

# Thresholded assessment: Does it work?

## Report on an eSTEEeM project

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## Executive summary

Many Science Faculty modules have moved from their previous summative continuous assessment to formative but thresholded continuous assessment. The aim of the project was to evaluate this Faculty-wide change in practice.

Two basic models of formative thresholded assessment are currently in use:

- Model A. Tutor-marked assignments (TMAs) and interactive computer-marked assignments (iCMAs) are weighted, and students are required to reach a threshold (usually 40%) overall.
- Model B. Students are required to demonstrate engagement by reaching a threshold (usually 30%) in, say, 5 out of 7 assignments.

The relative merits of summative, purely formative and Model A and Model B formative-thresholded assessment were investigated. The project was split into a number of smaller practitioner-led sub-projects. The methodology was largely data-driven, though student and associate lecturer perception and opinion was also considered.

The main findings were as follows:

- Many students and ALs have a poor understanding of our assessment strategies, including conventional summative continuous assessment. This is in line with a frequently found result that students have poor understanding of the nature and function of assessment.
- Many of the other findings stem from a similar lack of understanding. The increase in plagiarism following the move to formative thresholded assessment (with the accompanying re-use of TMA questions) was less marked than had been feared, but whenever tutor notes get into the public domain they are sometimes copied by students and submitted as their own work. This does not help the students to learn, or prepare them for the examinable component, so they are only “cheating themselves”. However, the offending students often find this point difficult to understand.
- No significant differences in engagement were seen as a result of summative continuous assessment or models A or B of formative thresholded assessment. Following a move to either model of formative thresholded assessment, more students were seen to omit the final assignment or to submit a partial assignment. However overall retention and success rates have not altered as a result of the changes in assessment strategy (other factors e.g. changing student populations have had considerably larger impact) and some students have been seen to appreciate the encouragement to concentrate on the formative aspects of the continuous assessment rather than on the minutiae of the grading.
- There is a correlation between the number of assignments submitted and overall success. However some students omitted TMAs without apparent impact on their final module result, and some of these students appear to have spent their limited time more profitably on revision.
- Thus, overall, no evidence has been seen to support a return to summative continuous assessment. However, it has rightly been pointed out that examinations cannot authentically assess all aspects of university-level skills. The use of two components contributing to the “overall examinable score” (OES), e.g. an examination and an

experimental write-up, seems a sensible way forward, with the formative thresholded components helping students to prepare for both components.

- There was no evidence of different behaviour as a result of the number of assessment points in the module, but several instances were observed in which submission rates dropped as a result of TMAs being too close to due dates for examinable components on the same module or for modules frequently studied concurrently.
- Some evidence has been seen of students appearing more likely to complete modules with end-of-module assessments rather than examinations. However, if this effect is real (as opposed to being as a result of some modules being easier than others), it appears to influence engagement during a module rather than at the end, perhaps because students are less likely to feel frightened and overwhelmed on a module with an end-of-module rather than an examination.
- Students have been seen to engage considerably more and more deeply with formative iCMAs when they have thresholds and hard cut-off dates. Some students appear to benefit from repeating questions. Since the repeating of iCMA questions sits more comfortably within Model B and there is no evidence to support the notion that Model A is more effective in any other way, Model B formative thresholded assessment with hard cut-off dates seems the best approach for iCMAs.
- In the interests of consistency, the Faculty should then consider whether Model B formative thresholded assessment is also a better approach for TMAs. Model A was initially proposed as an alternative because it was felt that otherwise students would be tempted to omit TMAs, but there is no evidence of a significant difference in student behaviour on the two models. Model B would also be straightforward to explain to students, and there would be less scope for confusion with summative assessment.
- Overall, the evidence presented supports the conclusion that students are “conscientious consumers” (Higgins, Hartley & Skelton, 2002) doing exactly what they think they are “meant” to do. However, the devil is in the detail; if we give an advisory cut-off date but put the actual cut-off date at a later stage, we should not be surprised that students see the actual cut-off date as the one that matters and work to that date rather than the advisory one.
- The project started by looking for evidence that a change in modules’ assessment strategies might alter assignment submission rates. However, since submission rates also give a measure of attrition, it is possible to use the project’s detailed inspection of assignment submission on a wide range of modules to investigate other factors affecting retention. The different behaviour of continuing and new students, especially early in a module, was not a surprise, but the extent of the difference in retention was shocking. It is clear that different modules behave in different ways, but no unambiguous evidence has been found to explain why. Similarly, no systematic difference in attrition between 30- and 60-credit modules has been found, a point which is worthy of further investigation.

# 1. Background, aims and scope of the project

## 1.1 Aim

Many Science Faculty modules have moved from their previous summative continuous assessment to formative but thresholded continuous assessment. The aim of the project was to evaluate this Faculty-wide change in practice.

## 1.2 What is formative thresholded assessment?

In formative thresholded assessment, students are required to demonstrate engagement by meeting a threshold of some sort in the module's overall continuous assessment score (OCAS<sup>1</sup>), but the student's overall grade is then determined on the strength overall examinable component score (OES) alone. The Science Faculty has been allowed to move to formative thresholded assessment for all undergraduate level 1 modules, but only for level 2 and 3 modules with an examination rather than an end-of-module assessment (EMA).

Two basic models of formative thresholded assessment are currently in use:

- Model A. Tutor-marked assignments (TMAs) and interactive computer-marked assignments (iCMAs) are weighted, and students are required to reach a threshold (usually 40%) overall.
- Model B. Students are required to demonstrate engagement by reaching a threshold (usually 30%) in, say, 5 out of 7 assignments.

Several of the modules included in the study use minor variants of the above, and there have been changes during the period of the investigation. Whilst, in general terms, such variation is to be discouraged because of the confusion caused to students, it has enabled useful comparison of some points of detail:

- *Human biology* (SK277<sup>2</sup>) has adopted Model A but with an overall threshold of 30% not 40%.
- *Investigative and mathematical skills in science* (S141), which is one of two modules using formative thresholded assessment which has an EMA rather than an examination, has adopted Model A, but with an additional threshold of 70% in OCAS if students are to be eligible for a distinction on the basis of their OES. S141 also requires students to pass a satisfactory participation threshold on the module's investigative and experimental components.
- *The physical world* (S207) uses Model A for its CMA41 and six TMAs, but Model B for its iCMAs.
- *Analytical science* (S240) has adopted Model B, but in addition its examinable component comprises an iCMA-component (very similar to the earlier iCMAs) as well as a written component.
- *Astrophysics* (S382) and *The relativistic Universe* (S383) which use Model B, also have two-part OES, each with an "EMA" taken part-way through the presentation as well as an examination at the end.

A further difference in practice has developed between iCMAs in Model A and Model B. In Model A, the standard two/three/four tries with increasing feedback are allowed, but students cannot

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<sup>1</sup> Appendix A gives a list of the abbreviations used in this report.

<sup>2</sup> Each module is identified by name and code the first once or twice it is mentioned, but thereafter only the code is used. Appendix A includes a full list of the modules included in the project, and explains the module and presentation codes.

repeat the whole question. In contrast, in Model B, students may attempt<sup>3</sup> iCMAs questions and entire iCMAs as many times as they wish, up to a cut-off date, with the latest score for each question within an iCMA, and the highest score for the whole iCMA being the ones that count. Another point of variation is that some modules have hard iCMA cut-off dates at appropriate points during the module's presentation whilst others have all the hard cut-off dates at the end of the presentation, with advisory cut-off dates earlier in the presentation.

All of the modules included in the investigation include self-assessment questions and some also include purely formative iCMAs. *Exploring science* (S104), which transferred from summative OCAS with an EMA to Model B formative thresholded OCAS with an examination for the presentation starting in October 2012 (12J presentation), then made its iCMAs purely formative from the 13J presentation. Similarly, when iCMAs were first introduced into *The quantum world* (SM358) in 2009, they were purely formative, whilst the TMAs were summative. Model B formative thresholded assessment was introduced for TMAs and iCMAs from 2010.

### 1.3 Rationale and development

The use of formative thresholded assessment in the OU Science Faculty was first suggested by Joy Manners, then Director of Teaching in the Department of Physics and Astronomy. The concept was developed by various colleagues including Stuart Freake, John Bolton and Andrew Norton, with a rationale as described in Freake (2008), Manners, Freake, Bolton & Jelfs (2008) and Norton (2010).

The major drivers were:

- To allow questions to be re-used so “more effort would be put into optimising the questions, the tutor notes and feedback, and the hints and answers provided by iCMAs, because they would be reused each year. Improvements could be made if necessary in the light of experience” (Freake, 2008, p. 4).
- To remove one of the barriers to more frequent presentation of the courses and to flexible study rates (since new assignments would not need to be produced for each presentation) and to encourage the use of “little and often” assessment, for pacing (Gibbs & Simpson, 2004-5).
- To free students from anxiety over the minutiae of grading of TMAs and iCMAs, placing greater focus on feedback and dialogue between students and associate lecturers.
- To establish more honest assessment strategies. As Freake (2008, p.4) points out: “In practice, the summative nature of the continuous assessment is somewhat illusory for the vast majority of Physics and Astronomy students since their course grade is determined by their exam mark, which is generally significantly lower than their continuous assessment mark.”

These points are supported by assessment theory and work from outside the Open University. Price, Carroll, O'Donovan & Rust (2011, p. 486) point out that “achieving a balance between summative and formative assessment requires a complex, contextual theory”. Brearley & Cullen (2012) report that when summative assessment has a formative function, the formative function sometimes “gets lost”, whilst Wiliam (2008, p. 276) contends that “banking” marks from continuous assessment can lead to a pedagogy that emphasises coverage of the curriculum at a shallow level.

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<sup>3</sup> A distinction should be made between “try” (the opportunity to alter an answer in response to feedback) and “attempt” (the opportunity, only sometimes available, to repeat the whole question, perhaps in a different variant).

Formative thresholded assessment Model B was first introduced into two existing level 3 physical science modules, *The quantum world* (SM358) and *Electromagnetism* (SMT359) from 2010, alongside two new modules *Astrophysics* (S382) and *The relativistic Universe* (S383); *Analytical science* (S240) adopted a similar approach from 12B. From 12J, *Exploring science* (S104), *Introducing health sciences* (SDK125) and *Human biology* (SK277) moved to formative thresholded Model A, alongside the new module *Investigative and mathematical skills in science* (S141), and other modules followed from 13B and 13J. Level 2 and Level 3 modules with end-of-module assessments rather than examinations have retained summative OCAS, as have modules nearing the end of their lifetimes.

#### 1.4 Related work

Student opinion was canvassed prior to the introduction of formative thresholded assessment, (Manners et al., 2008). The introduction of purely formative iCMAs into SM358 was evaluated by Bolton (2010), whilst Jordan (2011) investigated student engagement with iCMAs in a range of modules including S104, SDK125 and, in purely formative use, in *Practising science* (SXR103).

Basiro Davey and Ellie Dommett undertook a piece of work, also for eSTEEeM, to investigate the reasons for early withdrawal and non-engagement with SDK125 (Davey & Dommett, 2014). Findings were inconclusive, but all the more interesting for that, for example there was no evidence to support the idea that students were withdrawing because the module was overloaded. Some of their report's key findings which may be of relevance to assessment are:

- More than half of all students who did not complete the module had disengaged before TMA01.
- Investigation of assessment issues revealed confusion among interviewees about the 40% threshold for continuous assessment; some thought that they needed to achieve 40% on every assignment.
- Some students referred to the importance of achieving a score well in excess of 40% as an indication that they were “learning what they were supposed to learn”. Davey and Dommett concluded that this has implications for student perceptions of the value of completing formative TMAs, particularly if combined with learning-outcomes-based marking (e.g. “well demonstrated” vs high numerical score).
- The majority of interviewees did not realise that “formative” assignments meant their final grade was determined solely by the exam score; clarification by the interviewer elicited mainly negative reactions e.g. that work on formative TMAs was “pointless” and “wasted effort”. Davey and Dommett concluded that the value of continuous assessment for learning has to be communicated to students more effectively.
- Attitudes towards the final examination were less negative than expected. Almost 23% of questionnaire respondents said they preferred an exam to an EMA and 35.5% had no preference for exam or EMA. Exam anxiety was not identified by interviewees as a factor in early disengagement with SDK125, though a few expressed concerns that might deter them as the examination date approached.

#### 1.4 Research questions

In more detail, the current project sought to investigate the following questions:

- Has the move to formative thresholded assessment led to a change in TMA and iCMA submission rates?
- Has the move to formative thresholded assessment led to a change in TMA performance?

- Has the move to formative thresholded assessment led to a change in module completion and pass rates?
- Has the move to formative thresholded assessment led to a change in the extent or type of plagiarism cases that are detected?
- How do the levels of student engagement on iCMAs compare for summative, formative thresholded, and purely formative use?
- What are the relative merits of Model A and Model B formative thresholded assessment?
- What is the impact of other assessment-related factors e.g. additional thresholds?
- What is the impact of other student-related factors e.g. do new students and continuing students perform differently?; if students are studying two modules concurrently, what is the impact on TMA submission?
- What do students and associate lecturers know about and think of our assessment strategies?

## 2. Methodology

The project was split into a number of smaller practitioner-led sub-projects. The methodology was largely data-driven, with most results presented visually, though student and associate lecturer perception and opinion was also considered. The sub-projects were as follows:

1. An analysis of TMA submissions, grades and overall completion and success rates across a range of modules (John Bolton, Sally Jordan, Richard Jordan, Jon Golding, Kerry Murphy). This work was completed iteratively. For comparison, the results section starts by presenting some of John Bolton's earlier work for SM358 and SMT359 which were the first modules to move to formative thresholded assessment (Model B) in 2010. The work in the current project initially concentrated on modules (S104, SDK125 and SK277) that moved to formative thresholded assessment (Model A) from 12J, then looked in detail at SK320, which moved to formative thresholded assessment (Model A) from 13B and on which no other change was made between the 12B and 13B presentations, and on which the changes in student population observed at level 1 were predicted to have not yet occurred. Finally, after the end of the 13J presentation, assignment submissions and completion rates were inspected for a number of years for all undergraduate science modules and submissions by date were compared for all 13J presentations. This analysis enabled a more systematic evaluation of the impact of the move to formative thresholded assessment.
2. An investigation into the correlations between TMA and iCMA completion and overall success on SM358, SMT359, S383, S104, SK320 and S240 (John Bolton, Jon Golding, Ruth Williams, Richard Jordan, Sally Jordan).
3. An investigation into the potential impact on student outcomes of altering the OCAS thresholds on S240, S207 and SK277 (Ruth Williams, Richard Jordan and Sally Jordan).
4. An analysis of student engagement on two level 1 modules (Lynda Cook and Sally Jordan). Two new 30-credit level 1 modules, S141 (first presentation 12J) and *Topics in science study* (S142) (first presentation 13B) have broadly similar formative thresholded assessment strategies. However S141 requires students to pass a threshold of 70% if they are to be eligible for a distinction by achieving 85% or more in OES, whilst S142 has a single OCAS threshold, with distinctions being awarded purely on the basis of OES.

This sub-project investigated whether S141's additional threshold had any impact on student engagement and also considered, by means of reports from associate lecturers (ALs), students' reasons for non-submission of TMAs. The instructions given to the ALs are reproduced in Appendix B.

5. A comparison of scores on from students studying two modules concurrently (Janet Haresnape). The scores for assignments and overall for 53 students who studied *Infectious disease and public health* (SK320) (with formative thresholded OCAS) and *Molecular and cell biology* (S377) (with summative OCAS) concurrently in the 13B presentation were compared.
6. An analysis of student engagement with iCMAs in formative, formative-thresholded and summative use, applying techniques described in Jordan (2014a) and others (Sally Jordan, Richard Jordan and John Bolton). This analysis also considered the impact of cut-off dates and of allowing students to attempt questions multiple times.
7. A consideration of the impact on plagiarism cases received by academic conduct officers (Lynda Cook).
8. An investigation into student and staff perception of assessment strategies (Karen New and Sally Jordan) The opinions of 16 students on S104, SK277 and *Cell biology* (S294) and 18 ALs on S141 (all of whom tutor or have tutored other modules) were sought by email dialogue. Where opinions were received by other means, these were also considered.
9. The major complication faced by the study has been the changing student population, in particular at level 1 following the changes to HE funding in England in 2012. The project therefore drew on Saroj Datta's 2013 investigation into the different performance of different cohorts of SDK125 students, and further investigated the different performance of new and continuing students (Sally Jordan).

### 3. Results and discussion

Much of the project's design has been iterative i.e. one finding has led to a further investigation. For this reason, the results section includes more discussion than would normally be the case.

Note: the figures reproduced in this report are a small sub-set of those obtained. For similar figures for other Science Faculty modules, please contact [sally.jordan@open.ac.uk](mailto:sally.jordan@open.ac.uk).

#### 3.1 TMA submissions, grades and overall completion and pass rates

Particular care should be taken in interpreting the results in this section, especially in the light of the changing student population. Since TMA submission is used as a measure of student retention it is very difficult to separate cause and effect: is a particular assessment strategy causing students to actively or passively withdraw from a module or is non-submission of assignments simply a measure of student attrition caused by other factors? This point is further discussed in Sections 3.9 and 4.

##### 3.1.1 SM358 and SMT359 TMA submissions and scores (John Bolton)

Figure 1 shows a slight reduction in submissions for the later TMAs, in particularly for TMA04, following SM358 and SMT359's move from summative to formative thresholded assessment (Model B) from 2008/9 to 2010 (SMT359 was not presented in 2009). Figure 2 shows that performance on submitted TMAs was essentially unchanged. SM358's overall completion and

success rates were similarly unchanged, with 71% of the 380 students who started the module in 2009 completing, and 61% gaining credit, compared with 71% of the 207 students who started the module in 2010 completing, and 60% gaining credit. The variation in student numbers at this time was caused by a move from biennial to annual presentation. For SMT359, 63% of the 318 students who started the module in 2008 completed it, and 50% gained credit, compared with 61% of the 286 students who started the module in 2010 completing it, and 48% gaining credit.

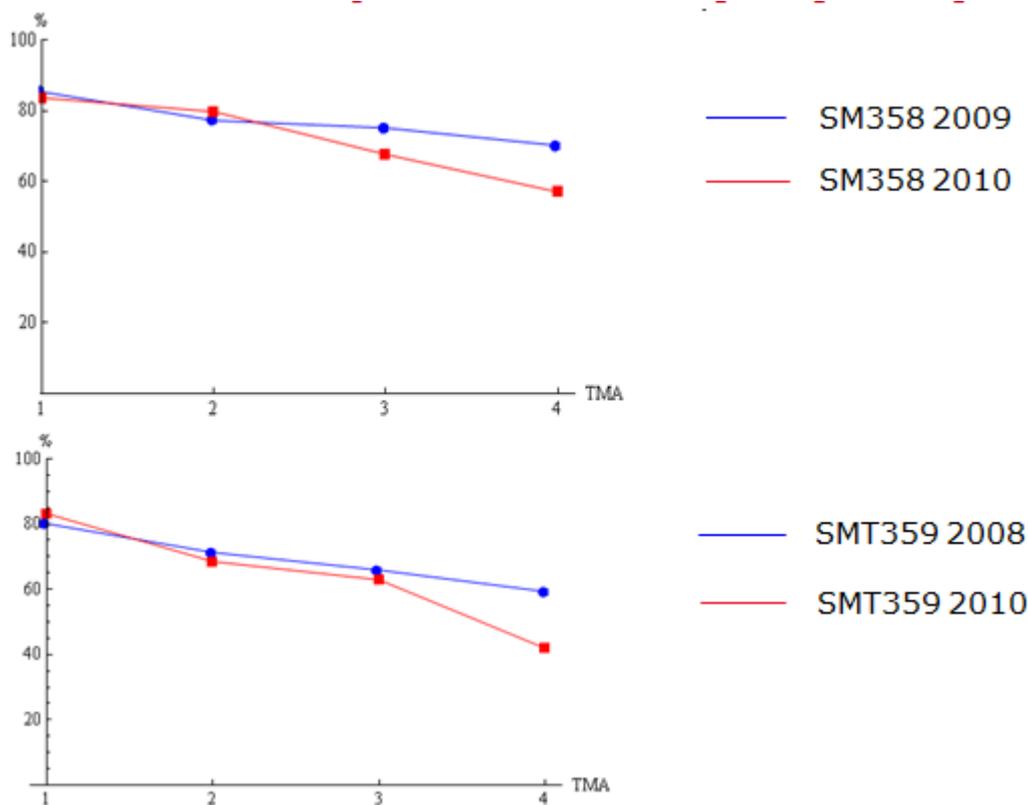


Figure 1(a) TMA submissions for SM358 TMA in summative use in 2009 (blue line) and formative thresholded use (Model B) in 2010 (red line); (b) TMA submissions for SMT359 TMA in summative use in 2008 (blue line) and formative thresholded use (Model B) in 2010 (red line).

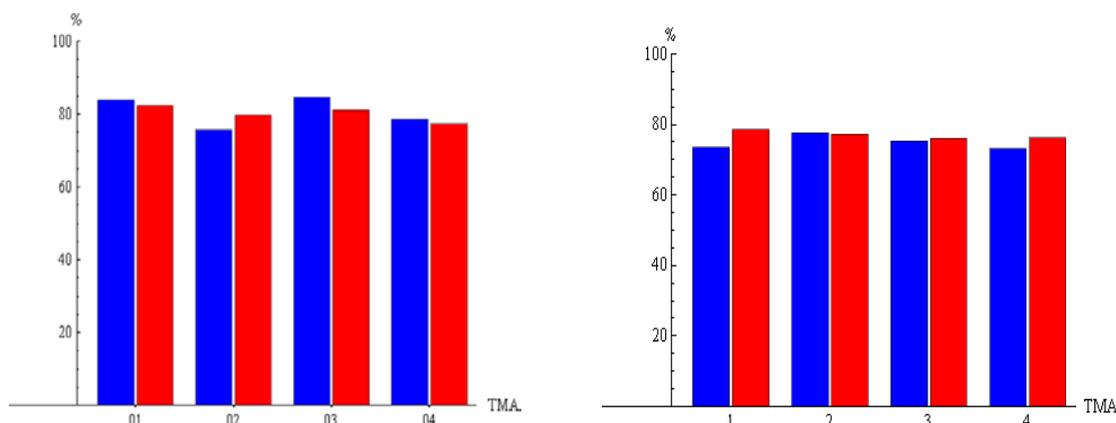


Figure 2(a) Average scores for SM358 TMA in summative use in 2009 (blue) and formative thresholded use (Model B) in 2010 (red); (b) Average scores for SMT359 TMA in summative use in 2008 (blue) and formative thresholded use (Model B) in 2010 (red).

### 3.1.2 SK277 TMA submissions and scores (Kerry Murphy)

Figure 3 shows no noticeable difference in SK277 submission rates and TMA scores following the modules move to formative thresholded assessment (Model A but with an overall threshold of 30%) from the 12J presentation.

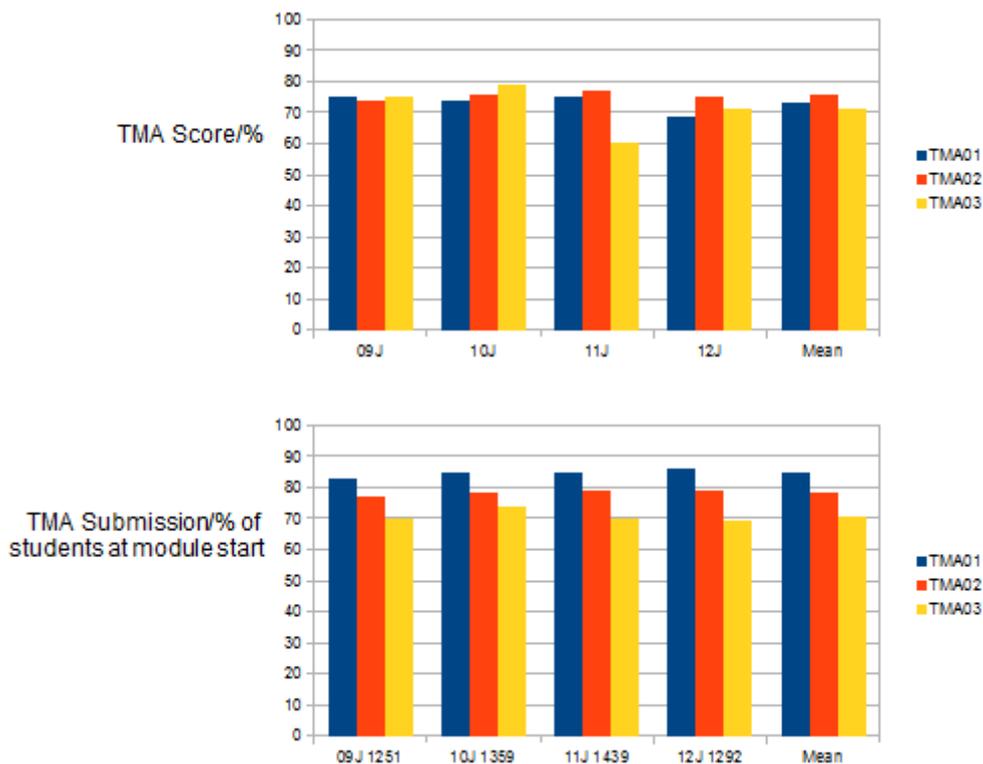


Figure 3 Average scores and submission rates for SK277 TMAs from 09J to 12J. OCAS was summative in 09J-11J and formative thresholded (Model A with 30% overall threshold) in 12J. Note that from 09J-11J, SK277 also had an additional TMA04, not shown in this figure, with a submission rate of 65%, 70% and 68% respectively of students at module start.

### 3.1.3 S104 TMA submissions and scores

Figure 4, for S104, which moved to formative thresholded assessment (Model A) from the 12J presentation and introduced an examination at the same time, has been deliberately plotted in the same style as Figure 3. The most obvious factor (Figure 4(b)) is the steady decline in TMA submission as each presentation proceeds, whatever its assessment strategy, and many factors are likely to have contributed to this. Although the submission rates and performance on the final TMA, which were similar for 11J and 12B, can be seen to drop for 12J, both were better in 12J than 11B, and any significant variation as a result of the change in assessment strategy is masked by other larger variations.

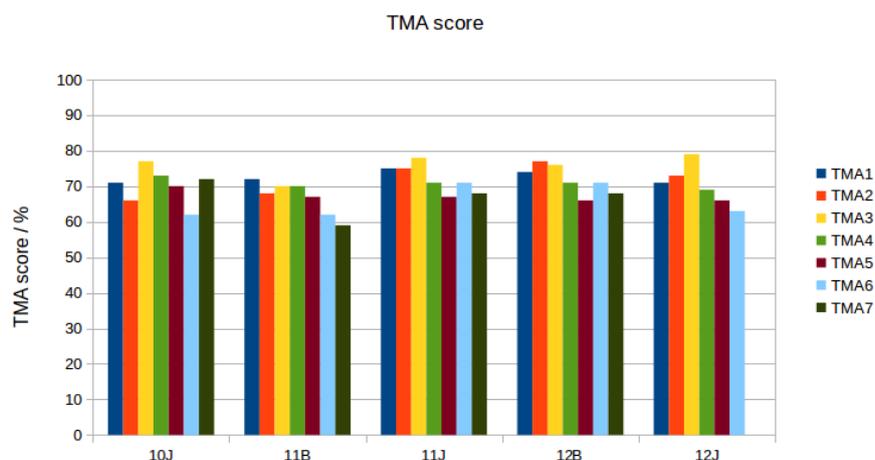


Figure 4a Average scores for S104 TMAs from 10J to 12J. OCAS was summative from 10J-12B and formative thresholded (Model A) in 12J. Note that TMA07 was discontinued from 12J and an examination replaced the previous EMA.

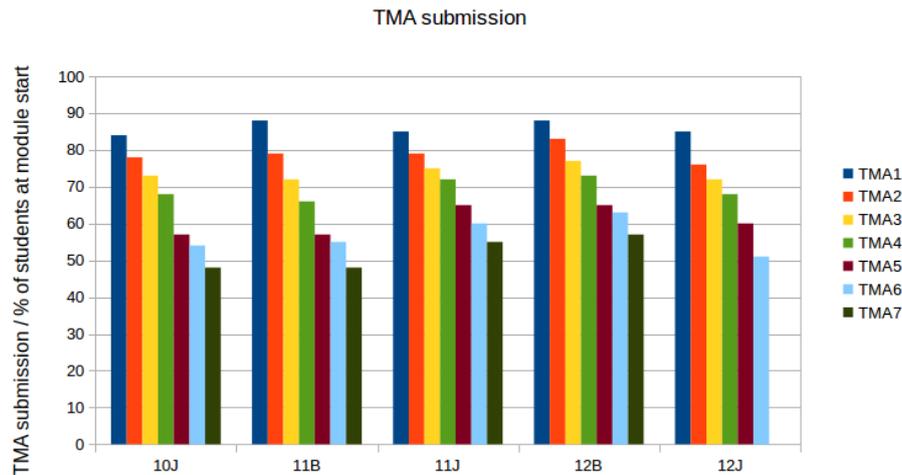


Figure 4b Submission rates for S104 TMAs from 10J to 12J. OCAS was summative from 10J-12B and formative thresholded (Model A) in 12J. Note that TMA07 was discontinued from 12J and an examination replaced the previous EMA.

3.1.4 SDK125 TMA and iCMA submissions, for all students and those who attempted the examination

Figure 5 compares TMA submission for the 11J and 12J presentations of SDK125, where 11J had summative OCAS whilst 12J had formative thresholded OCAS (Model A).

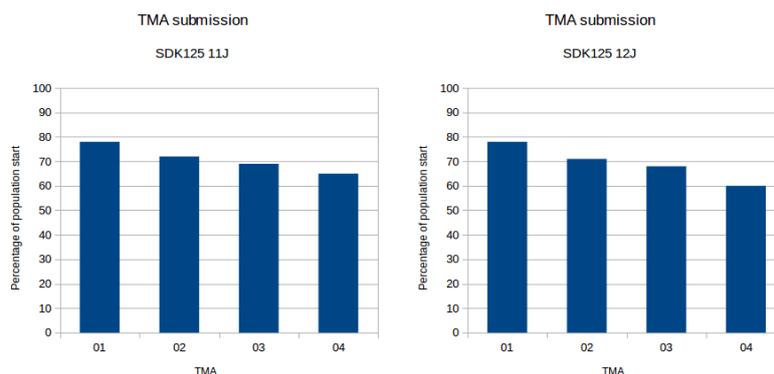


Figure 5 TMA submission rates for the 11J and 12J presentations of SDK125, for all students who were registered at module start (n = 1262 for 11J; n = 1396 for 12J).

As for S104, there was a substantial drop in TMA submission as each presentation proceeded, and for SDK125, less than 80% of the students who started the module submitted TMA01. The module’s assessment strategy may impact on the attrition rate, but the changing student population appears to be the major factor, as discussed in Section 3.9. To investigate the extent to which the move to formative thresholded assessment had any impact on submission rate, it was therefore decided to consider TMA submission data for students who attempted the exam only. These data are shown in Figure 6 and indicate that submission rates for the first three TMAs were similar in 11J and 12J, but a slightly larger number of students omitted TMA04 in 12J.

Similarly, Figure 7 shows that slightly more students omitted one TMA in the 12J presentation than had been the case for 11J.

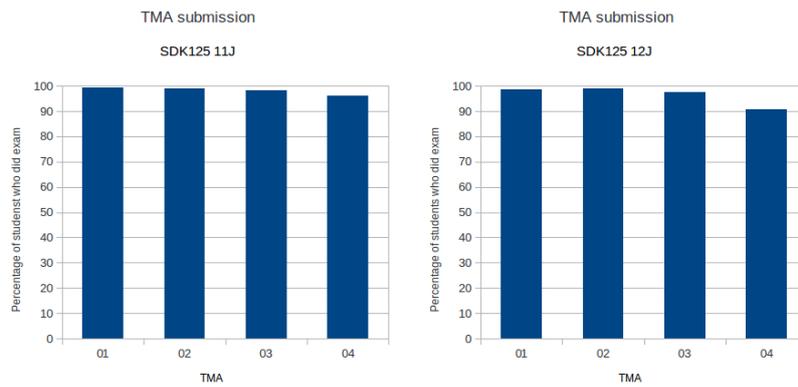


Figure 6 TMA submission rates for the 11J and 12J presentations of SDK125, for students who attempted the examination only.

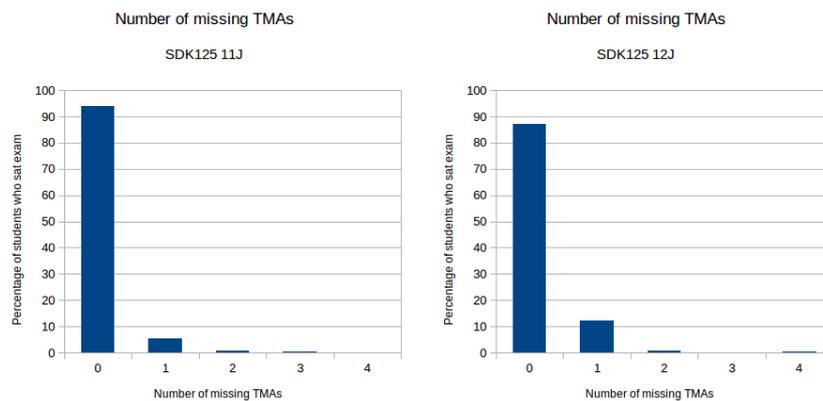


Figure 7 Number of non-submitted TMAs for the 11J and 12J presentations of SDK125, for students who attempted the examination only.

SDK125 has consistently used iCMAs as part of its summative or thresholded OCAS; the iCMA data (Figures 8-10) show the same trends as the TMAs, with students being slightly more likely to omit iCMAs, in particular iCMA46 and iCMA47 in the 12J presentation than was the case for 11J.

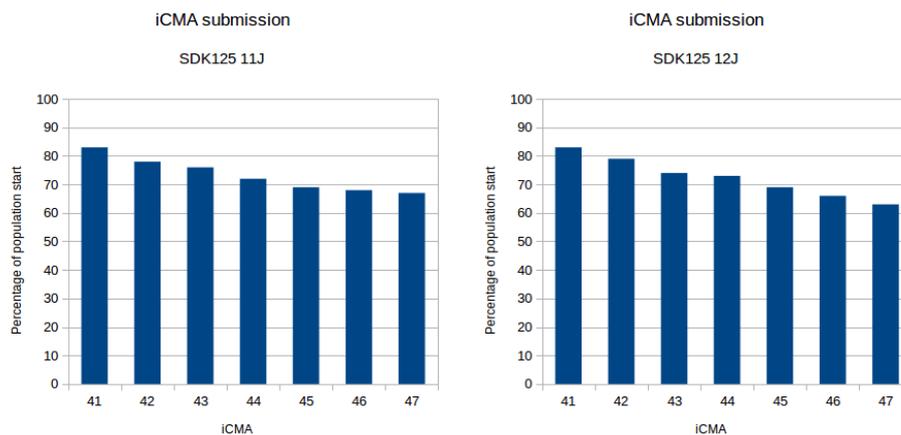


Figure 8 iCMA submission rates for the 11J and 12J presentations of SDK125, for all students who were registered at module start.

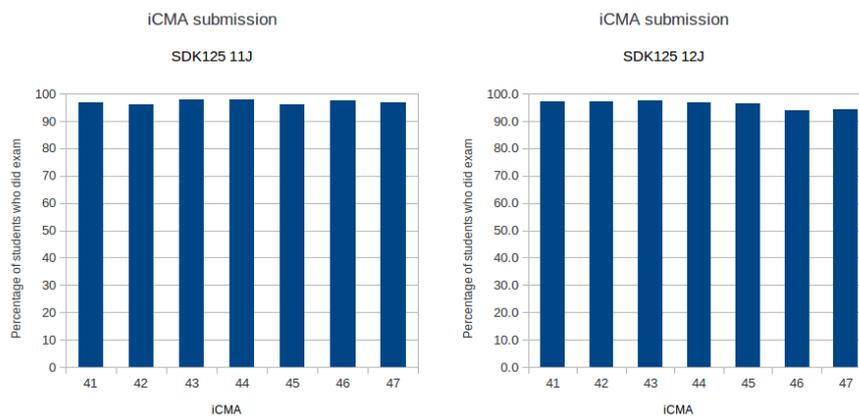


Figure 9 iCMA submission rates for the 11J and 12J presentations of SDK125, for students who attempted the examination only.

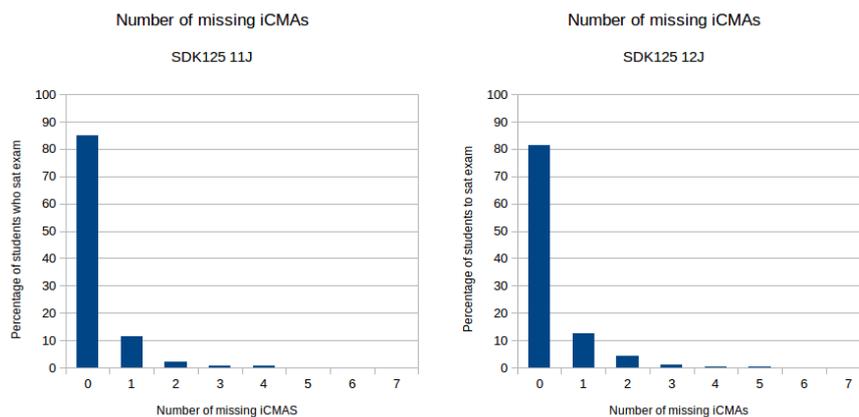


Figure 10 Number of non-submitted iCMAs for the 11J and 12J presentations of SDK125, for students who attempted the examination only.

### 3.1.5 S104 Partial TMA submissions

Anxiety had been expressed, supported by Figure 4(b), that even when students submit all the assignments, they may put in less effort once they have achieved the module’s threshold. In order to investigate this further, the percentage of students who submitted each of S104’s TMAs but scored zero in one or more questions are compared in Table 1, for the 11J presentation (summative OCAS) and 12J presentation (formative thresholded OCAS). Scoring zero in a question was taken as a proxy for not attempting that question; though obviously some of the students will have scored zero for a question despite attempting it!

Figure 1 Percentages of S104 students who scored zero for one or more questions in a TMA. Note that TMA07 was discontinued from 12J and an examination replaced the previous EMA.

| 11J presentation. n = 2109 at module start |      | 12J presentation. n = 2357 at module start |      |
|--------------------------------------------|------|--------------------------------------------|------|
| TMA01                                      | 1.6% | TMA01                                      | 0.8% |
| TMA02                                      | 3.4% | TMA02                                      | 2.5% |
| TMA03                                      | 2.8% | TMA03                                      | 2.4% |
| TMA04                                      | 5.8% | TMA04                                      | 4.3% |
| TMA05                                      | 3.9% | TMA05                                      | 6.0% |
| TMA06                                      | 2.8% | TMA06                                      | 7.9% |
| TMA07                                      | 6.5% |                                            |      |

Table 1 shows that for the early part of the module, there was a smaller percentage scoring zero in questions for the 12J presentation than for the 11J presentation. However, unsurprisingly, for the final two TMAs, the percentage of students with zero scores for questions increased with the move to formative thresholded assessment.

### 3.1.6 TMA submission, module completion and pass rates for a range of modules

Figure 11 illustrates a common finding, in this case for SK320 (further discussed in Section 3.2.3): Even when a move to formative thresholded assessment has been accompanied by a reduction in submission rates for TMAs towards the end of the module, overall module completion and success rates are unaffected. In this case the module completion rates were 63% and 62% for the two presentations illustrated and the pass rates from module start were 51% and 50% respectively.

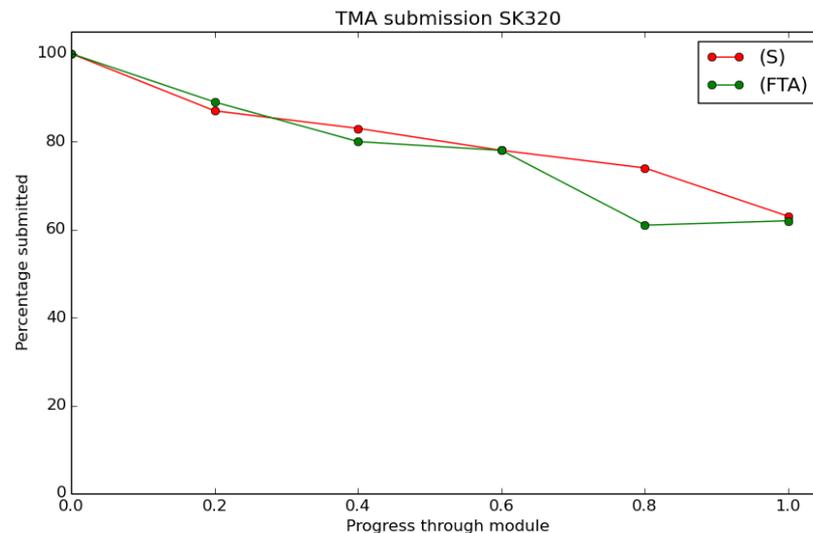


Figure 11 TMA submission and module completion rates for SK320, with summative OCAS (12B; red line) and formative thresholded OCAS (Model A) (13B; green line). The overall pass rates (from module start) were 51% and 50% respectively.

Figure 12 shows a similarly large drop in final TMA submission for the final TMA on *The molecular world* (S205), in this case accompanied by a small drop in overall completion and pass rate. However for *Environmental science* (S216) (Figure 13) the drop in submission rate for the final TMA was present before the move to formative thresholded assessment, and in this case the move to formative thresholded assessment was accompanied by a very slight increase in overall completion and pass rate. S205 and S216 have late final TMAs (S205 TMA05 was due on 22<sup>nd</sup> May 2014 with the exam on 3<sup>rd</sup> June whilst S216 TMA07 was due on 19<sup>th</sup> September with the exam in 8<sup>th</sup> October) which may account for the particularly marked drop in submission rate for these TMAs; the S216 module website warned students that TMA07 might not be returned in time for revision, and this TMA was only carried half the weighting of previous TMAs. It appears that these factors have had a more marked impact on TMA submission than the change from summative to formative thresholded OCAS. To allow for comparison between modules in different presentations, the plots in this sub-section show TMA submissions as evenly spaced evenly through the year, even when this is not the case. The impact of assignment due date is discussed further in Section 3.1.7, which compares all modules in the 13J presentation.

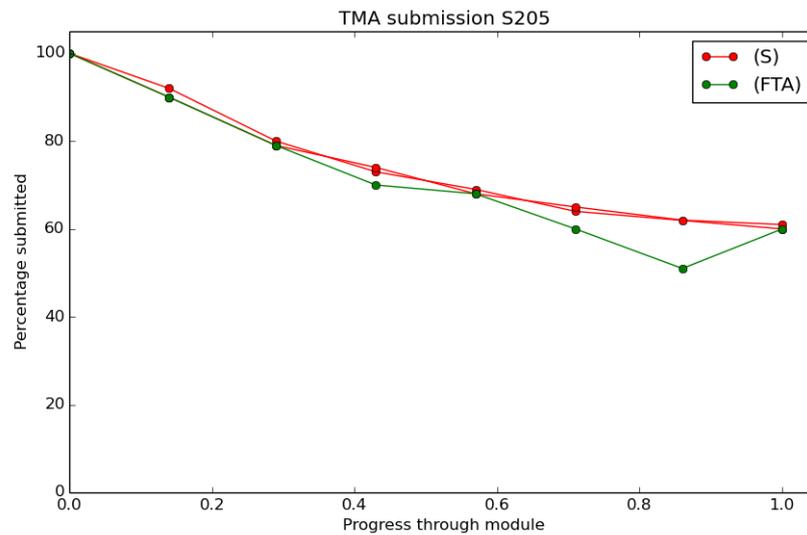


Figure 12 TMA submission and module completion rates for S205, with summative OCAS (11J and 12J; red lines) and formative thresholded OCAS (Model A) (13J; green line). The overall pass rates (from module start) were 53%, 54% and 49% respectively.

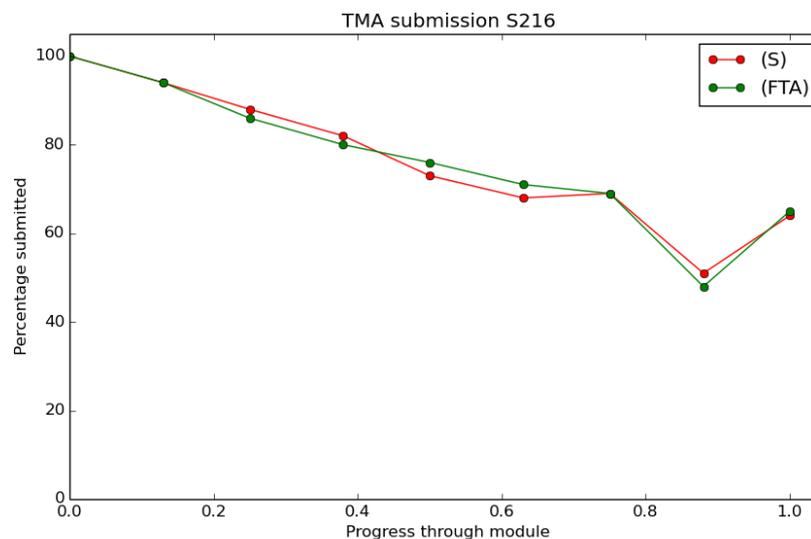


Figure 13 TMA submission and module completion rates for S216, with summative OCAS (12B; red line) and formative thresholded OCAS (Model A) (13B; green line). The overall pass rates (from module start) were 56% and 57% respectively.

In other cases, e.g. SDK125 as shown in Figure 14, the move to formative thresholded assessment has been accompanied by a drop in TMA submission rates (as discussed in Section 3.1.4) and in overall completion and pass rate. This is unlikely to have been caused by the change in assessment strategy and is further discussed in Section 3.9. In contrast, the TMA submission, overall completion and pass rates for S279 all increased following the move to formative thresholded assessment, as shown in Figure 15. Again, this improvement is unlikely to have been as a result of the change in assessment strategy, with the most plausible explanation being that S279 is known to be a difficult module and so the student population has become more highly qualified (with 24% of 12B students having less than 2 A-Levels or equivalent at the start of their Open University studies; whilst only 12% of 13J students were in this category).

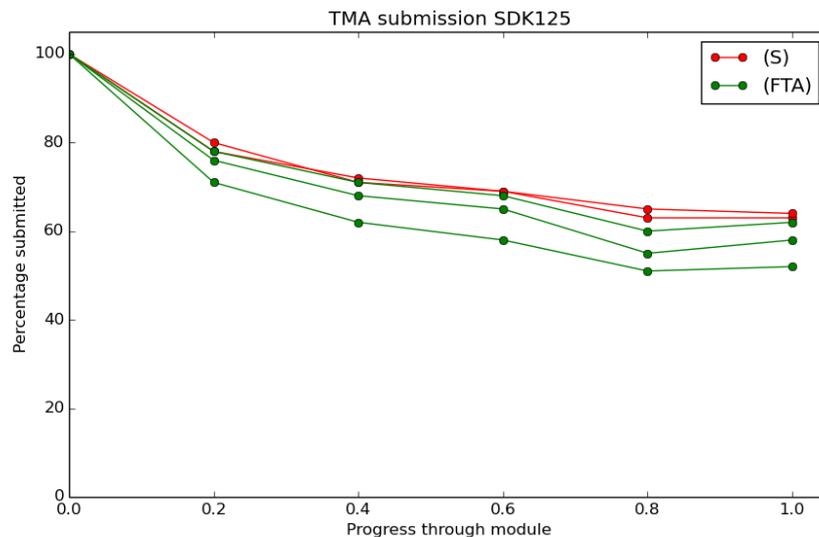


Figure 14 TMA submission and module completion rates for SDK125, with summative OCAS (10J and 11J; red lines) and formative thresholded OCAS (Model A) (12J, 13B and 13J; green lines, with the lowest line being for the 13B presentation). The overall pass rates (from module start) were 53% (10J), 52% (11J), 52% (12J), 48% (13B), 53% (13J).

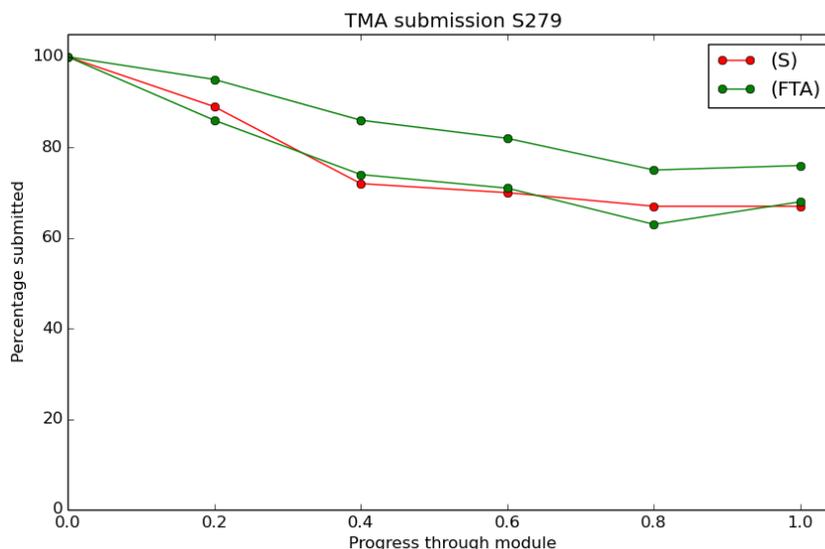


Figure 15 TMA submission and module completion rates for S279, with summative OCAS (12B; red line) and formative thresholded OCAS (Model A) (13B and 13J; green lines, with the highest line being for the 13J presentation). The overall pass rates (from module start) were 60% (12B), 65% (13B), 70% (13J).

Even where a module's assessment strategy was unchanged, as for S377 in Figure 16, the TMA submission, overall completion and pass rates sometimes altered noticeably between presentations. The drop in S377's performance from 12B (top line in Figure 16) to 13B can be attributed to more students studying the module alongside a number of others, as they attempted to complete their studies with transitional funding.

The only assessment-related factor that appears to be associated with higher module completion rates is an examinable component that is an end-of-module assessment rather than an examination. The environmental web (U316), which has an EMA, has the highest submission, completion and pass rates of all undergraduate Science Faculty modules, though as for S377, the completion and pass rates rates dropped from 12B to 13B (Figure 17).

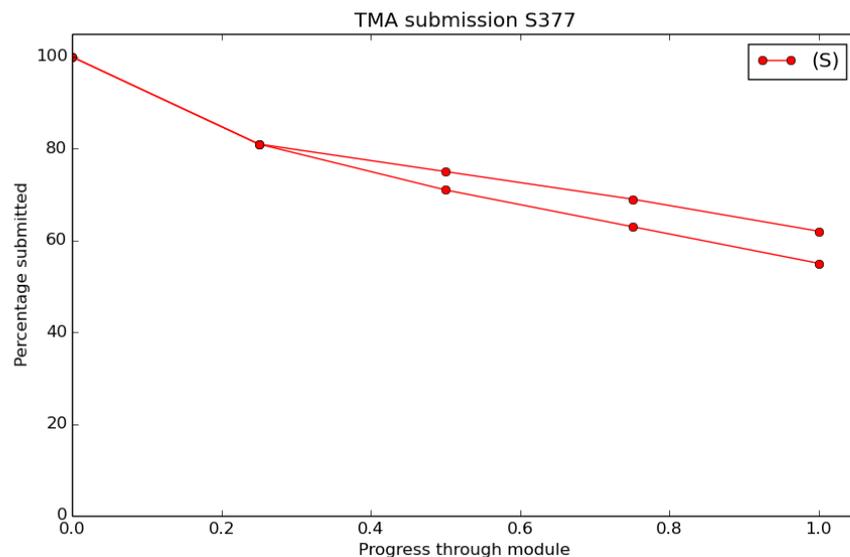


Figure 16 TMA submission and module completion rates for S377, with summative OCAS and an examination. The top line is the 12B presentation and the lower line is for 13B. The overall pass rates (from module start) were 47% and 44% respectively.

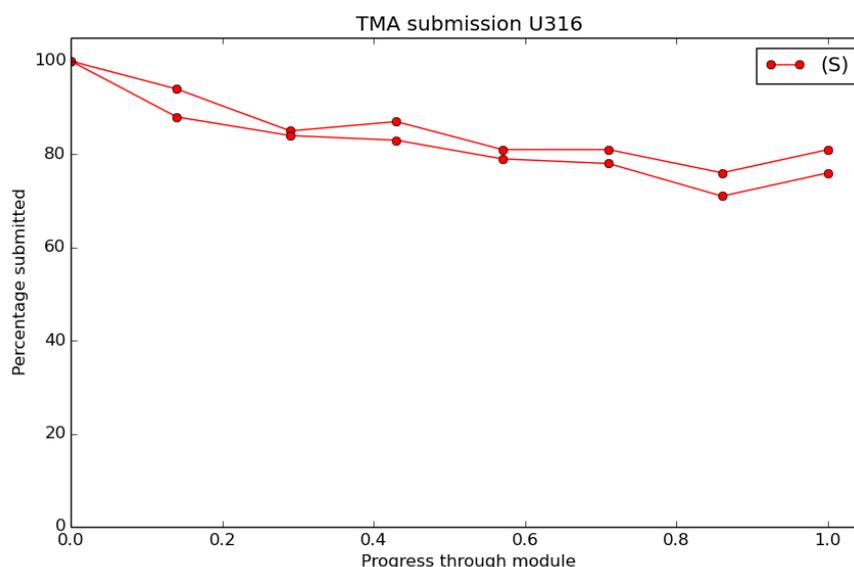


Figure 17 TMA submission and module completion rates for U316, with summative OCAS and an EMA. The top line is the 12B presentation and the lower line is for 13B. The overall pass rates (from module start) were 76% and 72% respectively.

### 3.1.7 TMA and iCMA submission and module completion by date for all Science 13J modules

To enable further comparison between modules, TMA and iCMA submission and overall completion rates were compared for all Science Faculty undergraduate level 1, level 2 and level 3 modules that ran in the 13J presentation. iCMAs were included when they were not purely formative and when they had a fixed cut-off date before the end of the presentation.

Inspection of Figures 18-20 indicates no clear difference in behaviour between modules with summative OCAS or Models A or B of formative OCAS. So, for example, in Figure 19, the “best” and “worst” performance are both for modules with formative thresholded assessment (Model A). It is also noteworthy that the number and timing of assignments seems to make very little difference to submission rates, with the exception of a late final assignment which many students chose to omit. Figure 19 also indicates that the two level 2 60-credit modules (S205 and S207) have retention rates than are at amongst the lowest of those for all the level 2

modules, though it is not possible to attribute causality, nor to draw conclusions as to the benefits of 30- or 60-credit modules without additional information about the total study intensity of the students in question.

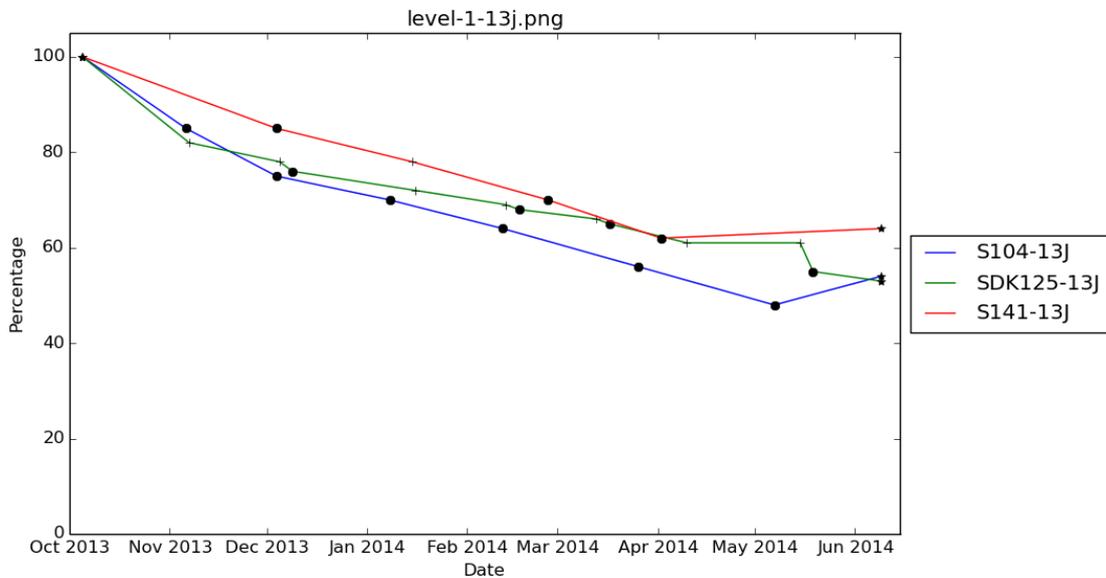


Figure 18 TMA and iCMA submission and module completion rates for level 1 modules in the 13J presentation, shown against date. TMA submissions are shown as dots on the appropriate due date; iCMA submissions (when not purely formative) are shown as crosses; the percentages of students who attempted examinable components are shown as stars. All three modules had formative thresholded OCAS (Model A); S104 and SDK125 had an exam whilst S141 had an EMA; S104 was 60-credit whilst S141 and SDK125 were 30-credit.

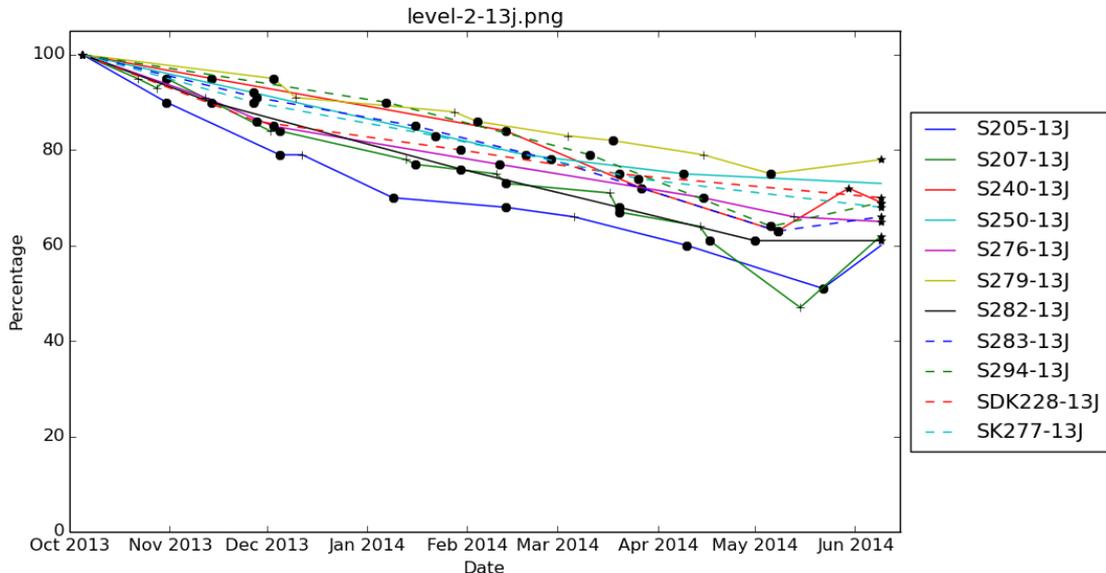


Figure 19 TMA and iCMA submission and module completion rates for level 2 modules in the 13J presentation, shown against date. TMA submissions are shown as dots on the appropriate due date; iCMA submissions (when not purely formative and when hard cut-off dates occurred during the presentation) are shown as crosses; the percentages of students who attempted examinable components are shown as stars. SDK228 and S250 had summative OCAS and an EMA, S240 had formative thresholded OCAS (Model B) and OES comprising an exam and an iEMA; all the other modules had formative thresholded OCAS (Model A) and an exam.

The noticeable dip in S383 submissions (Figure 20), which is present for all presentations of S383, was for TMA04, which was due on 20<sup>th</sup> February whilst the extended assessment (contributing to OES) was due on 6<sup>th</sup> March. S383 has 6 iCMAs and 6 TMAs and students are required to demonstrate engagement (by achieving 30% or more) on at least 9 out of 12

assignments. It appears that many students choose to omit TMA04 (which is also perceived to be difficult) and instead to concentrate on the OES component.

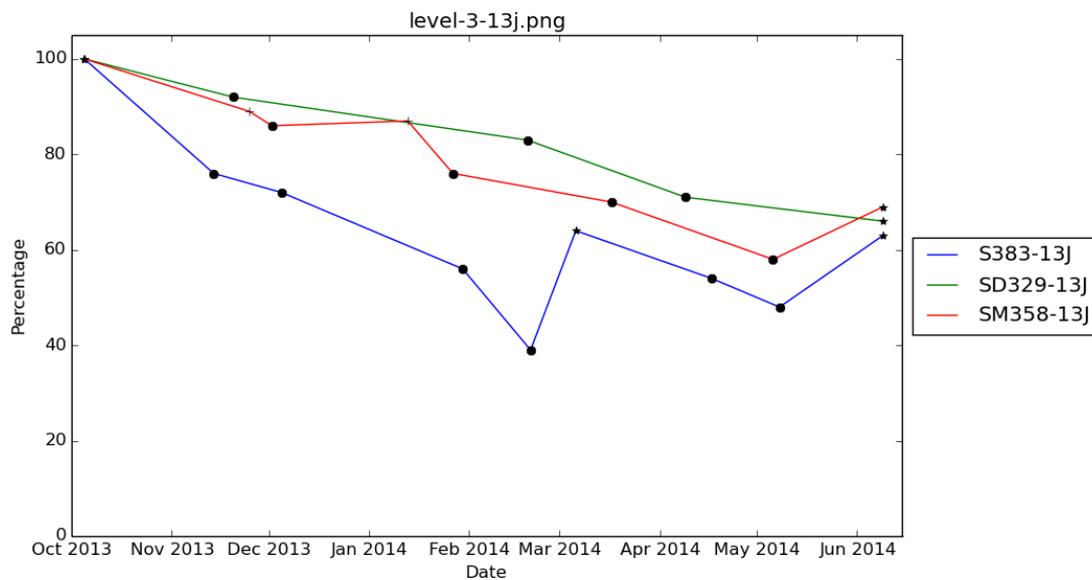


Figure 20 TMA and iCMA submission and module completion rates for level 3 modules in the 13J presentation, shown against date. TMA submissions are shown as dots on the appropriate due date; iCMA submissions (when not purely formative and when hard cut-off dates occurred during the presentation) are shown as crosses; the percentages of students who attempted examinable components are shown as stars. SD329 had summative OCAS and an EMA, SD329 and SM358 both had formative thresholded OCAS (Model B), with SM358 having an exam and S383 having an examinable component comprising an extended assessment as well as an exam.

### 3.2 Correlations between TMA/iCMA submission and overall success

#### 3.2.1 Correlations between TMA/iCMA submission and overall success for level 3 physics and astronomy modules (John Bolton)

In order to pass the OCAS threshold on SM358 and SMT359, students are required to demonstrate engagement (by achieving 30% or more) on at least 7 of the 10 assignments (4 TMAs and 6 iCMAs), of which at least two must be TMAs. TMA and iCMA submissions that met the overall threshold in the 2010B presentation are highlighted by yellow shading in Tables 2–5.

Tables 2 illustrates that more than a third of students who started SM358 chose to submit all the assignments, with 8.2% dropping one iCMA, 5.8% dropping one TMA, and 5.8% dropping one TMA and one iCMA. Table 3 shows that the students who submitted all the assignments did better in the examination. However this may be because the more able, keener students, or those with more time for studying, were both more likely to submit all the assignments and more likely to do well in the exam, without one effect necessarily causing the other.

Table 2 TMA and iCMA submissions for students on the 2010B presentation of SM358, as a percentage of the 207 students who started the module.

| SM358   | 0 TMAs | 1 TMA | 2 TMAs | 3 TMAs | 4 TMAs |
|---------|--------|-------|--------|--------|--------|
| 0 iCMAs | 1.6%   | 3.4%  | 1.5%   | 0.5%   | 0.5%   |
| 1 iCMA  |        | 1.5%  |        | 1.0%   |        |
| 2 iCMAs |        | 1.5%  | 2.4%   | 1.5%   |        |
| 3 iCMAs |        |       |        |        | 1.5%   |
| 4 iCMAs |        |       |        | 5.3%   | 2.4%   |
| 5 iCMAs |        | 0.5%  | 3.9%   | 5.8%   | 8.2%   |
| 6 iCMAs | 0.5%   | 0.5%  | 5.8%   | 5.8%   | 34.3%  |

Table 3 Mean OES for students in each of the categories of TMA and iCMA submission, for 207 students on the 2010B presentation of SM358 (where the percentages of students in each category is shown in Table 2).

| <b>SMT359</b>  | <b>0 TMAs</b> | <b>1 TMA</b> | <b>2 TMAs</b> | <b>3 TMAs</b> | <b>4 TMAs</b> |
|----------------|---------------|--------------|---------------|---------------|---------------|
| <b>0 iCMAs</b> |               |              |               |               | 6.0           |
| <b>1 iCMA</b>  |               |              |               |               |               |
| <b>2 iCMAs</b> |               | 17.0         | 24.0          |               |               |
| <b>3 iCMAs</b> |               |              |               |               | 60.0          |
| <b>4 iCMAs</b> |               |              |               | 43.7          | 62.0          |
| <b>5 iCMAs</b> |               | 23.0         | 46.0          | 62.6          | 69.5          |
| <b>6 iCMAs</b> |               |              | 35.3          | 60.8          | 77.5          |

Submission rates for SMT359 (Table 4) are similar to those for SM358, though in 2010B a slightly smaller percentage submitted all the assignments and students were noticeably more likely to omit TMAs than iCMAs. More than 16% of students chose to omit the maximum number of assignments that they could omit whilst still meeting the OCAS threshold (two TMAs and one iCMA; one TMA and two iCMAs or three iCMAs). Table 5 shows that students who submitted more assignments again tended to do better, though the mean OES of 64.8% for students who omitted two iCMAs shows that it is dangerous to generalise. Some students appear to do well in the examination without the practice and feedback provided by TMAs and iCMAs.

Table 4 TMA and iCMA submissions for students on the 2010B presentation of SMT359, as a percentage of the 286 students who started the module.

| <b>SMT359</b>  | <b>0 TMAs</b> | <b>1 TMA</b> | <b>2 TMAs</b> | <b>3 TMAs</b> | <b>4 TMAs</b> |
|----------------|---------------|--------------|---------------|---------------|---------------|
| <b>0 iCMAs</b> | 14.0%         | 4.5%         | 1.7%          | 0.3%          | 0.3%          |
| <b>1 iCMA</b>  | 0.7%          | 4.5%         | 2.4%          | 1.0%          | 0.7%          |
| <b>2 iCMAs</b> |               | 0.7%         | 0.3%          | 1.0%          |               |
| <b>3 iCMAs</b> |               |              | 0.3%          | 0.7%          | 2.1%          |
| <b>4 iCMAs</b> |               | 0.3%         | 0.7%          | 8.4%          | 2.1%          |
| <b>5 iCMAs</b> |               | 0.3%         | 5.6%          | 3.1%          | 3.8%          |
| <b>6 iCMAs</b> |               |              | 4.5%          | 7.0%          | 28.3%         |

Table 5 Mean OES for students in each of the categories of TMA and iCMA submission, for 286 students on the 2010B presentation of SMT359 (where the percentages of students in each category is shown in Table 4).

| <b>SMT359</b>  | <b>0 TMAs</b> | <b>1 TMA</b> | <b>2 TMAs</b> | <b>3 TMAs</b> | <b>4 TMAs</b> |
|----------------|---------------|--------------|---------------|---------------|---------------|
| <b>0 iCMAs</b> |               |              |               |               |               |
| <b>1 iCMA</b>  |               |              |               |               | 27.0          |
| <b>2 iCMAs</b> |               |              |               |               |               |
| <b>3 iCMAs</b> |               |              | 69.0          |               | 45.3          |
| <b>4 iCMAs</b> |               |              | 8.0           | 41.3          | 64.8          |
| <b>5 iCMAs</b> |               |              | 45.9          | 46.0          | 51.0          |
| <b>6 iCMAs</b> |               |              | 47.7          | 50.1          | 62.4          |

Figure 20 indicated that on the 13J presentation, S383 students were quite likely to omit at least one of the module's 12 assignments. Table 6 shows that of 131 students who started an earlier (10B) presentation of this module, just 10.7% of students submitted all the TMAs and iCMAs, whilst 13.0% omitted the maximum allowed 3 TMAs, and around 27.6% omitted a total of three assignments. Table 7 shows that students generally did better the more assignments they submitted, though again nothing should be implied about causality.

Table 6 TMA and iCMA submissions for students on the 2010B presentation of S383, as a percentage of the 131 students who started the module.

| S383    | 0 TMAs | 1 TMA | 2 TMAs | 3 TMAs | 4 TMAs | 5 TMAs | 6 TMAs |
|---------|--------|-------|--------|--------|--------|--------|--------|
| 0 iCMAs | 16.8%  | 3.8%  | 3.0%   | 4.6%   | 1.5%   | 0.8%   | 0.8%   |
| 1 iCMA  |        | 1.5%  | 2.3%   | 0.8%   | 1.5%   |        | 0.8%   |
| 2 iCMAs |        |       |        | 0.8%   | 0.8%   |        |        |
| 3 iCMAs |        |       | 0.8%   | 0.8%   | 0.8%   |        | 3.1%   |
| 4 iCMAs |        | 0.8%  | 0.8%   |        | 0.8%   | 6.9%   | 3.8%   |
| 5 iCMAs |        |       |        |        | 4.6%   | 2.3%   | 1.5%   |
| 6 iCMAs |        |       |        | 13.0%  | 7.6%   | 2.3%   | 10.7%  |

Table 7 Mean OES for students in each of the categories of TMA and iCMA submission, for 131 students on the 2010B presentation of S383 (where the percentages of students in each category is shown in Table 6).

| S383    | 0 TMAs | 1 TMA | 2 TMAs | 3 TMAs | 4 TMAs | 5 TMAs | 6 TMAs |
|---------|--------|-------|--------|--------|--------|--------|--------|
| 0 iCMAs | 16.8%  | 3.8%  | 3.0%   | 4.6%   | 1.5%   | 0.8%   | 0.8%   |
| 1 iCMA  |        | 1.5%  | 2.3%   | 0.8%   | 1.5%   |        | 0.8%   |
| 2 iCMAs |        |       |        | 0.8%   | 0.8%   |        |        |
| 3 iCMAs |        |       | 0.8%   | 0.8%   | 0.8%   |        | 3.1%   |
| 4 iCMAs |        | 0.8%  | 0.8%   |        | 0.8%   | 6.9%   | 3.8%   |
| 5 iCMAs |        |       |        |        | 4.6%   | 2.3%   | 1.5%   |
| 6 iCMAs |        |       |        | 13.0%  | 7.6%   | 2.3%   | 10.7%  |

### 3.2.2 Correlations between TMA/iCMA submission and overall success for S104

For both summative OCAS with an EMA (the 11J presentation) and formative thresholded OCAS (Model A) with an examination, S104 students who submit all TMAs did better overall. For 11J students who submitted all TMAs, the mean EMA score was 57.5%; for students who did not submit all TMAs, the mean EMA score was 41.3%. For 12J students who submitted all TMAs, the mean exam score was 53.4%; for students who did not submit all TMAs, the mean exam score was 44.4%. Again, it is possible that TMA submission is helping students to prepare for the final assessment, but it may simply be that students who are more able or who have more time are more likely to submit all TMAs and also to be more successful in the EMA or examination.

### 3.2.3 SK320 TMA submissions, scores and impact on the exam (Jon Golding)

The SK320 analysis is described in more detail in Appendix C.

The submission of the final SK320 TMA (TMA04) fell from 74% of registered students in 2012B (with summative OCAS) to 61% of registered students in 2013B (with formative thresholded OCAS, Model A), as shown in Figure 11; the mean score for this TMA for students who submitted it also fell from 73 to 69 between the two years, suggesting that some students may have put less effort into TMA04 than in 2012B. TMA04 was designed to prepare SK320 students for Part C of the final examination so this drop in engagement was a cause for concern.

However, as shown in Appendix C, there was at best a weak association between performance on TMA04 by students who submitted it in 2013B and their performance on Part C of the October exam, and no association between non-submission of TMA04 and Part C score. Some students may have made a sensible decision in choosing to concentrate on revision rather than on submitting or gaining a high score in the final TMA.

### 3.2.4 Correlations between TMA/iCMA submission and overall success for S240 (Ruth Williams and Richard Jordan)

The S240 iEMA accounts for 20% of OES and is designed to prepare students for the exam, and the iCMAs are designed to prepare students for the iEMA. Students are allowed to repeat the questions as many times as they wish and they are told that some iCMA questions will

appear in different variants in the iEMA. During the second (12J) presentation of S240, the Module Team encouraged students to engage with iCMAs and TMAs more than had been the case for the first (12B) presentation.

Despite a similar student population, student engagement and outcomes were both considerably better for the 12J presentation than had been the case for 12B, with an increase in the average number of assignments submitted from students from 6.24 to 7.38 (out of 8) and at the same time a substantial increase in both module completion and pass rates. The details are given in Appendix D.

In similar results for those reported for S104 in Section 3.2.2, students who submitted all the TMAs and all the iCMAs did better overall, for example in the 12J presentation, the mean OES for students who submitted all iCMAs was 66.3%, compared with 52.6% for those who did not submit all the iCMAs. It was therefore decided to investigate the correlations between iCMA score and iEMA score and between iEMA score and exam score more thoroughly.

Figure 21 indicates that whilst students who do better on the iCMAs also tend to do better in the iEMA, the correlation is not strong (Spearman rank correlation coefficient = 0.52). Students who score 100% on the iEMA have generally done very well on the iCMAs, but some of the students with a mean score of 100% on the iCMAs (likely to have been obtained by repeating the questions) do distinctly less well in the iEMA.

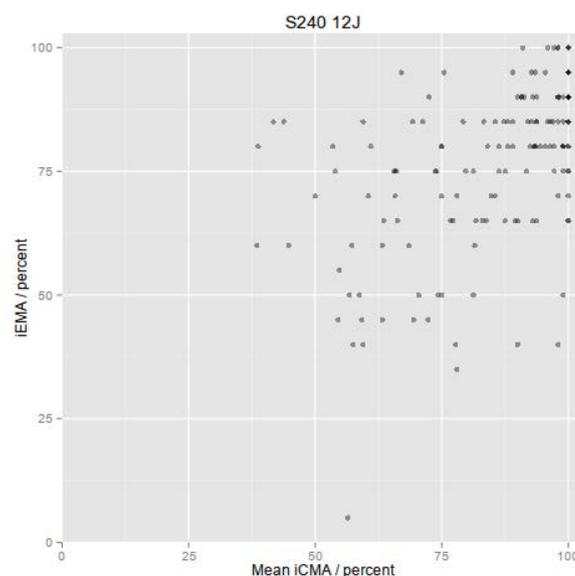


Figure 21 Correlation between iEMA score and mean iCMA score for S240 12J students with non-zero scores.

There is a similarly weak correlation between iEMA score and exam score (Figure 22) on this occasion with students who do well on the exam tending to do well on the iEMA too, but some students doing well on the iEMA but not on the exam (Spearman rank correlation coefficient = 0.58).

Of more direct relevance to this study are the correlations between OES and mean overall TMA score (Figure 23(a)) and between OES and mean TMA score for TMAs actually submitted (Figure 23(b)). Comparison of the two figures shows that there are some cases where students who do well in OES (with scores over 75%) but appear to have a mean TMA score which is only around 40% (Figure 23(a); in all cases the dots representing these cases move to the right on Figure 23(b); in other words these students' low mean TMA score on Figure 23(a) was as a result of them choosing to omit a TMA. Some of these students did very well in the module's OES, so their decision to omit a TMA may have been a sensible one. Figure 24 confirms that whilst some students who omitted TMAs then failed OES, others did very well.

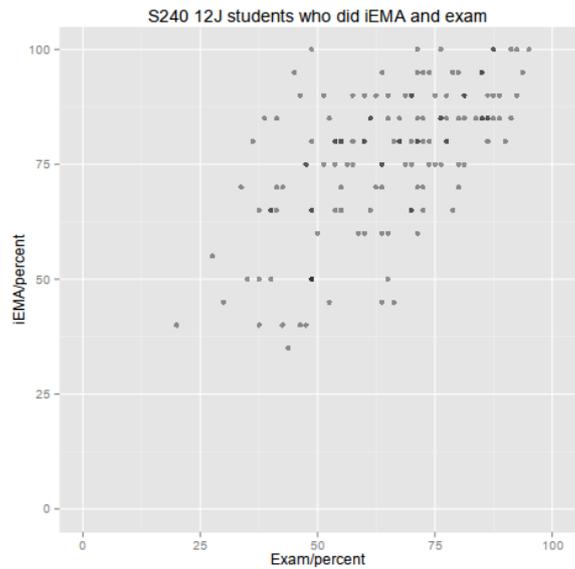


Figure 22 Correlation between iEMA score and exam scores for S240 12J students with non-zero scores.

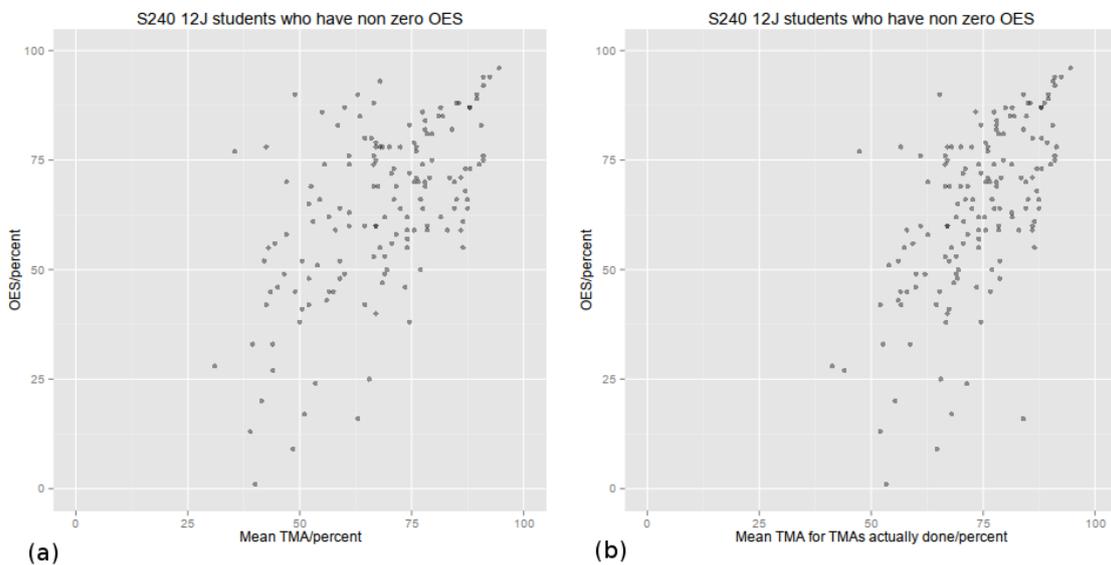


Figure 23(a) Correlation between OES and mean TMA score for S240 12J students with non-zero OES (Spearman rank correlation coefficient = 0.53); (b) Correlation between OES and mean score for TMAs actually done for S240 12J students with non-zero OES (Spearman rank correlation coefficient = 0.61).

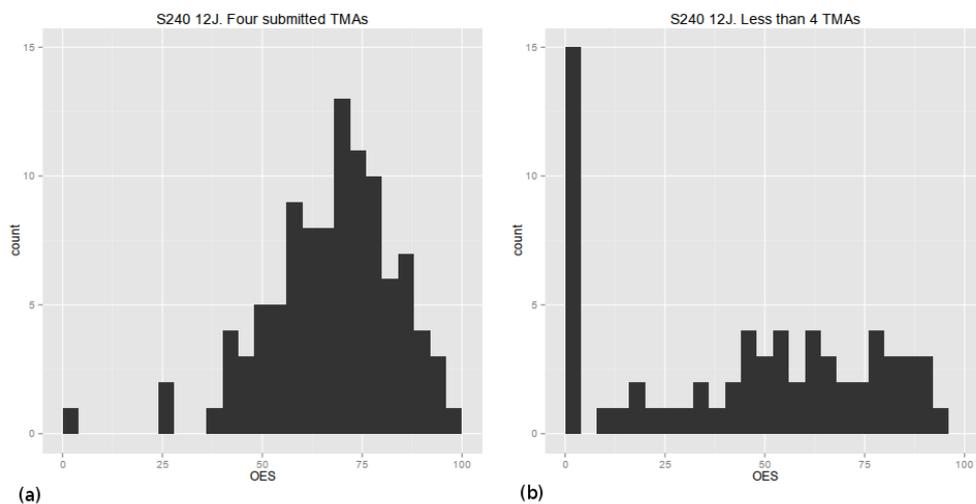


Figure 24(a) Distribution of final OES for students who submitted all four TMAs on the 12J presentation of S240; (b) Distribution of final OES for students who submitted less than four TMAs on the 12J presentation of S240.

### 3.3 Potential impact of a change in threshold

This work whose results are given in this section began as a small-scale inspection (Richard Jordan for Ruth Williams) of the results for students who had passed S240's OCAS threshold by obtaining 30% on at least three of the four TMAs and at least two of the four iCMAs, but who would not have passed a reached a threshold of 40% for all of the assignments. These are students A-H and M-P in tables 8 and 9 below. The "critical thresholds" (iCMA/TMA scores between 30% and 40% that were "needed" in order for the student to reach the overall OCAS threshold) are embolded in the second and third columns of the tables 8 and 9. Interestingly, despite the fact that these students passed the OCAS threshold, only 5 of the 8 students for 12B passed OES and none of the four 12J students did so (the student with a 'postponed exam' has postponed again and so not yet completed the module). It is also the case that all of these students apart from Student E omitted at least one TMA or iCMA. There is thus an argument along the lines that a more demanding threshold (e.g.  $\geq 40\%$  on the same number of assignments, or  $\geq 30\%$  on a larger number of assignments), might encourage greater engagement and thus greater success on OES. However, although increasing the OCAS threshold in some way is very likely to increase engagement with TMAs and iCMAs, it is impossible to predict its impact on OES.

Table 8 Scores for borderline students for S240 12B

| Student | iCMAs                         | TMAs                   | OES (outcome)           | Mean iCMA score | Mean TMA score |
|---------|-------------------------------|------------------------|-------------------------|-----------------|----------------|
| A       | 96, 88, 100, 93               | <b>32</b> , 50, 0, 78  | 70 (Grade 2 pass)       | 94              | 40             |
| B       | 63, <b>33</b> , 0, 0          | 56, 0, 74, 66          | 38 (resit)              | 24              | 49             |
| C       | <b>38</b> , <b>38</b> , 25, 0 | 62, 34, 42, 22         | Absent from exam (fail) | 25              | 40             |
| D       | 44, 67, 0, 79                 | 44, 0, <b>34</b> , 70  | 40 (Grade 4 pass)       | 48              | 37             |
| E       | 100, 96, 86, 79               | 50, <b>34</b> , 32, 54 | 59 (Grade 3 pass)       | 90              | 43             |
| F       | 100, 100, 100, 100            | 70, <b>36</b> , 0, 62  | 52 (Grade 4 pass)       | 100             | 42             |
| G       | 79, 96, 82, 0                 | <b>38</b> , 0, 70, 56  | 34 (resit)              | 64              | 41             |
| H       | 100, 100, 100, 86             | 66, 0, 56, <b>38</b>   | 54 (Grade 4 pass)       | 97              | 40             |
| I       | 61, 58, 0, 0                  | 60, 68, 0, 46          | 17 (resit)              | 30              | 44             |
| J       | 46, 67, 0, 0                  | 82, 86, 68, 44         | 57 (Grade 3 pass)       | 29              | 79             |
| K       | 92, 0, 0, 61                  | 90, 74, 66, 0          | 82 (Distinction)        | 38              | 58             |
| L       | 79, 75, 0, 0                  | 78, 72, 0, 66          | 36 (resit)              | 39              | 54             |

Table 9 Scores for borderline students for S240 12J

| Student | iCMAs              | TMAs                  | OES (outcome)     | Mean iCMA score | Mean TMA score |
|---------|--------------------|-----------------------|-------------------|-----------------|----------------|
| M       | 96, 96, 0, 0       | 0, 40, <b>32</b> , 52 | 28 (resit)        | 48              | 31             |
| N       | 100, 100, 100, 100 | 68, 56, <b>32</b> , 0 | Postponed exam    | 100             | 39             |
| O       | 58, 67, 36, 57     | 62, <b>36</b> , 0, 60 | 33 (resit)        | 55              | 40             |
| P       | 67, 64, 0, 0       | 74, 44, 22, <b>36</b> | 27 (resit)        | 33              | 44             |
| Q       | 100, 96, 79, 89    | 0, 56, 44, 42         | 77 (Grade 2 pass) | 91              | 36             |
| R       | 46, 71, 39, 0      | 72, 54, 68, 68        | 25 (resit)        | 39              | 66             |
| S       | 58, 96, 0, 0       | 72, 92, 0, 80         | 63 (Grade 3 pass) | 39              | 61             |
| T       | 63, 92, 0, 0       | 66, 86, 74, 0         | 62 (Grade 3 pass) | 39              | 57             |

It was decided to extend the S240 project to consider the potential impact of a change from Model B to Model A thresholding. Care should be taken in interpreting the results because the actual thresholding in place would alter student behaviour, and an arbitrary decision had to be taken as to the Model A weightings and thresholds to apply: I chose to consider a case in which all iCMAs and all TMAs were equally weighted and students were required to pass separate thresholds of 40% on the iCMAs and TMAs. Students B, C and P would have failed the overall iCMA threshold whilst Students D, M and N would have failed the overall TMA threshold. In addition, four students for each presentation (Table 8 students I-L and Table 9 students Q-T) would have failed one of the OCAS thresholds (all but student Q would have failed the iCMA threshold). It is interesting that most of these students were clearly being strategic in their decision to omit iCMAs and/or TMAs and some, though not all, did very well on OES.

The other two modules included in the study are S207 (where there is a Model A-type threshold for CMA41 and the TMAs, and a Model B-type threshold for the iCMAs) and SK277 (which uses Model A-type thresholding but with an overall threshold of 30% instead of 40%). Table 9 lists the S207 students from the 12J presentation who achieved the current overall 40% OCAS threshold (obtained from a weighted mean of scores from CMA41 and TMAs01-06) but who would not have reached a threshold of 30% on four or five out of six TMAs, or vice versa. The table also lists iCMA scores, since S207 students are also required to demonstrate engagement by reaching more than 30% on 5 out of 7 iCMAs. All of the students other than Student f, who was an offender learner, met the required iCMA threshold.

After removing students who withdrew, obtained a discretionary postponement, and seven students who were absent from the exam (at least 5 of whom appear to have passively withdrawn), five students (a-e) remained who passed the current OCAS threshold, but who would fail if required to meet a 30% threshold on 4 or 5 of the TMAs, with no additional students who would have failed to meet a 30% threshold on 5 out of the TMAs. In addition, there were two students (f and g) who failed to reach the current threshold but who would have met a 30% threshold on 4 of the TMAs and two more (h and i) who would have met a 30% threshold on 5 of the TMAs.

The over-riding picture from Table 9 is the weakness of these students, though it must be remembered that they are a small fraction of the whole S207 population (the 12J presentation had 657 students at at module start, many of whom did very well in both OCAS and OES). Where the students in Table 9 have passed an OCAS threshold they have achieved no more than a grade 4 pass overall, and there is no evidence that the outcomes would have been significantly different with Model B rather than Model A thresholding for S207's CMA41 and TMAs. There is certainly no evidence of successful strategic behaviour.

Table 9 TMA and iCMA scores and final outcomes for borderline students for S207 12J

| Student | CMA41 | TMA scores                   | OCAS | OES (outcome)     | iCMAs submitted and over 30% |
|---------|-------|------------------------------|------|-------------------|------------------------------|
| a       | 95    | 64, 40, 46, 52, 24, 0 (late) | 41   | 41 (Grade 4 pass) | 7 iCMAs all >30%             |
| b       | 93    | 0, 70, 0, 48, 68, 41         | 44   | 26 (resit)        | 5 iCMAs all >30%             |
| c       | 80    | 66, 24, 24, 58, 34, 48       | 44   | 22 (resit)        | 7 iCMAs all >30%             |
| d       | 88    | 68, 48, 60, 76, 0, 0         | 45   | 34 (resit)        | 6 iCMAs, 5 > 30%             |
| e       | 74    | 64, 66, 58, 26, 6, 54        | 47   | 20 (resit)        | 7 iCMAs all >30%             |
| f       | 0     | 48, 42, 0, 50, 0, 50         | 30   | 18 (fail)         | 0 iCMAs (offender learner)   |
| g       | 68    | 58, 12, 58, 44, 8, 33        | 37   | 35 (fail)         | 7 iCMAs all >30%             |
| h       | 40    | 58, 30, 24, 34, 32, 40       | 37   | 19 (fail)         | 7 iCMAs all >30%             |
| i       | 36    | 44, 54, 0, 40, 60, 32        | 38   | 20 (fail)         | 5 iCMAs all >30%             |

Table 10 shows that for SK277, after removing students who withdrew, obtained a discretionary postponement, and 10 students who were absent from the exam (at least half of whom appear

to have passively withdrawn), there were 25 students who who passed the current OCAS threshold of 30%, but who would not have pass a 40% overall threshold. It is notable that most of these students did not perform well in the examination (the outcomes were 11 resits, 7 grade 4 passes, 3 grade 3 passes, 2 grade 2 passes and one distinction; compared with the overall outcomes for the 1298 students who started this presentation of 15% resits, 10% grade 4 pass, 23% grade 2 pass and 16% distinction). Some of the students listed in Table 10 (e.g. Jj, Kk and Ll) were clearly very weak, and might have benefitted from re-taking the whole module, which they would probably have had to do had they failed to meet an OCAS threshold, though it is difficult to be certain whether individual students would have achieved a higher mean for their TMAs had they known that the OCAS threshold was 40% not 30%.

There were no SK277 students who would have passed a threshold of 30% in 2 out of 3 TMAs but failed on either a 30% or 40% threshold overall. However Table 10 includes three students, Dd, Ff and Tt, who passed the current threshold but would have failed if they were required to obtain more than 30% in 2 out of 3 TMAs (a typical Model B strategy). Students Dd and Tt appear to have adopted a strategic approach in their TMA-submission decisions; Tt still did very well in the examination but Dd did not.

Table 10 Scores for borderline students for SK277 12J

| Student   | Mean TMA score | OES (outcome)            | TMA scores       |
|-----------|----------------|--------------------------|------------------|
| Aa        | 30             | 40 (Grade 4 pass)        | 34, 56, 0        |
| Bb        | 30             | 57 (Grade 3 pass)        | 36, 0, 55        |
| Cc        | 31             | 23 (resit)               | 32, 38, 23       |
| <b>Dd</b> | <b>32</b>      | <b>54 (Grade 4 pass)</b> | <b>0, 95, 0</b>  |
| Ee        | 32             | 32 (resit)               | 26, 40, 31       |
| <b>Ff</b> | <b>33</b>      | <b>47 (Grade 4 pass)</b> | <b>0, 29, 69</b> |
| Gg        | 33             | 38 (resit)               | 51, 58, 0        |
| Hh        | 34             | 58 (Grade 3 pass)        | 67, 0, 34        |
| Ii        | 34             | 72 (Grade 2 pass)        | 37, 17, 48       |
| Jj        | 34             | 39 (resit)               | 36, 29, 46       |
| Kk        | 35             | 22 (resit)               | 21, 39, 44       |
| Ll        | 36             | 29 (resit)               | 18, 40, 49       |
| Mm        | 36             | 66 (Grade 2 pass)        | 74, 0, 35        |
| Nn        | 36             | 34 (resit)               | 39, 36, 34       |
| Oo        | 37             | 22 (resit)               | 30, 45, 35       |
| Pp        | 37             | 23 (resit)               | 51, 60, 0        |
| Qq        | 37             | 62 (Grade 3 pass)        | 0, 41, 70        |
| Rr        | 38             | 54 (Grade 4 pass)        | 66, 48, 0        |
| Ss        | 38             | 72 (Grade 2 pass)        | 34, 40, 41       |
| <b>Tt</b> | <b>39</b>      | <b>91 (Distinction)</b>  | <b>0, 90, 26</b> |
| Uu        | 39             | 44 (Grade 4 pass)        | 0, 67, 49        |
| Vv        | 39             | 37 (resit)               | 41, 41, 34       |
| Ww        | 39             | 51 (Grade 4 pass)        | 54, 40, 24       |
| Xx        | 39             | 41 (Grade 4 pass)        | 40, 32, 46       |
| Yy        | 39             | 30 (resit)               | 27, 46, 46       |

### 3.4 S141 and S142 comparison (Lynda Cook and Sally Jordan)

At the time of Lynda Cook's poster presentation to the 2013 Assessment in Higher Education Conference (Cook, Butler & Jordan, 2013), only 46% of students on the 13B presentation of S142 had submitted TMA02, whose cut-off date had passed, compared with 69% of S141 12J students who submitted iCMA41 (S141's second assignment) and 60% who submitted TMA02. However, by the end of the S142 presentation, 69% of students had submitted TMA02. Many students had requested an extension for this TMA because its due date (12<sup>th</sup> June) was very close to the main examination period for 12J presentation modules.

Reasons identified by ALs for non-submission of a sample of TMA02s are given in Table 11. There were particular issues of student overload on the 12J presentation of S141 (in England,

students could only be studying this presentation of S141 if they were studying it concurrently with other modules, usually S104) and the non-submission of assessed tasks acted as an early warning of the difficulties being experienced by over-committed and underprepared students, many of whom were also failing to make progress on their other modules. The different behaviour of new and continuing students on the 13J (more typical) presentation of S141 is further discussed in Section 3.9.

Table 11 A sample of the reasons given by ALs for non-submission and partial submission of TMA02 (where known). Reproduced from Cook et al. (2013)

| Reason (defined prior to the study)                                                                                                                            | Number of times mentioned |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| The student is struggling academically with either module                                                                                                      | 3                         |
| Student has a disability                                                                                                                                       | 4                         |
| The student is struggling to find the time for S141 or S142 because of other external commitments e.g. employment, caring responsibilities.                    | 5                         |
| The student is struggling to find the time for S141 or S142 because of unexpected events e.g. illness                                                          | 2                         |
| The student is struggling to find the time for S141 or S142 because of the pressures of other OU modules.                                                      | 7                         |
| The student is studying strategically and decided not to submit the TMA because they felt it was not necessary to obtain 40% on overall continuous assessment. | 0                         |
| I believe the student has stopped studying (i.e. has passively withdrawn from S141 or S142)                                                                    | 17                        |
| The student has formally withdrawn from S141 or S142                                                                                                           | 28                        |

Table 11 shows no evidence that students were omitting TMA02 for strategic reasons, and whilst there was some evidence of such behaviour for TMA03 on both modules, this was a smaller effect than had been expected.

Evidence from ALs and the S141 curriculum manager indicates that only a very small number of students, on either the 12J or 13J presentation, appeared to engage more with the S141 continuous assessment in an attempt to reach the 70% OCAS threshold and thus to qualify for a distinction on the basis of their OES. However, very many students continued to engage because they were anxious that otherwise they might not reach S141's satisfactory participation threshold, indeed some students appeared unduly concerned about this. Satisfactory participation in S141 activities, in particular investigative science activities, is "marked" by ALs, and current practice is that students are not informed of the satisfactory participation threshold.

### 3.5 Comparison of scores for students studying SK320 and S377 concurrently (Janet Haresnape)

There was some concern that SK320 students might be omitting assignments (Section 3.2.3) because they felt under pressure to engage to a greater extent with clashing assignments on other modules being studied concurrently (Section 3.4), especially when these modules had summative OCAS. SK320 (formative thresholded OCAS, Model A) and S377 (summative OCAS) are frequently studied concurrently. In the 13B presentation, SK320 had TMAs with due dates of 7<sup>th</sup> March, 6<sup>th</sup> June, 18<sup>th</sup> July and 29<sup>th</sup> August, and iCMAs due on 16<sup>th</sup> May and 22<sup>nd</sup> August. S377 had TMAs due on 25<sup>th</sup> April, 27<sup>th</sup> June and 29<sup>th</sup> August, thus the due date for SK320 TMA04 clashed with the due date for S377 TMA03.

This sub-project inspected the assessment records for the 23 students who completed both SK320 and S377 in the 13B presentation. The data are given in Appendix E. There is no evidence from this data that students were putting more effort into the continuous assessment for S377 than for SK320. If anything, individual students scored higher marks on their SK320

assignments than their S377 assignments, supporting the simple conclusion that S377 is a more difficult module to score high marks on and get a good grade for than SK320.

### 3.6 Student engagement with iCMAs

#### 3.6.1 Overall activity on iCMAs

Figures 25-29 show the total number of iCMA questions (from all iCMAs) started per date for a selection of different modules and different assessment strategies. The number of questions started can be taken as a proxy for overall engagement, though when an assignment has an unusually large number of questions (as for S104 12J and 13J iCMA44 and iCMA45 with 20 questions each, S104 11J iCMA49 and S104 12J iCMA47 with 25 questions each, and S104 13J iCMA47 with 30 questions) the plots may give a slightly misleading impression, because the apparently high usage may actually be caused by a relatively small number of students attempting a relatively large number of questions from the same iCMA on the same day. When all iCMAs share a due date (as for S104 13J) the effect may be even more pronounced.

Figures 25-27 compare student activity on iCMAs in three successive October-start presentations of S104 on which, in order, the iCMAs contributed to the summative OCAS with fixed cut-off dates through the presentation (11J, shown in Figure 25); the iCMAs contributed to the weighted mean for formative thresholded OCAS (Model A) with fixed cut-off dates through the presentation (12J, shown as Figure 26); the iCMAs were purely formative with no cut-off dates (13J, shown as Figure 27).

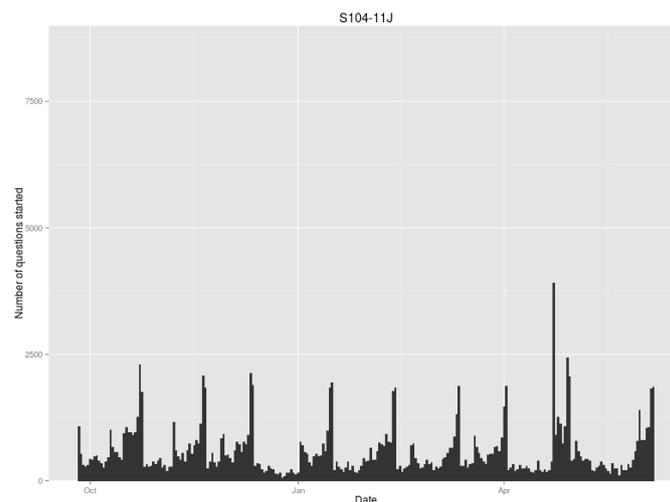


Figure 25 Number of questions started per day for all students ( $n=2109$  at module start) on the 11J presentation of S104. This presentation had 9 iCMAs with fixed cut-off dates through the year, contributing to the summative OCAS. iCMAs41-48 had 10 questions each and iCMA49 had 25 questions.

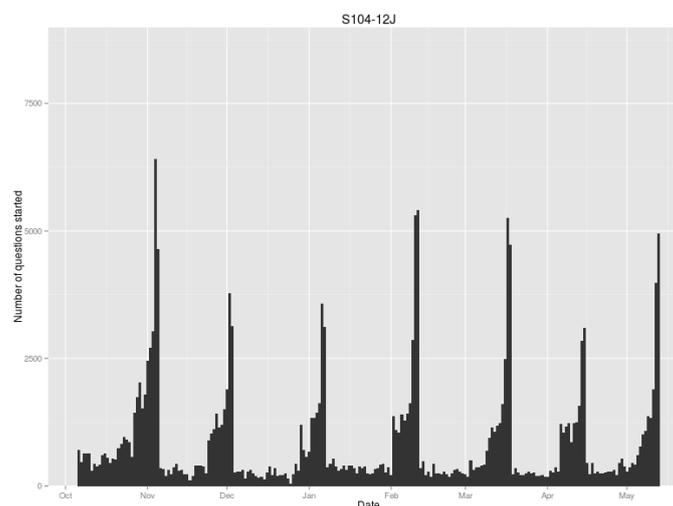


Figure 26 Number of questions started per day for all students (n=2357 at module start) on the 12J presentation of S104. This presentation had 7 iCMAs, contributing to the weighted mean for the OCAS threshold, with fixed cut-off dates through the year. iCMA41 had 10 questions, iCMAs 42,43 and 46 had 12 questions, iCMA44 and 45 had 20 questions, and iCMA47 had 25 questions.

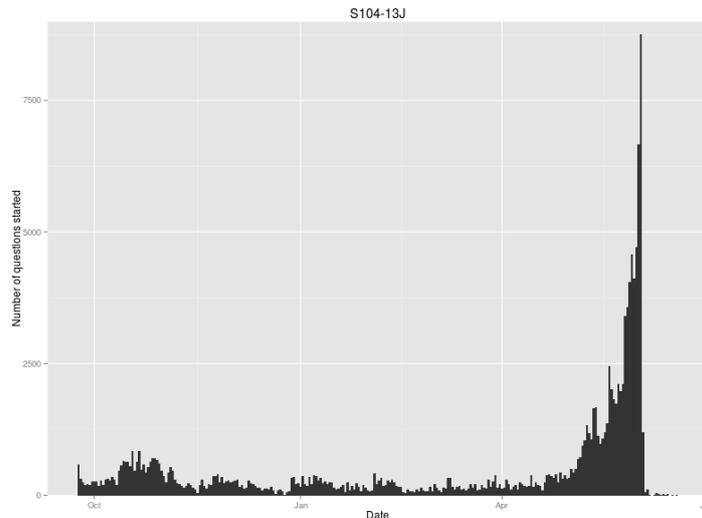


Figure 27 Number of questions started per day for all students (n=2112 at module start) on the 13J presentation of S104. This presentation had 7 purely formative iCMAs. iCMA41 had 10 questions, iCMAs 42,43 and 46 had 12 questions, iCMA44 and 45 had 20 questions, and iCMA47 had 30 questions.

It is clear from Figures 25 and 26 that in summative or formative thresholded use with fixed cut-off dates, the iCMAs provided a pacing function throughout the presentation, which was not present in purely formative use (Figure 27). 13J students were encouraged to use the iCMAs as a “revision aid” and it appears that students were doing just that; the examination was on 3<sup>rd</sup> June 2014.

Figures 28 and 29 compare the number of questions answered per day for S207 12J and S240 12J. Both of these modules use Model B formative thresholded assessment for their iCMAs, with S207 students needing to demonstrate engagement by reaching a threshold of 30% on at least 5 out of 7 iCMAs whilst S240 students needed to demonstrate engagement by reaching a threshold of 30% on at least 2 out of 4 iCMAs. In both cases questions could be attempted as many times as a student wished before the cut-off date, with different variants available and with the highest score counting. The main difference was that for S207 there were fixed cut-off dates throughout the year (and the iCMAs then re-opened with different urls for use for revision purposes) whereas for S240 there were advisory cut-off dates throughout the year, but the hard cut-off dates for all the iCMAs were all at the end of the presentation, on 6<sup>th</sup> June 2013. The impact of the hard cut-off dates in encouraging students to engage with the questions at the appropriate time is very clear.

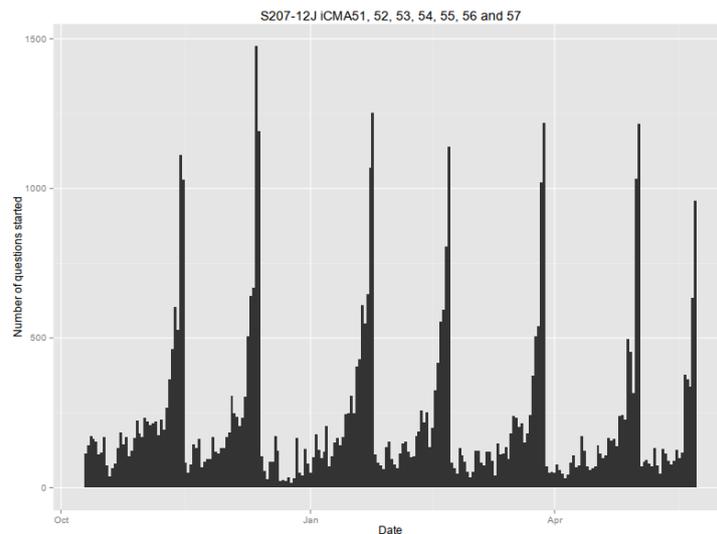


Figure 28 Number of questions started per day for all students (n=657 at module start) on the 12J presentation of S207. This presentation had 7 iCMAs with 8 questions each, with fixed cut-off dates through the year. Students were required to achieve at least 30% in at least 5 of the 7 iCMAs.

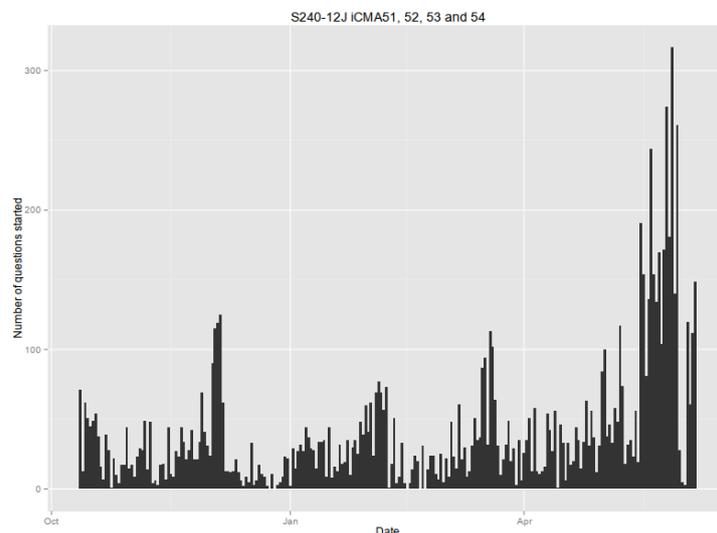


Figure 29 Number of questions started per day for all students (n=208 at module start) on the 12J presentation of S240. This presentation had 4 iCMAs with 6-7 questions each, with advisory cut-off dates throughout the year but with all hard cut-off dates on 6<sup>th</sup> June 2013. Students were required to achieve at least 30% in at least 2 of the 4 iCMAs.

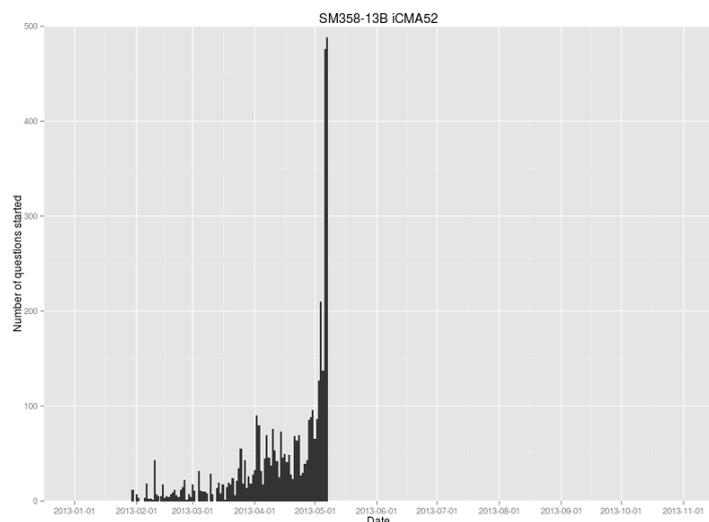


Figure 30 Number of questions started per day for all students (n=323 at module start) on iCMA52 for the 13B presentation of SM358, with 8 questions and a fixed cut-off date of 7<sup>th</sup> May 2013.

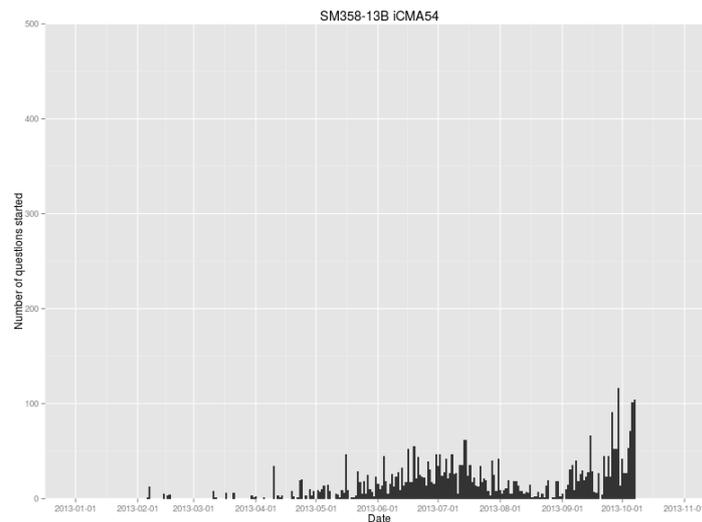


Figure 31 Number of questions started per day for all students ( $n=323$  at module start) on iCMA54 for the 13B presentation of SM358, with 8 questions, an advisory cut-off date of 15<sup>th</sup> July 2013 and a fixed cut-off date of 7<sup>th</sup> October 2013.

Further evidence of the different student behaviour resulting from fixed and advisory cut-off dates is provided by Figures 30 and 31. These figures give the number of questions started per day for two separate iCMAs on the 13B presentation of SM358. SM358 has a total of 6 TMAs and 4 iCMAs, and students are required to demonstrate engagement by achieving a threshold of 30% on at least 7 of the assignments, or which at least two must be TMAs. Thus students are required to engage with between three and five iCMAs. However, iCMA51 and iCMA52 have fixed cut-off dates at the appropriate time in the study calendar (and the iCMAs then re-open with different urls for use for revision purposes) whilst the later iCMAs, like S240, use advisory cut-off dates throughout the year, with hard cut-off dates at the end of the presentation, on 7<sup>th</sup> October for the 13B presentation.

### 3.6.2 Number of questions answered and number of attempts at each question

When iCMAs are in summative use, unsurprisingly most students attempt all the questions in each assignment. In purely formative use, the number of students who access the iCMA questions has been observed to drop off both between and during iCMAs, as shown in Figure 32a for SDK125's four purely formative iCMAs. Figure 32b shows a much better consistency of usage for S240's formative thresholded (Model B) iCMAs.

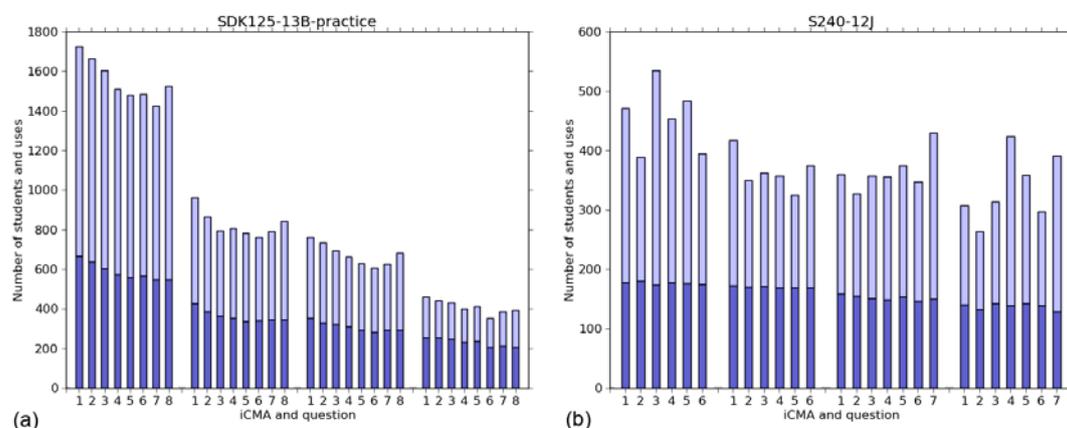


Figure 32. Number of users (dark blue lines) and usages (light blue lines) for iCMAs in (a) purely formative use (SDK125 13B); (b) formative thresholded use (S240 12J).

In figures 32, 34 and 35, the dark blue lines refer to the number of separate users for each student whilst the light blue lines refer to the number of separate usages, reflecting the number of times whole questions were repeated. Where repeating is allowed, it is usually the case that there appear to be approximately twice as many usages as there are users, but this does not

mean that most students are attempting the questions twice, rather than that most students are attempting the questions just once, but a small number are attempting them many times, as shown in Figure 33, which sums the data for all iCMAs in the 12J presentation of S240.

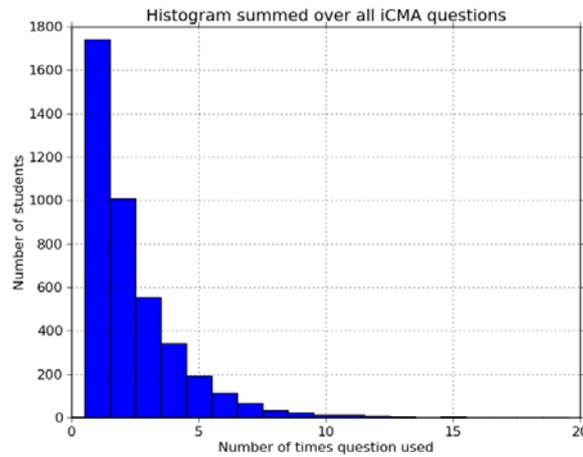


Figure 33. A distribution showing the extent of repeating on all S240 iCMAs in the 12J presentation.

For the 12J presentation of S104, the first presentation that used formative thresholded continuous assessment, repeating of questions was allowed by mistake for iCMA41 (beyond the usual three tries, questions cannot usually be repeated in Model A formative thresholded assessment, though it is encouraged in Model B usage). This explains the difference between student behaviour on iCMA41 and later iCMAs, shown in Figure 34. However, the number of separate users per iCMA remains around 1500 for all the questions, with just a slight indication that students were not bothering with all the questions on the 25-question iCMA57.

In contrast, Figure 35 shows that when S104’s iCMAs were purely formative, by halfway through the module only around 500 students were attempting the iCMAs. Thus, apart from the fact that repeating of questions is “not allowed” in formative thresholded Model A, the contrast between Figure 34 and Figure 35 is very similar to the contrast between Figure 32 (b) and (a).

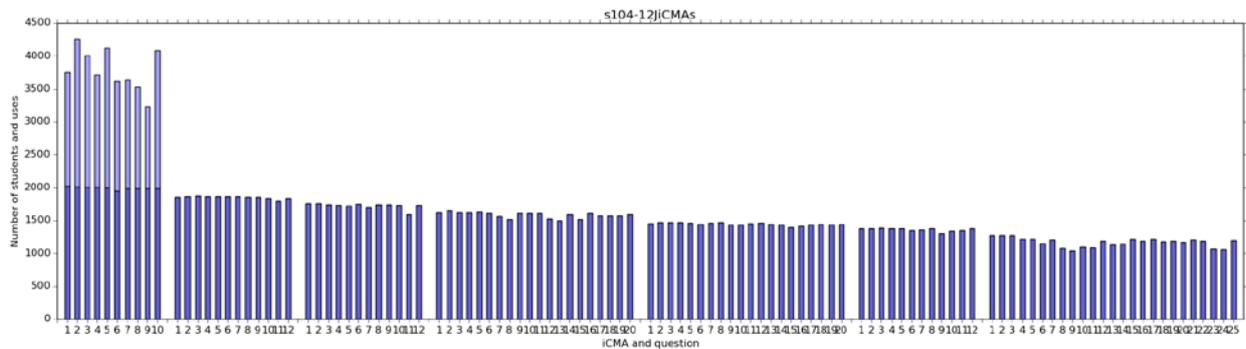


Figure 34. Number of users (dark blue lines) and usages (light blue lines) for S104 12J iCMAs (formative thresholded use, Model A). The student population was 2357 at module start.

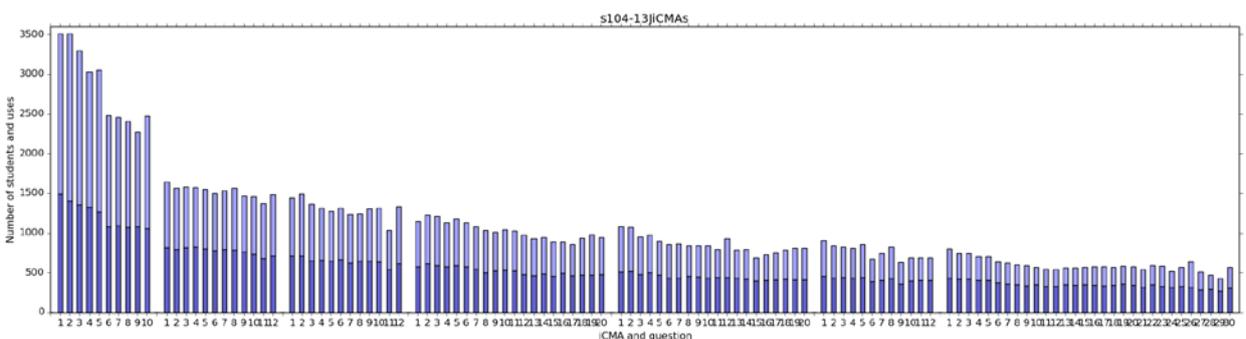


Figure 35. Number of users (dark blue lines) and usages (light blue lines) for S104 13J iCMAs (formative thresholded use, Model A). The student population was 2112 at module start.

### 3.6.3 Are students “cheating”? (John Bolton)

Figure 36 illustrates the fact that, in formative thresholded use (Model B), with repeating of questions allowed, a larger than expected number of students attempted some (but by no means all) S207 questions four times.

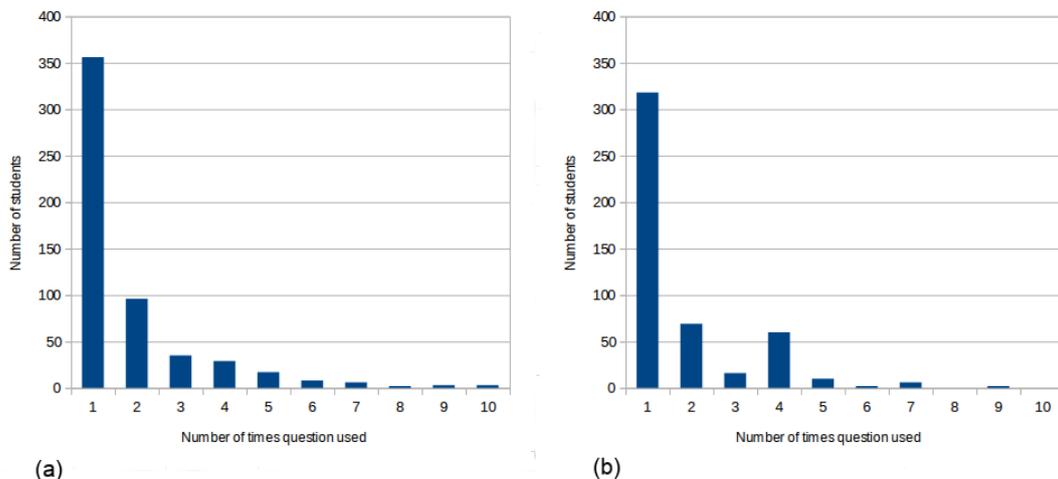


Figure 36. Distributions showing the extent of repeating, for two contrasting S207 iCMA questions (12J presentation).

All S207 iCMA questions exist in three variants, so there was some anxiety that a substantial number of students had got into the habit of simply “clicking through” the questions until the initial variant was offered again. However Tables 12-14 show that very few students did this regularly. In all three tables “XXX” indicates students who repeated the same response for their three tries at a question, at which point they will have received the question again, though in a different variant, whilst “XXX, XXX, XXX” indicates students who clicked through the question three times; on the fourth attempt they will have been presented with a variant that they had seen before, so this behaviour might be seen as cheating. Table 12, which illustrates student behaviour on all questions in two typical S207 iCMAs, shows that there were certain questions (e.g. iCMA54 Q3 and iCMA55 Q3, Q5, Q7 & Q8) on which both behaviours were much more common. Table 13 shows that the majority of students who clicked through any of the questions in an iCMA only did this once on a particular iCMA, whilst Table 14 shows that only 9 of the 657 students who started the 12J presentation of S207 clicked through questions to get to previously seen variants more than 7 times on the module’s 7 iCMAs, each with 8 questions. There is thus evidence to suggest that students only clicked through questions that they found particularly difficult.

Table 12 The extent of multiple tries and multiple attempts on two S207 iCMAs (12J presentation).

| <b>iCMA 54</b> | XXX | XXX, XXX, XXX | <b>iCMA 55</b> | XXX | XXX, XXX, XXX |
|----------------|-----|---------------|----------------|-----|---------------|
| Q1             | 62  | 4             | Q1             | 116 | 5             |
| Q2             | 78  | 7             | Q2             | 17  | 0             |
| Q3             | 139 | 11            | Q3             | 137 | 21            |
| Q4             | 50  | 6             | Q4             | 36  | 1             |
| Q5             | 78  | 5             | Q5             | 103 | 11            |
| Q6             | 34  | 1             | Q6             | 28  | 1             |
| Q7             | 73  | 6             | Q7             | 117 | 11            |
| Q8             | 44  | 3             | Q8             | 175 | 23            |

Table 13 The extent to which students repeating questions once or multiple times in the same iCMA, for two S207 iCMAs (12J presentation).

| <b>iCMA 54</b> | XXX | XXX, XXX, XXX | <b>iCMA 55</b> | XXX | XXX, XXX, XXX |
|----------------|-----|---------------|----------------|-----|---------------|
| once           | 60  | 10            | once           | 71  | 43            |
| twice          | 36  | 5             | twice          | 51  | 7             |
| 3 times        | 20  | 2             | 3 times        | 30  | 4             |

|         |    |   |         |    |   |
|---------|----|---|---------|----|---|
| 4 times | 18 | 3 | 4 times | 27 | 1 |
| 5 times | 13 | 1 | 5 times | 25 | 0 |
| 6 times | 9  | 0 | 6 times | 16 | 0 |
| 7 times | 9  | 0 | 7 times | 7  | 0 |
| 8 times | 14 | 0 | 8 times | 11 | 0 |

Table 14. The extent to which students repeating questions once or multiple times over all iCMAs in the 12J presentation of S207.

| Number of repeats or multiple repeats for all questions in all iCMAs | XXX | XXX, XXX, XXX |
|----------------------------------------------------------------------|-----|---------------|
| 1                                                                    | 79  | 50            |
| 2                                                                    | 39  | 31            |
| 3                                                                    | 24  | 11            |
| 4                                                                    | 23  | 12            |
| 5                                                                    | 18  | 7             |
| 6                                                                    | 21  | 5             |
| 7                                                                    | 9   | 5             |
| 8                                                                    | 11  | 3             |
| 9                                                                    | 14  | 1             |
| 10                                                                   | 9   | 0             |
| >10                                                                  | 170 | 5             |

### 3.6.4 Proportion of responses correct at first second and third attempt

Figure 37 and Figure 38 contrast the proportion of students who were correct at first, second and third try<sup>4</sup> and not at all, for all questions in iCMA42 for S104 12J (with iCMAs contributing the the overall OCAS threshold) and 13J (with purely formative iCMAs). iCMA42 was selected for this comparison because the questions were identical for these two presentations. It can be seen that, whilst the proportions were similar for some questions, for others (e.g. Q2 and Q12) a noticeably smaller proportion of responses were correct at the first try and a noticeably larger proportion of responses were incorrect after three tries when the questions were in purely formative use (Figure 38) than when in formative thresholded use (Figure 37).

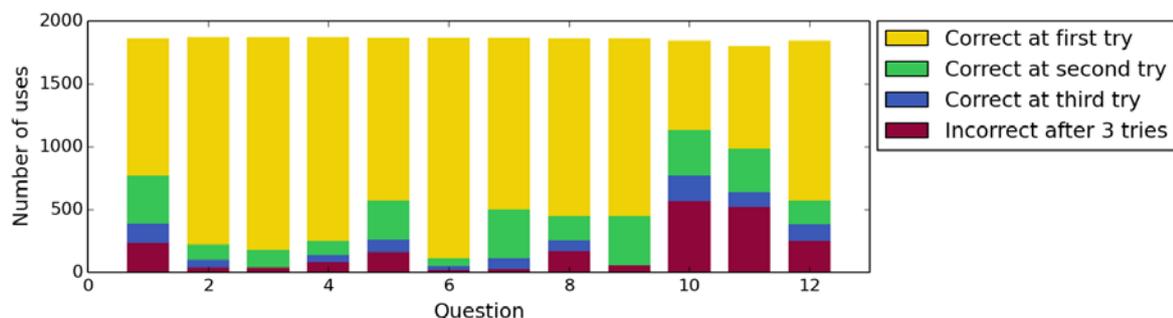


Figure 37. Number of responses correct at first, second and third try and not at all, for all questions in S104 iCMA42 in formative thresholded use (Model A) (12J presentation with 2357 students at module start).

<sup>4</sup> Recall that a distinction should be made between “try” (the opportunity to alter an answer in response to feedback) and “attempt” (the opportunity, only sometimes available, to repeat the whole question, perhaps in a different variant).

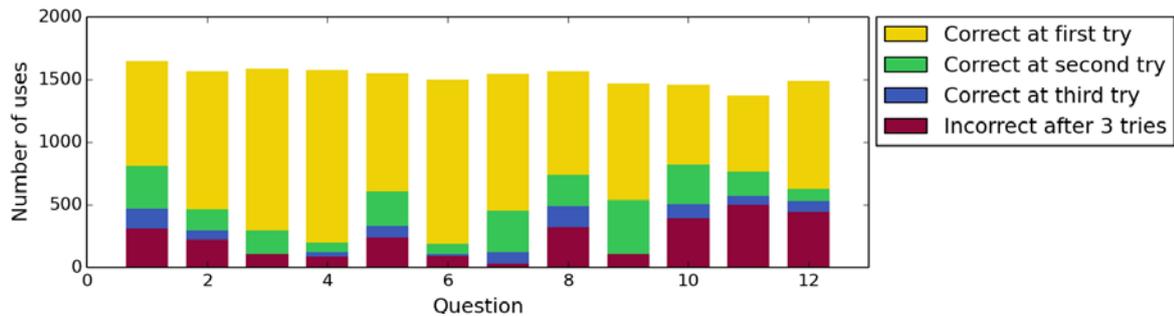


Figure 38. Number of responses correct at first, second and third try and not at all, for all questions in S104 iCMA42 in purely formative use (13J presentation with 2112 students at module start).

### 3.6.5 Blank and repeated responses

Figures 39 and 40 further explore the depth of student engagement for S104 iCMA questions in summative, formative thresholded and purely formative use. Each figure illustrates the extent of repeated and blank responses for identical questions in summative use on the 11J presentation (left-hand diagram in each figure), formative thresholded use (Model A) on the 12J presentation (middle diagram in each figure), and purely formative use on the 13J presentation (right-hand diagram in each figure). In each case, green indicates correct responses whilst red, orange and yellow indicate incorrect but non-blank responses, and grey indicates blank responses. Responses that were repeated from 1<sup>st</sup> to 2<sup>nd</sup> try and/or from 2<sup>nd</sup> to 3<sup>rd</sup> try are shown in the same colour.

In both cases, the student behaviour in summative and formative thresholded use was similar. For the question shown in Figure 39, slightly fewer responses were correct at the first attempt when the question was in purely formative use, and slightly more responses were repeated and/or blank. For the question shown in Figure 40, whilst approximately the same number of responses were correct at first attempt, irrespective of the mode of use, considerably more responses were repeated and/or blank when the question was in purely formative use.

A high proportion of blank and repeated responses has previously been associated with lack of seriousness of engagement (Jordan, 2014a). However it should be noted that the detail of the question being asked is also important; students are more likely to leave the response blank or to leave the response unchanged after feedback for questions that are time-consuming or complicated to complete. In this case, the question illustrated in Figure 39 was a simple drag and drop question whilst the question illustrated in Figure 40 required the use of a calculator in order to perform a relatively complicated calculation.

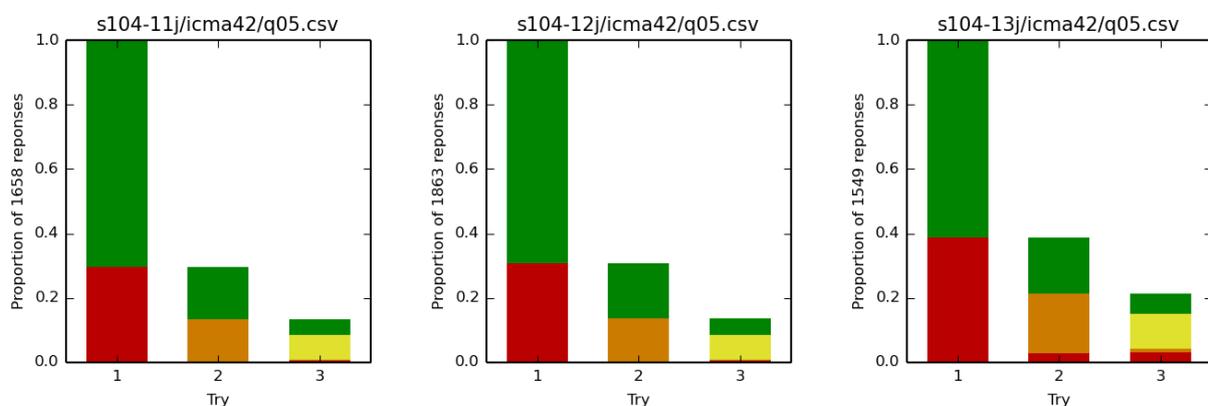


Figure 39. The proportion of responses correct at 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> try, showing the extent of repeating and blank responses for the same S104 question in summative, formative thresholded (Model A) and purely formative use (for S104 11J, 12J and 13J iCMA42 Q5)

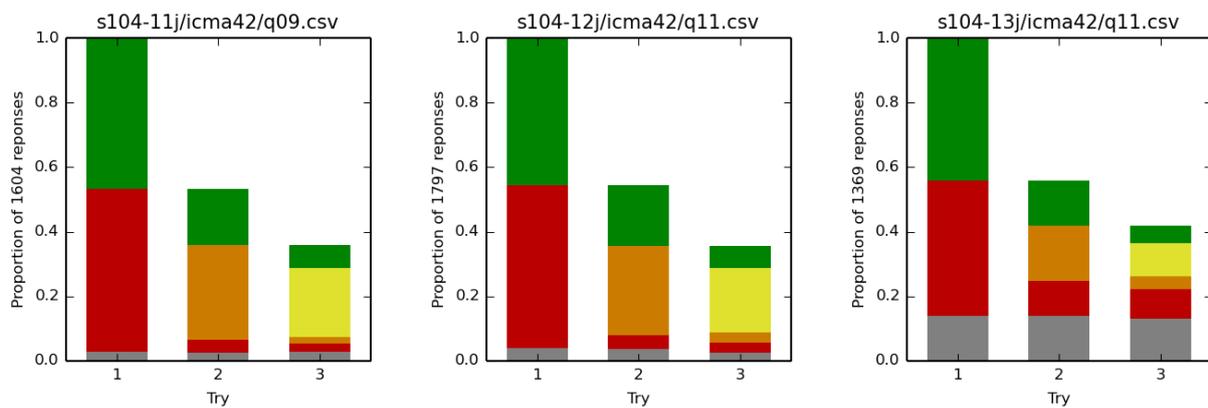


Figure 40. The proportion of responses correct a 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> try, showing the extent of repeating and blank responses for the same S104 question in summative, formative thresholded (Model A) and purely formative use (for S104 11J iCMA42 Q9; 12J and 13J iCMA42 Q11)

### 3.7 Impact on plagiarism cases (Lynda Cook)

Concern had been expressed that the re-use of TMAs would lead to tutor notes getting into the public domain and also that students who deferred from one presentation to the next without assessment banking might present answers provided by their tutor in one presentation as their own work in the next. Some module teams went so far as to tell ALs only to supply references to module materials (rather than full answers) to students who had not attempted a particular question, but this led to an outcry from ALs who quite reasonably felt that they should not disadvantage the weaker students for whom references to module materials might be insufficient, simply to avoid plagiarism by a minority of students. Several modules developed “assessment commentaries”, which suggest starting points for each question without giving answers, and these have been well received, with some ALs commenting that, for weak students, assessment commentaries are more useful than full answers in any case. Other module teams have produced screencasts with feedback on TMA questions, again to make feedback more discursive and less prone to plagiarism, and these have also been well received.

A review of plagiarism cases by Lynda Cook (Faculty Academic Conduct Officer) in summer 2014 found that, whilst the re-use of assignments had been accompanied by an increase in plagiarism cases, it was not possible to attribute causality, and the increase in cases had not been as large as feared.

A snapshot of several modules showed that:

For S104 (which moved to formative thresholded assessment in 12J) there had been some instances of students deferring without assessment banking and hence having access to tutor feedback, but the introduction of assessment commentaries had reduced the public availability of “model” answers. If students had made use of previous feedback, incorporating the feedback into their own work, then this was deemed to be acceptable academic development.

On *Health sciences in practice* (S110) and *Developing your paramedic practice* (S211) (summative assessment but with re-used assessment questions) there had been a number of instances of collusion between students due to the similarity in the assessment material. These modules were largely studied by externally funded students and the close working relationship between the students (e.g. from the same employment) had led to particular problems.

On SK277 (which moved to formative thresholded assessment in 12J) there had been large numbers (of the order of 50 per presentation) of academic conduct cases (both study skills and disciplinary investigations) both prior to and after the change in assessment strategy. The problem had been attributed to the design of the TMAs, with a large number of publically available resources that students had been tempted to copy, and students making extensive

use of the module materials. The module team had addressed some of the issues by changing assessment questions.

It appears that the major problem overall has been one of a lack of shared understanding of the nature and purpose of assessment. In formative thresholded assessment, students who copy assignment answers are only really cheating themselves. However the academic conduct officers want to encourage module teams to use student matching software (Copycatch) against current and past presentations to ensure that scripts are appropriately screened.

### 3.8 Student and staff perception of assessment strategies

The full report of Karen New's email dialogue with 16 students on S104, SK277 and S294 is reproduced in Appendix F. Most of the students wanted their TMA and iCMA marks to count, and felt cheated when they discovered that this was not the case. However this should be seen in the context of a poor understanding of Open University assessment strategies including summative OCAS.

Responses to the questions sent by email to S141 ALs (all of whom tutor or have tutored other modules), revealed the general feeling that students do not understand the Open University's use of either summative or formative thresholded assessment and that our assessment strategies should be more consistent and transparent. Furthermore, some of the responses revealed a lack of understanding on the part of the AL.

The following AL responses (copied beneath the question) to the following question are particularly revealing:

*Do you feel that students on modules with summative continuous assessment properly understand this? In particular, do students realise that although the OCAS mark 'counts', for most modules their final grade is determined by their mark in the exam or end of module assignment alone (because they do less well in OES than OCAS)?*

- Again, I suspect many do not understand it, although even those who do often still aim for high marks because of pride in achievement. Marks do matter to most students.
- I think most do - in general I think students assume to start with that every mark will count.
- I don't think they do understand this - and I don't either. My experience on S104 was that in the previous model of summative continuous assessment the final mark was made up of both OCAS (75%) and OES marks (25%) – or at least that's what I thought... maybe I was wrong all those years, oops! Then in S250, the assessment strategy states that the two components are equally weighted. So basically I'm as confused as the students by all the different models of assessment.
- I don't really understand the reasons behind either system. From a learning point of view summative makes more sense to me, but I don't follow why OCAS does not input to final grade. To me it should do, as a measure of a student ability and level of understanding of the material.
- I do work on other modules with a variety of different assessment strategies. Some have summative continuous assessment and others have formative thresholded assessment. My understanding is similar for both. I do wish there was consistency in assessment strategy style across the faculty, for me and for students.

Several interesting comments have been received anecdotally:

1. An SK277 12J presentation student commented

*I really like the fact that I can treat the TMAs with the same dedication as I have in all the courses, but haven't got the stress of aiming for 100% with each one. Looking back on my previous courses I think I stressed over my TMAs far too much, perhaps to the detriment of revising throughout the year in preparation for the exam. I always wanted each TMA to be perfect so that I could gain the maximum marks for the overall course assessment. The reality for me has always been that my exam grade is the one which has determined by final grade. This year I am still working hard on my TMAs but I am not stressing about every tiny detail like I used to . I think I can actually say I am enjoying my TMAs. Using this method of working has also freed up some of my quite limited time to allow me to go back and look over the previous books.*

2. An AL who tutors on a number of the modules commented:

*I would like to see fixed cut-off dates – having the first two fixed on SM358 seems to work very well. When students are not doing iCMAs and electing to omit TMAs, not attending tutorials then you start to wonder if they are doing anything.*

3. An external examiner commented:

*I understand that from next year, as for all courses in the faculty, that assessment will be based only on the examination, with no weight given to TMAs, which will simply be used for learning and formative feedback. I have to say that I find this a regressive step, since exams can only effectively test some aspects of knowledge and understanding in this field, and the time-limited and stressful conditions will undoubtedly disadvantage many OU students, who will not be able to show their true ability and understanding. In my experience, the direction of travel in other institutions for environmental science has been to reduced the emphasis on final examinations, and instead to rely on a mix of assessment methods, including examination – precisely the current position with [module code].*

Unfortunately this external examiner, in common with many ALs, students and module team members, was incorrect in believing that TMAs in a typical OU summative strategy had effectively contributing to the student's final grade. However the point that a mix of assessment methods is a "good thing" is well made. The National Union of Students' (2010) charter on assessment and feedback calls for a variety of assessment methods, whilst many experts emphasise the importance of the use of valid and authentic assessment tasks, with Knight (1995, p. 13) pointing out that "what we choose to assess and how, shows quite starkly what we value".

If the following year the same external examiner went on to express anxiety about the poor student engagement with the module's final TMA:

*As in previous years, a worrying number of students did not tackle the final TMA or only dealt with part of it. I was also concerned in some tutor feedback to see that this was encouraged by some tutors. With a move to assessment by exam only, and students only needing to reach a threshold pass mark for their TMAs, there is a risk that even fewer students will tackle the final TMA while some will be tempted not to do any TMAs once they reach the threshold. This is of considerable concern not only because it will disadvantage the students in at least some exam questions, but because it means that they will have had no appropriate training in important elements of Environmental Science.*

For the module in question, there is no evidence of a drop in submission rate for the final TMA or in overall module completion or success following the move to formative thresholded assessment. However, engagement with this module's final TMA has been particularly poor, for both summative and formative thresholded OCAS. This appears to be as a result of a due date very close to the date of the final examination (as discussed in Section 3.1.6).

3.9 Impact of changing student population and other factors

It was noted in Section 3.1.6 that the improvement in overall completion and success rates that accompanied S279’s move to formative thresholded assessment was unlikely to have been as a result of the change in assessment strategy, but rather for other reasons, perhaps that the student population had become more highly qualified (with 24% of 12B students having less than 2 A-Levels or equivalent at the start of their Open University studies; whilst only 12% of 13J students were in this category).

Similarly, the decline in performance seen on S104 and SDK125 (Figure 14) can be attributed to the changing student population, which has been captured for SDK125 by Saroj Datta in Figures 41 to 43. Between the 11J and the 13B presentation, the student population became more likely to be under 25, non-white, from a low social economic group, as well as being less likely to have studied previously with the Open University and more likely to be studying other modules concurrently.

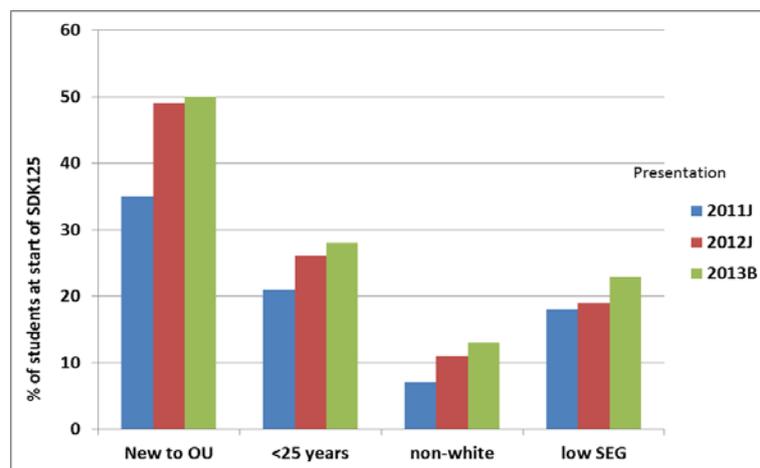


Figure 41. The changing student population on SDK125 for the 11J, 12J and 13B presentations (total number of students registered at module start were 1262 for 11J, 1396 for 12J and 945 for 13B, the first time SDK125 had two presentations per year).

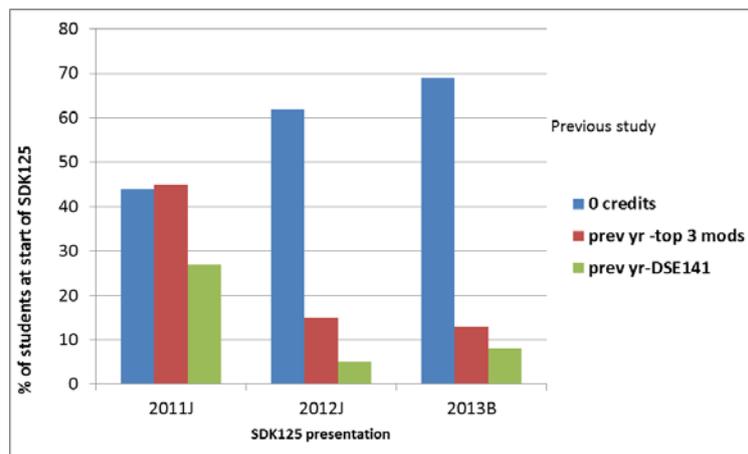


Figure 42. The proportion of SDK125 students in the 11J, 12J and 13B presentations who had studied previously with the Open University.

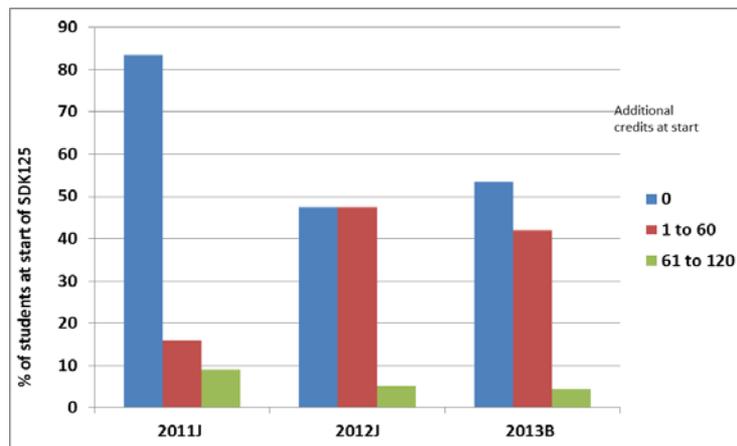


Figure 43. The proportion of SDK125 students in the 11J, 12J and 13B presentations who were studying additional credit at module start.

The different behaviour of two different cohorts of students, studying the same material in S141 and the 10-credit *Maths for Science* (S151) in the 12J presentation, has been noted previously, as has the vastly different success rates of new and continuing students on the 12J presentation of S141 (Jordan, 2014a). The 12J presentation was somewhat atypical (because new students were over-represented), so assignment submission rates were again compared for new and continuing students on the 13J presentation of S141. These data (Table 15) show that the starkly different submission rates have persisted, with S141's much improved overall completion and success rates for 13J being as a result of the much smaller proportion of new students.

Table 15. TMA submission rates for new and continuing S141 students for the 13J presentation.

|                     | Number of students at start | TM01 submission (due 04/12/13) | iCMA41 submission (due 15/01/14) | TMA02 submission (due 26/02/14) | TMA03 submission (due 02/04/14) |
|---------------------|-----------------------------|--------------------------------|----------------------------------|---------------------------------|---------------------------------|
| New students        | 272                         | 189 (69%)                      | 164 (60%)                        | 142 (52%)                       | 125 (46%)                       |
| Continuing students | 795                         | 718 (90%)                      | 672 (85%)                        | 606 (76%)                       | 541 (68%)                       |
| All students        | 1067                        | 907 (85%)                      | 836 (78%)                        | 748 (70%)                       | 666 (62%)                       |

Figure 44 shows powerfully that the different completion rates for new and continuing students on the 13J presentation of S141 is entirely attributable to the difference in attrition prior to the first assignment, with a cut-off date of 4<sup>th</sup> December 2013. 31% of new students appear to have actively or passively withdrawn by this date, compared with 10% of continuing students; after this date the two lines in Figure 44 are very nearly parallel.

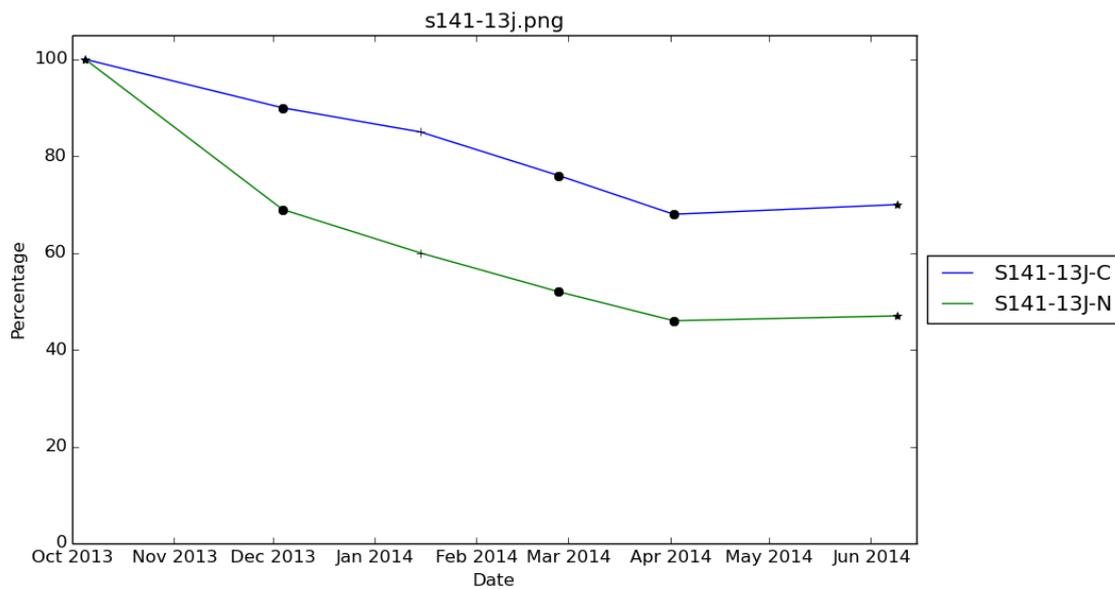


Figure 44. TMA and iCMA submission and completion rates for continuing (blue line) and new (green line) students on S141 (13J presentation).

Figure 45 shows that the attrition rate for new students on S141 was slightly worse than the rate for all students on the other level 1 modules in the 13J presentation (perhaps unsurprisingly, since S141 is designed for study after S104, and new S141 students in England will inevitably have been studying S141 alongside at least one other module, which was not the case for S104 or SDK125).

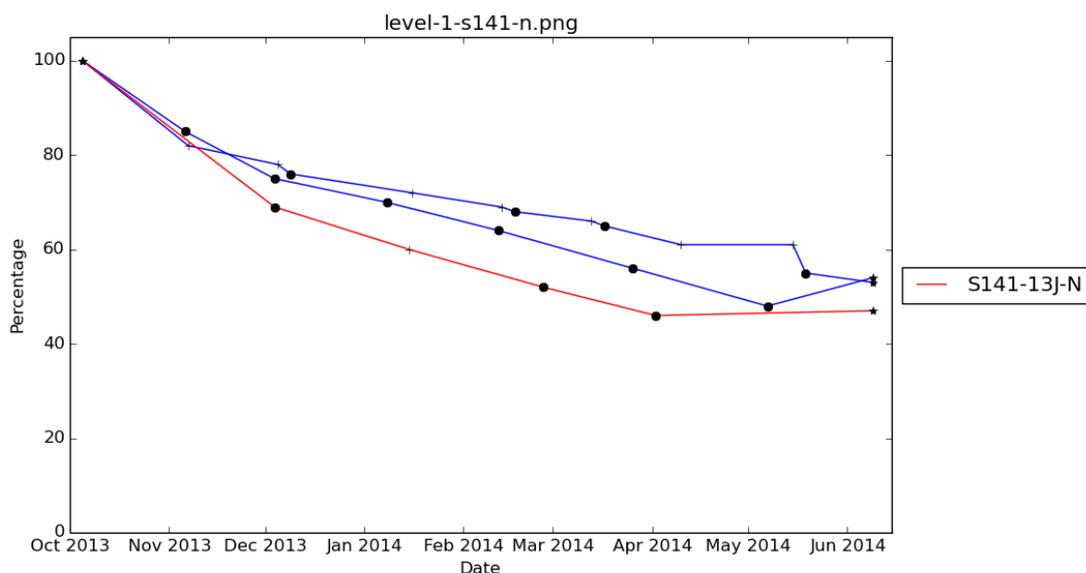


Figure 45. TMA and iCMA submission and completion rates for new students on S141 (red line) compared with all students on S104 and SDK125 (blue lines) (all for the 13J presentation).

Figure 46 shows that the attrition rate for continuing students on S141 was indistinguishable from than the rate for all students on level 2 modules in the 13J presentation. This reinforces the importance of addressing the active and passive withdrawal of new students right at the beginning of their studies.

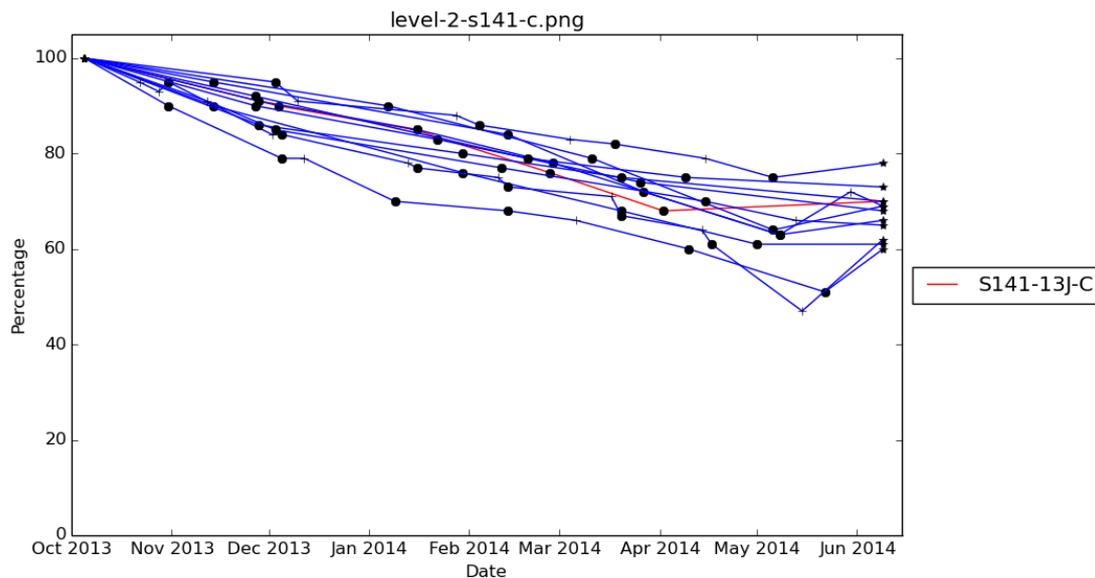


Figure 46. TMA and iCMA submission and completion rates for new students on S141 (red line) compared with all students on Science Faculty level 2 modules (blue lines) (all for the 13J presentation).

Note that there is nothing special about the date of 4<sup>th</sup> December (the date at which the gradient of the green line in Figure 44 appears to alter markedly): Figure 47 shows a broadly similar effect for new and continuing students on *Voices and texts* (A150), a 30-credit module designed for study after AA100, much as S141 was designed for study after S104. In each case the first assignment date was simply the first date on which student engagement could be reliably measured.

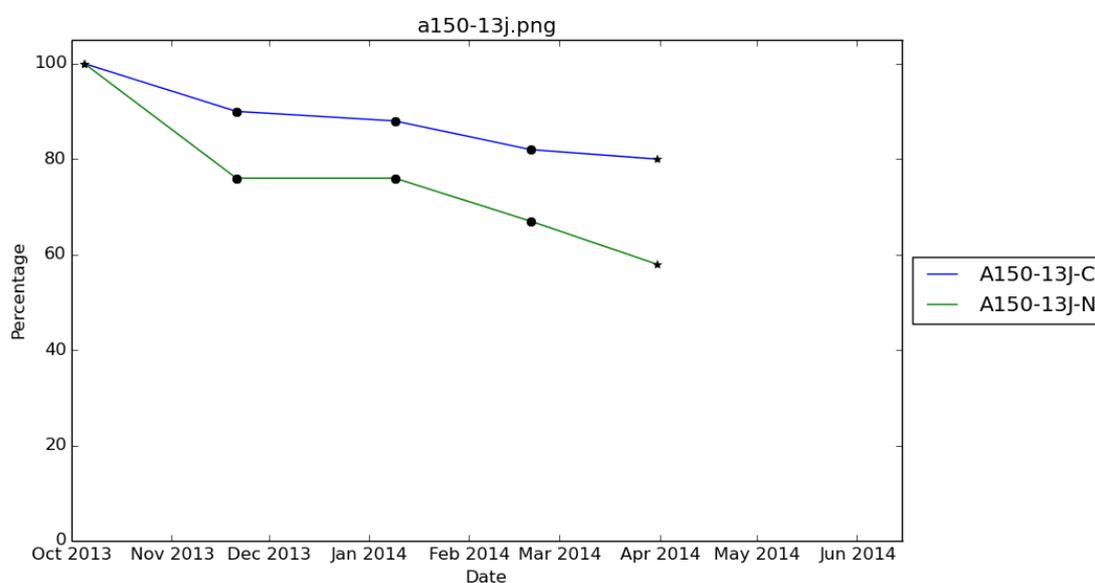


Figure 47. TMA and iCMA submission and completion rates for continuing (blue line) and new (green line) students on A150 (13J presentation).

Figure 48 compares assignment submission and completion rates for a range of faculties' 'entry' level 1 modules, and for ease of comparison only new students are considered. Virtually all of the modules have a steeper drop of engagement prior to the first assignment than later in the presentation, whenever the first assignment might occur. Beyond that, it is very difficult to unpick the reasons for the modules' different behaviours. *The arts past and present* (AA100) and *Environment: journeys through a changing world* (U116) have markedly better completion rate than the other modules; this may be because both have very clear assessment strategies and no examination, but the detail of the assessment on the two modules is very different and it

may simply be that these modules are easier than the others (note that *Introducing the social sciences* (DD101) and *Discovering mathematics* (MU123) also have no examination). If the presence or absence of an examination is significant, it appears from both Figure 17 and Figure 48 that this effect occurs during the study of the module rather than at the end, perhaps because some students lose confidence early on of their ability to pass and examination.

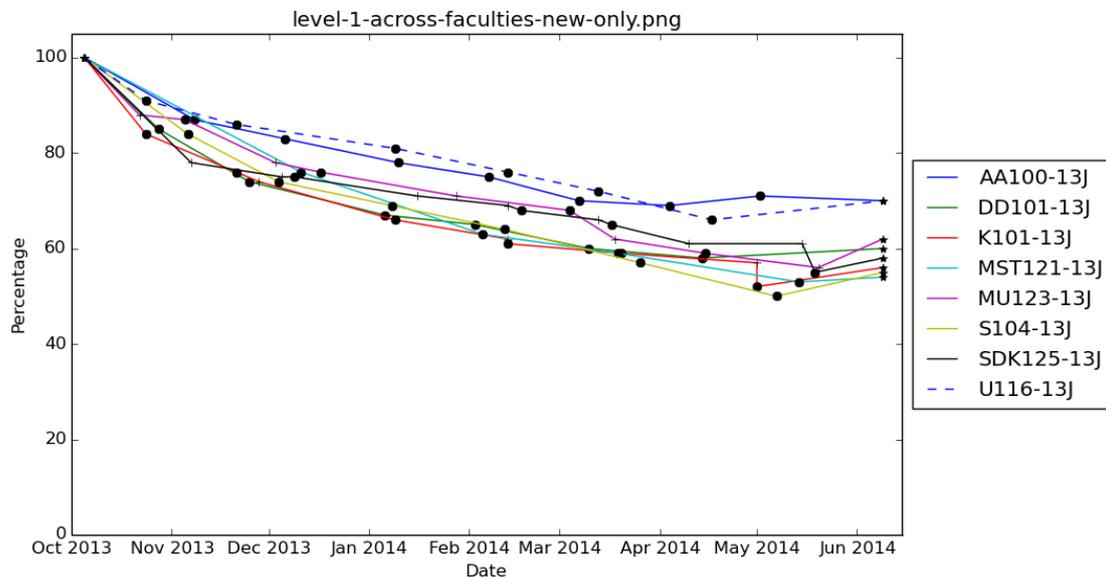


Figure 48. TMA and iCMA submission and completion rates for new students on a range of modules (13J presentation).

Three of the modules shown in Figure 48 (SDK125, MU123 and *Using mathematics* (MST121)) were 30-credit modules; the rest were all 60-credit modules. It is surprising that there was no noticeable difference in completion rates between the two; SDK125, MU123 and MST121 were at the lower end of the completion rates shown in Figure 48 but not appreciably so. It is interesting (Figure 19) that the two level 2 60-credit Science Faculty modules that ran in the 13J presentation (S205 and S207) had retention rates amongst the lowest of those for all the level 2 modules (Figure 19). It is not possible to attribute causality, nor to draw conclusions as to the benefits of 30- or 60-credit modules without additional information about the total study intensity of the students in question. It is possible that there was a very different behaviour for students studying a 30-credit module by itself (in which case they might be doing better than students studying 60-credits) and students who were trying to study more than one 30-credit module at the same time.

#### 4. Discussion and conclusions

Many students and ALs have a poor understanding of our assessment strategies, including conventional summative continuous assessment. This is in line with a frequently found result that students have poor understanding of the nature and function of assessment (e.g. Carless, 2006; Orsmond & Merry, 2011). Surgenor (2013) points out that this may be because we have not told them, whilst Hardy and Kay (2012) remind us that things that are “obvious” to lecturers are not clear to novice students.

Many of the other findings in this report stem from a similar lack of understanding. Although the increase in plagiarism cannot be directly attributed to the move to formative thresholded assessment (with the accompanying re-use of TMA questions), when tutor notes get into the public domain they are sometimes copied by students and submitted as their own work. This does not help the students to learn, or prepare them for the examinable component, so they are

only “cheating themselves”. However, the offending students often find this point difficult to understand.

There is no evidence of a significant difference in engagement on a module as a result of summative OCAS or models A or B of formative thresholded assessment. Following a move to either model of formative thresholded assessment, more students were seen to omit the final assignment or to submit a partial assignment. However overall retention and success rates have not altered as a result of the changes in assessment strategy (other factors e.g. changing student populations have had considerably larger impact) and some students have been seen to appreciate the encouragement to concentrate on the formative aspects of the continuous assessment rather than on the minutiae of the grading.

There is a correlation between the number of assignments submitted and overall success. However some students omitted TMAs without apparent impact on their final module result. Whilst student motivation cannot be implied, it is possible to see evidence that supports a notion of two contrasting groups of students who are in borderline OCAS categories: those who do well on the minimum number of TMAs and iCMAs but chose not to submit others, but who still do well on OES, and those who have a more modest performance on OCAS (perhaps just omitting one assignment) and fail the module as a result of their poor OES performance; some of these students may have done better had they submitted more TMAs and iCMAs, which they would have been forced to do with a more demanding threshold. Students in the opposing category may not gain a great deal from our continuous assessment. However, a slightly different interpretation is that some students gain from early assignments but later in the module their limited time is more profitably spent on revision.

In general there was no evidence of different behaviour as a result of the number of assessment points in the module, but several instances were observed in which submission rates dropped as a result of TMAs being too close to due dates for examinable components on the same module (e.g. S216 and S383) or for modules frequently studied concurrently (e.g. clashes between a TMA in the 13B presentation of S142 and 12J exams). The New Models of Assessment and Tuition Project Principle 3 (approved by Assessment Policy Committee) states that:

*Assessment is a core element of learning design. It should be scheduled to support consistent progression and pace of learning through the module and qualification...*

Faculty assessment leads have been asked to “consider timing of assessment points, to achieve consistent pace and allow students to respond to feedback. This should include modules studied concurrently, where appropriate.” The evaluation of formative thresholded assessment has revealed the importance of this review.

No significant impact has been observed of the 70% threshold which S141 students are required to reach in order to be considered for a distinction on the basis of their end-of-module assessment. However a requirement for students to pass a satisfactory participation threshold for S141 has had a marked impact on engagement. We should not be using “tricks” to encourage engagement, rather being explicit with our students about what they are required to do, and emphasising the importance of formative assessment in practice for summative. If students are required to participate in particular activities, we should be assessing this, not using questions that might actually be assessing something quite different.

There is some evidence of students being more likely to complete modules with end-of-module assessments rather than examinations. However, if this effect is real (as opposed to being as a result of some modules being easier than others), it influences engagement during a module rather than at the end, perhaps because students are less likely to feel frightened and overwhelmed on a module with an end-of-module rather than an examination.

Students engage with iCMAs both to a greater extent and with greater depth of engagement if they are in either summative or formative thresholded use rather than purely formative use. Hard cut-off dates are important in helping students to pace their studies and to enable associate lecturers to monitor the extent to which students are engaging with the module. Computer-mediated cut-off dates are an example of the powerful influence of a remote “teacher” on student behaviour (Jordan, 2014b).

Beyond the usual three tries, questions cannot usually be repeated in Model A formative thresholded assessment, though it is encouraged in Model B usage. This is a reasonable approach for each model of use. Allowing students to repeat questions is good for learning, but most colleagues are more comfortable with the notion of questions being repeated when students are just being encouraged to pass a low threshold on a certain number of iCMAs; when students need to pass a threshold that is based on the weighted mean of a number of TMAs and iCMAs, there is anxiety that they students might be inclined to repeat the iCMA questions so as to score 100% in each iCMA and thus to “get away with” a low mark on their TMAs. Repeating questions to get access to a previously seen variant does not appear to be a common behaviour; even students who sometimes do this only do it on a few specific questions that they find difficult. It would be possible to discourage this behaviour by altering the number of variants of questions (so there are not always three variants, as is currently the case for S207) or to use the question behaviour in which variants appear randomly, rather than cycling round in order. Or, as with plagiarism, since the assessment’s primary purpose is formative, we could simply remind students that they are “cheating themselves” and let the behaviour go.

Evidence of the strong impact of student understanding of question and feedback wording (Jordan, 2014b) and of the impact of cut-off dates, supports the conclusion that students are “conscientious consumers” (Higgins, Hartley & Skelton, 2002) doing exactly what they think they are “meant” to do. However, the devil is in the detail; if we give an advisory cut-off date but put the actual cut-off date at a later stage, we should not be surprised that students see the actual cut-off date as the one that matters and work to that date rather than the advisory one.

The project started by looking for evidence that a change in modules’ assessment strategies might alter assignment submission rates. However, since submission rates also give a measure of attrition, it is possible to use the project’s detailed inspection of submission rates on a wide range of modules to investigate other factors affecting retention. The different behaviour of continuing and new students, especially early in a module, was not a surprise, but the extent of the difference in retention was shocking. It is clear that different modules behave in different ways, but no unambiguous evidence has been found to explain why. Similarly, no systematic difference in attrition between 30- and 60-credit modules has been found, a point which is worthy of further investigation.

## 5. Looking to the future

It is clear that we need to make assessment strategies clear and consistent across qualifications and to explain them carefully to students.

Qualifications should be reviewed to ensure that assessment points are not too close together, either within modules or on modules that are frequently studied concurrently.

No evidence has been seen to support a return to summative continuous assessment. However, examinations may be off-putting for some students and it has rightly been pointed out that examinations cannot authentically assess all aspects of university-level skills. The use of two-part OES, with an examination and a piece of written work (e.g. an experimental write-up) seems a sensible way forward, with the formative thresholded components helping students to prepare for both components.

Students engage considerably more with formative iCMAs when they have thresholds and hard cut-off dates. Some students appear to benefit from repeating questions. Since the repeating of iCMA questions sits more comfortably within “Model B”, in which students are required to meet a threshold of 30% on a number of the iCMAs, and there is no evidence to support the notion that Model A (with a threshold on a weighted mean of all continuous assessment components) is more effective in any other way, Model B formative thresholded assessment for iCMAs seems the best approach.

In the interests of consistency, the Faculty should then consider whether Model B formative thresholded assessment is also a better approach for TMAs. Model A was initially proposed as an alternative because it was felt that otherwise students would be tempted to omit TMAs, but there is no evidence of a significant difference in student behaviour on the two models. Model B would also be straightforward to explain to students, and there would be less scope for confusion with summative assessment.

Most students who actively or passively withdraw are lost very early in their first module of study; it is not immediately clear whether this is as a result of factors at this stage or a lack of confidence in their ability to succeed to the end and anxiety about future assessment tasks. Possible routes for increasing early engagement include:

- Allow students to resubmit the first assignment, following feedback, so as to build their confidence to submit it in the first place. This is similar to practice on AA100, one of the best-performing level 1 modules. AA100 also allows some choice of questions.
- To give even quicker feedback, require students to engage with a very early formative iCMA, and then require them to discuss this with their AL.
- Further investigate the impact of an examination on retention (current evidence is somewhat contradictory).

The study has revealed a puzzling lack of difference in retention on 30- and 60-credit modules. This should be further investigated, and if study-intensity is found to be a significant factor, the use of ‘stretched presentations’ (which formative thresholded assessment enables) should be explored.

## 6. Deliverables

Cook, L., Butler, D. & Jordan, S. (2013, June). *Student engagement in formative assessment*. Poster presentation at the 4th Assessment in Higher Education Conference, Birmingham, 24<sup>th</sup>-25<sup>th</sup> June 2013.

Jordan, S. & Haresnape, J. (2013, June). *Formative thresholded assessment: Evaluation of a faculty-wide change in assessment practice*. Oral presentation at the 4th Assessment in Higher Education Conference, Birmingham, 24<sup>th</sup>-25<sup>th</sup> June 2013.

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## Appendix A Abbreviations and codes for modules and module presentations

|      |                                                          |
|------|----------------------------------------------------------|
| AL   | Associate lecturer (AL) (part-time tutor)                |
| CMA  | Computer-marked assignment (not necessarily interactive) |
| EMA  | End-of-module assessment                                 |
| iCMA | Interactive computer-marked assignment                   |
| iEMA | An end-of-module assessment in the form of an iCMA       |
| OCAS | Overall continuous assessment score                      |
| OES  | Overall score on a module's examinable component         |
| TMA  | Tutor-marked assignment                                  |

The codes for the modules mentioned in the report are as follows:

|        |                                                                 |                          |
|--------|-----------------------------------------------------------------|--------------------------|
| A150   | <i>Voices and texts</i> (2010–2014)                             | 30-credit level 1 module |
| AA100  | <i>The arts past and present</i> (2008–)                        | 60-credit level 1 module |
| DD101  | <i>Introducing the social sciences</i> (2009–2014)              | 60-credit level 1 module |
| MST121 | <i>Using mathematics</i> (1997–2014)                            | 30-credit level 1 module |
| MU123  | <i>Discovering mathematics</i> (2010–)                          | 30-credit level 1 module |
| S104   | <i>Exploring science</i> (2008–)                                | 60-credit level 1 module |
| S111   | <i>Health sciences in practice</i> (2007–)                      | 60-credit level 1 module |
| S141   | <i>Investigative and mathematical skills in science</i> (2012–) | 30-credit level 1 module |
| S142   | <i>Topics in science</i> (2013–)                                | 30-credit level 1 module |
| S151   | <i>Maths for science</i> (2002–2012; new edition 2012–)         | 10-credit level 1 module |
| S154   | <i>Science starts here</i> (2007–2012)                          | 10-credit level 1 module |
| S205   | <i>The molecular world</i> (2002–2014)                          | 60-credit level 2 module |
| S207   | <i>The physical world</i> (2000–)                               | 60-credit level 2 module |
| S211   | <i>Developing your paramedic practice</i> (2009–)               | 60-credit level 2 module |
| S216   | <i>Environmental science</i> (2002–2014)                        | 60-credit level 2 module |
| S240   | <i>Analytical science</i> (2012–)                               | 30-credit level 2 module |
| S279   | <i>Our dynamic planet: Earth and life</i> (2007–2014)           | 30-credit level 2 module |
| S294   | <i>Cell biology</i> (2012–)                                     | 30-credit level 2 module |
| S377   | <i>Molecular and cell biology</i> (2004–)                       | 30-credit level 3 module |
| S382   | <i>Astrophysics</i> (2010–)                                     | 30-credit level 3 module |
| S383   | <i>The relativistic Universe</i> (2010–)                        | 30-credit level 3 module |
| SDK125 | <i>Introducing health sciences</i> (2008–)                      | 30-credit level 1 module |
| SK277  | <i>Human biology</i> (2004–)                                    | 30-credit level 2 module |

|        |                                                           |                          |
|--------|-----------------------------------------------------------|--------------------------|
| SK320  | <i>Infectious disease and public health</i> (2012–)       | 30-credit level 3 module |
| SM358  | <i>The quantum world</i> (2007–)                          | 30-credit level 3 module |
| SMT359 | <i>Electromagnetism</i> (2006–)                           | 30-credit level 3 module |
| SXR103 | <i>Practising science</i> (Residential school; 2001–2012) | 10-credit level 1 module |
| U116   | <i>Environment: journeys through a changing world</i>     | 60-credit level 1 module |
| U316   | <i>The environmental web</i> (2003–)                      | 60-credit level 3 module |

The start date of each presentation is indicated by the year and a letter to indicate the month, so 2008B indicates a presentation which started in February 2008, since B is the second letter of the alphabet and February is the second month, whilst 2012J indicates a presentation which started in October 2012J, since J is the tenth letter of the alphabet and October is the tenth month.

## Appendix B Instructions given to S141 ALs as part of S141/S142 subproject

The core aim of the current phase is to find out as much information as possible about the reasons our students fail to engage with assessment.

I attach a copy of a spreadsheet for your S141 students (including any who have withdrawn). This includes TMA01 and iCMA41 scores and a blank column for TMA02 and TMA03 scores.

I have added several extra columns after each assignment. In the first column please could you indicate which, if any, questions or part questions were omitted from the assignment (I will complete the iCMA column at a later date). I am not interested in poorly answered part questions, just ones that are missing.

In the next column, for those students whose TMA or iCMA was missing or incomplete, indicate whether you know why this was. Please use the following codes (sometimes more than one code will apply). If you feel that additional codes are needed please could you let me know.

|                                                                                                                                                                        |       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| I don't know (no recent contact).                                                                                                                                      | N     |
| The student is struggling academically with S141.                                                                                                                      | A     |
| Student has a disability                                                                                                                                               | D     |
| The student is struggling to find the time for S141 because of other external commitments e.g. employment, caring responsibilities.                                    | T(E)  |
| The student is struggling to find the time for S141 because of unexpected events e.g. illness                                                                          | T(U)  |
| The student is struggling to find the time for S141 because of the pressures of other modules.                                                                         | T(OU) |
| The student is studying strategically and decided not to submit the TMA or iCMA because they felt it was not necessary to obtain 40% on overall continuous assessment. | S     |
| I believe the student has stopped studying (i.e. has passively withdrawn from S141)                                                                                    | PW    |
| The student has formally withdrawn from S141                                                                                                                           | W     |

In the final column, please note any other relevant factors for **any** of your students at around the time of the assignment in question, in particular noting any factors which you believe may have influenced their motivation to submit this TMA or iCMA41 e.g. the student is aiming for a distinction.

Note: Student names and PIs are to ease data collection only. They will be removed once the information has been collected.

Sally Jordan

3<sup>rd</sup> February 2013

## Appendix C SK320 Impact of formative thresholded assessment in 2013B cohort

In the second presentation of SK320 (2013B) all assignments were made formative with a 40% OCAS pass threshold. The submission of the final TMA (04) fell from 74% of registered students in 2012B (when all assignments were summative) to 61% of registered students in 2013B; the mean score for this TMA for students who submitted it also fell from 73 to 69 between the two years, suggesting that some students may have put less effort into TMA04 than in 2012B. TMA04 prepares students for Part C of the final examination by requiring them to research and write a structured report on an infectious disease topic that is only minimally covered in the module. The topic for Part C changes every year and is notified to students a few days after the cut-off date from TMA04 and six weeks before the exam, enabling students who submit TMA04 to get feedback on it while researching the Part C topic.

Chart 1 below shows that there is at best a weak association between performance on TMA04 by students who submitted it in 2013B and their performance on Part C of the October exam, and no association between non-submission of TMA04 (by 34 examined students scoring zero (0) for this TMA) and their Part C score (out of 25).

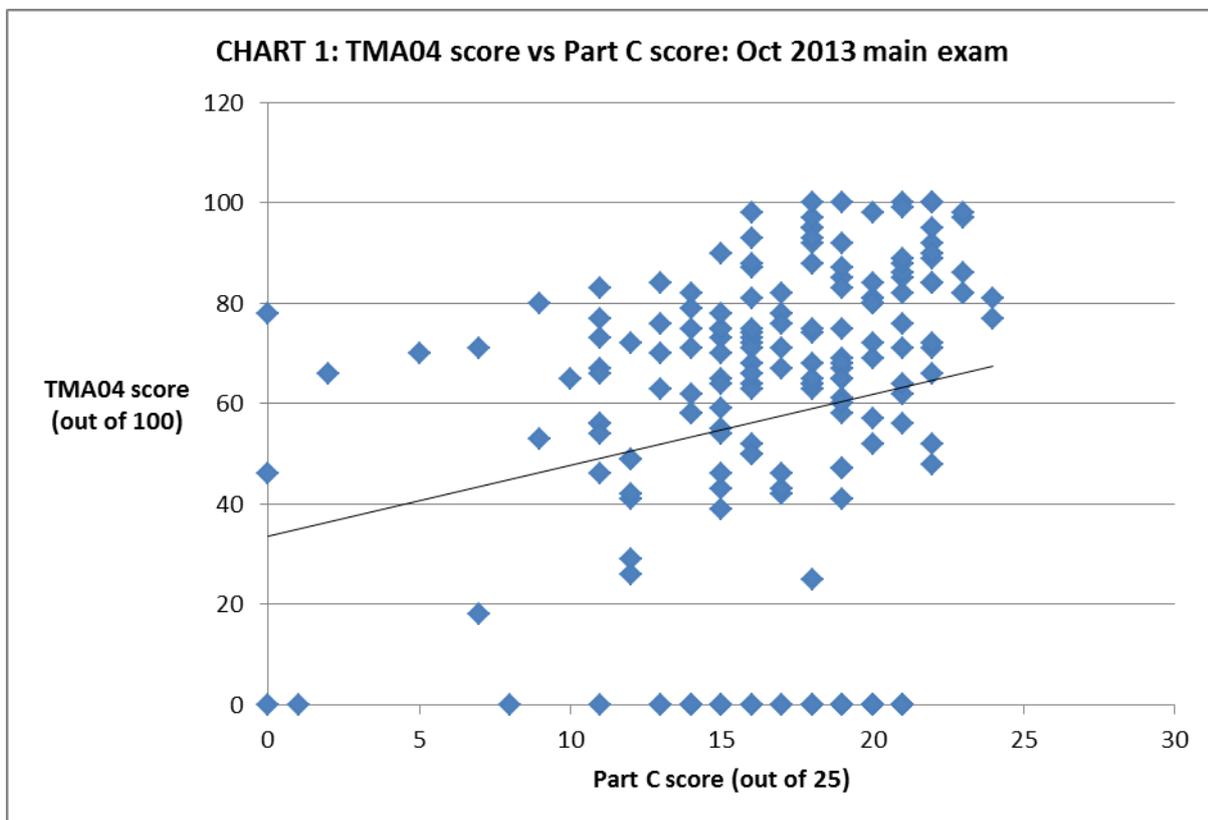


CHART 1 SK320 Individual TMA04 score vs Part C score for each student who sat the October 2013 main exam (N = 187). TMA04 scores of zero (0) denote non-submission by an examined student.

Jon Golding

## Appendix D S240 Analysis of OCAS participation and Exam Pass Rates 2012B and 12J Presentations

The data was compiled from 12B and 12J EAB listings.

Students at Course Start 188 (12 B), 205 (12 J)

Students sitting exam [% of course start]: 119 [63.3%] (12 B), 156 [76.1%] (12 J)

Students passing exam [% of course start] {% sitting exam}:

102 [54.3%] {85.7%} (12 B), \*141[68.8%] {90.4%}(12 J)

\*excludes 3 vivas

**Table summarising OCAS submission Data**

| Assessment        | 12B No. students | 12B % students | Total assessment | 12J No. students | 12J % students | Total assessment |
|-------------------|------------------|----------------|------------------|------------------|----------------|------------------|
| 4 TMA+4 iCMA      | 57               | 47.9           | 456              | 87               | 55.8           | 696              |
| 4 TMA + 3 iCMA    | 3                | 2.5            | 21               | 11               | 7.1            | 77               |
| 4 TMA+ 2 iCMA     | 4                | 3.4            | 24               | 4                | 2.6            | 24               |
| 3 TMA + 4 iCMA    | 20               | 31.1           | 140              | 34               | 21.8           | 238              |
| 3 TMA + 3 iCMA    | 6                | 5.0            | 36               | 9                | 5.8            | 54               |
| 3 TMA + 2 iCMA    | 8                | 6.7            | 40               | 8                | 5.1            | 40               |
| >3 TMA + 2 iCMA** | 4                | 3.4            | -                | 3                | 1.9            | -                |
| Total             | 119              | 100.0          | 718              | 156              | 100.1          | 1129             |

\*\*Threshold fail

Mean No. of pieces of assessment submitted for **12B** (excluding \*) = **6.24**

With 64 (53.8%) completing all 4 TMAs, and 77 (64.7%) completing all 4 iCMAs

Mean No. of pieces of assessment for **12J** (excluding \*) = **7.38**

With 102 (65.0%) completing all 4 TMAs, and 121 (77.6%) completing all 4 iCMAs

Participation in formative assessment in 12J compared with 12 B:

4 TMAs up by 11.2%      4 iCMAs up by 12.9 %

**Module Completion rate has improved by 12.8 %** from 63.3% 12 B to 76.1 % in 12 J.

**Module Pass rate has improved by 14.5% (Course start) or by 4.7% (sitting exam)**

Ruth Williams, July 12<sup>th</sup> 2013

## Appendix E S377 and SK320 13B presentation comparison for students studying both

Fifty-three students were identified who had registered on 13B presentations of both S377 and SK320. Both are 30 credit modules but S377 has summative assessment (3 TMAs) while SK320 has formative assessment (4 TMAs and 2 iCMAs). Of these students, 10 were also taking another 30 credit module, and 6 were also taking another two 30 credit modules.

Only 23 students completed both modules, and their scores are shown in Figure 1.

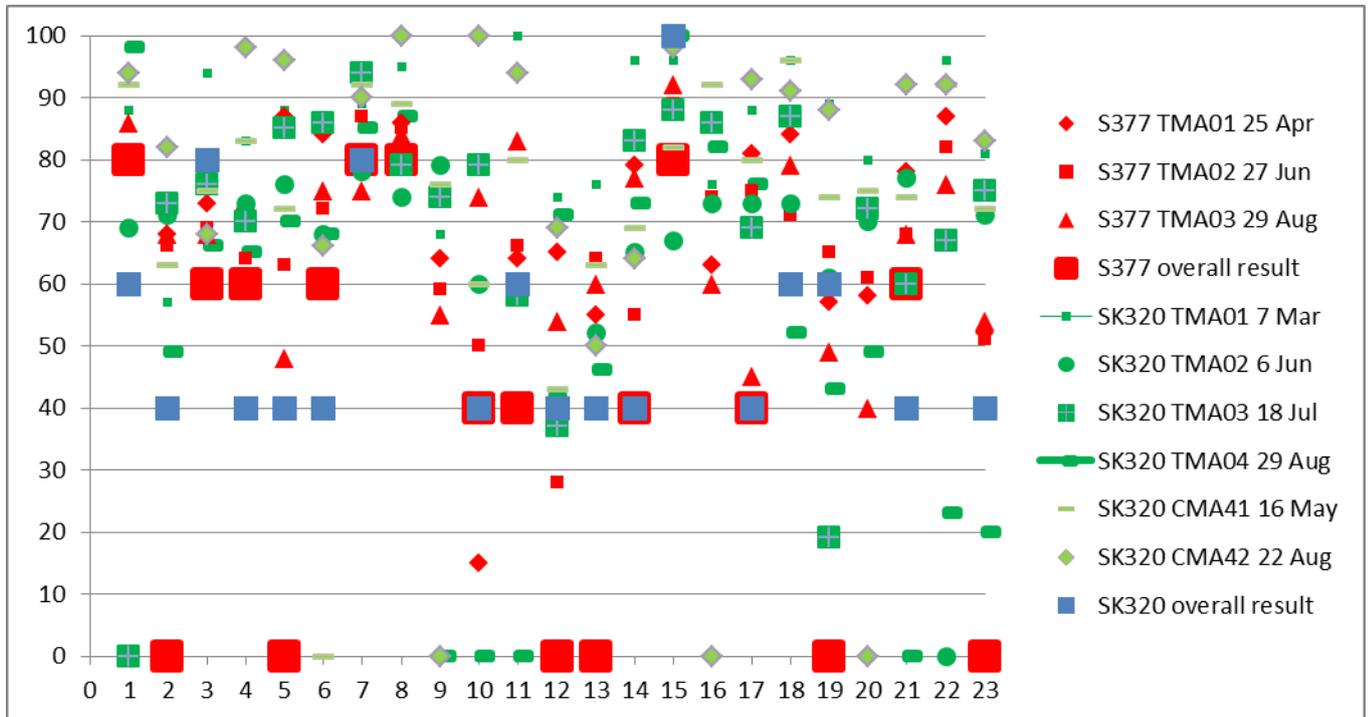


Figure 1. Scores for TMAs, iCMAs and overall module result for the 23 students who completed the 13B presentation of both S377 and SK320. Note TMA and iCMAs are shown as percentages. Overall module results shown for convenience with grades 1, 2, 3 and 4 against the 100%, 80%, 60% and 40% marks respectively, and a result of grade 5 or Q as 0%.

Of those who completed both modules, results were generally higher for SK320 than for S377. Students with no overall result recorded are those who have used assessment banking. Four students (9, 16, 20 and 22) used assessment banking for both modules, one (18) used it for S377 and one (8) used it for SK320. Their overall results are therefore not yet available.

There is no evidence from this data that students were putting more effort into the continuous assessment for S377 which had summative assignments than for SK320 which had formative assessments. If anything, individual students scored higher marks on their SK320 than their S377 assignments. The main conclusion is that S377 is a more difficult module to score high marks on and get a good grade for than SK320.

Janet Haresnape July 2014

## Appendix F Student perceptions of formative and summative assessment

### Introduction and background

There have been recent changes within the Science Faculty, with an examination replacing the end-of-module assessment on S104, and a replacement of summative TMAs with formative TMAs on level 1 modules and higher level modules with examinations. Anecdotal evidence suggests that learner understanding of the assessment strategy within the Science Faculty is often, at best, incomplete, and at worst, incorrect.

Assessment strategies, although explained on official course websites (and other documentation), may not always be easy to find (given the wealth of information a student encounters on starting a course) / clearly explained / given appropriate priority by the student. Furthermore, informal conversations amongst learners (at tutorials, on official tutor group forums, on OUSA forums), where learners may have different experiences of assessment strategy at different times in their OU studies, may add to the confusion.

This qualitative, small-scale study has been undertaken to get a better understanding of how students understand assessment procedures, and to obtain some feedback on the assessment process generally.

### Design of the study

This section describes the setting, perspective, design and procedures followed.

All students within this study have had the same tutor for their studies this year, however, only those who had successfully passed their course have been included in this study. It was felt that students who had withdrawn or failed the course would need to focus on their revision process for retake exams and inclusion at this point might introduce bias.

A qualitative research approach has been used in this study. The data was collected solely from email conversations. Although interviews (telephone) would have been useful, time-constraints limited the approach for this initial investigation.

Students were invited to participate using the 'group email' function within tutor home (with those individuals to be excluded from the study as detailed previously 'de-selected' from the inclusion criteria). In total 53 students were invited to participate (Table A1). Students who agreed to take part in the survey were then emailed back individually using Outlook.

| Module   | Region       | Number of students invited | Number of students responding to first set of emailed questions | Number of students responding to second set of emailed questions |
|----------|--------------|----------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|
| S104 12J | R06          | 20                         | 5                                                               | 3                                                                |
| S294     | R06/national | 10                         | 1                                                               | 1                                                                |
| SK277    | R06/R07      | 23                         | 10                                                              | 6                                                                |

Table A1 Invitation and response breakdown

### Results and comments

#### S294

The single S294 who responded fully to this survey correctly interpreted the assessment strategy, understanding that there was a 'threshold' for TMA scores, which needed to be achieved, but that these did not contribute to their final score. This student valued having the

threshold to 'aim for' and reported submitting all assignments. This student correctly understood that the assessment strategy for S294 was different to the assessment strategy on their previous course (which they also correctly understood). However, this student also commented that *'exams are too heavily weighted in the OU'*.

### S104

5 students completed the first part of the survey, and all reported submitting all TMAs and iCMAs, although 2 commented that later iCMAs/TMAs had sections omitted for 'time constraints'.

Only 3 of the initial 5 students completed the second part of this survey. Only 1 student understood the assessment strategy and felt that the threshold *'seemed realistic'*. This student was new to the OU. The other 2 students did not know that continuous assessment did not contribute to their final grade until *'the date of the exam'* and *'after the exam'*. Both of these students expressed disappointment with their final course score as a result of this strategy. It is interesting to note that both of these students attended the introductory S104 tutorial, where the assessment was explained in some detail. Both of these students were new to the OU this year (although one was also studying a science short course alongside S104).

### SK277

10 students completed the first part of the survey, and all reported submitting all TMAs (no iCMAs on SK277). 2 of these 10 students reported partial submission of the final TMA due to time constraints.

Only 6 of the initial 10 students completed the second part of this survey. 4 appeared to understand the assessment strategy. 1 of these students felt the current strategy was ideal, that the emphasis on exam performance was important (despite achieving a significantly lower mark in the exam than achieved OCAS), the other 3 students who understood the assessment process felt that TMAs were a *'waste of time'* and that they had felt *'too pressured in the exam'*.

2 students did not understand the assessment strategy, and thought that their TMAs contributed to their overall course mark. One of these was new to the OU this year, and, interestingly, the other was an AL within the science faculty, who had previously taught an earlier presentation on SK277).

### Comments

From the email survey, it would appear that the majority of students submitted all their TMAs, despite a common theme that *'TMAs were a waste of time'*. A comment repeated by S104 and SK277 students was that why should students *'waste time'* *'slaving over TMAs'* when they don't count towards final score. In fact, three people commented that they were close to quitting the OU due to the disappointment of exam score compared to continuous assessment score (S104, S294 and SK277). That said, there was little evidence from the 16 students who replied to the first email, of strategic submissions.

From marking TMAs, although the majority of students did submit all the assignments, a significant number (who did not take part in this survey) submitted partial final tutor marked assignments – all were questioned at the time to ensure submissions were as they intended, and all commented on concentrating on revision rather than continuous assessment.

Karen New  
R06 AL: S104, S294, SK277