	Little change
Scientific reports	80	78	Little change

* Mean mark and pass rate for 2006 only.

Constructive alignment

Biggs (1996) brought together two fundamental principles of education:

1. learning results from what the learner does
2. teaching that encourages and supports student activities that will achieve the unit's learning objectives is effective teaching.

Web of consistency

All components of the system (objectives, activities, assessment) address the same agenda and support each other

The teacher's job is to trap the students into learning

Schuell (1996)

"...what the student does in determining what is learned is more important than what the teacher does."

The constructive alignment design framework

1. Decide on the learning objectives.
2. Choose teaching/learning activities which get the students to do the things that the objectives nominate.
3. Choose assessment tasks which get students to show evidence of the learning stated in the objectives.

Example 1: Scientific report writing

Objective: To write a scientific report

T/L activities: Training workshop with LAS
Students write 2 reports

Assessment: Report 1 (5% & feedback)
Report 2 (10% & feedback)

Constructive alignment!

Example 2: Animal diversity

Objective: To be able to classify an animal into its phylum by recognising the diagnostic features of each phylum.

T/L activities: Lectures
Practical classes

T/L activities: Practical classes

One phyla per class e.g. Mollusca

Dissect a snail
Draw the dissection
Label external and internal structures

Look at examples of other types of mollusc

Example 2: Animal diversity

Objective: To be able to classify an animal into its phylum by recognising the diagnostic features of each phylum.

T/L activities: Lectures
Practical classes

Assessment: Final exam
Practical section
Theory section

An alternative approach

T/L activities:

Pre-lab

Students create their own table of diagnostic features of the animal phyla.

In class

Students look at unknown specimens and assign each to a phylum.

Students write a short justification of the classification.

An alternative approach

Objective: To be able to classify an animal into its phylum by recognising the diagnostic features of each phylum.

Assessment:

Correct classification

Correct use of diagnostic features to classify

Constructive alignment!

Acknowledgments

Brian Malone – unit coordinator of BIO1AD