

# Mastering Biology: BS101 Molecular Cell Biology

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## Background

Mastering Biology was introduced on this course in 2009-10 as part of the coursework score. There were 160 students in 2015-16 when this study was conducted and Mastering Biology was well integrated into the first semester, also used in the second semester. Areas of particular interest for the teaching team included:

- Actively supporting individual students
- Encouraging consistent engagement with the course, motivating students
- Maintaining positive feedback on the resource, satisfied students
- Identifying areas of difficulty with the course, ensuring students are supported
- Positive student experience, provide timely support for students

Assessment in Year 1 comprised of: 33% MCQ Term 1 Exam, 33% Term 2 Exam and 33% Coursework. Mastering counts as 10% of total 33% coursework mark i.e. 3.3%. It was designed as an incentive to student participation but not to impact on a final pass/fail mark.

## Findings

### Supporting Student Attainment

Over the last 7 years, Louise Beard has tracked student achievement on BS101. According to the data she collected, Mastering Biology has had an impact on student attainment on the course. Since introducing it to the coursework element of the course in 2009, mean scores in **all** aspects of the course have increased. That is to say MCQ, exam and coursework scores all improved, not only in coursework where Mastering Biology is used for credit. The course has not otherwise changed in delivery, apart from the introduction of Mastering Biology.

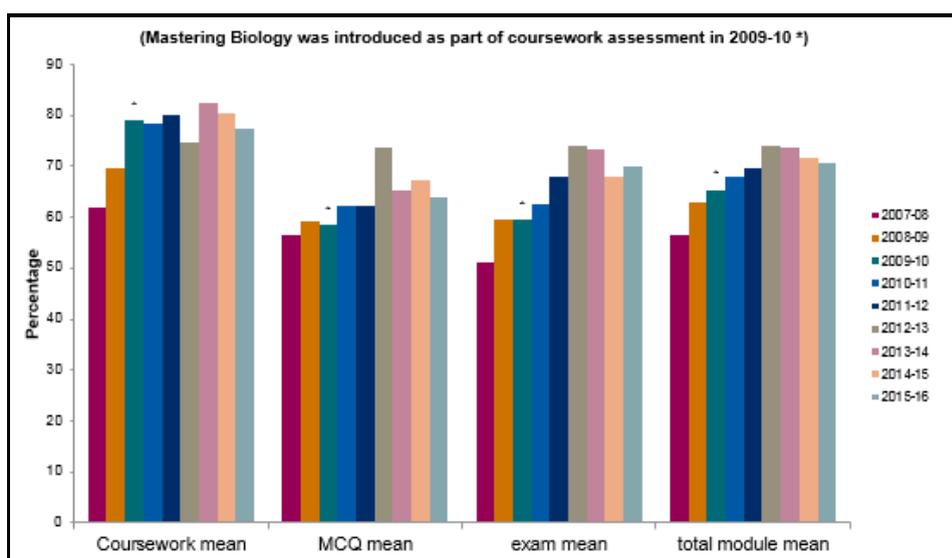


Chart 1.1

Assignment scores on Mastering Biology were also compared to summative testing scores from the course (see Chart 1.2). The results show students achieving high scores on Mastering assignments suggesting they could benefit from additional questions with a greater degree of difficulty. Challenging them to do more difficult questions might also help the teaching team to identify which students are struggling more easily.

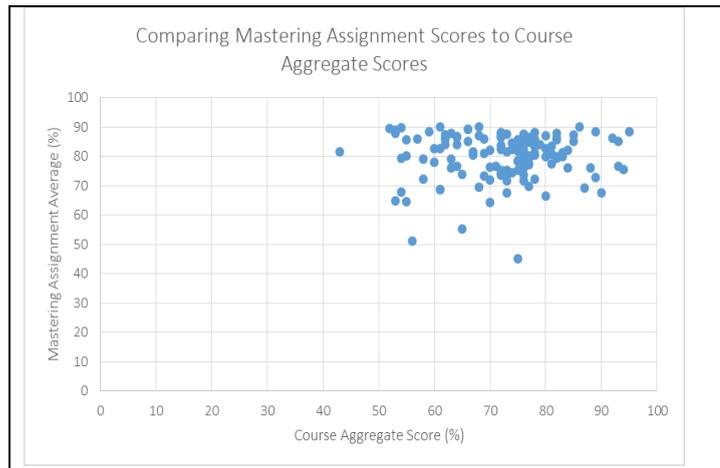


Chart 1.2

**Time** spent on Mastering shows a positive relationship with the aggregate course scores, generally the more time a student spent on Mastering, the better their score on the course overall. The same finding was reported in a 2016 study into Mastering Engineering which found a positive correlation where students who spent more time on Mastering performed better on the course (significant, medium relationship  $r=.40$ ,  $p<.01$ )

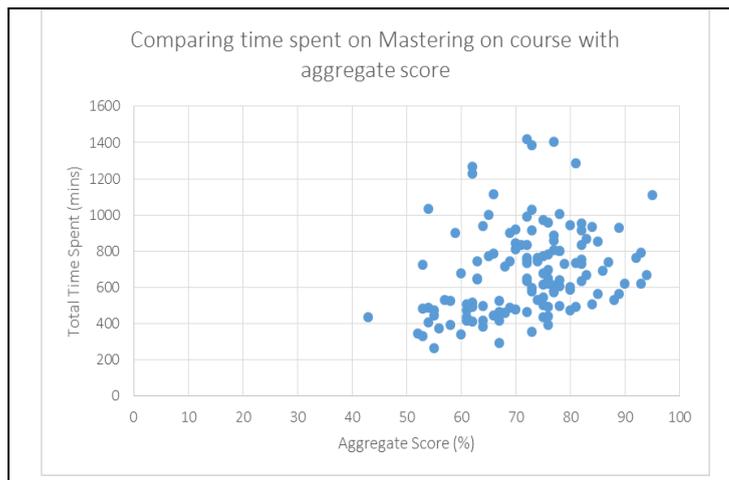


Chart 2

Comparing **difficulty** and **achievement** shows that the more difficult students found the assignments on Mastering Biology overall, the lower the score they achieved on their assignments. Knowing this helps to pinpoint those students whose achievement might be improved most by additional support before the final exams or coursework submissions.

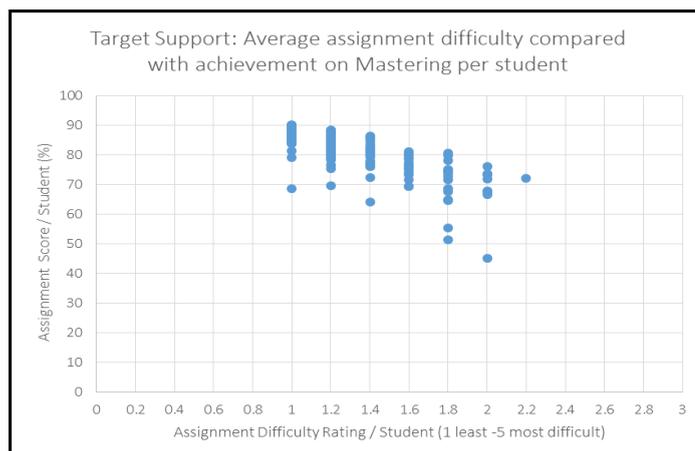


Chart 3.1

The **difficulty level** assigned to each formative assignment (5 being most difficult) showed that this class, on average, found assignments easier than average expected scores (universal average). Assignment 1 was the exception to this. Providing students with additional learning opportunities on Mastering Biology in these areas may improve scores.

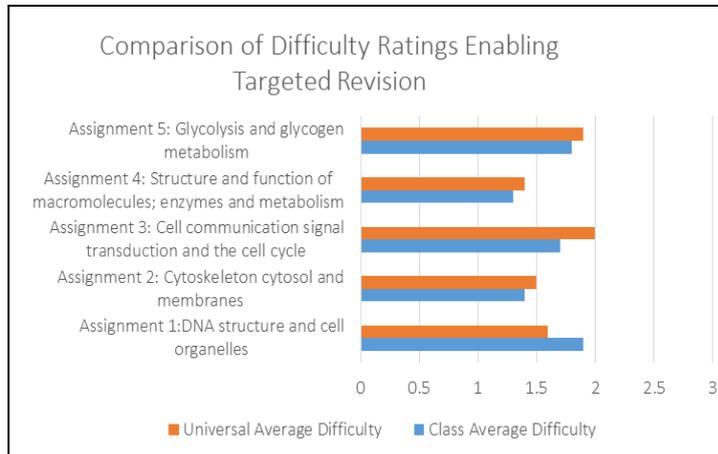


Chart 3.2

### Engagement & Retention

**Impact of providing compulsory assignments.** Overall 90% of students participated in Assignments (compulsory) and 25% participated in Revision (non-compulsory activities). Compelling students to complete work and offering credit for it is clearly a powerful motivator which encourages engagement with the work.

The 5 points here show the 5 compulsory 'Assignments'. All other points on the chart are optional activities without credit assigned to them.

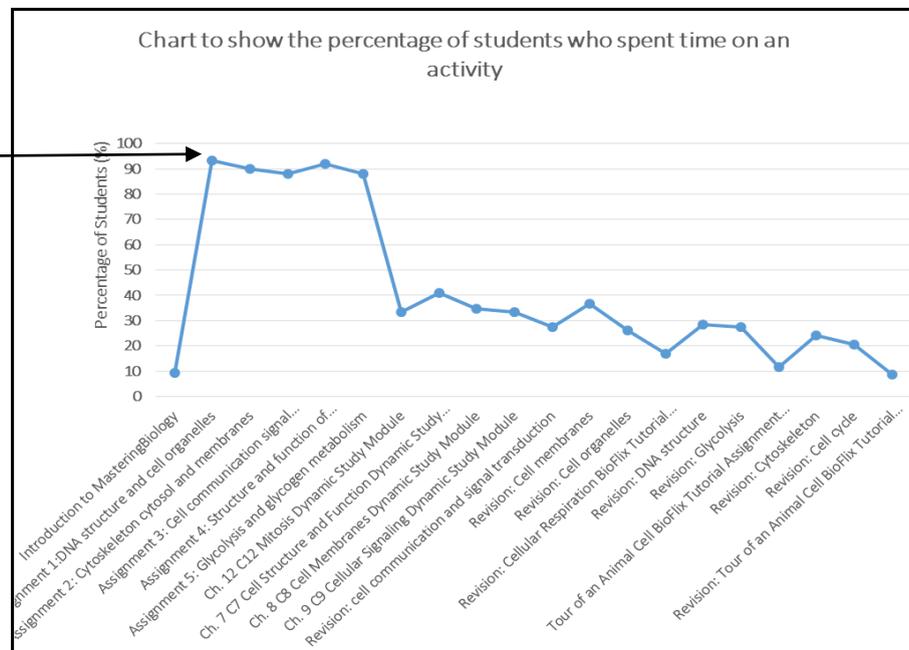


Chart 4.1

Louise Beard, the module convenor on this course, found this to be true even over 7 years of analysis - shown in her charts on the following page.

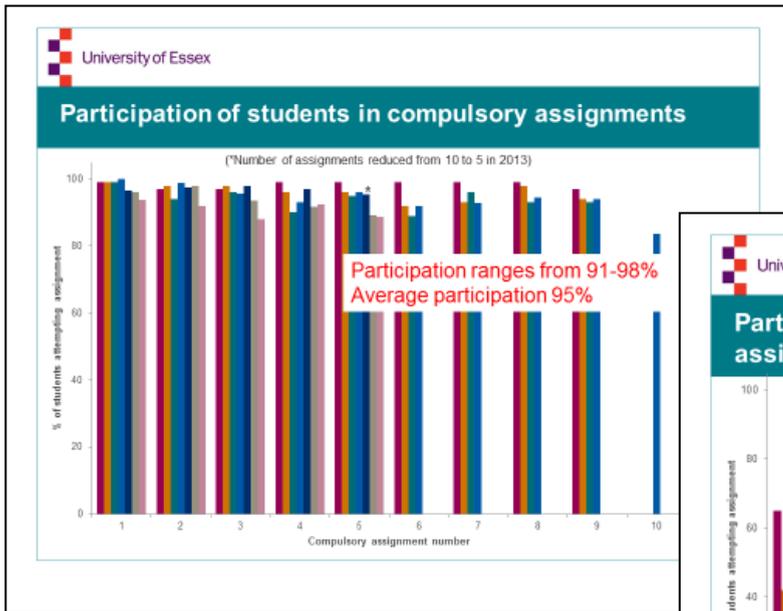


Chart 4.2

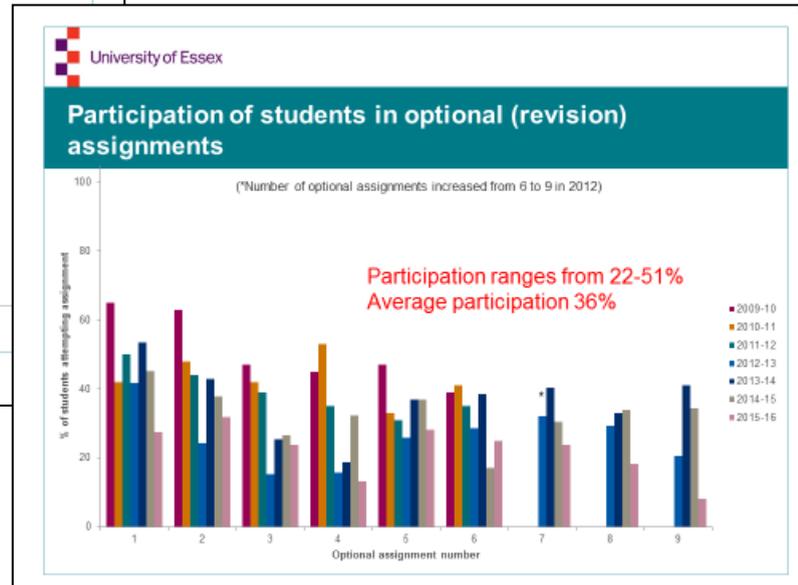


Chart 4.3

**Non continuation.** There were some students who did not appear in the Mastering Biology gradebook at all, despite being registered on the university module and having access to the resource. Of particular interest are the final outcomes of those students.

Of the small group who failed to engage with Mastering Biology at all, 5 of the 8 students (62.5%) failed to return to Year 2 in any course at the University of Essex. This is an annual loss of £45,000. Earlier identification of the students might have helped to retain some of them either on this or a different course.

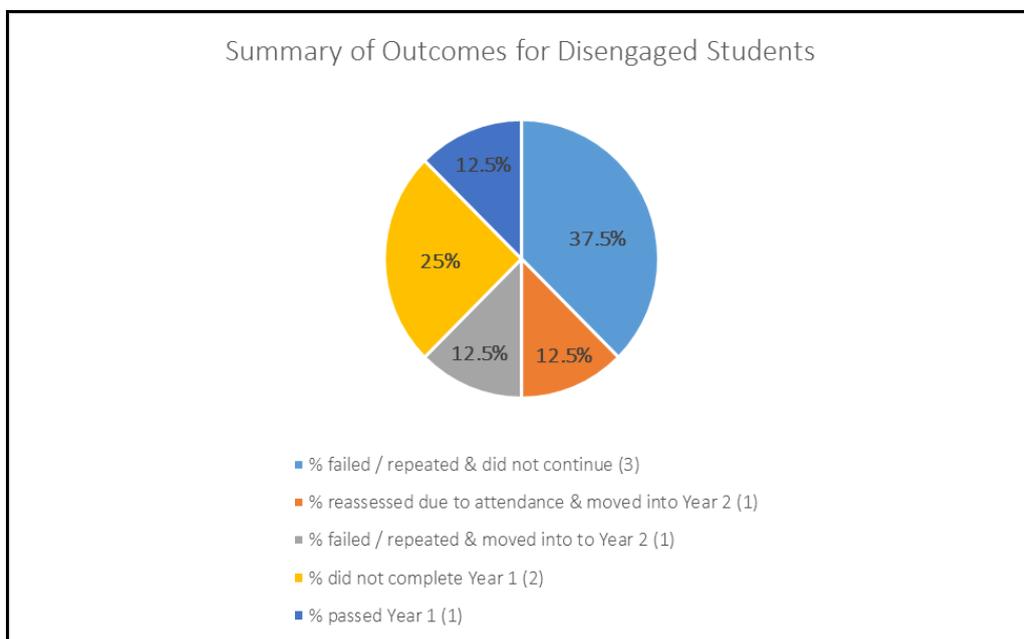
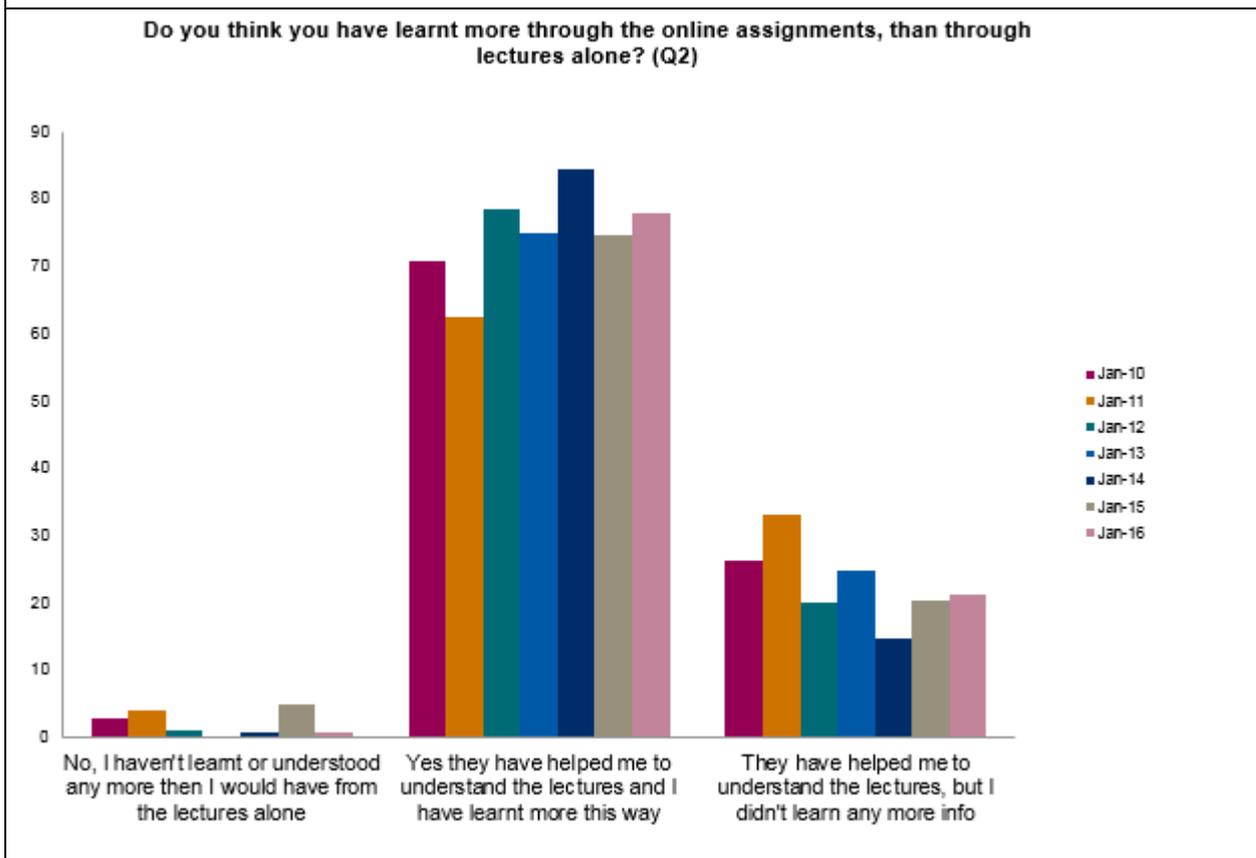
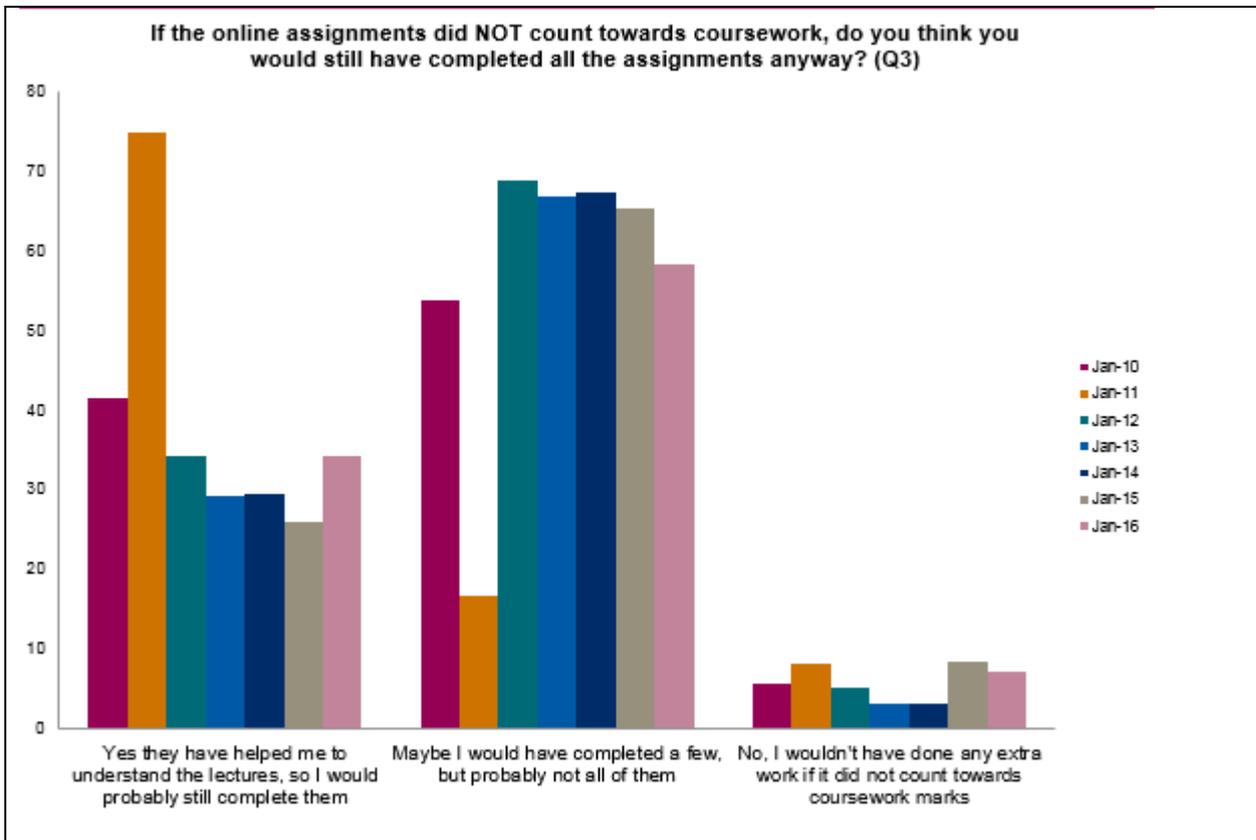
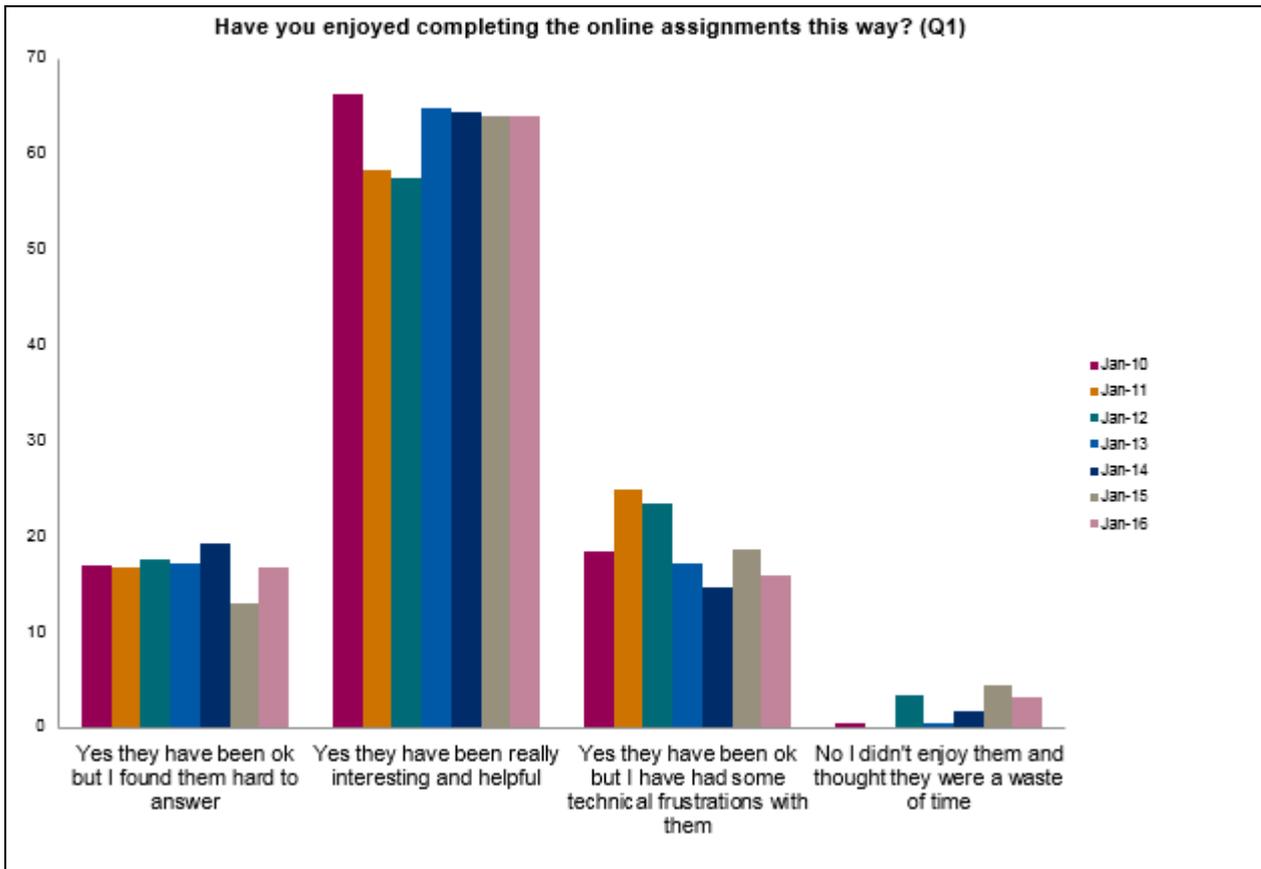


Chart 5.1

## Student Experience

Louise Beard gathered annual feedback on Mastering Biology from her students and the charts below are representative of student experience and opinion over the space of 7 years. They show that the majority of students found Mastering to be helpful to their understanding, enjoyment and learning on the course.






University of Essex

Favourite module of 1st year - still 'they' very well. I especially enjoyed the revision available on mastering biology.

- Mastering Biology is dynamic and intellectually stimulating. Mastering biology was brilliant.

Mastering Biology is the best help I've ever used using mastering biology.

The use of Mastering bio. helped me enjoy Mastering biology was a good practice.

Loved Mastering biology. Mastering biology was a really useful tool.

Mastering Biology was really helpful. Mastering bio. - excellent. helped me understand topics more.