Student generated content for learning

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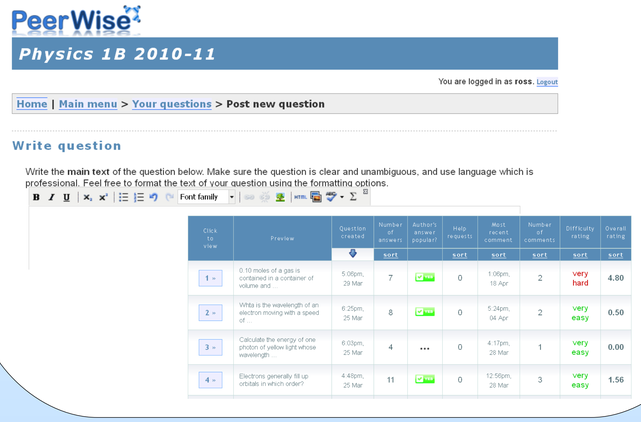
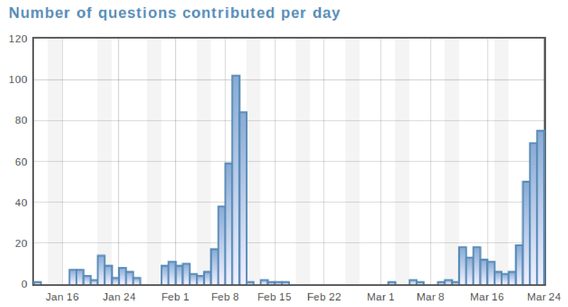
What is PeerWise?

PeerWise is a free, online multiple choice question (MCQ) authoring and sharing system. Students create their own questions using the tools in the online repository. Students then answer, rate and comment on their peers' questions, making use of the system's Web2.0-like functionality (such as discussion threads, ratings-based sorting, and the ability to 'follow' authors).



How did the students make use of the system?

The figure below illustrates the temporal profile of student submission of questions to the system for the second year Physics class at Glasgow. Two peaks can be seen: these correspond to summative assessment deadlines. There is also lower level engagement prior to the deadlines: this is activity by highly engaged students. We see very similar profiles of student activity in all the classes in which the system was deployed, with students routinely participating to a much greater extent than was mandated by the assessment tasks.



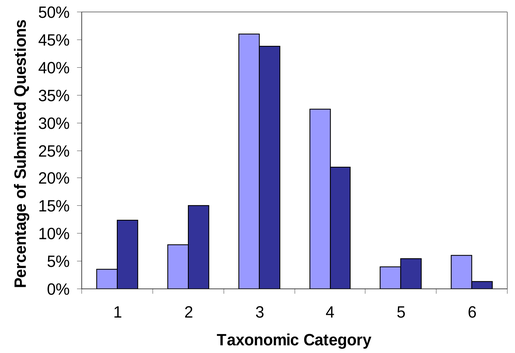
What standard of questions did they write?

Questions submitted to both first and second semester first year Physics courses at Edinburgh were classified according to the level of sophistication of their content. The classification was conducted using a revised form of Bloom's Taxonomy, identifying 6 cognitive levels as follows:

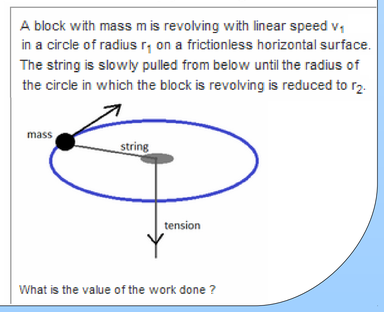
Category Description

1 Remember, recognise or recall
2 Understand, interpret or predict
3 Apply, implement or calculate (1-step calcs.)
4 Analyse, differentiate or organise (multi-step)
5 Evaluate, assess or rank
6 Create, combine or produce (synthesise ideas)

The figure shows the distribution of submitted student questions for the first semester course (Newtonian mechanics, light bars) and second semester course (waves and modern physics, dark bars).

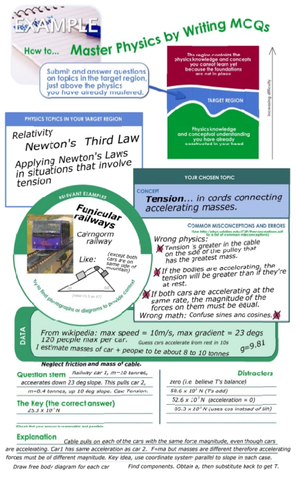


There are comparatively few questions in the lowest two taxonomic categories (particularly for the first semester course). Most of the questions require students to go beyond simple factual recall or elementary understanding, A significant proportion of the questions occupy categories 4 and above, requiring students to engage in detailed analysis, solve extended multi-step problems, or to synthesise ideas from more than one area of physics. An example of one such question is shown here.



How and where did we deploy the system?

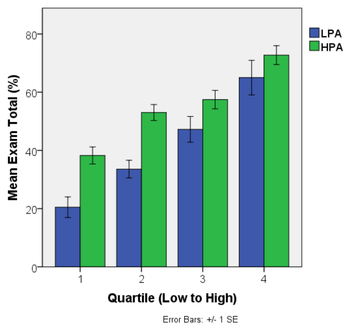
We deployed PeerWise with first and second year undergraduates, over a number of different classes including Physics, Chemistry and Biology, at the Universities of Edinburgh, Glasgow and Nottingham in the UK. Prior to its introduction, we provided scaffolding materials to the students to support their use of the system, targeting cognitive aspects of MCQ design rather than system usage. Specifically, we held interactive sessions addressing good practice for setting effective MCQs, and providing high quality example questions for students to work through in groups. We hypothesise that the example questions 'set the bar' for subsequent good quality student submissions.



Does using PeerWise influence course result?

Cohort	Number of Students	Mean Exam Score *	Standard Error	*p* value	Effect Size **
Physics 2	*(N=152)*				
HPA ***	78	58.1	1.9		
LPA	74	38.0	2.7	< 0.001	0.45

* all scores expressed as percentages
** Pearson's *r*
*** HPA/LPA denote higher/lower PeerWise activity



Here we illustrate some example course outcomes from the second year Physics class at Glasgow. The figure shows comparisons of final exam scores for students with low (LPA) and high (HPA) PeerWise activity, divided into quartiles according to a pre-test. In all quartiles, HPA students outperform LPA students, with statistically significant differences for students in the lowest two quartiles. Whole class statistics are given in the table.

sites.google.com/site/edpersite
www.gla.ac.uk/schools/physics/staff/moragcasey

peerwise.cs.auckland.ac.nz

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