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RESEARCH ARTICLE

STUDENTS' PERSPECTIVES ON THE MULTI-COMPONENT EVALUATION SYSTEM IN PHYSIOLOGY

***,[1]Sharmila Torke, [2]K. Ramnarayan and [1]Reem Rachel Abraham**

[1]Department of Physiology, Melaka Manipal Medical College (Manipal Campus), Manipal University, Manipal 576104, Karnataka State, India
[2]Vice Chancellor, Manipal University, Manipal 576104 Karnataka State, India

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ABSTRACT

Background: Assessment contributes directly to the way students approach their study and therefore contributes indirectly, but powerfully, to the quality of their learning. A well designed assessment programme will use different types of question appropriate for the content being tested.Meaningful interpretation of course evaluation results requires collecting evidence of validity. One of the method employed for gathering evidence of validity involves collecting student feedback about the various components of the evaluation system. In this perspective, this study was conducted to explore student perspectives on multi-component evaluation system in Physiology at Melaka Manipal Medical College (Manipal Camus), India.
Methods: Students' perspectives on different components of evaluation system in Physiology were collected by administering a questionnaire containing 9-12 items.
Results and Conclusion: In general, students agreed that our evaluation system is quite fair. However, in some areas there is a lack of consensus amongst students. The results of our study was comparable with the earlier observation that a single assessment tool does not fulfill all the functions of assessment such as assessing knowledge, comprehension and skills, motivation and providing feedback. The multi-component evaluation system allows one to assess numerous elements of the knowledge and competence required of a successful doctor.

INTRODUCTION

Assessment plays a crucial role in the education process: it determines much of the work students undertake affects their approach to learning and is an indication of which aspects of the course are valued most highly. Performance is a function of the nature of the materials to be learned, the characteristics of the learner (current knowledge, skills and attitudes), the learning activities and the kind of assessment used to evaluate the degree of learning (**Bransford,1979**).The teaching learning system as well as the evaluation system affect the quality of learning. If we wish our students to become effective learners, we must become much more concerned with the way in which they approach learning and the way in which we might influence their approach by the activities which we impose (**Shreemathi, 2001**). The sorts of changes which might be possible and would improve the situation include assessment demanding critical thinking, problem solving and reasoning skills. The type of assessment chosen should be related to learning outcomes and governed by decisions about its purpose, validity and relevance. Every assessment method will place some students at a disadvantage to some extent; a range of types of assessment is desirable to reduce the element of disadvantage suffered by any particular student. There is a range of methods available for assessment; the challenge to medical schools is to utilize these to achieve the required changes in medical education (**Fowell *et al*., 1998**).

Whatever strategy used, students will be powerfully influenced by the assessment system. Type of questions set has a strong influence on the forms of understanding students seek during their revision (**Entwistle *et al*., 1991**). If students perceive that the subject offered requires understanding and provides opportunities to apply such knowledge and skills so as to enhance their personal competencies, they will choose to use a deep approach (Dart, 1994). The evaluation system should incorporate a variety of tests that test different aspects of knowledge, understanding and abilities (**Abraham *et al*., 2005**). Question types should be selected according to their specific strengths and weaknesses. A teacher must experiment with a variety of assessment methods and monitor the effectiveness of each method in helping the students to learn. Teacher must provide formative, repeated feedback at regular intervals at the classroom level to help students clarify their goals and assess progress towards them while there is still

Corresponding author: Sharmila Torke,
Department of Physiology, Melaka Manipal Medical College (Manipal Campus), Manipal University, Manipal 576104, Karnataka State, India.

time to make changes based on the feedback (**Angelo *et al*., 1993**).

In many medical schools, data from student course evaluation questionnaires are used to improve and evaluate faculty teaching, entire courses and the curriculum as a whole (**van der Hem-Stokroos *et al*., 2003; van der Hem-Stokroos *et al*., 2001; Remmen *et al*., 2000**). Meaningful interpretation of course evaluation results requires collecting evidence of validity (**Downing, 2003**). Most of the validity evidence addressing course evaluations has been gathered by statistical and psychometric methods: correlation studies, comparisons of means and factor analyses (**Marsh *et al*., 1997; Marsh, 1987; Abrami, 1990; Greenwald *et al*., 1997; McKeachie *et al*., 1997**). Another method that has been recommended for gathering evidence of validity involves collecting student feedback about the various components of the evaluation system (**Copeland *et al*., 2000**). Student attitudes can provide validity evidence that complements statistical analyses (**Gagliardi *et al*., 2004**).

In this perspective, this study was conducted to explore student perspectives on multi-component evaluation system in Physiology at Melaka Manipal Medical College (Manipal Camus), India.

MATERIALS AND METHODS

Study setting

The undergraduate medical course (MBBS) at Melaka Manipal Medical College (Manipal Campus), Manipal, is a five-year academic program. This course includes two phases. Phase I involves two and a half years of preclinical training in Manipal, followed by Phase II which offers two and a half years of clinical training in Malaysia. The Phase I curriculum is conducted in two stages, namely, Stage I(one year duration) and Stage II (one and a half year duration). There are two student admissions per academic year, one in March and the other in September. Students are taught basic science subjects in Stage I, which include Anatomy, Physiology and Biochemistry. The first year curriculum is spread over four blocks, each block of ten-week duration. Each block comprises two to three systems, which are indicated below.

Block 1: Basic concepts, blood, and nerve-muscle physiology.
Block 2: Cardiovascular, respiratory and gastrointestinal physiology.
Block 3: Endocrine, reproductive, and renal physiology.
Block 4: Central nervous system and special senses.

Evaluation methods

For the study group, continuous assessment in Physiology was in the form of class tests and progress examinations. At the end of each block, there was a progress or block examination including theory and practical components. The first, third and the fourth block examinations also included viva voce component. The continuous/internal assessment marks in theory contributed 30% of the total marks in the theory component and that of practical contributed 20% of the total marks in the practical component of the final summative examination which was conducted at the end of stage I. This study involved 3 batches of first year MBBS students (n=429) of Melaka Manipal Medical College (Manipal Campus). For the study sample, the final summative examination consisted of a written examination and a practical examination. The written examination was of three-hour duration and included two components, the essay paper followed by the multiple true-false papers. The essay paper was of two-hour duration with a maximum of 60 marks and the multiple true-false papers were of one-hour duration with a maximum of 120 marks. Both essay and multiple true-false scores were then scaled down to 30 marks each. Scores in essay and multiple true-false papers comprised 60% of the final examination score. Viva voce (10 marks) and the internal assessment marks in theory (30 marks) contributed to the remaining 40%. The practical examination was administered in the form of Integrated Practical Examination (IPE) which included two components, Objective Structured Practical Examination (OSPE) followed by Performance Exercise (PE). The practical component involved 50 marks, 40 from OSPE and PE, the internal assessment marks in practical (10 marks) contributed to the remaining 10. Students required a minimum of 50% each in both theory and practical components to pass.

Methods

Students' perspectives on different components of evaluation system in Physiology were collected by administering a questionnaire related to the assessments during the course. They were asked to respond to the items in the questionnaire on a five-point Likert scale (5=strongly agree; 1= strongly disagree). A total of 429 questionnaires were distributed to the students of March 2003(n=142), September 2003(n=138) and March 2004(n=149) batches, 408 of which were completed and returned, giving an overall response rate 95%.The average ratings on the items in the questionnaire awarded by the students are shown in Tables 1, 2, 3, 4 and 5.

RESULTS AND DISCUSSION

Carefully designed assessment contributes directly to the way students approach their study and therefore contributes indirectly, but powerfully, to the quality of their learning. For most students, assessment requirements literally define the curriculum. Students place more emphasis on understanding of the subject matter if the examination demands it (**Abraham *et al*., 2004**). Assessment is therefore a potent strategic tool for educators with which to spell out the learning that will be rewarded and to guide students into effective approaches to study. Equally, however, poorly designed assessment has the potential to hinder learning or stifle curriculum innovation (**James *et al*., 2002**). Choosing the best question type for a particular examination is not simple. A careful balancing of costs and benefits is required. A well designed assessment programme will use different types of question appropriate for the content being tested (**Schuwirth *et al*., 2003**). The fact that 95% of the total 408 students approached completed and returned the questionnaire was confirmation not only that students have views on assessment, but that they want these views to be heard.

For essay component (Table 1), the item mean scores ranged from a maximum of 3.96 (item 1: All students examined uniformly on the content and time) to a minimum of 2.70 (item 8: Less stressful) with March 2003 batch. For September 2003 batch, mean scores ranged from 4.12 (item 1) to 2.72 (item 8). For March 2004 batch, mean scores ranged from 4.14 (item 5: Tests understanding and application of knowledge) to 2.64 (item 8). Students of September 2003 batch strongly agreed (mean 4.12) that they were examined uniformly on the content and time (item 1) followed by March 2003 (mean 3.96) and March 2004 (mean 3.77) batch of students. The statement related to examiner subjectivity (item 2), was not rated very highly by the students of all thee batches (March 2004 batch - mean 3.41, March 2003 batch- mean 3.23 and September 2003 batch - mean 3.23), suggesting moderate agreement with the statement. Student ratings regarding the comprehensiveness (item 3) of the essay paper (March 2003 batch-mean 3.73, September 2003 batch-mean 3.67 and March 2004 batch-mean 3.94) and the role of essay Paper in testing clinical (item 6) reasoning skills (March 2003 batch-mean 3.75, September 2003 batch-mean 3.76 and March 2004 batch-mean 3.76) and the relevance to practice (item 9) of the exam material (March 2003 batch-mean 3.73, September 2003 batch-mean 3.79 and March 2004 batch-mean 3.81) were found to be moderately high with all three batches. Students of March 2004 batch strongly felt (mean 4.02) that our essay paper mainly tested factual recall (item 4). Students of March 2003 (mean 3.89) and September 2003 (mean 3.67) batches were also found to be agreeing with this statement. Students of all three batches were found to be strongly in agreement with the role of essay Paper in testing understanding and application (item 5) of the knowledge (March 2003 batch-mean 3.86, September 2003 batch-mean 4.10 and March 2004 batch-mean 4.14) and problem solving (item 7) skills (March 2003 batch-mean 3.80, September 2003 batch-mean 4.10 and March 2004 batch-mean 3.99). Statement regarding the stress factor (item 8) yielded ratings of 2.70 (March 2003), 2.72 (September 2003) and 2.64(March 2004), suggesting moderate disagreement.

For MTF component (Table 2), the item mean scores ranged from a maximum of 4.03 (item 1) to a minimum of 3.10 (item 8) with March 2003 batch. For September 2003 batch, mean scores ranged from 4.00 (item 1) to 2.87 (item 8). For March 2004 batch, mean scores ranged from 4.17 (item 4: Tests mainly factual recall) to 2.89 (item 6: Tests clinical reasoning skills). Students of all three batches agreed that they were examined uniformly (item 1) on the content and time (March 2003 batch-mean 4.03, September 2003 batch-mean 4.00 and March 2004 batch-mean 3.94). The statement related to examiner subjectivity (item 2), was rated highly by the students of March 2004 batch (mean 4.09) followed by September 2003 (mean 3.45) and March 2003 (mean 3.42) batches. Student ratings regarding the comprehensiveness (item 3) of the MTF paper (March 2003 batch-mean 3.75, September 2003 batch-mean 3.79 and March 2004 batch-mean 3.75) and understanding and application (item 5) of the knowledge (March 2003 batch-mean 3.77, September 2003 batch-mean 3.88 and March 2004 batch-mean 3.56) were found to be moderately high with all three batches. Students of March 2004 batch strongly felt (mean 4.17) that our MTF paper mainly tested factual recall (item 4).Students of March 2003 (mean 3.86) and September 2003 (mean 3.89) batches also agreed with this statement. Our findings correlate with the earlier findings that MTF items test more of factual recall (**Davis *et al*., 1999; Fowell *et al*., 1998**). Students of all three batches were less strongly in agreement with the role of MTF Paper in testing reasoning (item 6) skills (March 2003 batch-mean 3.14, September 2003 batch-mean 3.27 and March 2004 batch-mean 2.89) and problem solving (item 7) skills (March 2003 batch-mean 3.14, September 2003 batch-mean 3.48 and March 2004 batch-mean 3.01). Students of all three batches were found to agree with the statement related to the relevance to practice (item 9) of the exam material (March 2003 batch-mean 3.46, September 2003 batch-mean 3.48 and March 2004 batch-mean 3.34).

Table 1. Student ratings on items related to essay component

Components of competence	Mean±SD		
	March 2003 batch	September 2003 batch	March 2004 batch
1. All students examined uniformly on the content and time	3.96±0.95	4.12±0.82	3.77±1.05
2. Little examiner subjectivity	3.41±1.07	3.23±1.19	3.23±1.20
3. Samples a larger part of curriculum	3.73±1.10	3.67±1.15	3.94±1.04
4. Tests mainly factual recall	3.89±1.12	3.67±1.19	4.02±0.99
5. Tests understanding and application of knowledge	3.86±1.11	4.10±0.98	4.14±0.95
6. Tests clinical reasoning skills	3.75±1.00	3.76±1.05	3.76±1.15
7. Tests problem-solving skills	3.80±1.00	4.10±0.97	3.99±1.14
8. Less stressful	2.70±1.33	2.72±1.44	2.64±1.43
9. Assesses material that is relevant to the practice of medicine	3.73±1.22	3.79±1.15	3.81±1.15

Table 2. Student ratings on items related to MTF component

Components of competence	Mean±SD		
	March 2003 batch	September 2003 batch	March 2004 batch
1. All students examined uniformly on the content and time	4.03±0.99	4.00±0.85	3.94±0.96
2. Little examiner subjectivity	3.42±1.12	3.45±1.15	4.09±1.18
3. Samples a larger part of curriculum	3.75±1.11	3.79±1.03	3.75±1.06
4. Tests mainly factual recall	3.86±1.12	3.89±1.03	4.17±0.93
5. Tests understanding and application of knowledge	3.77±1.07	3.88±0.99	3.56±1.12
6. Tests clinical reasoning skills	3.14±1.18	3.27±1.11	2.89±1.17
7. Tests problem-solving skills	3.14±1.19	3.48±1.09	3.01±1.18
8. Less stressful	3.10±1.38	2.87±1.47	3.60±1.36
9. Assesses material that is relevant to the practice of medicine	3.46±1.31	3.48±1.27	3.34±1.19

Students of March 2004 batch (mean 3.60) agreed that MTF paper is less stressful. (item 8). Students of March 2003 batch (mean 3.10) were less strongly in agreement with this statement. Ratings of September 2003 batch (mean 2.87), suggested moderate disagreement.

For viva voce component (Table 3), the item mean scores ranged from a maximum of 3.81 (item 5: Tests understanding and application of knowledge and item 10: Permits useful interaction with teachers) to a minimum of 2.63 (item 9: Less stressful) with March 2003 batch. For September 2003 batch, mean scores ranged from 3.92 (item 5: Tests understanding and application of knowledge) to 2.68 (item 9: Less stressful). For March 2004 batch, mean scores ranged from 4.17 (item 5: Tests understanding and application of knowledge) to 2.33 (item 9: Less stressful).

Students of all three batches were less strongly in agreement with the statements that they were examined uniformly (item 1) on the content and time (March 2003 batch-mean 3.23, September 2003 batch-mean 3.37 and March 2004 batch-mean 3.29) and that our viva voce examination samples (item 3) a larger part of curriculum (March 2003 batch-mean 3.24, September 2003 batch-mean 3.51 and March 2004 batch-mean 3.31). Students of all three batches felt (March 2003 batch-mean 3.32, September 2003 batch-mean 3.26 and March 2004 batch-mean 3.52) that our viva voce examinations mainly tested factual recall (item 4). The statement related to examiner subjectivity (item 2), was not rated highly by the students of March 2003 (mean 3.20) and September 2003 (mean 3.29) batches. The rating of March 2004 (mean 2.84) batch of students on this item was the least suggesting moderate disagreement.

Table 3. Student ratings on items related to viva voce component

Components of competence	Mean±SD		
	March 2003 batch	September 2003 batch	March 2004 batch
1. All students examined uniformly on the content and time	3.23±1.13	3.37±1.09	3.29±1.20
2. Little examiner subjectivity	3.20±1.05	3.29±1.10	2.84±1.36
3. Samples a larger part of curriculum	3.24±1.09	3.51±1.09	3.31±1.06
4. Tests mainly factual recall	3.32±1.19	3.26±1.12	3.52±1.13
5. Tests understanding and application of knowledge	3.81±1.03	3.92±1.03	4.17±1.03
6. Tests clinical reasoning skills	3.67±1.06	3.72±1.15	3.72±1.12
7. Tests problem-solving skills	3.50±1.12	3.62±1.22	3.65±1.14
8. Tests interactive skills	3.76±1.22	3.85±1.10	4.00±1.18
9. Less stressful	2.63±1.18	2.68±1.35	2.33±1.33
10. Permits useful interaction with teachers	3.81±1.08	3.84±1.17	4.06±1.19
11. Assesses material that is relevant to the practice of medicine	3.63±1.21	3.74±1.21	3.67±1.14

Table 4. Student ratings on items related to OSPE component

Components of competence	Mean±SD		
	March 2003 batch	September 2003 batch	March 2004 batch
1. All students examined uniformly on the content and time	3.86±1.05	3.78±0.98	3.56±1.08
2. Little examiner subjectivity	3.33±1.09	3.40±1.00	3.46±1.27
3. Samples a larger part of curriculum	3.51±0.99	3.36±1.06	3.29±1.06
4. Tests mainly factual recall	3.61±1.10	3.39±1.18	3.77±1.06
5. Tests understanding and application of knowledge	3.72±1.03	3.85±1.04	3.56±1.13
6. Tests clinical reasoning skills	3.66±1.07	3.69±1.05	3.54±1.11
7. Tests problem-solving skills	3.36±1.10	3.54±1.15	3.24±1.12
8. Less stressful	3.30±1.24	3.23±1.38	3.37±1.34
9. Assesses material that is relevant to the practice of medicine	3.80±1.10	3.78±1.10	3.72±1.07

Students of March 2004 batch were found to be strongly agreeing with the statements underlying the role of our viva voce examination in testing understanding and application (item 5) of the knowledge (mean 4.17), interactive (item 8) skills (mean 4.00) and providing useful interaction (item 10) with teachers (mean 4.06). Students of March 2003 (item 5-mean 3.81, item 8-mean 3.76 and item 10-mean 3.81) and September 2003 (item 5-mean 3.92, item 8-mean 3.85 and item 10-mean 3.84) batches also agreed with these statements. Student ratings regarding the role of viva voce examination in assessing reasoning (item 6) skills (March 2003 batch-mean 3.67, September 2003 batch-mean 3.72 and March 2004 batch-mean 3.72), problem solving (items 7) skills (March 2003 batch-mean 3.50, September 2003 batch-mean 3.62 and March 2004 batch-mean 3.65) and the relevance to practice (item 11) of medicine (March 2003 batch-mean 3.63, September 2003 batch-mean 3.74 and March 2004 batch-mean 3.67) were found to be moderately high with all three batches.

Students of all three batches were found to be disagreeing (March 2003 batch-mean 2.63, September 2003 batch-mean 2.68 and March 2004 batch-mean 2.33) with the statement indicating that our viva voce examinations are less stressful (item 9).

For OSPE component (Table 4), the item mean scores ranged from a maximum of 3.86 (item 1: All students examined uniformly on the content and time) to a minimum of 3.30 (item 8: Less stressful) with March 2003 batch. For September 2003 batch, mean scores ranged from 3.85 (item 5: Tests understanding and application of knowledge) to 3.23 (item 8). For March 2004 batch, mean scores ranged from 3.77 (item 4: Tests mainly factual recall) to 3.24 (item 7: Tests problem-solving skills). Students of all three batches were found to be agreeing with the statements underlying the role of OSPE in providing uniform examination (item 1) of all students (March 2003 batch-mean 3.86, September 2003 batch-mean 3.78 and

March 2004 batch-mean 3.56), understanding and application (item 5) of the knowledge (March 2003 batch-mean 3.72, September 2003 batch-mean 3.85 and March 2004 batch-mean 3.56), reasoning (item 6) skills (March 2003 batch-mean 3.66, September 2003 batch-mean 3.69 and March 2004 batch-mean 3.54) and assessing material that is relevant (item 9) to the practice of medicine (March 2003 batch-mean 3.80, September 2003 batch-mean 3.78 and March 2004 batch-mean 3.72). Students of all three batches felt that (March 2003 batch-mean 3.61, September 2003 batch-mean 3.39 and March 2004 batch-mean 3.77) our OSPE mainly tested factual recall (item 4). Student ratings regarding statements related to the comprehensiveness (item 3) of OSPE (March 2003 batch-mean 3.51, September 2003 batch-mean 3.36 and March 2004 batch-mean 3.29) and its role in assessing problem solving (item 7) skills (March 2003 batch-mean 3.36, September 2003 batch-mean 3.54 and March 2004 batch-mean 3.24) were found to be moderately high with all three batches. Students of all three batches were found to be agreeing with the statements (March 2003 batch-mean 3.33, September 2003 batch-mean 3.40 and March 2004 batch-mean 3.46) that there was little examiner subjectivity (item 2) and that OSPE (item 8) is less stressful (March 2003 batch-mean 3.30, September 2003 batch-mean 3.23 and March 2004 batch-mean 3.37).

related to the understanding and application (item 5) of knowledge (March 2003 batch-mean 3.92, September 2003 batch-mean 4.00 and March 2004 batch-mean 3.99), clinical reasoning (item 6) skills (March 2003 batch-mean 3.84, September 2003 batch-mean 4.06 and March 2004 batch-mean 3.88), physical examination (item 8) skills (March 2003 batch-mean 3.97, September 2003 batch-mean 4.07 and March 2004 batch-mean 4.10), interactive (item 9) skills (March 2003 batch-mean 3.81, September 2003 batch-mean 3.80 and March 2004 batch-mean 3.87) and providing useful interaction (item 11) with teachers (March 2003 batch-mean 3.84, September 2003 batch-mean 3.92 and March 2004 batch-mean 3.89) were found to be high with all three batches. Students of all three batches felt that performance exercises mainly tested factual (item 4) recall (March 2003 batch-mean 3.43, September 2003 batch-mean 3.33 and March 2004 batch-mean 3.39). Students of all three batches agreed with the statement related to the role of performance exercises in testing problem-solving (item 7) skills (March 2003 batch-mean 3.49, September 2003 batch-mean 3.64 and March 2004 batch-mean 3.60). Students of March 2004 batch were found to disagree (mean 2.40) with the statement indicating that performance exercises are less stressful (item 10).

Table 5. Student ratings on items related to PE component

Components of competence		Mean±SD		
		March 2003 batch	September 2003 batch	March 2004 batch
1.	All students examined uniformly on the content and time	3.52±1.19	3.67±1.09	3.21±1.21
2.	Little examiner subjectivity	3.34±1.17	3.33±1.15	2.94±1.15
3.	Samples a larger part of curriculum	3.39±1.09	3.55±1.23	3.34±1.16
4.	Tests mainly factual recall	3.43±1.24	3.33±1.21	3.39±1.12
5.	Tests understanding and application of knowledge	3.92±1.13	4.00±1.07	3.99±1.06
6.	Tests clinical reasoning skills	3.84±1.12	4.06±1.06	3.88±1.11
7.	Tests problem-solving skills	3.49±1.20	3.64±1.22	3.60±1.14
8.	Tests physical examination skills	3.97±1.24	4.07±1.06	4.10±1.16
9.	Tests interactive skills	3.81±1.27	3.80±1.22	3.87±1.15
10.	Less stressful	3.06±1.37	3.11±1.43	2.40±1.33
11.	Permits useful interaction with teachers	3.84±1.11	3.92±1.13	3.89±1.16
12.	Assesses material that is relevant to the practice of medicine	4.17±1.03	4.01±1.15	4.29±0.91

For PE component (Table 5), the item mean scores ranged from a maximum of 4.17 (item 12: Assesses material that is relevant to the practice of medicine) to a minimum of 3.06 (item 10: Less stressful) with March 2003 batch. For September 2003 batch, mean scores ranged from 4.07 (item 8: Tests physical examination skills) to 3.11 (item 10). For March 2004 batch, mean scores ranged from 4.29 (item 12) to 2.40 (item 10). Students of all three batches were in strong agreement with the statement that performance exercises were assessing material that is relevant (item 12) to the practice of medicine (March 2003 batch-mean 4.17, September 2003 batch-mean 4.01 and March 2004 batch-mean 4.29). Students of September 2003 (mean 3.67) and March 2003 (mean 3.52) batches agreed that in performance exercises they were examined uniformly on the content and time (item 1) followed by March 2004 batch of students (mean 3.21). The statement related to examiner subjectivity (item 2), was not rated highly by the students of March 2004 batch (mean 2.94), suggesting moderate disagreement. However, students of March 2003 (mean 3.34) and September 2003 (mean 3.33) batches were found to agree with this statement. Student ratings regarding statements However, the ratings on item 10 by the students of September 2003 (mean 3.11) and March 2003 (mean 3.06) batches were comparatively higher though they were less strongly in agreement with this statement.

In general, students agreed that, on the whole, the assessments are fair. However, in some areas there is a lack of consensus amongst students. Majority of the students opined that our evaluation system puts too much stress on them. This may be attributed to the fact that there were more frequent class tests during first year. In addition to preparing for the four progress examinations in three subjects in the first year, students were also required to prepare for six to seven class tests in physiology in every block. Based on student feedback, the number of class tests was considerably reduced for the subsequent batches. Thus the multi-component evaluation system allows one to assess numerous elements of the knowledge and competence required of a successful doctor. The results of our study was comparable with the earlier observation that a single assessment tool does not fulfill all the functions of assessment such as assessing knowledge,

comprehension and skills, motivation and providing feedback (Seale *et al*., 2000; Lowry, 1993; McLachlan, 2000). It also helps teachers to think about innovative methods of teaching and evaluation to improve the relevance of Physiology in clinical practice.

Competing interests: The author(s) declare that they have no competing interests.

Contributors: ST planned the study, collected the data, interpreted the data and drafted the manuscript. KR and RRA collaborated in the design of the study, contributed to the data analysis and participated in the interpretation of data and helped draft the manuscript. All authors have read and approved of the final manuscript.

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