

# Does the Progress Test Support and Encourage Enquiry-Based Learning? A Study of Students' Preparation for the Test in Two Medical Schools which use Problem-Based Learning

Chris Harrison, Val Wass, Karen Mattick and Louise Wade, Manchester Medical School

## Abstract

The progress test (PT) is an exam used in several medical schools that have a Problem-Based Learning (PBL) curriculum, which is intended to encourage deep learning in students by a method of enquiry. Little is known about student attitudes to or preparation strategies for the exam.

Quantitative methodology was used to compare students' approaches to PTs in two UK Problem-Based Learning medical schools (Manchester and Peninsula) with contrasting assessment programmes: Manchester has PTs twice a year with additional knowledge tests; and Peninsula has PT four times a year. A validated 42-item questionnaire was completed by 1053 students (640 Manchester Medical School, 413 Peninsula Medical School). Comparative statistics (Chi square) were used.

Manchester students were significantly more motivated to prepare throughout the year ( $p < 0.001$ ). Peninsula students placed more value on other knowledge tests and tended to prepare at the last minute ( $p < 0.001$ ). Students at both schools expressed ambivalence towards the PT's effectiveness in monitoring improvement in their knowledge. At both schools, the preferred revision strategies were published multiple choice questions (MCQs) and textbooks.

The PT does not necessarily support the deep Enquiry-Based Learning behaviour intended by PBL. The learning environment, assessment frequency and presence of other assessments significantly influence student preparation strategies.

## Background

### Course Structure

The Medicine degree at the University of Manchester lasts 5 years, and, once completed, students attain the Bachelor of Medicine and Bachelor of Surgery degree, MBChB. There are approximately 400 students in each year, and the majority of students enter directly after finishing school. The course has extremely wide ranging aims over the five years: students learn everything from communication skills and practical procedures required of doctors to medical ethics. A large part of the course is structured to give the students a strong background in the basic medical sciences, and then to build on this knowledge to develop an understanding of disease processes and how they are investigated and managed. This learning is based around strong memory and recall of information; therefore, the curriculum and assessment methods must be designed to support deep learning.

The exam we chose to look at in this study, the Progress Test, is used as part of a programme of exams used to assess students sitting the Manchester curriculum.

This study also looked at Peninsula Medical School, which similarly uses the Progress Test, but the curriculum structure and various aspects of assessment differ from those at Manchester (Table 1). We were interested to see how these variances could affect students' approaches to the Progress Test.

### Progress Testing

The Progress Test is a wide-ranging exam that covers knowledge from all areas and disciplines covered in the undergraduate curriculum (Van Der Vleuten, 1996). It is written in line with the end-objectives of the course. For the institutions in this study, the Progress Test takes the form of 125 multiple choice questions. The aim of the Progress Test was to break the direct relationship between the assessment and the material studied in the previous semester; it was hoped that students would be discouraged from adopting a 'pass and forget' mentality prevalent in other end-of-unit type assessments.

<b>Differences in Curricula and Progress Testing</b>	
Peninsula Medical School	Manchester Medical School
Four Progress Tests per year	Two Progress Tests per year
Progress Test consists of 125 questions with three hours to complete it.	Progress Test consists of 125 questions with 2 ½ hours to complete it.
Questions are negatively marked.	Questions are not negatively marked.
Option to answer 'don't know'.	No option to answer 'don't know'.
No end of unit tests in years 1 and 2 (one additional written exam is sat at the end of year 1; it is the same structure as the Progress Test but only tests material covered in year 1).	End of unit tests in years 1 and 2.
Extensive clinical contact in years 1 and 2.	Little clinical contact in years 1 and 2.
No PBL tutorials in clinical years.	PBL tutorials run throughout all five years.

*Table 1. Differences in Curricula and Progress Testing.*

In Progress Testing, first year students are not able to answer many questions; the second year students can answer a few more; and this trend continues to increase through to final year students who achieve average scores of between 60% and 70% (*ibid.*). Variations in test difficulty mean that this increase is not steady and that relative, rather than absolute standards are used to create pass marks (Muijtjens *et al.* 1994).

Manchester Medical School recommends students revise for no more than six hours for the exam. However, anecdotal reports suggest many students revise for weeks, using rote-learning strategies. Some students rely on past papers, which suggests superficial learning strategies (Berkel *et al.* 1994).

## Rationale

This study aimed to increase what was known about the ways in which students perceive the Progress Test and how the test motivates them to learn. By contrasting two different medical schools, we can see how variations in the test structure, such as the 'don't know option', frequency of test sitting and the presence of other end-of-unit exams impact students' perceptions and resultant study motivations. Collaboration with Peninsula Medical School also improves the authenticity of the findings, as well as our ability to make generalizations about our findings.

It was hoped that a deeper understanding of the PT will allow us to draw conclusions about whether it supports high quality learning and is aligned constructively into a PBL curriculum. This research will enable redesign of the assessment if necessary.

A quantitative method questionnaire was chosen for the study, because it held the advantages of anonymity for participants and an ability to sample large numbers of students across both universities. As there was no pre-existing questionnaire that would be appropriate for our study, we needed to develop our own.

With some refinement, the questionnaire developed as part of this project could form a validated questionnaire that could be used as a tool across other Faculties/Universities using similar EBL assessments aimed at discouraging learning motivated solely by assessment.

## Approach

Prior to beginning the research, ethical approval was granted from both the Manchester and the Peninsula Medical School Research Ethics Committees.

To develop an informative and reliable questionnaire, two focus groups were initially run. The focus groups supported the hypothesis that many students were studying for the Progress Test often using superficial methods. The focus groups also generated topic areas around which to form questions and provided extra study data on student perceptions and behaviours.

Two focus groups were conducted. Both consisted of students from Manchester Medical School, one with eight fourth-year medical students and the other with 11 second-year students. To avoid volunteer bias, the groups used were student PBL groups that had been created by the University.

The groups were recorded and the discussions transcribed; the tapes were then destroyed. Members of the team from both Manchester and Peninsula Medical Schools then worked together to develop the questionnaire. It consisted of question stems that the participants would respond to using a 5-point Likert scale, with the categories strongly disagree, disagree, neutral, agree and strongly agree. The 48 question stems were developed from our original research objectives and informed by the focus groups:

*Last minute preparation helps me improve my grade on the Progress Test.*

*The Progress Test motivates me to work hard all year.*

The questionnaire also had an initial section requesting demographic information and asking students to give an estimate of the time they spent preparing for the exam.

To identify items that needed clarification and to get feedback on how participants found the questionnaire, it was piloted to 12 second-year and 14 third-year medical students, again, all from Manchester. This led to the removal of four of the stems.

The questionnaire was printed in an electronically scannable format to allow delivery to large numbers of students. At Peninsula Medical School, it was delivered to students after they completed their Progress Test, and all five years of students were sampled. In Manchester, this method of delivery was also planned but was not possible, mainly as a result of the very large number of sites at which the Progress Test is given. Instead, it was delivered to First Years at their portfolio reviews, Second Years at a poster presentation day and Fourth Years at a compulsory lecture. Unfortunately, Years 3 and 5 at Manchester could not be sampled. Questionnaire response rates are visible in Table 2.

<b>Questionnaire Response Rates</b>		
	Manchester	Peninsula
1 <sup>ST</sup>	72.4%	43.4%
2 <sup>ND</sup>	48.7%	37.0%
3 <sup>RD</sup>	----	48.0%
4 <sup>TH</sup>	34.3%	65.7%
5 <sup>TH</sup>	---	65.3%

Table 2. Questionnaire response rates.

Once completed, the questionnaires were electronically scanned and the results displayed in Excel. This programme was used to calculate the mean responses to each question and also to allow comparison between different groups (*e.g.*, by university, by year of study, etc.). The data were exported into SPSS to be analysed. The standard deviation of responses was calculated, as was the Chi square test to measure significance. Members of the teams from Manchester and Peninsula discussed the results in relation to the original aims.

# Assessment

Our study had several primary outcomes related to assessment:

- **Preparation for the Progress Test**

Students preferred to use textbooks and example books of multiple choice questions to prepare for the exam; however, these sources lend themselves to more superficial revision. Activities throughout the year, including notes made for PBL sessions and time spent in hospital, were not rated highly by students as useful preparation for the Progress Test.

- **Revision approaches reflect the weight given to the Progress Test in the overall assessment programme.**

Most First and Second Year students at Manchester said they spent 0 or 0-3 hours preparing, while most Peninsula students spent at least over 12 hours and 44% of the Second Years said they were spending over 72 hours.

The Manchester pre-clinical students agreed that 'the Progress Test has little bearing on whether I pass or fail the year'. Manchester Medical School does not require the students in the first year to pass the exam in order to progress into second year; and they need only pass one out of the two Progress Tests in the second year to progress. The traditional knowledge tests (*i.e.*, semester tests) are more important to their progression and students are required to pass them all. At Peninsula, except for the first Progress Test in first year, all of their Progress Tests are summative.

The increased weight given to the exam at Peninsula encouraged students to focus on it much more. As discussed above, the majority of Peninsula Medical School students said they were working throughout the year, and not just preparing for the exam at the last minute. We can deduce that they start thinking about the exam early and are encouraged to work hard throughout the course in preparation for it. In contrast at Manchester, the pre-clinical students take very little notice of the Progress Test, and, therefore, it has little influence on the learning methods they employ.

- **Frequency of exam sitting affects how students' view and prepare for the Progress Test**

The increased frequency of exam sitting at Peninsula – four times a year – compared to twice yearly at Manchester affects the way the students approach the exam.

Prevention of 'test-directed studying', in line with EBL, is one of the key reasons outlined by Maastricht for introducing the Progress Test (Van Der Vleuten, 1996).

The Manchester students stated that most of their preparation for the Progress Test is 'done at the last minute', whilst the students at Peninsula disagreed with this. The Peninsula students agreed that the Progress Test motivates them to work hard all year, whilst the students at Manchester did not agree with this.

Worryingly, students at neither school felt the Progress Test helped them improve their knowledge.

## Evaluation

This is an original study which has considerably increased what we know about students' approaches to the Progress Test.

By being a piece of collaborative work between two Medical Schools, this has clearly demonstrated to us the importance of the learning environment in students' perceptions of the assessment.

Acquisition of the CEEBL grant for the study has been of great benefit, because with it, we were able to produce electronically scannable questionnaires, which allowed us to sample a significantly larger population of students than we could have done by hand. The grant has also allowed us to employ James Hollands to assist in our data collection and analysis.

However, there are some weaknesses of this study that are important to note:

- We have not managed to survey the 3<sup>rd</sup> or 5<sup>th</sup> Years at Manchester Medical School which makes our data for the clinical years less robust; this is compounded by the low response rate for the 4<sup>th</sup> Years at Manchester.
- There was no accredited questionnaire that would have been appropriate to use for this study; therefore, we had to develop one by ourselves. Unfortunately, we were not able to achieve a good measure of internal consistency for our questionnaire.
- We feel that the questionnaire may have been too long; 8% of respondents did not reach the end of the questions. There were some students who commented that they felt we

were asking them to answer several similar questions. Students also mentioned that the use of Information and Computer Technologies was a popular revision source, but, unfortunately, it was one we omitted to ask about.

## Further Development

Such a large volume of data was collected in the study that it is still being fully interpreted.

The results were disseminated at the AMEE 2009 Conference, and it is hoped a paper will be accepted by one of the Medical Education journals.

Upon completion, further work is needed in order to find out how the learning and assessment environment can be modified to ensure that students perceive that the assessment method is supporting high-quality learning.

## References

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