

Using choice in assessment to motivate students: the CSI assignment in a first year biology course

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Abstract

As academics, we sometimes struggle with making assessment interesting and motivating for students, especially for students in large first year courses. We need to align assessment with learning, while providing timely, helpful feedback in a cost-effective, efficient manner. Markers with large cohorts mark many assignments on the same topic and in the same format, which quickly becomes a chore. This session presents a case study of an innovative assessment item for a first year biology course, the CSI assignment. Students can choose the topic, presentation format and submission mode (individual or group) of their assignments. Offering this range of choices, combined with scaffolding the experience throughout semester, leads to positive student experiences with assessment. The session discussion will focus on the issues of choice and flexibility in assessment and the perceived advantages and limitations.

Context

Cell Biology (LFS100) is a foundation course in science taught in first year of Bachelor programs at the University of the Sunshine Coast, a regional new generation university. The themes of the course are the structure and function of eukaryotic and prokaryotic cells. A diverse group, including school leavers, mature age students and a high proportion of first-in-family students, enrol in the course. Most students study in various science and allied health programs, with enrolment numbers from 250 to 400 students. In 2008 two main concerns prompted us to develop the Cell Specific Investigation (CSI) assignment. Firstly, by giving students the opportunity to research a specific cell type of their own choice, we hoped to motivate them to engage with their biology content. Increased interest in and motivation to successfully complete the assessment, as well as greater understanding of the lecture concepts, were other expected outcomes (Glynn & Koballa, 2005 cited in Glynn & Koballa, 2006; Race, Brown, & Smith, 2005; Steglich, 2000). Secondly, we wanted to accommodate student diversity; the CSI celebrates the diversity of student talents and interests by allowing choice in the way students address the assignment criteria. When students are allowed choice in their learning and the methods of assessment, positive attitudes to learning result (Glynn & Koballa, 2006; Ramsden, 2003). In a study of a large introductory course in general biology, alternate assignment choices lead to improved grades, and students welcomed the chance to own their own learning in at least some small way (Litchfield, Mata, & Gray, 2007). Students showed “increased motivation and perceived relevance” (p. 39).

The decision to develop the assessment was made after careful analysis of course feedback and discussion with the course team and other colleagues. Concurrent with new method of course assessment, the weighting of the invigilated final examination has reduced, which has,

in some small part, reduced the stress associated with a first semester, first year course (Race, et al., 2005).

The CSI assignment

The key to the CSI assignment is choice:

- choice of cell type (i.e. assignment topic)
- choice of assignment format
- choice to work individually or in a small group
- choice of referencing style

Cell Type

Students choose a specific cell type, research the literature and then describe the structure and function of the cell type. They are required to cite academic references to support their information. To demonstrate a level of understanding of the integrative nature of the course, students must link the cell type to at least one concept covered in the Cell Biology lecture series. For example, a small intestine cell could be linked to nutrient uptake or a mesophyll cell in a leaf could be linked to photosynthesis. In addition, students must use a database search to seek out some current topical research on the cell type. A description of this research must be incorporated into the presentation and must demonstrate a link with a biology discipline (e.g. environmental science, biomedical science, nutrition, biology education). This criteria allows research and knowledge acquisition that links to students' own personal and future career interests (Steglich, 2000). Another course aim is to develop proficiency in scientific writing, and therefore students are also assessed on the quality of their writing style.

Assignment Format

The choice of assignment format carries the greatest flexibility. Students may choose from the suggested options for presentation (e.g. a pamphlet, fact sheet, PowerPoint presentation, science magazine article or mini-poster). Alternatively, they may develop their own ideas for presentation, provided the assignment criteria are fulfilled and the course coordinator approves. For example, students have submitted innovative formats like board games, videos, and interactive 3D models. Students are assessed on the CSI's creativity and originality, as well as the general formatting and presentation.

Group work

Students can choose to complete the assignment as an individual or as part of a self-selected group (maximum of 4 students). Clear guidelines on group work support students and scaffold learning. Groups maintain work evidence sheets to demonstrate members' contributions and collaboration. Group members also complete a peer- and self-assessment that contributes a weighting to the final mark.

Referencing Style

Yet another choice students make is the referencing style (Harvard or Vancouver) that best suits the format of their presentation. For example, the citation-sequence format of Vancouver referencing may be more compatible with PowerPoint and poster presentations.

Scaffolding of the assessment task helps focus students

The CSI assignment contributes 15% towards a student's final grade. The assignment is introduced in the Week 1 lecture and is due in Week 11 of semester. Clear expectations and criteria for the assignment are provided by (a) an analytical rubric, (b) clear and comprehensive instructions and guidelines, and (c) other support material (e.g. referencing style guides and examples of formatting). All of these materials are posted to Blackboard no later than Week 3. In addition, timely checkpoints provide guidance on the development of the assignment (Race, et al., 2005). The students complete a total of three checkpoint forms at regular intervals (Weeks 4, 7 and 9). These pre-submissions are discussed with teaching staff and provide "staged deadlines" (Race, et al., 2005, p. 91) to help keep students on track for successful completion. Students supply information on their cell choice, whether they have formed a group, their literature search results, and an updated timeline for completion. Sufficient time to develop the work (at least 10 weeks) facilitates deeper thinking.

Additional tools for support include a Blackboard discussion forum with peer and tutor contributions, and face to face drop-in sessions with tutors (Race, et al., 2005). Tutorial exercises on paraphrasing, referencing and plagiarism make the policy and consequences of plagiarism explicit (Soto, Anand, & McGee, 2004).

The impact of the CSI assignment

Impact on students

Student feedback suggests they enjoy this assessment more than others because they choose something of particular interest to themselves:

The CSI assignment was really interesting and allowed for a better understanding of course concepts and applicability of Cell Biology

The best thing about this course was doing the CSI assignment!

The motivation and interest generated often lead to:

- more effort in the assessment task (summary of mean scores included in Table 1)
- students' developing their own motivation for learning
- a greater sense of student ownership of work

Table 1: Metrics for the CSI assignment in LFS100.

	2008 ^a	2009 ^b
Number of students completing assessment as a group	91 students (33 groups)	131 students (55 groups)
Group score (mean \pm SD)	73.7 \pm 8.7% [#]	71.2 \pm 9.6%*
Number of fails (group submission)	0	1
Number of non-submits (group submission)	0	0
Number of students completing assessment as an individual	184	164
Individual score (mean \pm SD)	69.0 \pm 12.8%	65.6 \pm 13.6%
Number of fails (individual)	10	15
Number of non-submits (individual ^c)	28	34

^a five marking criteria, equally weighted in 2008; ^b six marking criteria, unevenly weighted in 2009;

^c includes Withdrawn & Withdrawal Fail students;

- significant difference Group vs Individual scores 2008, Student's t-test, $p < 0.04$; * significant difference Group vs Individual scores 2009, Student's t-test, $p < 0.01$

Another positive outcome of the assessment strategy was skill development in computer software. Students learnt to use, for themselves or from each other, new computer software programs. These programs included PowerPoint, Publisher and Flash animation. More traditional assignments such as essays or literature reviews often limit students to use of standard word processing software. Group workers in particular benefitted as members brought different experiences and creative talents to the exercise.

Impact on teaching staff

- Markers commented that grading was more pleasurable due to the variety of topics and presentation formats
- Uptake of the group submission option has reduced marking time

Session outline

After a 15 minute PowerPoint presentation on the principles behind and implementation of this innovative assessment, session attendees will be encouraged to comment on the practice presented and to discuss the issues of:

- how assessment can be used to motivate students to learn
- the advantages of choice in assessment
- possible disadvantages or limitations of choice in assessment
- whether the general principles of choice can be applied to other types of assessments

References

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