THE SPRINTA PROJECT: ENGAGING STUDENTS IN FORMATIVE ASSESSMENT: STRATEGIES AND OUTCOMES

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The SPRInTA Project, (Student Portal Resources for Innovative Targeted Assessments), is a two-year project at the University of Essex funded through the Higher Education Funding Council for England (HEFCE) as part of Phase 5 of the Fund for the Development of Teaching and Learning (FDTL). The aim of the project is to provide a solution to sector wide concerns that increasing student numbers and unfavourable staff to student ratio's are adversely affecting the support available to students on assessment and the provision of effective feedback. The project aims to address this issue by developing tutorial guidance and formative assessments for undergraduate Sports Science Students. These resources are being made available via the University's institutional student portal, enabling targeted support for assessment.

This short paper will provide a brief overview of the SPRInTA Project detailing progress to date. Particular detail will be given to patterns of student uptake including strategies and recommendations for optimising student engagement in online formative assessment.

Introduction: An Overview of the SPRInTA Project

The SPRInTA Project is located at the University of Essex in the Centre for Sports and Exercise Science. The SPRInTA project is a two year project that started in November 2004 that aims to support student achievement by providing targeted and personalised support for assessment. The project is based on research that Computer Aided Assessment has numerous advantages, especially when used for large groups of students and can be used to give students' feedback, guide student effort, diagnose problems in learning and can give students experience in assessment methods (Lowry, 2005).

Over the two-year period the project team have developed a range of online formative assessments and tutorial guidance for Sports Science students. These formative assessments and tutorial guidance are based on the five

types of assessment common to Sports Science students, with the aim of achieving a high degree of transferability from the onset. The types of assessment used by the SPRInTA Project when delivering the project include multiple choice questions (MCQs), practical coursework, examinations, reporting in scientific paper format (SPF) and data analysis and interpretation.

Unique to the project is the automated delivery of dynamic assessments which are made available to students via the myEssex student portal[i]. When a student logs into the portal they will be recognised and will be served assessments and learning resources that relate to their record of achievement at that time. In this way the project enables tailored learning pathways and will in effect deliver 'intelligent' assessments. As the University of Essex uses QuestionMark Perception extensively to deliver computer assisted assessments this will be the software of choice for the SPRInTA Project and will also use the related programming tool QMWise to develop this active link between the student and the online formative assessments.

Project Progress to Date

To date the SPRInTA Project has developed large stratified MCQ banks for a number of level one and level two modules. These modules include; Human Physiology, Biomechanics, Sport Psychology, Nutrition and Metabolism, Functional Anatomy and Exercise Lifestyle and Health. The question banks are designed as formative assessments and a way that students' can self-assess themselves online during the course of the module.

In the level one modules that SPRInTA have targeted, summative assessment is via an MCQ examination at the end of the module and by a short answer and essay examination in the summer exam period. By providing large MCQ banks for student self-assessment a high degree of transferability from formative assessment to summative assessment was available from the onset. This was further developed by a switch from paper based summative MCQ exams to online summative MCQ exams. The consistency in the format of assessments has deemed to be very popular with level one students.

Questions were authored in QuestionMark Perception for each module and were then split into either submodules (for the pilot module) or weekly releases (subsequent modules after the pilot). The questions were then divided into three difficulty levels (basic, intermediate and advanced). On the last teaching day of each week (or subtopic) a set of questions relating to that weeks topic or submodule became available via the myEssex student portal. The student could then access the questions at an intermediate level. Once the student had submitted their intermediate test, they receive full feedback for each answer and feedback for the assessment as a whole, depending on their score they then got the chance to re-take the intermediate assessment (40-80%), or a more basic (<40%) or advanced (>80%) assessment.

The online formative assessments have been very popular with the students, a recent survey demonstrated that 94% of students recommend online self-assessment should be made available for all first year modules and 76% of students agreed that SPRInTA self-assessments have aided their learning. This improvement in learning has also been demonstrated by improvements in academic performance, statistical analysis (independent t-test) has shown that the introduction of online formative assessment resulted in significant ($P<0.01$) increases in the summative Multiple Choice Question (MCQ) exam results when compared with the results from previous years. This improvement has also continued into the Human Physiology summer exam with a significant improvement ($p<0.05$) in performance from the previous year. At the time of writing, it is too early to report on results of the additional modules that SPRInTA has developed, but it is expected that the improvement in summative MCQ exam scores will also be replicated in the summer exams.

SPRInTA are currently working on the second phase of the project, the tutorial guidance section. Interactive virtual learning environments using WebCT are being produced for reporting in scientific paper format (SPF), essay writing and data analysis and interpretation.

Strategies for Engaging Students in Online Formative Assessment

Gibbs and Simpson (2003) argue that 'you have to assess everything in order to capture students' time and energy'. The SPRInTA team were very aware that student uptake of formative assessment can be poor when formative assessment is "un-assessed". To try and avoid low student uptake the SPRInTA Team decided to provide an incentive to encourage students to use the formative assessments provided and the 30 end of module summative MCQ questions were placed within the question bank for each module. A minimum of three hundred questions were used for each module to prevent rote learning.

SPRInTA split the assessments into weekly or submodule releases, to encourage students to engage with the assessment on an even basis throughout the module. However, as previously reported (short paper presented to the 2005 CAA Conference; The SPRInTA Project: Supporting Student Assessment through a Portal) in the original pilot run by the SPRInTA Project on a level one Human Physiology module student uptake was heavily skewed towards the exam period with a significant majority of assessments being completed in the week before the final exam (see Fig 1).
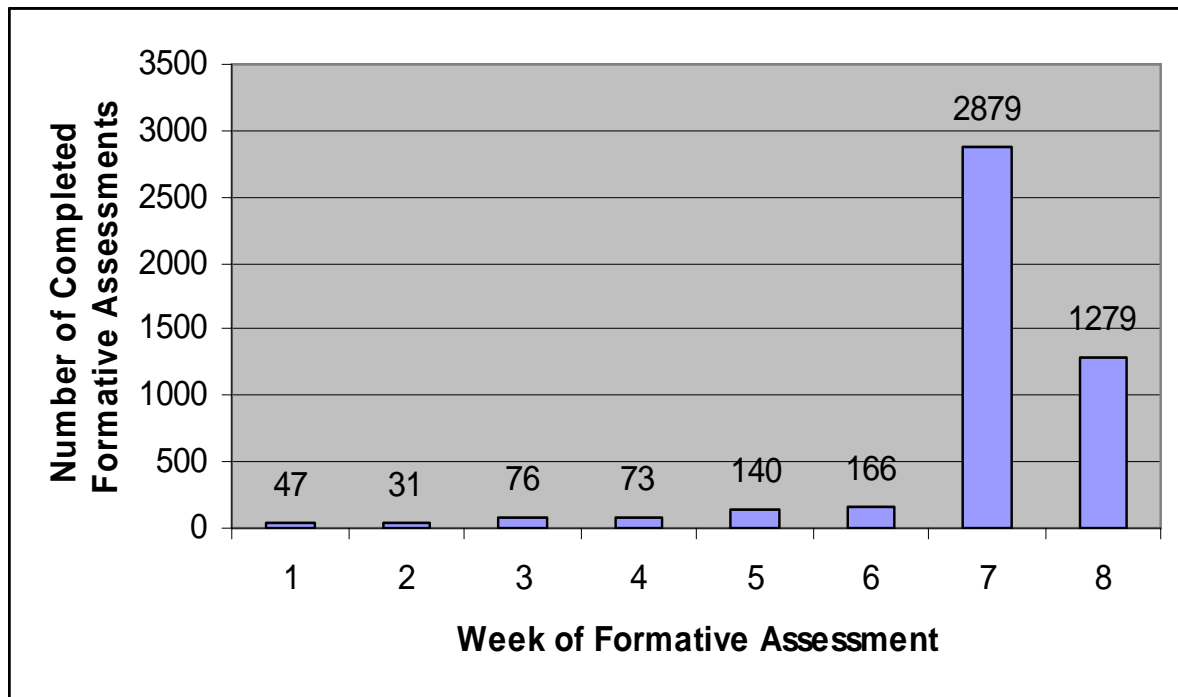
Fig 1: Number of formative assessments completed per week for the Human Physiology pilot

In order to try and modify this uneven completion of assessments a number of initiatives were implemented to subsequent modules to try and encourage students to spread their study time evenly over the course of the module. Many of these changes came from information collected in the survey and focus group that were completed at the end of the pilot module and the changes were implemented in October 05.

Feedback: Preventing Surface learning

It was decided to alter the feedback that was given in the pilot whereby the feedback to an incorrect distracter was the correct answer, as it was felt that just giving the correct answer encouraged surface learning. In order to engage students and encourage a deeper level of learning the reason why the distracter that was selected was wrong was given instead. Also in an attempt to give "correct guessers" more learning opportunities, feedback was also given for correct answers.

Feedback was also included within the myEssex student portal to enable users to view the date and time the assessment is available from and until, the number of previous attempts for each assessment, the maximum, minimum and average score for each assessment as well as their score for their previous attempt.

Publicity: Raising the Profile of the SPRInTA Project

In the survey at the end of the pilot 83% of students had heard of the SPRInTA Project and 73% of students thought the question banks were well publicised by SPRInTA. To try and improve the profile of the SPRInTA Project

every level one student was given a SPRInTA key ring at the start of term. The key ring was also a bottle opener and the theory was that each time the student used the key ring they would be reminded of the formative assessments available to them.

It was also decided to try and improve the way that students were alerted when new assessments became available. An additional slide was attached to each lecturers PowerPoint informing the students when a new assessment was available. The slide was designed to catch the student's attention and included a picture of the SPRInTA Project Officer with some speech attached regarding the new assessment.

Release Dates and Patterns

Data from the survey indicated students did not like the randomisation of questions because they could not guarantee that they had viewed and completed all questions when revising for their end of module summative assessment. The SPRInTA team decided to reduce the question bank to 300 questions (600 questions were written for the pilot module) and to release assessments on a weekly rather than sub-topic basis. This meant that each weekly assessment would contain 38 questions (12-13 questions for each difficulty level), and students who completed all assessments would have completed every available question.

The release dates and patterns of assessment were also experimented with. Two core level one modules (A = Functional Anatomy and B = Sports Psychology) were supported by a weekly release of online formative assessments. Module B was exposed to the weekly release pattern as previously reported and outlined above. This release pattern involved weekly topics of formative assessment opening throughout the module and staying open until after the summative assessment. Module A received formative assessments that were open for two weeks and then closed until the week before the summative exam, when they were again made available for revision purposes. The hope was that this would encourage a more even distribution of student participation throughout module.

Student Engagement and Feedback

As seen in the Human Physiology Pilot engagement levels with the online formative assessments was high, 83.7% of Module A and 79% of Module B students completed at least one assessment.

Statistical analysis (independent t-test) demonstrated that module A and module B saw a significant ($P<0.01$) improvement in the end of module MCQ summative exams when compared to the previous year. Module A also saw a significant positive correlation ($P<0.05$) between the number of completed formative assessments and end of module MCQ summative exam.

Despite efforts to encourage students to use the assessments throughout the module, there was no change in the distribution of completed assessments as

seen in Fig 1. However it is encouraging to see that the percentage of completed assessments in the week leading up to the summative exam were less in Module A (68.2%) and Module B (56%) when compared to the previous Human Physiology Pilot (88.6%). This may have been due to the increased publicity drive with the end of module survey showing that 97% of students have heard of the SPRInTA Project when compared to the previous 83% seen in the survey at the end of the pilot. 97% of the students also thought the questions were well publicised by SPRInTA (previously 73%), with 76% of students finding the new assessment PowerPoint slide useful.

The experimentation of release patterns had little effect on the distribution of completed assessments; this can be seen in Fig 2 and Fig 3.
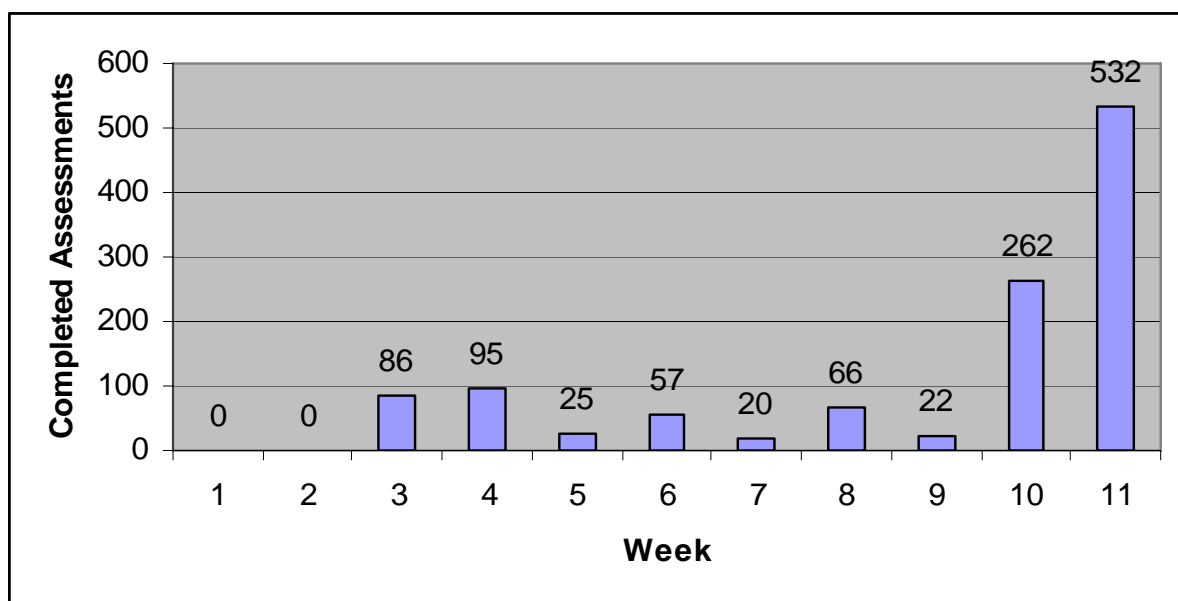

Fig 2: Number of completed formative assessments by week number for Module A. The Summative Exam was at 10am on the Tuesday of Week 11
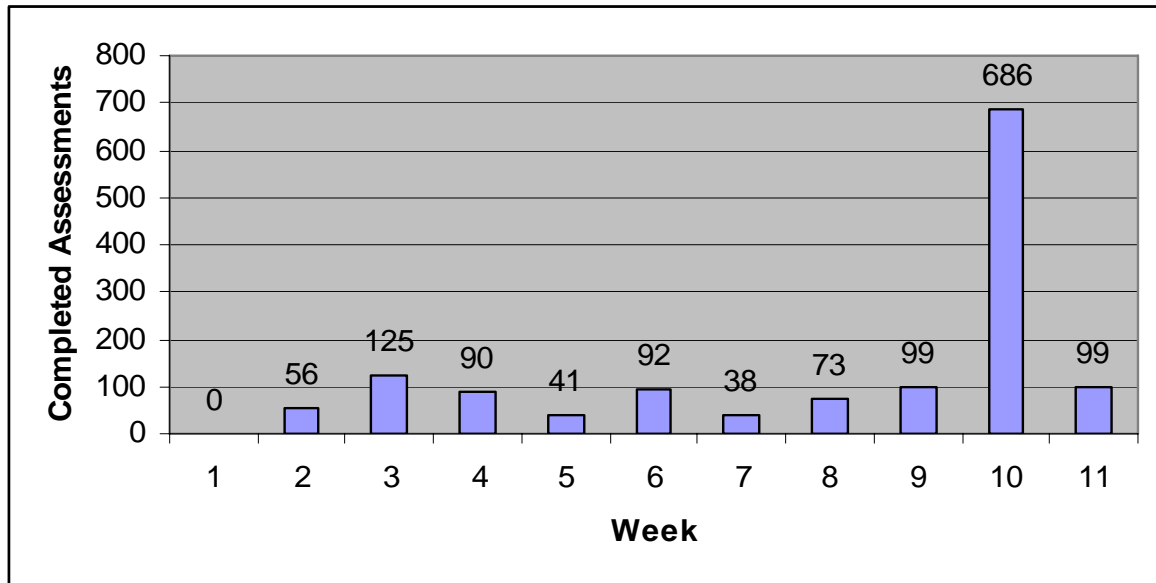
Fig 3: Number of completed formative assessments by week number for Module B. The Summative Exam was at 10am on the Monday of Week 11

In addition students disliked the release pattern implemented for Module A. In a survey completed at the end of module A and module B students were asked whether the new release pattern for Module A helped them to distribute their study time evenly, only 31% of students agreed that this was the case with 21% of students neither agreeing nor disagreeing and 48% of students disagreeing. During completion of the survey students were invited to give free text responses regarding the positive and negative aspects of the SPRInTA question bank. There were no positive comments for the release pattern trialled in Module A, in contrast 21% of the negative comments were about the release pattern.

Conclusion

It can be clearly seen that students like freedom of choice when choosing when to study, and despite attempts to alter study patterns it appears that a majority of students when revising for a summative MCQ exam are strategic/surface learners. This agrees with the some of the current literature available on MCQ tests which suggest that MCQs only measure the first level of intellectual behaviour important in learning (knowledge). A study by Scouller (1998) showed that students were more likely to employ surface learning approaches in the MCQ examination context and to perceive MCQ examinations as assessing knowledge-based (lower levels of) intellectual processing. In contrast, students were more likely to employ deep learning approaches when preparing their assignment essays. SPRInTA are in the process of collecting data from the students about their approach to learning to validate these claims.

It can be concluded that in order to engage students in formative assessment there needs to be an incentive for the student. In this case it was summative

questions placed in a large bank of formative questions; however there are some further ways that the SPRInTA Team are looking at engaging students.

Ranking

As the SPRInTA Project are working predominately with Sports Science Students it has been suggested that we appeal to their competitive nature and add a ranking system to the information that the student receives about their assessments in the student portal. This means that once a student completes an assessment they can see where they lie in terms of performance against their peers.

Summative Component

According to Tait *et al.* (1998) the strategic approach refers to the systematic arrangement of learning activities in order to achieve the specific assessment criteria required to pass a course. If the summative component of the course is at the end of the module (as seen in Module A and B) this means a strategic student will only study in the lead up to the exam (as seen in the SPRInTA initiative). If a small summative component was attached to each weekly assessment this would make the assessments compulsory and as a consequence build a more consistent and deeper approach to learning. In a recent focus group this was deemed popular with the majority of students as less pressure would be placed on the student in the end of module exam.

Just in time Teaching (JiTT)

Just-in-Time Teaching is a teaching and learning strategy based on the interaction between online assessments and an active learner classroom. Students are required to complete an online assessment before a lecture, before the lecture the lecturer reads the student submissions "just-in-time" to adjust the classroom lesson to suit the students' needs. This could work well with the SPRInTA Project as it would ensure consistent engagement in with the question banks as well as tailoring lectures to the students needs.

Further information about the project can be found at

http://www.essex.ac.uk/sprinta/

References

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Lowry, R. (2005). Computer aided self assessment-an effective tool. *Chemistry Education Research Practice.* **6** (4), 198-203.

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[i] The myEssex student portal offers students structured sets of links to online services and information, customised for each user, and with further options for users to personalise a range of features. The portal delivers customised links and information based on what it knows about the user (you are studying these courses, you are based at Loughton/Colchester, etc) and personalised by the user (the user can choose to hide some links, add others, and change the presentation).