

Modes of assessing a Student's performance in statistical subjects – A brief look at the pro's and con's

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The role of assessment tasks in statistics subjects plays a very important role in determining the level of understanding of the material being taught. There are many options that are available to the teacher, all of which are either beneficial or counterproductive for the students understanding of statistics. This poster will explore some of these options, and in particular, its use in first year service teaching units which is how most students learn of statistics.

Design of an enquiry-based 'Practical Only' course for the teaching of basis skills in first year Biology

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First year Biology teaching at the Callaghan Campus of the University of Newcastle has undergone a significant reorganisation in 2006. The rearrangement was conducted with the aims of increasing flexible delivery, improving student learning, reducing overall teaching effort, targeting teaching effort to biology majors and standardising course delivery throughout the university campuses. Key to the reorganisation has been the separation of the practical and lecture components of first year into distinctly separate courses. The practical course runs only in semester 2 and is compulsory for students that intend to graduate with a major in biology. Students that do not intend to continue their biology studies past 1st year are not required nor expected to enrol in the course.

Separation of the courses has allowed a renewed focus on basis skills including laboratory and field techniques, the scientific method and practice, report writing and personal interaction. In this paper we present the design of this practical course and explain the process and logic we have used in its construction. Skill acquisition is situated in authentic learning contexts, employing the University campus as a unifying theme. Through an enquiry-based approach, students learn how to think as scientists, posing and testing questions rather than 'doing the experiment'. The process of building and reinforcing skills (scaffolded learning) and the use of assessment & peer interaction to facilitate the learning process is discussed.

Creativity in mathematics assessment

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It is often said that to be a good mathematician you need to be creative. However this is not always shown in the assessment of first year Mathematics. So what does happen when encourage students to be creative in an assessment task?

In many undergraduate mathematics courses most types of assessment is designed to see if the students understand what has been covered in lectures. Timed examinations and difficult assignments are the mainstay of assessment. This makes Mathematics assessment seem to be a hard slog. Indeed attempts to change this are met with resistance from students who do not believe that you can learn mathematics in other ways.

This paper describes an innovative assessment task where students get to show their creative side. This is done by asking students to design objects in three dimensions with the aid of *Mathematica*. They have the options of using Cartesian, cylindrical and spherical coordinate systems as well as defining curves and surfaces parametrically. The object in the assignment changes each year but the task remains the same.



We discuss the pedagogical elements used in the design of the task and the support given to students to achieve quality outcomes. We describe the benefits from student learning and hear from the students themselves as they describe how their learning has deepened - and also the fun and delight of their creative output.

Teaching coloured perception to Thai students by inquiry

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Coloured light and colour perception are the scientific phenomena close to every one. However, results from the preliminary work using conceptual test showed that the students taught with traditional teaching have a lot of misconceptions about coloured light and colour perception. This conceptual test are composed of six open-ended questions used to probe the students' understanding of primary coloured lights and their combination, colour perception under the white light or others coloured light conditions and the phenomenon named "after image". This result implies that traditional teaching can not make the students to understand in these topics, clearly. Therefore we construct the coloured light mixing box with removable light emitted diode (LED) sockets and use the white, orange, purple, red, green and blue LEDs as the light sources. Then we introduced this instrument into an interactive classroom with hands-on activities. As a result, students can learn and gain correct understanding of the phenomena of coloured light by themselves.

On the Notion of Conceptual Learning in Undergraduate Physics

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Methods for improving the quality of student learning continues to be central to research and practice in teaching and learning in tertiary education. Extensive studies have shown that student learning approaches influence their learning conception and outcomes. In particular, it has been shown that learning as simple reproduction of knowledge leads to surface learning approaches, while learning as transformation of knowledge leads to deep learning approaches [1,2]. An important factor in the way students learn appears to be the way knowledge is structured when presented.

In this paper we illustrate how concept maps of the hierarchical organisation of cognitive structure may benefit the preparation, presentation and assessment of course material. The results of a comparison between the concepts presented with those actually assessed in a one semester first year university, introductory physics course show a large imbalance. Concept maps may be effectively used to improve the planning and structure of all components of course presentation in order to more realistically match assessment tasks. Concept maps also help develop relationships and perspectives related to the physics ideas by the students. We illustrate how the maps were used to organize the discussed concepts, and how the new concepts could be incorporated into the map so that the new knowledge becomes an integral part of the existing structure.

References

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