Learning through examinations: use of an objective structured clinical examination as a teaching method in general practice

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SUMMARY An objective structured clinical examination was written to evaluate the primary care teaching in Southampton medical school's third year curriculum. Its transition from a summative to a formative evaluation is described. During the academic year 1985–86 the examination was completed by 115 students in 12 groups, and the results give some support to its validity. Students reported that they had learnt from the exercise and the reasons for this are discussed.

Introduction

Since its inception in 1971, Southampton University medical school has made a substantial commitment to teaching general practice. The major component is in the third year, when students begin full-time clinical studies, and one morning a week is spent in general practice. Of the 40 sessions, up to eight are spent in seminar groups and the remainder in general practitioners' surgeries, with students either alone or in pairs.

The medical faculty employs a system of continuous assessment and students are graded at the end of each attachment on a scale of A–F. The grade is usually assigned on the result of a brief clinical examination and the teacher's report. There was no formal examination for the general practice course and the grade was based solely on reports from each student's four clinical teachers together with that of the seminar tutor. In addition, there is a general practice component in the final examination.

For some years members of the department have felt uneasy about this system. The reports on which grades are based are wholly subjective and may depend on the relationships that students make with teachers. Furthermore, although information is collected about the content of clinical teaching, there was some uncertainty about the clinical mix experienced by individual students and the measurable effects of the course on their skills and behaviour. In 1982 it was decided to embark on a more systematic attempt to assess the students.

The main aim of the course is for students to acquire basic clinical skills, and by the end of the year they should be able to handle simple consultations on their own. Any system to evaluate the course would have to allow direct measurement of the various components of students' consulting skills. It was decided to construct and test an objective structured clinical examination. In this students are required to perform a range of specified tasks, with preset performance criteria, arranged in a series of stations, with one student at each station, moving on to the next after a set time. At the end of the examination there is an opportunity for students and markers to discuss the questions so that each student can learn about his performance. The examination was originally developed for use in hospitals, but has also been used in general practice assessment. It was felt that it would allow the assessment of clinical skills while providing a useful learning exercise for the students. Originally, however, the aim was to obtain feedback about the course.

Development of the examination

An objective structured clinical examination was first written for the academic session 1982–83. It was completed by selected groups in that and the following year, and the questions were rewritten or modified in the light of comments from students and staff. During the session 1984–85 the examination consisted of 12 questions and was completed by seven out of 12 groups.

Students consistently reported that the examination was a valuable learning exercise and that they enjoyed it. In particular some students reported that they understood the purpose of the course much better after the examination. This created a dilemma — if the examination was a useful learning exercise then it ought to be a standard part of the curriculum, and if it helped the students make more sense of the rest of the course then it should come around the middle of the year and not at the end. On the other hand the heavy manpower requirements of the exercise meant that it could not be repeated at the end of the year. It was therefore decided to run the examination for all groups in the middle of the year as a learning exercise, and the aim of using it to assess the outcome of the course was abandoned. This changed the examination from a summative to a formative evaluation. By the beginning of the session 1985–86, the exercise consisted of 10 questions. Of these, five were clinical, each requiring students to talk to or examine someone in the role of a patient with another person observing as marker. The other five were written questions.

Use of the examination

Between November 1985 and February 1986 the examination was completed by 115 students in 12 groups. The range of scores was 82–156 out of 191 (42.9–81.7%, mean 60.1%). Correlations have been calculated using Spearman's rank correlation coefficient (rho).

Reliability

At one examination, with 10 students taking part, three questions were marked twice. One of these was a patient interview, with two observers marking the question simultaneously, and the other two were written questions. Correlation coefficients were 0.84 for the interviewing question, and 0.86 and 0.87 for the other two (P<0.01 in each case).

Validity

Two problems emerge when trying to assess validity. First, in the absence of a widely-accepted objective standard for comparison, establishing construct validity is impossible. Secondly, one strength of the objective structured clinical examination is that for each student it can identify domains of learning in which he shows particular ability or deficiency. There is no reason why a student should score equally well on questions testing, for instance, factual knowledge and interviewing skill. Therefore,
neither the use of other examinations measuring students’ abilities, nor the correlation of all the different items in this examination can provide the key to construct validity. The only test that can be applied is whether questions purporting to measure in similar domains produce similar scores.

Correlation coefficients were calculated using scores for all individuals in all possible pairs of questions to generate a correlation matrix (Table 1). Of the 45 correlation coefficients, 10 showed a correlation (P<0.05), but all were nevertheless small, demonstrating the wide scatter of scores. There was a significant correlation (P<0.05) between the two diagnostic interview questions (rho = 0.297), the two explanation interview questions (rho = 0.224), the two attitudinal questions (rho = 0.197), and the two factual/problem solving questions (rho = 0.236).

Evidence of learning
There was no correlation between the time of taking the examination and overall scores (rho = 0.022). This can be explained by the short period in which the different groups took the examination (three months) and the considerable scatter of marks within each group of students.

Reactions from the students
After the debriefing session the students were asked to complete a short questionnaire about their reactions to the exercise — 91 students completed the questionnaire. The first two items were about time allowed and level of difficulty: 88 thought that the questions were at about the right level of difficulty; 67 thought that there was enough time to complete the exercise and 24 that there had not been enough. In answer to the question ‘How much did you learn from the exercise?’, 27 said a lot, 50 quite a bit, 12 not much and one said he had learnt nothing (one person did not answer this question). Fourteen students spontaneously said that the examination was fun, eight that it was interesting, and 23 that it was useful (of whom two specified that it was useful to learn about their own attitudes). Four said that they would welcome the opportunity to do a similar exercise again. Negative comments were few: two students found the format artificial and another four said that they found it difficult to talk to role-played patients.

Discussion
The decision to use the objective structured clinical examination as a learning and not a grading exercise reflects the department’s current attitudes towards priorities in undergraduate education, and was also a response to the students’ expressed opinions. It is a clear statement to the students that the department feels it is more important to help them learn than to classify them.

Under these circumstances issues of validity are important only insofar as the exercise should truly reflect the objectives of the course. This is achieved by making the content of the questions and the marking schedules reflect the course objectives. For instance, in order to underline the importance of good interviewing technique, in all the clinical questions the marks are divided equally between content and style (although some markers feel that this balance should be weighted more heavily in favour of style). Acceptable interobserver reliability in both clinical and written questions has been demonstrated, therefore supporting the objectivity of the examination’s structure. Small but encouraging correlations between different questions testing abilities in single domains of learning have also been shown, thus supporting a belief in the examination’s capacity to give valid information about the students’ skills in everyday practice.

What makes this exercise so valuable to students remains an intriguing question. Nothing appears in the examination that is not covered elsewhere in the course, and the answer may depend on the style of the examination. Teaching in general practice usually takes place in a relaxed, non-threatening atmosphere which makes it easy for students to learn and be open about their areas of ignorance. However, that atmosphere may also make it easy for students to avoid having to formulate or state their own opinions about the patients they see. The objective structured clinical examination forces them to do this and complete a series of tasks in an atmosphere made more stressful by a time limit and the presence of observers, without the levels of stress generated by a formal examination. The subsequent debriefing session gives them immediate personal feedback about their performance, and a clear reminder of the course objec-

Table 1. Rank correlation coefficients for all pairs of questions.

<table>
<thead>
<tr>
<th>Questions</th>
<th>1</th>
<th>2</th>
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<tbody>
<tr>
<td>1. Cough: diagnostic interview</td>
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<td>2. Referral letter</td>
<td>0.136</td>
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<td>3. Anaemia: factual/problem solving</td>
<td>0.116</td>
<td>0.197</td>
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<td>4. Ethics: attitudes</td>
<td>-0.104</td>
<td>0.186</td>
<td>0.168</td>
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<td>5. Ear, nose and throat: examination</td>
<td>0.019</td>
<td>0.083</td>
<td>-0.086</td>
<td>0.157</td>
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<tr>
<td>6. Ear, nose and throat: explanation interview</td>
<td>0.348</td>
<td>0.191</td>
<td>0.019</td>
<td>0.154</td>
<td>0.131</td>
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<tr>
<td>7. Abdominal pain: diagnostic interview</td>
<td>0.297*</td>
<td>0.041</td>
<td>0.121</td>
<td>-0.04</td>
<td>0.079</td>
<td>0.197</td>
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<tr>
<td>8. Drug compliance: attitudes</td>
<td>0.130</td>
<td>0.144</td>
<td>0.398</td>
<td>0.197*</td>
<td>0.047</td>
<td>0.131</td>
<td>0.278</td>
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<tr>
<td>9. Rash: factual/problem solving</td>
<td>0.020</td>
<td>0.103</td>
<td>0.236</td>
<td>0.178</td>
<td>-0.099</td>
<td>0.036</td>
<td>0.048</td>
<td>0.121</td>
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<tr>
<td>10. Angina: explanation interview</td>
<td>0.122</td>
<td>0.242</td>
<td>0.192</td>
<td>0.154</td>
<td>0.067</td>
<td>0.224</td>
<td>0.032</td>
<td>0.044</td>
<td>0.052</td>
</tr>
</tbody>
</table>

For n>100, P<0.05 is represented by rho>0.195. *P<0.05 for same domains of learning. +P<0.05 for different domains.
tives. The combination of moderate stress and immediate feedback seems to be a particularly powerful learning method and justifies the considerable outlay in time and manpower.

References

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