

Use and perceptions of a blended learning resource: are student perceptions reflected in their performance ?

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Abstract

This study is part of an ongoing investigation looking at students' perceptions of use and usefulness of a range of learning resources in a junior human biology course that had undergone restructuring in 2005. The restructuring involved the incorporation of a major online component, HBOnline. The purpose of blending traditional resources, laboratory classes and lectures, with HBOnline was to increase the diversity of learning opportunities for students. This study addressed a number of questions relating to how 2005 and 2006 first year students in the advanced stream perceived this blended environment and how it relates to their performance. Comparisons between the cohorts indicate that the perceptions of usefulness of all resources within the curriculum are consistent and positive. The responses indicate that the students adapted with ease to the blended-learning environment and to HBOnline in particular.

Introduction

In recent years there has been a trend in tertiary education towards an increased use of online resources to provide a more acceptable learning environment to support today's students. This has included provision of course material, formative assessment opportunities, synchronous and asynchronous communications opportunities as well as a range of discipline or course specific tools. This 'new' environment has led to many teachers looking at different ways to blend both face-to-face and online activities and this in turn requires evaluation of the 'blend' to assess the usefulness of the various learning resources. This can be done by asking how students use the traditional and online materials, as research has shown making use of every learning opportunity enhances performance outcomes (Zakrzewski and Bull 1999; Buchanan 2000). The use of online materials can change the roles of students and teachers, facilitate more student-centred learning and expand the scope and content of the curriculum (Horgan 1998).

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Within the higher education sector, online material was introduced initially to assist students who studied off-campus, but has now developed into an integral part of the course material that complements the traditional methods (Oliver and Omari 2001). This trend towards using online material is increasingly relevant since it provides greater flexibility to cater for the diversity in the capabilities and commitments of students.

First Year Biology, at the University of Sydney, developed one of the university's first virtual learning environments (Franklin and Peat 2001). This Virtual Learning Environment (VLE), which has been in use since 1996, provided a virtual platform from which students and staff could communicate. It supported staff by providing a central location for online resources and a portal from which to communicate to individuals and groups. Evaluation of the resources available and research on the effectiveness of the formative assessment resources has been reported at length elsewhere (Peat 2000; Franklin et al. 2003; Peat et al. 2005). An early investigation into the blending of online resources within the curriculum provided evidence that mix-mode provision of learning resources could enhance the learning outcomes of students (Peat et al. 2002). Whilst some of the functionality of the first year biology VLE has been superseded by the introduction of *WebCT* as a learning management platform, the learning and self-assessment resources are still provided through the VLE.

HBOnline was created using *WebCT* for students in the first year Human Biology course. The resource was created by converting content-rich linear print material from laboratory notes, self-test quizzes and independent study modules into interactive online courseware (Lilje and Peat 2006). The courseware consists of four formative assessment modules each related to timetabled topics in the Human Biology course. These modules allow the students to read the prescribed texts and complete a variety of interactive exercises which include text-entry, matching, labeling, and word-selection. All the material covered in *HBOnline* is assessed indirectly in either the timetabled quizzes or the final theoretical exam. *HBOnline* forms one-third of the course structure with the remaining two-thirds consisting of the traditional course components, lectures and laboratory classes. There are summative assessment activities incorporated into *HBOnline*, including case-studies, which are group-work activities that encourage students to work through questions based on real life scenarios. The students are then required to submit a written response and give an oral presentation. Our initial objective for creating *HBOnline* was to provide a resource that could be used to gain new knowledge, consolidate knowledge or revise content. In addition the resource would allow the students to explore the subject to the depth that they felt suited them.

This paper reports on follow-up work from a previously presented study in which the development of *HBOnline* was discussed along with some early data on student use and perceptions of usefulness (Lilje and Peat 2006). The study addresses a number of questions relating to the use and perception of use of major components that make-up the Human Biology course, including *HBOnline*, and how it relates to student performance. Two cohorts of advanced human biology students (2005 and 2006) are now included in this study to provide a measure of reliability and consistency for the reported outcomes.

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Method

The research questions were:

1. “Does perception of usefulness of a resource vary with elearning and the traditional modes of learning?”
2. “How do students use major components of a course and does this change from year to year?”
3. “Is student perception of usefulness of compulsory assessment tasks a good indicator of performance?”

Students from the advanced stream of the human biology course were asked to volunteer for this study. As part of the prerequisite for enrolling in the stream students were required to have a NSW and ACT University admission index (UAI) of 93 or above. This reduced the heterogeneity of prior academic performance or ability influencing the findings of this study. The students were surveyed at the end of the semester. The paper-based survey collected student demographics, including prior experience in online learning. Perceptions of usefulness of all the learning resources were investigated using a four point scale, with students classifying statements according to whether they use a resource, found it not useful, useful or extremely useful. The 2006 survey repeated the questions asked in the 2005 survey, preliminary findings from which have previously been reported (Lilje and Peat 2006). The implementation of the survey complied with the University of Sydney’s Ethics Committee Guidelines for research with humans.

Chi-squared and two-way analysis of variance were used to measure significant differences ($P=0.05$) between and within years.

Results and Discussion

The survey was handed out to all students in class time in second semester in 2005 and 2006. The response rate was 61% for 2005 and 75% for 2006 with a similar number of males and females responding in both years (Males = 26% in 2005; 22% in 2006). In addition most of the students were full-time enrolled (98% in 2005; 95% in 2006) and they were mostly school leavers (95% in 2005; 100% in 2006).

Students reported that their IT skills, prior to commencing the course, were well developed. This included a reporting of all 2005 and 2006 students (100%) with computer, internet, email and word processing experience, but with less familiarity in the use of databases (68%), electronic discussions (70%) and *WebCT* (85%).

However, with the exception of home or work, there was significant difference between 2005 and 2006 students as to where students accessed *HBOnline* ($F_{1,2}=57.1, p=0.02$). While home or work was the preferred place for all students, the University access centers and the biology laboratories were used more often by students in 2006 (Figure 1). This suggests a greater awareness of the flexibility of the resource or more confidence and adaptability of the user. The latter possibility is difficult to substantiate given the similarities in prior IT skills with the 2005 cohort. However,

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the former may relate to the differing educational backgrounds of the two cohorts. In 2005, there was a higher percentage of students who had not taken biology in their final year of school (12%) as well as those who had not already taken a unit of university biology (7%), compared to 2% and 0% respectively in 2006. The prior exposure to elearning tools in other courses and in secondary school may have resulted in students being more aware of and confident in accessing on-campus facilities.

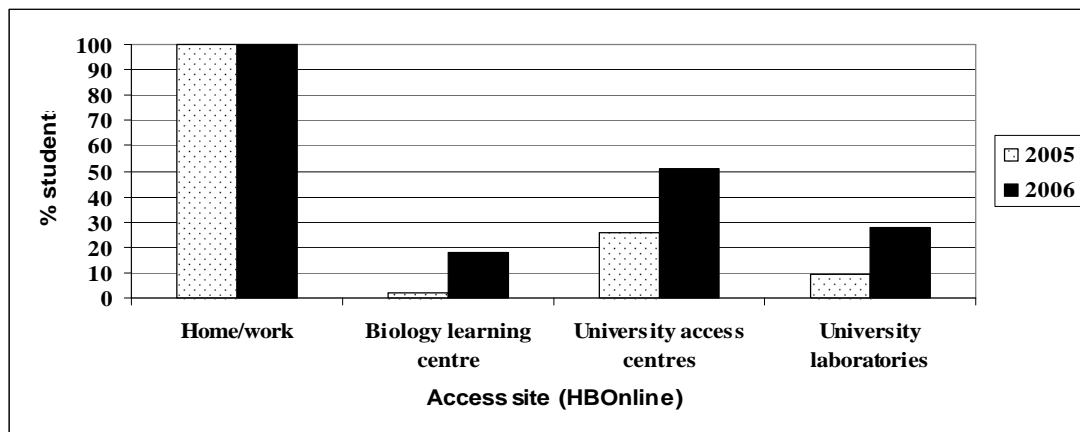


Figure 1: Where students access elearning resources

Research question 1: *Does perception of usefulness of a resource vary with elearning and the traditional modes of learning?*

This question compares students' perceptions of usefulness of the learning resources of elearning tools with traditional, face-to-face, lectures and practical classes. The course is given with both face-to-face and online experiences. Comparisons were made for two online components (using self-assessment modules (SAMs) and *HBOonline*) and for three face-to-face activities (special lectures, lectures and practical classes). The SAMs were designed to draw together related parts of a course to help students make connections between topics in biology and to promote a deeper learning strategy. The modules are additional, optional materials designed to let student identify their level of understanding (Peat and Franklin 2002).

Figure 2 shows an interesting trend in students' perceptions of usefulness. In 2005 and 2006, the larger proportion of students found *HBOonline* "extremely useful" (50 and 74% respectively), the practical notes "useful" (83 and 69% respectively) and the lecture notes "useful" (2005: 53%) or "extremely useful" (2006: 59%). It was interesting to note that the other elearning component, the SAMs, were not used as much as *HBOonline*, and this may be because *HBOonline* provides sufficient information without these advanced students needing to use other support materials. In addition, whilst students are notified of the relevant SAMs at appropriate times during the semester, these resources are not directly assessed and do not relate directly to the content of the practical classes, unlike *HBOonline*. This suggests that despite favoring flexibility in their access to online learning resources, students in the first year course need guidance.

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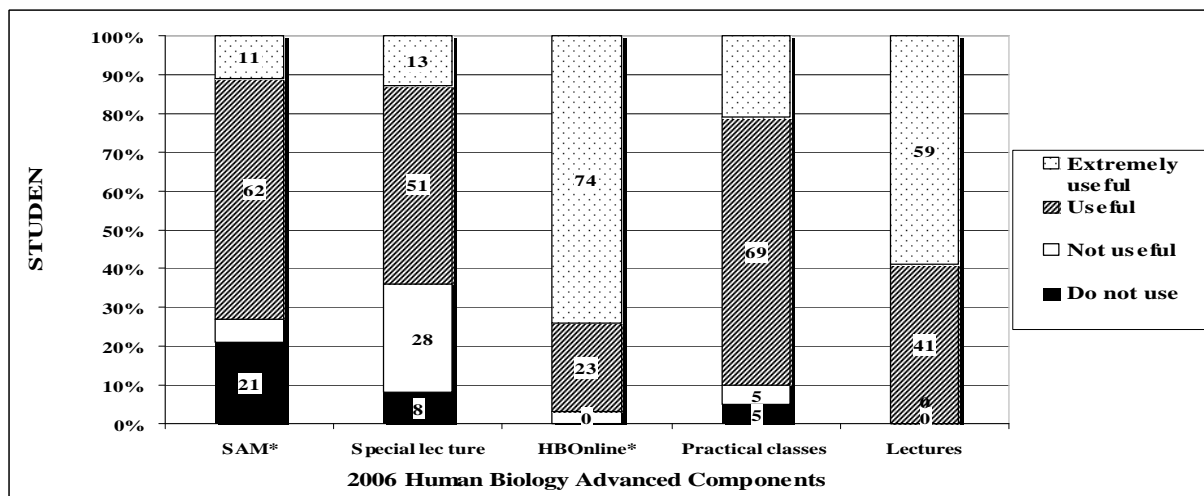
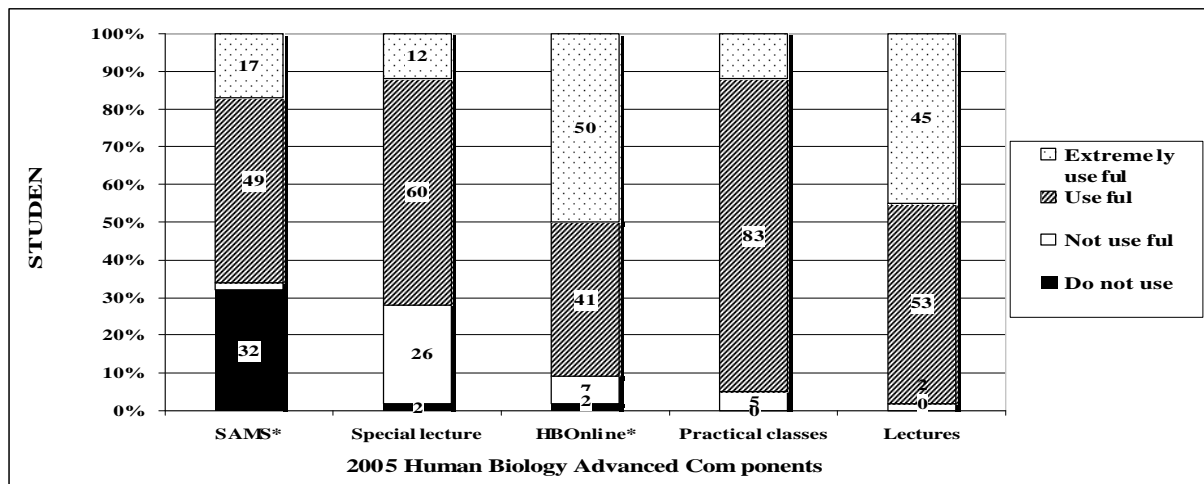


Figure 2: Student perceptions (for 2005 and 2006) of usefulness of components of Human Biology Advanced

There was no significant difference found, which suggests a consistent pattern between the years, but there is a trend from 2005 to 2006 in the percentage of students finding some of these components extremely useful.

The consistently high percentage of students that thought the main components – lectures, practical classes and *HBOnline*, are useful suggests students are complementing and integrating the traditional resources with the *HBOnline* material. This deviates from the conclusion of previous literature such as Oliver and Omari (2001) where they found that students identified the traditional resources as being more useful, citing the lack of face-to-face contact with IT resources as a problem. Perhaps limitations to the effectiveness of IT resources relates to how they are incorporated into the overall structure of a course as is suggested by the difference in

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perception to SAMs and *HBOnline*. Perception is also influenced by students' prior use and understanding of computer and internet skills (Peat et al. 2002; Jelfs et al. 2004). Our results indicate students are now very comfortable with the technology and we would expect this as the current "NetGen" move on into higher education.

Research question 2: *How do students use major components of a course and does this change from year to year?*

Students were asked two questions: whether they used the materials and if so how often; and, for what purpose did they use the materials and for this they had three options from which to choose: revision; gaining new knowledge; and, consolidation of knowledge. Students could indicate all three options for each 'resource'. Figures 3, 4 and 5 show the responses for 2005 and 2006. As might be expected from the format of the course, for *HBOnline*, students indicated that they used the resource more for gaining new knowledge than for either revision or consolidating knowledge, and this was also true for the lectures. Interestingly more students in 2006 reported 'new knowledge' gains from *HBOnline* and this difference is significant ($\chi^2=17.6$, $df=1$, $p<0.5$). There was no significant difference between years in the frequency of use of the resources (lectures, practical notes and *HBOnline*). This suggests the two cohorts are taking similar approaches in accessing the resources and assimilating the information.

One of the benefits of launching *HBOnline* on *WebCT* was the facility to track students' use through the recording of the number of times the student goes to a site, referred to as hits. However, using hits to determine frequency of use was found to be an unreliable way of estimating students' engagement with *HBOnline*. Anecdotal evidence suggests that students engaged differently with this e learning component. Many of the students used the print facility of *HBOnline* periodically to obtain paper-based copies of the exercises but continued to use *HBOnline* to check their answers. This raises the intriguing question of whether students are fully adapted to interactive online environments or whether they are still resorting to traditional paper-based study techniques. There is the possibility however that this points to the students' flexibility in adopting and merging online and traditional study practices. To investigate this further, a question relating to how students engaged with the online tools needs to be added to future questionnaires. Information on how students viewed the importance of the components in terms of their use (revision, new knowledge or consolidation of knowledge) using a sliding scale from 1 to 10 will also provide more detail as to how students viewed the benefits of the components.

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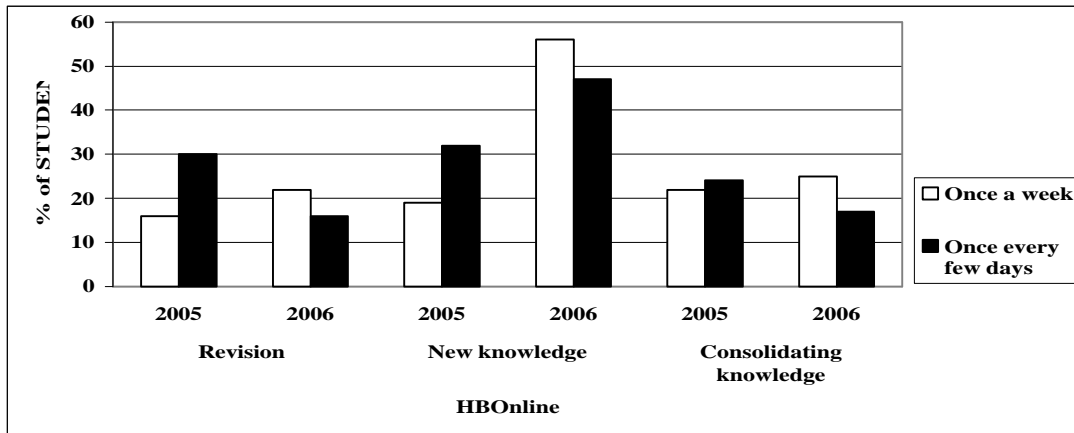


Figure 3: Comparison of usage and frequency of use of *HBO*Online

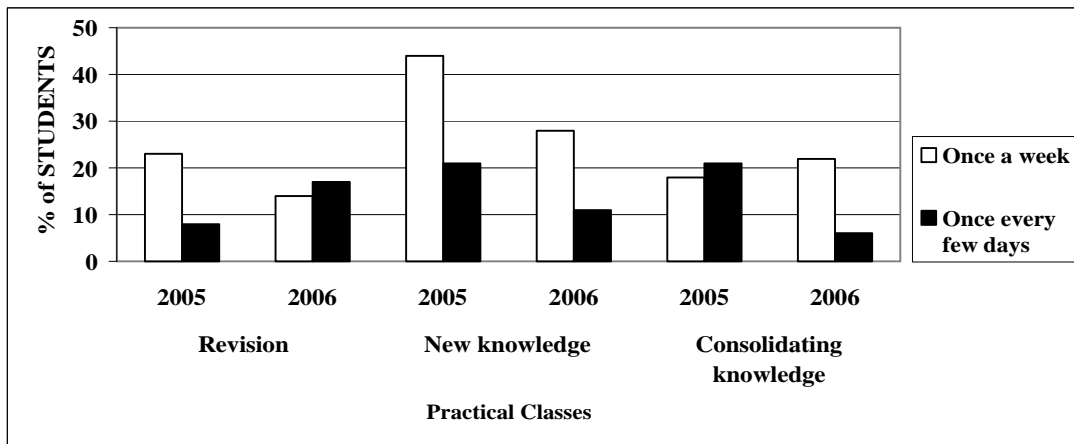


Figure 4: Comparison of usage and frequency of use of practical classes

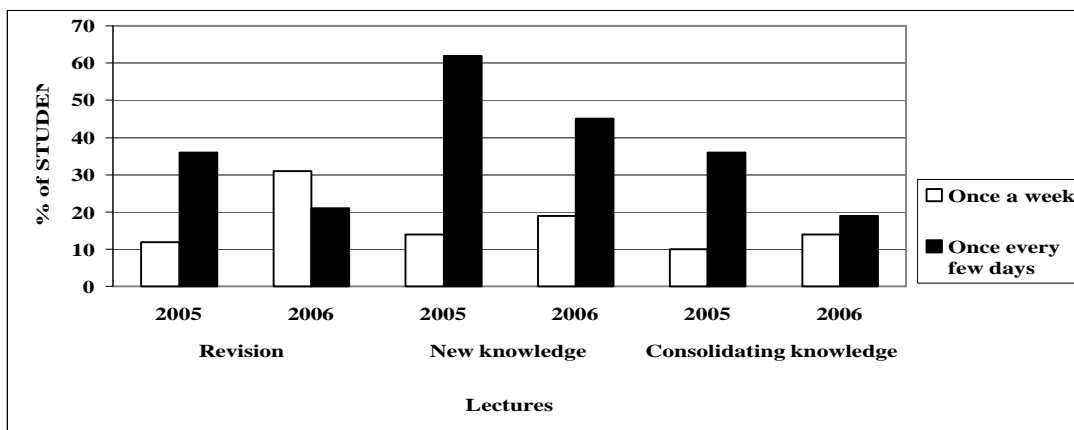


Figure 5: Comparison of usage and frequency of use of lectures

Research question 3: *Is student perception of usefulness of compulsory assessment tasks a good indicator of performance?*

Students' perceptions of usefulness (whether the resource material was extremely useful, useful or not useful) were compared to the marks received in assessment tasks, and analyzed for any patterns. Three assessment tasks were chosen to answer this question: a group essay mark; individual online quiz marks; and, an individual essay mark. The group essay mark was associated with a segment of the course which introduced first year students to issues of bioethics. The online quizzes covered content of the lectures, the practicals and *HBOonline* at regular intervals during the semester. Each student chose a topic of interest to research during the semester and produced an essay which was both orally presented as well as in written form.

The mark range for each assessment task reflects university merit grades. There was no clear correlation between students' perceptions of usefulness of compulsory assessment task and the mark achieved and this was true for both 2005 and 2006.

Figure 6 shows the data for the group essay. These data show a tendency for a higher percentage of students with high distinction for this assessment task to consider it useful or extremely useful.

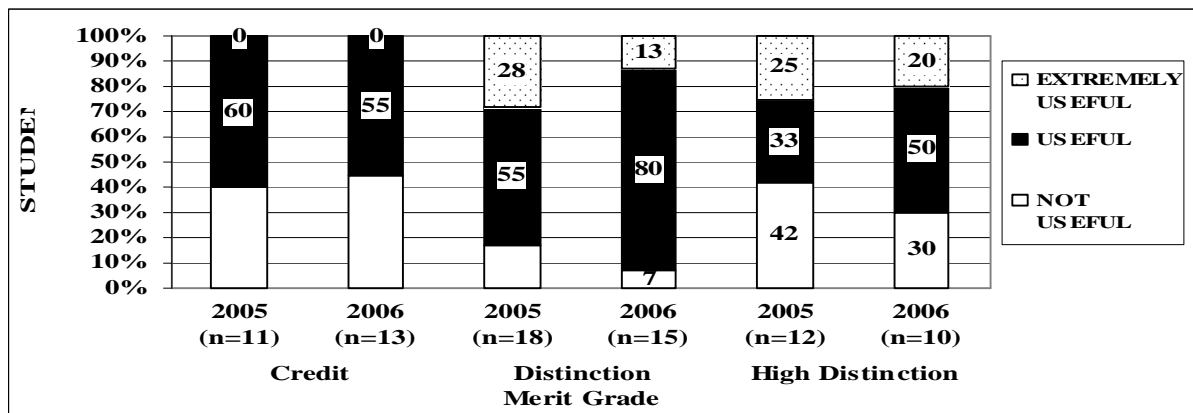


Figure 6: Students perception of usefulness of the summative assessment ethics group essay compared to marks

Figure 7, the data for the quiz, shows that of the 2005 and 2006 students in the distinction -high distinction category for this assessment task, a higher percentage found the task extremely useful to their learning.

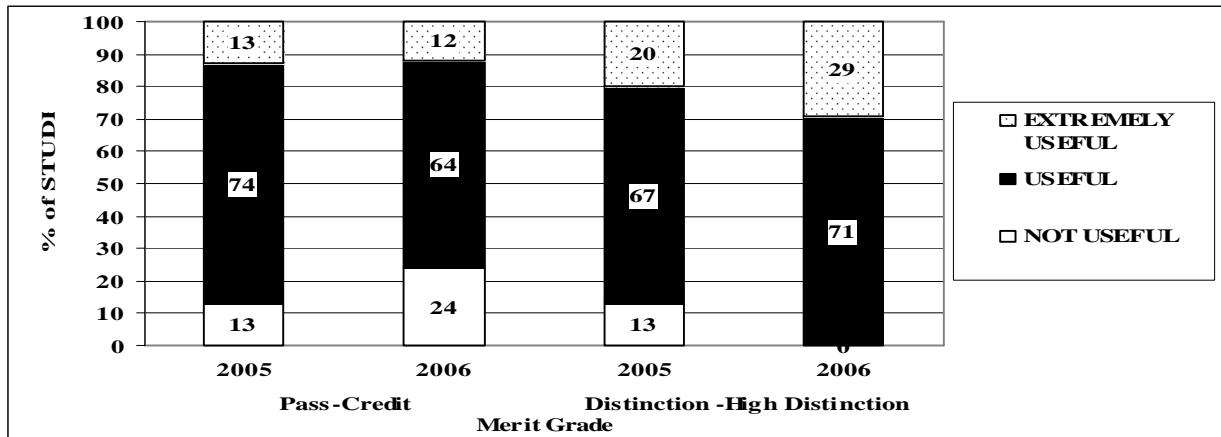


Figure 7: Students perception of usefulness of the summative quiz compared to marks

The independent essay is the only task where there is a variation between 2005 and 2006 (Figure 8). The percentage of 2005 students saying the task was “not useful” was higher for students who had received a credit or a distinction for this assessment task, with no students falling into the pass category in 2006. All students (2005 and 2006) in the upper range of marks found the activity either useful or extremely useful.

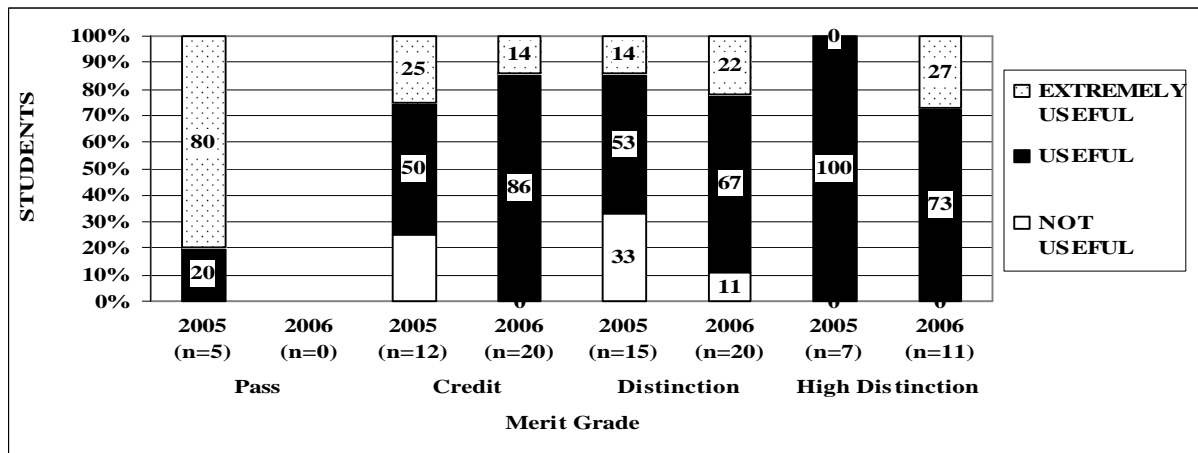


Figure 8: Students perception of usefulness of the independent essays compared to marks

Lack of correlation may be as a result of students not understanding their performance and not having an opportunity to improve on their performance, which would impact on their perception of usefulness. A lack of feedback to students may be responsible for this lack of clear pattern, since the students were not clear about their performance and therefore could not gauge the usefulness of the task (Kenny 2003).

This study has attempted to look at the way in which a group of advanced, and thus talented, students have gone about using a suite of resources that were provided to encourage deep

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thinking and personal reflection as well as opportunities to work with their peers and provide support for one another within an online learning environment. The study has looked at two cohorts of students to look for trends and to provide a measure of reliability. The demographics of the two cohorts is sufficiently similar to make comparisons between them. Students overwhelmingly agreed that the various resources, and especially the online resources, were of benefit to them in their learning, with no differences found between the two years. Now that our students are very experienced with using computers and online materials they are indicating strong support for online resources, which may be in contrast to previously reported views.

Students in this study reported using all the resources for gaining new knowledge, for revision and for consolidating knowledge with possibly an emphasis on *HBOnline* being a much used resource. Further work needs to be done to investigate and compare the perceptions of students in the standard stream, who experienced the new human biology course structure from 2006.

Part of the study, which has not been reported here, was to see if student engagement with these 'new resources' improved the ability of students to answer questions in the final exam paper. For this we chose to analyse their written answers, using a method based on SOLO taxonomy, to a series of short-answer questions. This work is still to be completed and will be part of a follow-up to this report.

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