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Student perception of integrated learning in pre-certificate education

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Pre-certificate year at the Faculty of Science/Hull University



This talk describes:

- The integrated approach in learning and teaching in pre-certificate Biology.
- The student perception of their experience with different teaching methods.

Pre-certificate Teaching

- Diverse cohort of students
- Move away from conventional approach
- Less formal workshop based learning in classroom, laboratory and field

Pre-certificate modules

- Biology Foundation 1
- Biology Foundation 2
- Biological Diversity
- Chemistry Foundation 1
- HE Learning
- Free elective

Biology Foundation 1 & 2 Module Structure

- 10 guided reading workshops
- 4 practical laboratory sessions

Guided Reading Workshops

- Students are given sections in their book to read roughly 1 week before the workshop (AS level)
- Topics are discussed in the workshop
- Short answer closed book class test on the topic
- Immediate feedback session on the questions
- Last 30 - 45 min lecture on an A2 topic
- Lecture knowledge tested in 3 MCQ tests throughout the semester

Practical Laboratory Sessions

- Supporting the topics of the workshops
- 3hour lab sessions
- Assessed by written lab report

Biological Diversity



The integrated field/classroom day for pre-Certificate students

- *Morning*. Groups of students are taken out into the field accompanied by a tutor and collect samples.
- *Afternoon*. Students work in classroom at field site, identify specimen of plants and animals using keys, with help from one another and from tutors.
- Students individually list their identified species and produce labelled and annotated drawings of three examples. These are handed in together with a list of identified species and their habitats at the end of the day for marking.







Assessments

- Field day workbooks
- Guide to Dalby Forest/Scarborough Sea Shore
- Peer assessed poster presentation

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The Department of Biological Sciences

Rocky Shore Diversity Within Areas of Different Immersion Periods on a Littoral Shore

Group 11
James Rayner, Michael Roach, Amy Robinson, Lisa Thetford

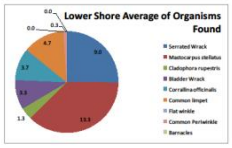
Introduction and Hypothesis

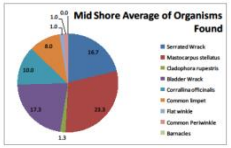
The shoreline or littoral region at Scarborough consists of sandy beaches which run north and south of the headland. There are high clay cliffs all along and a sea wall has been constructed to protect them from erosion. At low tide acres of rock pools can be seen which contain a vast array of marine creatures and seaweeds.

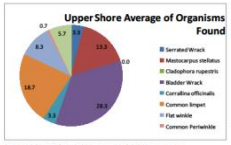
The hypothesis is that there will be a greater diversity and abundance of organisms on the rocks in areas of greater immersion periods than lower immersion periods. This hypothesis is based on the fact that; the rocky shore is divided into three sections the upper shore, the mid shore and the lower shore, according to the monthly tidal ranges that occur. Tides are caused by the gravitational pull of the sun and the moon which act together to cause a large rise and fall in the sea level. The High level is called the spring tide and occurs every two weeks, and in between these are the lower neap tides. This means that the various areas of the shore are under water at different times and for differing periods of time.
These tides are responsible for the abundance and diversity of the organisms present as their survival depends on the time spent submerged under water or exposed to the air. These organisms show different adaptations depending on which part of the shore there are on and this can result in distinct bands of communities in different areas.



Photo Showing Group Members Identifying Serrated Wrack, *Fucus serratus* (picture taken by James Rayner)







Figures 2,3 & 4, Pie charts showing the average abundance of species within the three quadrats from the respective areas.

COMMON NAME	SCIENTIFIC NAME
Serrated wrack	*Fucus serratus*
Bladder wrack	*Fucus vesiculosus*
na	*Cladophora rupestris*
na	*Coralina officinalis*
na	*Mastocarpus stellatus*
Common periwinkle	*Littorina littoria*
Flat periwinkle	*Littorina mariae*
Barnacles	*Semibalanus balanoides*
Common limpet	*Patella vulgata*

Figure 5, Table of species found with Latin names

Method.

9 Quadrats 50cm square in size were placed along a line transect from the lower shore to the top of the beach at intervals of 20metres. At each point measure the diversity and abundance of organisms. A comparison can then be made of the organisms from different immersion periods. Identification of organisms can be classified into three categories, sparse abundant and frequent.

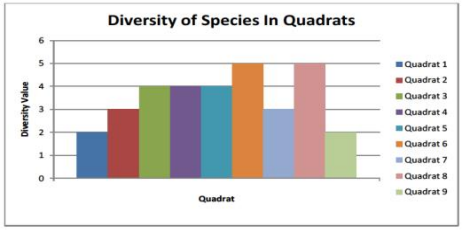


Figure 2 -Graph Showing the Diversity Value For The Different Quadrats

Results and Discussion

The results are based on the assumption that within each quadrat there is a possibility of 100 organisms and each organism found counts as 1%. The diversity graph shows that diversity increases the further away from the sea line you go, meaning there is more diversity in areas of less tidal immersion. The diversity values steadily rise from 2.13 at sea line to 5.07 at the upper shore, with an anomaly of 2.3 at the upper shore which can be explained by examining the method undertaken whilst gathering the data. This was done by a straight line transect, by which a quadrat with little in it could be placed directly next to an area of higher diversity. A visual inspection whilst gathering the data verified this to be the case.

Using the diversity equation also takes in to account the abundance of an organism, for example in the 9th quadrat, although it had a lower diversity value, there were a high number of bladder wrack found (60%) more than in any other quadrat. The data gained also showed that with the exception of bladder wrack, algae was in more abundance in the mid shore whilst a higher abundance of animals were found in the upper shore.

Therefore it is concluded that these findings do not support the hypothesis given.

To improve the findings and confirm further, the method should be adapted to a grid format and repeated in different areas of the shore and at different tides, (i.e. neap and spring) to increase the data set and give a more accurate view, it would also be beneficial to repeat the process at different times of year as different organisms may frequent the shore in different seasons and affect the results.

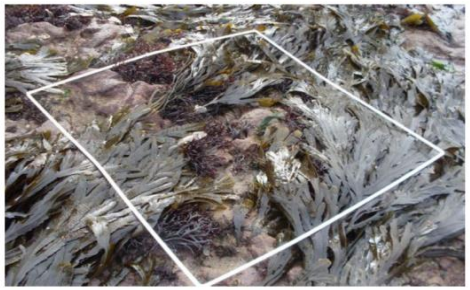


Figure 7 shows a sample of the species found within a Quadrat (Photo by James Rayner)

References
Cremona, J (2005)*Understanding Ecology Fieldwork 1*, Rocky shore communities. Field studies council.
Gibson, C (2008) *Pocket Nature Seashore*, A Unique Photographic Guide To The Coastal Wildlife of Britain and Europe. London, Dorling

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Example for group poster


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A comparison of diversity in the lower, middle and upper rocky shores.
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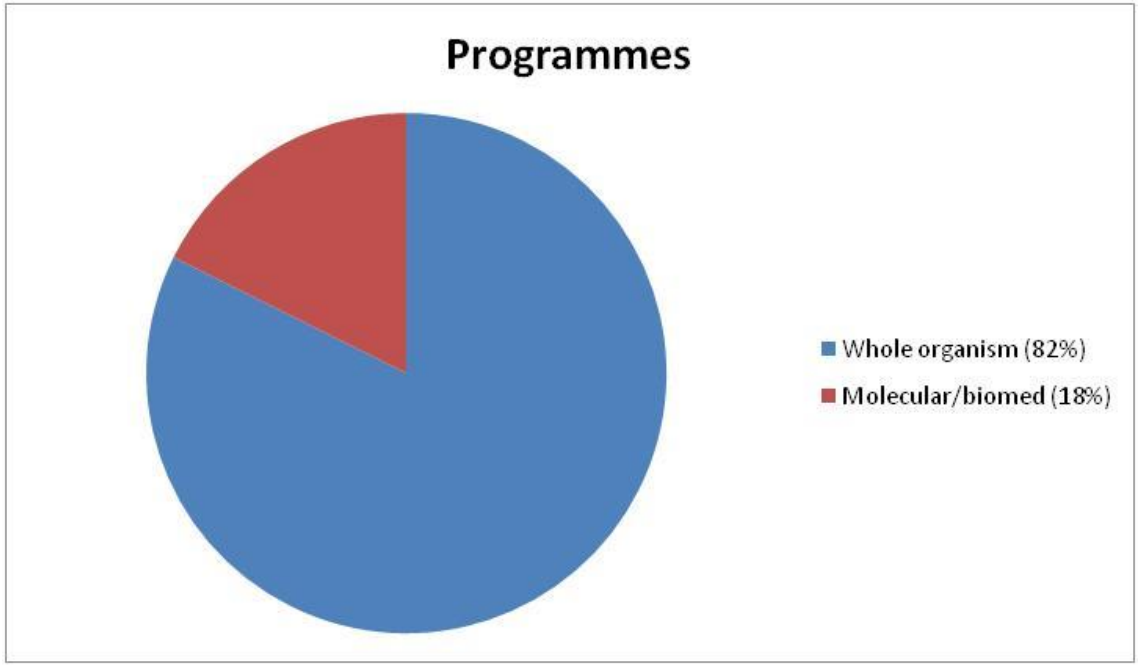
Experience after 3 Years

- Students engaging well
- Students and staff enjoy the modules
- Good attendance
- Good progression rate of around 75%

Student Survey

- Improve pre-certificate provision
- Better understand student motivation
- Better understand student preferences

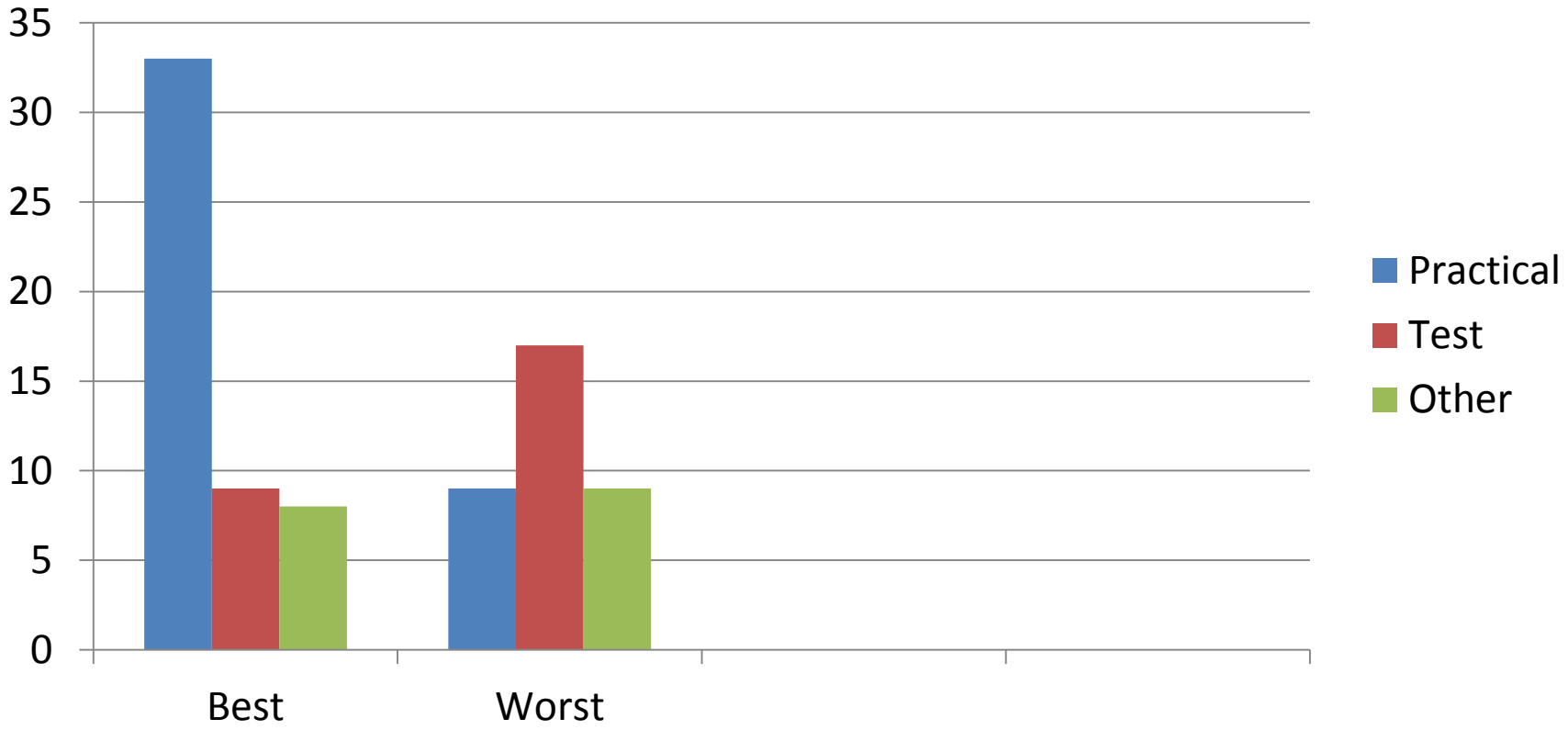
Programme Distribution



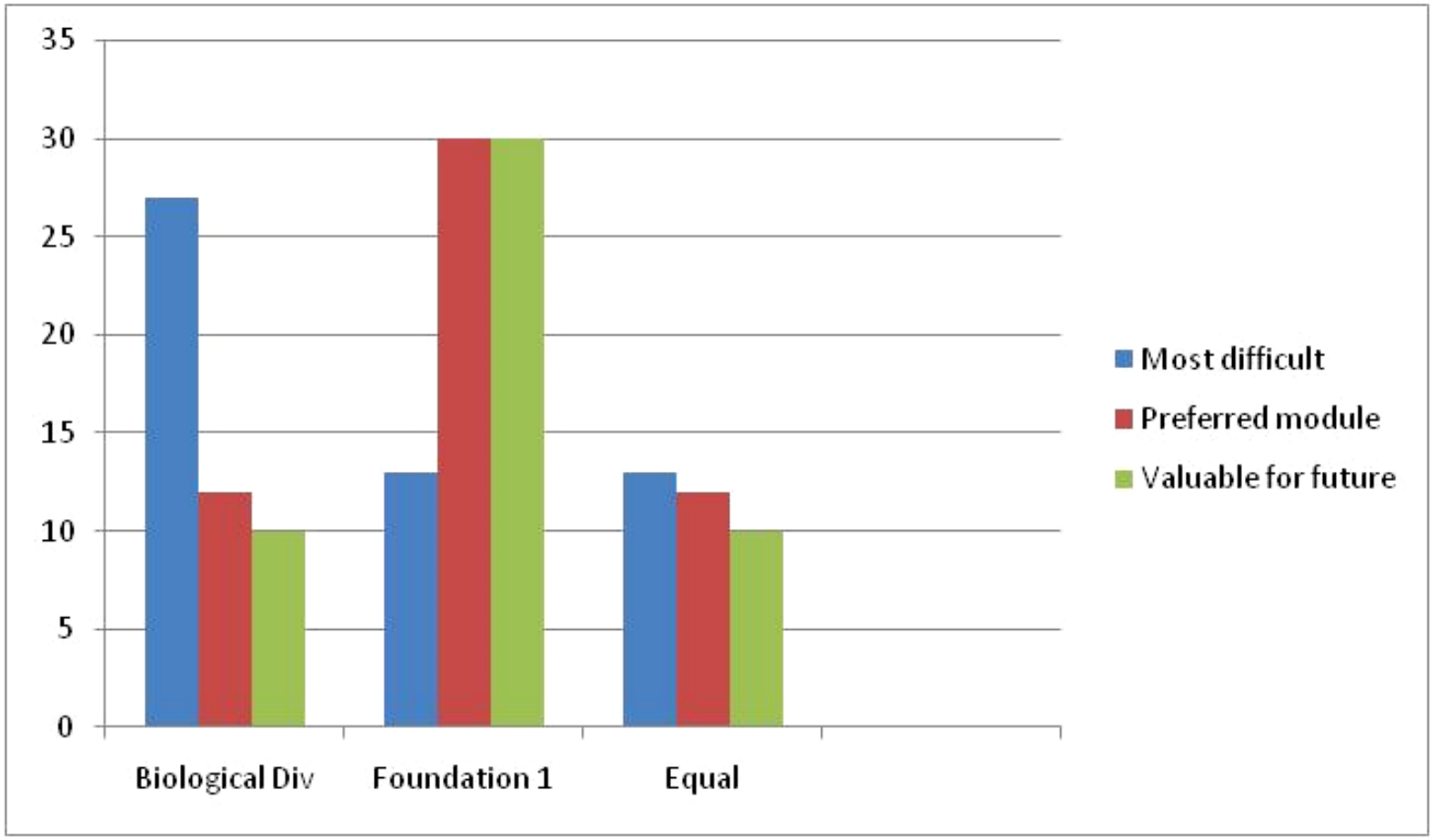
Aquatic Zoology
Coastal Marine Biology
Marine and Freshwater Biology
Environmental Science
Ecology
Zoology

Biology
Biology with Molecular Science
Biomedical Science
Human Biology

Best and worst experience in Biology Foundation 1



Difficulty, Preference and Most Valuable



Reasons - Difficulty

Biological Diversity

- Not enough time
- Tough marking
- More difficult assignments
- Physically tiring
- Unfamiliar topics

Biology Foundation 1

- Weekly tests

Reasons - Preference

Biological Diversity

- Fieldwork,
- More relevant to future career

Biology Foundation 1

- Learned more
- More relevant to further studies
- Weekly tests
- More interesting topics

Reasons - Most Valuable

Biological Diversity

- Learn about practical skills
- More relevant to course
- Link to future career
- Working as part of a team

Biology Foundation 1

- More relevant to course
- More valuable knowledge
- Weekly tests teach revision techniques
- Lab skills
- Broader view on biology

Summary

- Preferences not necessarily connected to programme of study
- Students prefer practical work
- Motivated to learn what is needed for future studies
- Field work fun, but difficult
- Takes them out of their comfort zone?

Conclusion

- Integrated approach keeps students focussed
- Topics need to be connected to future studies
- As much practical elements as possible
- Broader topics in Biological Diversity
- More time for assessments