

Trimming poster handouts into pieces to develop student skills

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SUMMARY

Traditionally, objectives of laboratory practical classes on Biomolecular subjects have been the development of technical expertise and the demonstration of theoretical knowledge. Nowadays, other important goals are the development of skills, such as information handling and presentation, and participating in discussions in ways that potentiate learning from others. A method that aims at developing the latter and at assisting students in the assessment of scientific works, is presented. It involved an assignment, that consisted in synthesizing information gathered in a literature survey in poster handouts, and its assessment in a student centered approach. The assessment strategy allowed students to score assignments and to identify keypoints of every handout. It contained an odd step: handouts were trimmed in their components before being assessed. Student's participation was enthusiastic. This paper presents the *trimming approach* and discusses its potential in undergraduate skill development.

KEYWORDS : Synthetic, integrative and assessment skills development

INTRODUCTION

The skill development of undergraduates is as slow and progressive as it is invaluable for the craft of science (Wood 1996, Huang 2000). There is no consensus as to the best ways of promoting it, and proposals have been published that deal with skills in general (Walker 1999, Denyer 2000), or with specific fields of biological sciences (Burachik et al. 1997, Barton and Lieberman 1999, Rivarola et al. 2000).

This work describes one strategy devised for Second year Biology undergraduates at the University of Azores, implemented in practicals of the subject Structural Biochemistry. The goals to be achieved were the development of student's skills implicit to: 1) taking part in scientific discussions; 2) making of consistent written assignments; 3) critically assessing scientific materials.

MOTIVATION

After 3 years of teaching in the University of Azores, I had the opportunity of meeting undergraduates of the 2nd and 3rd year, and of analysing some final graduation Thesis. I could observe that the following skills, deficient in 2nd year undergraduates, were hardly augmented in nearly graduates.

In oral discussions, there was an uneasiness demonstrated by students in giving or receiving critique, or in commenting on other's opinions. A tense and compromised atmosphere would dominate the classroom whenever students were asked to take part in oral discussions. In many instances, those who would participate, exhibited serious difficulties in articulating their ideas comprehensively, and would try to get from the teacher the conclusions that were to be gathered from the discussions

Written assignments exposed general difficulties in distinguishing important from irrelevant information. Students would, for example, treat key experimental or logical aspects alike less relevant data. Additionally, there was lack of coherence and of integration, making one whole work look as if it was made of glued unrelated parts. It was for example frequent to observe that a proper title, introduction or discussion was not chosen for a given set of results. If one considers the previous aspects, one comes to the conclusion that students lack skills that would allow them to judge on the quality of their assignments. Therefore there is a need to develop criticising and assessing skills (Wood 1996, Denyer 2000).

Considering that a strategy was needed to help students assess their new adventurous steps, an objective scoring method could be helpful. I developed the following *Trimming approach* to help students at discussing and assessing their own poster assignments.

THE ASSIGNMENT

The assignment was explicated early in the semester. Students, organized in groups, were asked to find literature on a molecular topic they considered relevant. Information was to be selected and presented in a poster handout. Since most students had never made a poster, a practical guide on how to build poster presentations was prepared and distributed. The need for building the poster using PowerPoint so that handouts could be printed, was stressed. It was strongly emphasized that handouts were to be anonymous and structured in the following 4 parts: title, Introduction, Results, Discussion. Apart from the fact that it would be student-centred, nothing was told about the assessment strategy until in the last practical, where it was carried out.

THE ASSESSMENT STRATEGY

In the beginning of the class, the rules (Table 1) and tasks (Table 2) were put forward. Every group played the role of *reviewer* of some other group's work, and would not know who would be reviewing the handout of their authoring. Every handout was reviewed by two different groups, to allow confrontation of viewpoints.

Handouts were trimmed in their 4 structural components, as the strategy was explained. Assessment consisted of 2 types of tasks: predictive - after being given one piece of the handouts, the group would make predictions on items that should be approached in the *next* part; comparative - after having read the *next* part, groups should score the match (# - number of or % - percentage of) of the text with their predictions.

In the assessment, corresponding pieces of every handouts were given to *reviewers* simultaneously, and the next piece would not be distributed until *reviewers* had finished their former task. When every handout and final comparative task were complete, handouts had been spliced back together. *Reviewers* of the same work were asked to write the scores on the blackboard and to use them for discussing handouts' key bad and good points and agree on key points that summarized their opinions. At this point authors of the work under assessment were asked to participate with their views on what had been commented, and a generalized discussion would then take place in which key aspects for successfully or unsuccessfully building a poster would be concluded.

Table 1: Rules for *reviewers*

1.	<i>Reviewers</i> would perform a series of predictive and comparative tasks (table 1) made on each of the trimmed parts of an anonymous handout elaborated by another group.
2.	Reviewer's should write down their answers to the predictive questions
3.	After having concluded the comparative part, reviewers should register the "number of unmet predictions (#)" or "similarity (%)" between predictions and actual handouts
4.	key points that summarized their opinions should be found, to facilitate discussion at the end of the class.

Table 2: Assessment tasks

Part	Predictive	Comparative
Title	5 items focused on introduction	-
Introduction	5 subjects approached in results	Chosen items absent from introduction (#)
Results	keypoints of the discussion	Chosen aspects absent from results (#)
Discussion	-	Similarity with predicted discussion (%)

COMMENTS

The strategy demanded from the students the practise of synthesizing information in two instances, namely the assignment – synthesizing information gathered in the survey – and the reviewing process - finding of key points to summarize group opinions.

The assessment strategy allowed every work to be scored under the same objective criteria, which students carried out with little or no teacher's assistance. Analysis of the scores revealed its assessing effectiveness. In one hand, the scaling of the assignments by their scores roughly matched their ordering through the application of rules described in the literature (Briscoe 1996, Brown 1997). On the other hand, since different scores were obtained for different parts of the handouts, a straightforward identification of their positive

and negative aspects was achieved (discussion of such aspects generally led to the demonstration of principles behind of posters construction). Furthermore, scores clearly unveiled handouts in which the 4 parts were not chosen adequately. In itself, this observation suggests that the method can be effectively used by students to critically assess their future written assignments, paying assistance in the development of integrative skills.

In what achieving participation in oral discussions is concerned, the strategy was very effective. Not only were dynamic discussions observed inside all groups, but also enthusiastic participation was achieved in the final class discussion. Through motivating students to participate, the strategy allowed practising of communicating skills.

STUDENTS' APPRECIATION AND FINAL REMARKS

Students' opinion was collected orally at the end of the assessment class, and in a written questionnaire distributed roughly one week later. Students unanimously recognized that they had appreciated taking part in the *trimming approach*, and could see its usefulness for future assignments. In the following year, I could observe this and other students' posters prepared for a different subject, and was happy to realize that posters of the students who had participated in the approach were more clearly written, integrated and evidenced fewer basic mistakes on poster construction than others. The students I then contacted still remembered the class where their works had been trimmed to pieces, and acknowledged its positive contribution for improving their poster building skills.

REFERENCES

- E. J. Wood, "Laboratory work in biochemical education: purpose and practice", *Biochemical Education*, 24, 3, 1996, 132-137.
- P.C. Huang, "The integrative nature of biochemistry: challenges of biochemical education in the USA", *Biochemical Education*, 28, 2, 2000, 64-70.
- J. H. Walker, "Taking notes in seminars - a new improved method", *Biochemical Education*, 27, 4, 1999, 211-213.
- Gareth Denyer, "Strategies for building criticism skills in undergraduate biochemists", *Biochemical Education*, 28, 2, 2000, 74-75.
- Moises Burachik, Martin Vasquez, Amalia Koss, "The Biotechnology enterprise project: an exercise on the detection and development of business skills in an undergraduate biotechnology module", *Biochemical Education*, 27, 1, 1997, 31-34.
- Michelle Barton and Michael A. Lieberman, "An optional laboratory in molecular techniques as an aid in the teaching of medical biochemistry", *Biochemical Education*, 27, 3, 1999, 150-152.
- Viviana Rivarola and Mirta B. Garcia, "Problem-based learning in veterinary medicine: protein metabolism", *Biochemical Education*, 28, 1, 2000, 30-31.
- Bernard Brown, "Poster design – six points to ponder", *Biochemical Education* 25, 3, 1997, 136-137.
- Mary Briscoe, *Preparing scientific illustrations - a guide for better posters, presentations and publications*, New York, Springer Verlag, 1996, 131-149.