Perceptions of the learning environment, learning preferences, and approaches to studying among medical students in Pakistan

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Perceptions of the learning environment, learning preferences, and approaches to studying among medical students in Pakistan

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ABSTRACT

Students at a Pakistani medical college were surveyed using instruments taken from Western research. The students who rated their courses positively tended to adopt an organised approach in their learning and studying. The students who perceived that their assessment and workload were inappropriate preferred a transmissive approach to teaching and adopted a surface approach in their learning and studying. The students who preferred a student-centred approach to teaching tended to adopt a deep approach in their learning and studying. This confirms the idea, well established in Western research, that there exists a strong relationship between students' perceptions of their courses and the approaches that they adopt on those courses. However, the incorporation of problem-based learning in the medical curriculum had not led to any enhancement of their perceptions and preferences, nor had it led to an unambiguous improvement in their approaches to studying. This is attributed to the hybrid nature of their programmes, in which problem-based activities were combined with more conventional forms of teaching and assessment, and to the anxiety and stress which seem to be common among students at medical schools in Pakistan.

Keywords: Approaches to studying, Learning preferences, Medical students, Pakistan, Perceptions of the learning environment, Problem-based learning

Introduction

Research in Western countries in the 1970s identified different approaches to studying among students in higher education: a deep approach, based upon understanding the meaning of course materials; a surface approach, based upon memorising the course materials for the purposes of assessment; and a strategic approach, based upon obtaining the highest possible marks or grades (Laurillard, 1979; Marton, 1976; Ramsden, 1979). A deep approach and a strategic approach tended to be associated with good academic performance, but a surface approach tended to be associated with poor academic performance. This was confirmed in subsequent research which used questionnaires to measure approaches to studying in larger numbers of students (for a review, see Richardson, 2000, pp. 182–183).

Ullah, Richardson, and Hafeez (2011) used instruments devised in Western research to compare perceptions of the learning environment and approaches to studying in a sample of students drawn from the general undergraduate population at two universities in Pakistan. They also measured the students' preferences between courses, teaching and assessment that supported their understanding (theoretically related to a deep approach to studying) rather than courses, teaching and assessment that involved the bare transmission of information (theoretically related to a surface approach to studying) (Entwistle, Tait, & McCune, 2000).

The students who had positive perceptions of the instructional practices, the learning resources, and their acquisition of generic skills were more likely to adopt a deep approach, to prefer courses, teaching, and assessment that supported their understanding, and to be engaged and reliable in studying. In contrast, the students who had negative perceptions of the appropriateness of the assessment and the workload tended to adopt a surface approach and to prefer courses, teaching, and assessment that were based on the bare transmission of information.

These results showed that there is a broad relationship between students' perceptions of their courses and the approaches to studying that they adopt on those courses. This notion has been well established in Western research (see Parpala, Lindblom-Ylänne, Komulainen, & Entwistle, 2013; Richardson, 2005). However, in detail the results obtained by Ullah et al. indicate that this relationship is construed differently in different countries and contexts, in that their students' perceptions were based on the instructional practices, the acquisition of generic skills, the appropriateness of the assessment, the appropriateness of their workload, and the available learning resources, but they were not based on the clarity of the goals and standards of their courses or the role of student independence and choice.

We explored this idea in the distinctive context of medical education in Pakistan. As elsewhere in the world, medical students in Pakistan are highly qualified and highly motivated. They have the opportunity to apply their academic knowledge in their encounters with clinical patients, and yet they are also expected to tolerate a heavy curriculum. An additional consideration is that, in contrast to the undergraduate programmes that Ullah et al. (2011) examined, virtually all medical schools in Pakistan have incorporated problem-based learning into their curricula to some extent. Given these distinctive features of the context, the aim of the present study was to investigate the interrelationships among approaches to studying, learning preferences and perceptions of the learning environment in Pakistani medical students.

Approaches to studying in medical education

We previously noted the relationships between different approaches to studying and students' academic attainment. In Western research, similar trends have been obtained in medical education, although a strategic approach is more strongly related to academic

performance than is a deep approach (for reviews, see Feeley & Biggerstaff, 2015; Ferguson, James, & Madeley, 2002). Undergraduate medical students endorse a deep approach and a strategic approach more than a surface approach, although both a deep approach and a strategic approach may be more common among postgraduate medical trainees and practising physicians (Cebeci, Dane, Kaya, & Yigitoglu, 2013; Newble & Hejka, 1991; Samarakoon, Fernando, Rodrigo, & Rajapakse, 2013). As in more mainstream higher education, medical students who have positive perceptions of their courses are more likely to adopt a deep approach and less likely to adopt a surface approach than are medical students who have negative perceptions of their courses (Smith & Mathias, 2010; in veterinary medicine, see also Haarala-Muhonen, Ruohoniemi, Katajavuori, & Lindblom-Ylänne, 2011; Ruohoniemi, Parpala, Lindblom-Ylänne, & Katajavuori, 2010).

However, a number of studies have found that medical students following traditional curricula tend to be progressively more likely to adopt a surface approach to studying as they proceed through their programmes (see Feeley & Biggerstaff, 2015, for a review). This trend is often attributed to students favouring a more teacher-centred way of learning in order to cope with high workload associated with an overloaded curriculum (Raidal & Volet, 2009). These and other considerations have promoted an interest in alternative forms of curricula.

Problem-based learning

Problem-based learning is an approach to curriculum design in which students collaborate in small groups to solve open-ended problems based on realistic scenarios. In Western countries, problem-based learning has been adopted for many years in medicine and other subjects. It has been promoted on the basis that it allows students to acquire and apply subject-based knowledge and skills, encourages self-directed, life-long learning, and prepares

graduates for the challenges of professional practice (Hernández-Encuentra & Sánchez-Carbonell, 2005).

Students following problem-based curricula rate them more highly than do students following traditional subject-based curricula in terms of the teaching, the assessment, the acquisition of generic skills and the fostering of their own independence (Lyon & Hendry 2002; Sadlo, 1997). They also tend to rate them more highly in terms of the promotion of professional competencies such as interpersonal skills, problem solving, self-directed learning, information gathering, and work planning (Chung & Chow, 2004; Schmidt, Vermeulen, & van der Molen, 2006).

Students following problem-based curricula are more likely to use a deep approach to studying and less likely to use a surface approach to studying than are students following subject-based curricula (Hall, Ramsay, & Raven, 2004; Kieser, Herbison, & Harland, 2005; Newble & Clarke, 1986; Richardson, Dawson, Sadlo, Jenkins, & McInnes, 2007; Sadlo & Richardson, 2003). A thorough-going problem-based curriculum should involve alternative assessments that are more authentic in terms of the students' future employment (see Barrow & Tamblyn, 1980). However, when assessed using the same procedures, students who have followed problem-based curricula may also demonstrate higher attainment than those who have followed subject-based curricula (Polanco, Calderón, & Delgado, 2004). In general, students who have followed problem-based curricula display superior long-term retention, skill development and satisfaction with their programmes (Strobel & van Barneveld, 2009).

In contrast, "hybrid" curricula that combine problem-based activities with traditional forms of teaching and assessment may be less successful. The same may also be true when students who have previously been exposed to subject-based curricula encounter course units that have been designed on the principles of problem-based learning. In these circumstances, Segers, Nijhuis, and Gijselaers (2006) found that the students were less likely to adopt a deep

approach and more likely to adopt a surface approach because they failed to perceive that the course unit's assessment demands were different (see also Gijbels, Segers, & Struyf, 2008).

Indeed, Prosser and Sze (2014) found that first-year medical students following problem-based curricula might understand those curricula in two quite different ways. Some students thought that problem-based learning was concerned with learning how to solve problems individually; these students de-contextualised the problems that they were given and did not appreciate their clinical relevance. Other students were aware of the importance of solving problems in groups and related the problems that they were given to their clinical context. The former tended to adopt a surface approach to studying, whereas the latter were more likely to adopt a deep approach (see also Balasooriya, Toohey, & Hughes, 2009).

Medical education in Pakistan

Siddiqui (2007, pp. 45, 60–63, 104–107) criticised the education system in Pakistan as being dominated by an emphasis on students obtaining good grades irrespective of the quality of their learning. Assessment, he argued, focused upon the reproduction of information and made little or no attempt to tap higher-order thinking skills. In higher education, lectures are the predominant mode of instruction, and interactions between teachers and students are limited by the large size of the classes (typically around 300 students). Ali, Tariq, and Topping (2009) confirmed the teacher-centred nature of the environment in a survey of 350 students at six public universities in Pakistan: they perceived their teachers to be concerned mainly with preparing them for their examinations through the rote repetition of information rather than with the practical application of knowledge learned in the classroom.

Most medical colleges in Pakistan, in particular, follow a conventional curriculum in which teachers transmit information through lectures and emphasise theoretical knowledge

rather than clinical competence (Naqvi, 1997). For their part, the students use their lecture notes and study guides to prepare for their examinations but do not play a significant role on the wards (Huda, 2004; Jaleel, Rehman, & Huda, 2001; Mahmud & Hyder, 2012). A striking feature of medical education in Pakistan is the pressure on students caused by an overloaded curriculum and the need to prepare for a continual series of examinations (Naqvi, 1997).

Even so, since the 1990s, there has been an increasing interest in problem-based learning (Bangash, 2002; Khan, Taqui, Khawaja, & Fatmi, 2007). Problem-based curricula were first introduced at Ziauddin Medical College in 1996 and at the Aga Khan University Medical College in 2002. As mentioned earlier, nowadays virtually all medical schools in Pakistan have adopted problem-based learning to some extent. Research suggests that these curricula are rated positively by students and are more effective than traditional curricula in enhancing critical thinking and problem solving (Mahmud & Hyder, 2012; Tayyeb, 2013).

It should nevertheless be emphasised that the relevant programmes are not wholly problem-based on the model described, for instance, by Barrow and Tamblyn (1980). Instead, they are generally acknowledged to be hybrid in nature and combine problem-based activities with more conventional forms of teaching and assessment. The adoption of a hybrid form of curriculum design has been driven by administrative and resource constraints (Baig, 2006; Bangash, 2002; Jafarey, 2005; Mahmud & Hyder, 2012) and by concerns regarding students' acquisition of subject knowledge (Mehraj et al., 2010; Memon, 2009; Zaman, 2001). Indeed, Talati (2001) argued that it was simply not feasible to implement a thorough-going Western model of problem-based learning at many medical colleges in Pakistan.

A more fundamental problem is that problem-based activities mainly take the form of clinical work with patients that does not count towards the students' final marks. Attendance is compulsory, but there is a heavy workload in the more traditional parts of the syllabus. As a result, students are not motivated to engage in clinical work and may leave the wards early

to revise for their examinations in the library. In short, there is a lack of alignment between the curriculum objectives and the teaching and assessment activities (cf. Biggs, 1999).

Aim of the present study

As was mentioned at the beginning of this paper, the aim of the present study was to investigate the interrelationships among approaches to learning, learning preferences and perceptions of the learning environment in Pakistani medical students. We also described a number of distinctive features of medical education in Pakistan that were not shared by the general undergraduate population surveyed by Ullah et al. (2011). We expected to find a similar broad alignment between students' approach, preferences and perceptions, but we did not expect to replicate the findings of Ullah et al. in a straightforward manner. Even so, we employed the same questionnaires and the same analytic techniques in order to be able to make valid and sensible comparisons with the results that Ullah et al. had obtained.

Methods

Participants

This study was conducted with students taking bachelor's degrees in medicine and surgery at Allama Iqbal Medical College. This is a public institution in Lahore, Pakistan, affiliated with the University of Health Sciences. As at other medical schools in Pakistan and elsewhere, there is intense competition among students for places, and they are expected to obtain high grades in the entrance test and in their intermediate examination. The College is a teaching institution with essentially no research culture. In the absence of a local ethics

committee or any counterpart at the regional or national level, approval for this study was obtained from the College's senior managers, who considered the ethical aspects of the research and hence constituted a de facto ethics committee.

The survey was administered to students in all five years of the programme in the context of regular classes. All of the 976 students present at the relevant sessions provided responses. They included 359 men and 592 women (25 students did not report their gender) aged between 16 and 25 years (M = 20.2 years). However, some students missed one or more items, and only 769 students provided complete data on the questionnaire as a whole.

Materials

The questionnaire comprised three parts selected from the instruments used by Ullah et al. (2011). Part A measured the students' perceptions of their learning environment and was based on the Course Experience Questionnaire (CEQ), devised by Wilson, Lizzio, and Ramsden (1997). Of the 36 items in the CEQ, 15 have a meaning that is opposite to that of the subscale to which they were assigned, and these are scored in reverse. The results of a pilot study led to minor changes of wording to render some of the items appropriate for use in a Pakistani context. The final wording of the items is shown in Table 1 below. In each case respondents indicated their agreement or disagreement with the item on a 5-point scale. Following Wilson et al. (1997), a 37th item was included to measure the students' overall satisfaction with their programme.

Part B measured students' learning preferences and employed a questionnaire devised by Entwistle et al. (2000) to examine students' preferences for different types of courses, teaching, and assessment. Four items concerned courses, teaching, and assessment that supported students' understanding, and another four items concerned courses, teaching, and

assessment that involved transmitting information. Ullah et al. (2011) had introduced minor changes of wording to the original instrument developed by Entwistle et al. (2000) so that participants could respond using the same 5-point scale that was used in Part A. The final wording of the eight items is shown in Table 2 below.

Part C measured students' approaches to studying and employed the Approaches to Learning and Studying Inventory devised by Entwistle, McCune, and Hounsell (2003). This contained 18 items intended to measure the use of a deep approach, a surface approach, and two different aspects of a strategic approach (monitoring studying and organised studying). The items are shown in Table 3 below; once again, participants responded on the same 5-point scale.

Procedure

The three parts were presented in a single booklet that also asked for information about basic demographic variables and the marks students had obtained in their entrance test and in their intermediate examination. In Parts A–C, the students were asked to choose one option from five labelled "definitely agree", "agree", "don't know", "disagree", and "definitely disagree". The questionnaire was administered to all students present in the lecture halls on the day of data collection during the last 20 min of their regular classes.

Data analysis

The students' responses to the survey were coded from 1 for "definitely disagree" to 5 for "definitely agree". The coding was then reversed for the 15 items in the CEQ whose meaning was opposite to that of the subscale to which they had originally been assigned. Data

analyses were carried out using only those students who had provided complete data on the relevant part or parts of the survey.

Exploratory factor analysis was carried out separately on the three parts of the questionnaire to determine the constructs underlying the students' responses. In each case, the number of factors to be extracted was determined by comparing the obtained eigenvalues with those produced by the parallel analysis of 1,000 random correlation matrices using the program written by O'Connor (2000). Principal axis factoring was used to extract the appropriate number of factors, and these were subjected to oblique rotation using the direct oblimin procedure. Loadings greater than 0.30 in absolute magnitude were regarded as salient for the purposes of interpretation, and the factors were interpreted on the basis of the items that showed the highest loadings.

Although factor scores can be estimated in various ways, Pedhazur and Schmelkin (1991, pp. 625–626) recommended the construction of factor-based subscales containing the salient items constituting each of the factors. Students were assigned scores on these subscales as the means of their scores on the relevant items, so that they too extend between a minimum of 1 and a maximum of 5. Finally, a second-order factor analysis was carried out to examine the relationships among the scores on the subscales.

Results

Perceptions of the learning environment

Out of the 976 participants, 877 provided complete data on this section of the questionnaire. A factor analysis of their coded responses identified four factors that explained 35.60% of the variance in the data. The pattern factor matrix is shown in Table 1, where the

items have been sorted in descending order of their salient factor loadings.

Table 1

Factor loadings for students' perceptions of the learning environment.

Item	Factor 1	Factor 2	Factor 3	Factor 4
6. This course has sharpened my analytic skills. (GS)	**0.67**	-0.01	-0.02	0.14
12. As a result of doing this course, I feel more confident about tackling unfamiliar problems. (GS)	**0.63**	0.01	-0.09	-0.04
2. The course has helped me to develop my problem solving skills. (GS)	**0.61**	-0.01	0.02	0.09
15. The course has encouraged me to develop my own academic interests as far as possible. (IN)	**0.50**	0.05	0.10	0.08
28. This course has helped me to develop the ability to plan my own work. (GS)	**0.48**	-0.05	0.10	0.11
11. This course has helped develop my ability to work as a team member. (GS)	**0.46**	0.11	0.04	-0.17
13. This course has improved my written communication skills. (GS)	**0.39**	-0.05	0.05	-0.04
8. I usually have a clear idea of where I am going and what is expected of me. (CG)	**0.38**	0.12	0.07	-0.11
33. This course really tries to get the best out of all its students. (GT)	**0.37**	0.04	0.22	-0.04
18. It is often hard to discover what is expected of me in this course.* (CG)	0.17	**0.46**	-0.03	0.16
17. Teaching staff seem more interested in testing what I have memorised than what I have understood.* (AA)	-0.09	**0.46**	0.11	0.13
24. The aims and objectives of this course are NOT made very clear.* (CG)	0.18	**0.44**	-0.02	0.02
7. Teachers here frequently give the impression they have nothing to learn from students.* (AA)	0.04	**0.44**	0.11	-0.01
31. Teaching staff here show no real interest in what students have to say.* (GT)	0.00	**0.44**	0.29	0.02
29. Feedback on student work is usually provided ONLY in the form of marks and grades.* (AA)	-0.19	**0.34**	0.22	0.17
32. It would be possible to get through this course just by working hard around exam time.* (AA)	0.04	**0.33**	-0.05	-0.09
26. Too many teaching staff ask us questions about facts.* (AA)	-0.02	**0.33**	-0.19	0.05
20. The teaching staff make a real effort to understand difficulties students may be having with their work. (GT)	0.03	0.10	**0.67**	-0.07
25. Teaching staff here work hard to make subjects interesting. (GT)	0.05	-0.02	**0.63**	0.02
22. Teaching staff here normally gives helpful feedback on how I am going. (GT)	0.04	0.05	**0.62**	-0.05

(Table 1 continues)

Table 1 ctd.

21. Students here are given a lot of choice in the work they have to do. (IN)	0.04	-0.10	**0.56**	0.08
30. We often discuss with our lecturers or tutors how we are going to learn in this course. (IN)	0.04	0.05	**0.54**	-0.06
23. Our teachers are extremely good at explaining things to us. (GT)	0.09	0.05	**0.52**	-0.09
19. We are generally given enough time to understand the things we have to learn. (AW)	0.05	-0.19	**0.45**	0.29
35. The teaching staff here make it clear right from the start what they expect from students. (CG)	0.15	0.08	**0.36**	-0.23
16. Students have a great deal of choice over how they are going to learning this course. (IN)	0.30	-0.01	**0.32**	0.06
5. The workload is too heavy.* (AW)	0.12	-0.02	-0.06	**0.58**
27. There is a lot of pressure on me as a student here.* (AW)	0.10	0.11	-0.01	**0.57**
10. To do well on this course all I really need is good memory.* (AA)	-0.13	-0.03	0.00	**0.42**
14. It seems to me that the syllabus tries to cover too many topics.* (AW)	-0.05	0.12	-0.07	**0.41**
36. The volume to be got through in this course means I cannot comprehend it all thoroughly.* (AW)	0.02	0.22	0.12	**0.37**
34. There is very little choice in this course in the ways I am assessed.* (IN)	-0.01	0.29	0.08	0.26
3. There are few opportunities to choose the particular areas I want to study.* (IN)	-0.08	0.16	-0.03	0.12
9. The teaching staff here put a lot of time into commenting on students' work. (GT)	0.13	-0.16	0.11	-0.09
1. It is always easy here to know the standard of work expected. (CG)	0.24	0.08	0.22	-0.13
4. The teaching staff of this course motivate students to do their best work. (GT)	0.28	0.19	0.29	-0.16
Factor intercorrelations				
Factor 1	1.00	0.08*	0.51***	-0.20***
Factor 2	0.08*	1.00	0.11**	0.27***
Factor 3	0.51***	0.11**	1.00	0.00
Factor 4	-0.20***	0.27***	0.00	1.00

N = 877. Each item is preceded by a number showing the order in which it was presented in this section of the questionnaire and followed by an abbreviation indicating the scale of the original CEQ from which it is taken: GT, Good Teaching; CG, Clear Goals and Standards; GS, Generic Skills; AA, Appropriate Assessment; AW, Appropriate Workload; IN, Emphasis on Independence. Items that were scored in reverse are indicated by asterisks. Loadings greater than 0.30 in absolute magnitude are shown in bold. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ (two tailed tests).

Factor 1 showed salient positive loadings on all six items from the Generic Skills subscale, one item from the Clear Goals subscale, one item from the Emphasis on Independence subscale, and one item from the Good Teaching subscale. It was interpreted as a measure of the acquisition of generic skills.

Factor 2 showed salient positive loadings on five items from the Appropriate Assessment subscale, two items from the Clear Goals subscale, and one item from the Good Teaching subscale. It was interpreted as a measure of appropriate assessment.

Factor 3 showed salient positive loadings on four items from the Good Teaching subscale, three items from the Emphasis on Independence subscale, one item from the Appropriate Workload subscale, and one item from the Clear Goals subscale. It was interpreted as a measure of good teaching.

Factor 4 showed salient positive loadings on four items from the Appropriate Workload subscale and one item from the Appropriate Assessment subscale. It was interpreted as a measure of appropriate workload.

The factor intercorrelations showed that Factor 1 was positively related to Factor 3, whereas Factor 2 showed a weaker relationship with Factor 4. Out of the 36 items, two items from the Emphasis on Independence subscale, one item from the Clear Goals subscale, and two items from the Good Teaching subscale failed to yield any salient loadings.

The items with salient loadings on each of the factors were taken to define a factor-based subscale. The correlation coefficients between the students' scores on these subscales and their responses to the item concerned with their overall satisfaction were: Generic Skills, 0.49, Appropriate Assessment, 0.20; Good Teaching, 0.47; and Appropriate Assessment, 0.09. Each of these was statistically significant, which confirms the criterion validity of this section of the questionnaire as a measure of students' perceptions of the academic quality of their courses (in other words, its relationship with some independent criterion). It should

however be acknowledged that the correlation coefficient between Appropriate Assessment and overall satisfaction was small in magnitude and only achieved statistical significance because of the very large sample size.

Learning preferences

Out of the 976 participants, 922 provided complete data on this section of the questionnaire. A factor analysis of their coded responses identified two factors that explained 45.90% of the variance in the data. The pattern factor matrix is shown in Table 2, where the items have been sorted in descending order of their salient factor loadings.

Table 2

Factor loadings for students' learning preferences.

Item	Factor 1	Factor 2
7. I like books which challenge us and provide explanations which go beyond the lectures. (SU)	**0.56**	-0.15
2. I like lecturers who encourage us to think for ourselves and show us how they themselves think. (SU)	**0.51**	0.20
3. I like exams which allow me to show that I have thought about the course material for myself. (SU)	**0.51**	0.06
6. I like courses where we are encouraged to read around the subject a lot for ourselves. (SU)	**0.45**	-0.03
5. I like courses in which it is made very clear just which books we have to read. (TI)	0.03	**0.59**
4. I like exams or tests which need only the material provided in our lecture notes. (TI)	-0.23	**0.51**
1. I like lecturers who tell us exactly what to put down in our notes. (TI)	0.03	**0.50**
8. I like books which give us definite facts and information which can easily be learned. (TI)	0.19	**0.43**
Factor intercorrelations		
Factor 1	1.00	0.10**
Factor 2	0.10**	1.00

N = 922. Each item is preceded by a number showing the order in which it was presented in this section of the questionnaire and followed by an abbreviation indicating the scale from which it is taken: SU, Supporting Understanding; TI, Transmitting Information. Loadings greater than 0.30 in absolute magnitude are shown in bold. **$p < 0.01$ (two tailed test).

Factor 1 showed salient positive loadings on the four items concerned with Supporting Understanding, and Factor 2 showed salient positive loadings on the four items concerned with Transmitting Information. Accordingly, they were interpreted as measures of supporting understanding and transmitting information. The correlation coefficient between the two factors was 0.10, suggesting that they were relatively independent of each other.

Approaches to learning and studying

Out of the 976 participants, 842 provided complete data on this section of the questionnaire. A factor analysis of their coded responses identified three factors that explained 38.66% of the variance in the data. The pattern factor matrix is shown in Table 3, where the items have been sorted in descending order of their salient factor loadings.

Table 3

Factor loadings for approaches to studying.

Item	Factor 1	Factor 2	Factor 3
12. It has been important for me to follow the argument, or to see the reasons behind things. (DA)	**0.61**	-0.05	-0.10
10. When I have been communicating ideas, I have thought over how well I have got my points across. (MS)	**0.57**	-0.08	0.00
9. I have looked at evidence carefully to reach my own conclusion about what I am studying. (DA)	**0.55**	-0.04	0.08
3. I have usually set out to understand for myself the meaning of what we had to learn. (DA)	**0.50**	0.03	0.02
16. In reading for this course, I have tried to find out for myself exactly what the author means. (DA)	**0.50**	0.01	-0.02
18. If I have not understood things well enough when studying, I have tried a different approach. (MS)	**0.48**	0.01	-0.04
6. In making sense of new ideas, I have often related them to practical or real life contexts. (DA)	**0.43**	-0.03	0.06
2. I have been over the work I have done to check my reasoning and see that it makes sense. (MS)	**0.38**	0.08	0.07
8. Ideas I have come across in my academic reading often set me off on long chains of thought. (DA)	**0.37**	0.16	0.02
14. I have tried to find better ways of tracking down relevant information in this subject. (MS)	**0.36**	-0.02	0.16
1. I have often had trouble in making sense of the things I have to remember. (SA)	0.02	**0.61**	-0.06
17. I have just been going through the motions of studying without seeing where I am going. (SA)	-0.08	**0.55**	-0.02
5. Much of what I have learned seems no more than lots of unrelated bits and pieces in my mind. (SA)	0.05	**0.51**	-0.10
13. I have tended to take what we have been taught at face value without questioning it much. (SA)	0.00	**0.30**	0.10
7. On the whole, I have been quite systematic and organised in my studying. (OS)	-0.03	-0.08	**0.72**
11. I have organised my study time carefully to make the best use of it. (OS)	0.02	-0.04	**0.68**

(Table 3 continues)

Table 3 ctd.

4. I have generally put a lot of effort into my studying. (OS)	0.14	0.18	**0.41**
15. Concentration has not usually been a problem for me, unless I have been really tired. (OS)	0.14	0.01	0.22
Factor intercorrelations			
Factor 1	1.00	0.19***	0.52***
Factor 2	0.19***	1.00	0.07
Factor 3	0.52***	0.07	1.00

N = 842. Each item is preceded by a number showing the order in which it was presented in this section of the questionnaire and followed by an abbreviation indicating the scale from which it is taken: DA, Deep Approach; SA, Surface Approach; MS, Monitoring Studying; OS, Organised Studying. Loadings greater than 0.30 in absolute magnitude are shown in bold. ***$p < 0.001$; otherwise, $p > 0.05$ (two tailed tests).

Factor 1 showed salient positive loadings on the six items concerned with Deep Approach and the four items concerned with Monitoring Studying. Factor 2 showed salient positive loadings on the four items concerned with Surface Approach, and Factor 3 showed salient positive loadings on three of the four items concerning with Organised Studying. Accordingly, they were interpreted as measures of deep approach, surface approach, and organised studying. There was a positive relationship between Factors 1 and 3, but both were relatively independent of Factor 2. Of the 18 items, only one item from the Organised Studying subscale failed to yield any salient loading.

Relationships among the factor-based subscales

Out of the 976 participants, 769 provided complete data on the entire questionnaire. Table 4 shows descriptive statistics for their subscale scores, calculated as the means of their scores on the salient items constituting each of the factors. Values of Cronbach's (1951)

coefficient alpha are shown as estimates of reliability. Most subscales yielded satisfactory values on conventional research-based criteria (Robinson, Shaver, & Wrightsman, 1991), but some did not. This is unsurprising, as coefficient alpha tends to vary directly with the number of items in a subscale.

Table 4

Descriptive statistics of scale scores.

	Number of items	Mean	Standard deviation	Coefficient alpha
Perceptions of the Learning Environment				
Generic Skills	9	3.24	0.73	0.78
Appropriate Assessment	8	2.51	0.64	0.65
Good Teaching	9	2.69	0.76	0.81
Appropriate Workload	5	2.06	0.72	0.62
Learning Preferences				
Supporting Understanding	4	3.71	0.75	0.58
Transmitting Information	4	3.56	0.80	0.57
Approaches to Learning and Studying				
Deep Approach	10	3.64	0.59	0.76
Surface Approach	4	3.31	0.78	0.56
Organised Studying	3	3.23	0.90	0.65

$N = 769$.

Table 5 shows the correlation coefficients among the respondents' scores on the nine factor-based subscales. All but two correlation coefficients were statistically significant, which demonstrates a clear relationship between the students' perceptions of their learning environment, their learning preferences, and their approaches to learning and studying. Cohen (1969, 76–77) suggested that in correlational research correlation coefficients of the order of 0.30 constituted "medium" effects of theoretical or practical importance.

Table 5

Correlation coefficients among scale scores.

	Perceptions of the Learning Environment			
	Generic Skills	Appropriate Assessment	Good Teaching	Appropriate Workload
Learning Preferences				
Supporting Understanding	0.20***	-0.24***	0.13***	-0.12***
Transmitting Information	0.21***	-0.16***	0.24***	-0.28***
Approaches to Learning and Studying				
Deep Approach	0.33***	-0.16***	0.23***	-0.22***
Surface Approach	0.00	-0.34***	0.04	-0.32***
Organised Studying	0.39***	-0.02	0.32***	-0.18***

$N = 769$. ***$p < 0.001$; otherwise, $p > 0.05$ (two-tailed tests).

However, correlation coefficients can be misleading with regard to the relationships between specific variables because they are confounded with their relationships with other variables. A second-order factor analysis identified three factors that explained 61.69% of the variance in the subscale scores. The pattern factor matrix is shown in Table 6.

Table 6

Factor loadings for second-order analysis.

Item	Factor 1	Factor 2	Factor 3
Perceptions of the Learning Environment			
Generic Skills	**0.70**	0.00	0.16
Appropriate Assessment	**0.41**	**-0.50**	-0.25
Good Teaching	**0.71**	0.04	0.01
Appropriate Workload	0.02	**-0.54**	-0.09
Learning Preferences			
Supporting Understanding	-0.03	-0.04	**0.65**
Transmitting Information	0.28	**0.51**	-0.07
Approaches to Learning and Studying			
Deep Approach	0.18	0.06	**0.67**
Surface Approach	-0.04	**0.60**	-0.05
Organised Studying	**0.38**	0.06	**0.34**
Factor intercorrelations			
Factor 1	1.00	0.06	0.23***
Factor 2	0.06	1.00	0.35***
Factor 3	0.23***	0.35***	1.00

N = 769. Loadings greater than 0.30 in absolute magnitude are shown in bold. ***$p < 0.001$; otherwise, $p > 0.05$ (two tailed tests).

Factor 1 linked high scores on Generic Skills, Appropriate Assessment, and Good Teaching with high scores on Organised Studying. In other words, students who rated their courses positively on the three former subscales tended to adopt an organised approach in their learning and studying. This factor was interpreted as a measure of organised learning.

Factor 2 linked low scores on Appropriate Assessment and Appropriate Workload with high scores on Transmitting Information and Surface Approach. In other words, students who perceived that their assessment and workload were inappropriate preferred a

transmissive approach to teaching and adopted a surface approach in their learning and studying. This factor was interpreted as a measure of surface learning.

Factor 3 linked high scores on Supporting Understanding with high scores on Deep Approach and (to a lesser extent) on Organised Studying. In other words, students who preferred a student-centred approach to teaching tended to adopt a deep approach in their learning and studying. This factor was interpreted as a measure of deep learning. Table 6 shows that Factors 1 and 2 were independent of one another, but that both were positively correlated with Factor 3.

Discussion

The factor structure of the questionnaires used in this survey of medical students in Pakistan was broadly similar to that obtained by Ullah et al. (2011) in students drawn from a general undergraduate population.

Only four of the constructs measured by the Australian version of the CEQ could be identified in the students' responses: good teaching, generic skills, appropriate assessment, and appropriate workload. The two remaining constructs could not be identified as distinct aspects of the students' perceptions. As Ullah et al. (2011) commented, the clarity of goals and standards and the role of independence and choice do not seem to be salient dimensions on which Pakistani students assess learning environments. Indeed, students in Pakistan are not encouraged to participate actively in the teaching–learning process but are expected to be the passive recipients of information (Ali et al. 2009; Siddiqui 2007). This is true in particular of medical students (Huda, 2004; Jaleel et al., 2001; Mahmud & Hyder, 2012; Naqvi, 1997).

Nevertheless, there was a clear distinction between a preference for courses, teaching, and assessment that supported students' understanding and a preference for courses, teaching,

and assessment that involved transmitting information. There was similarly a clear distinction between the tendency to adopt a deep approach to studying, the tendency to adopt a surface approach to studying, and the tendency to adopt an organized approach to studying. The means of most of the nine subscales were around the midpoint of the response scale (3), but the Appropriate Workload scale yielded the lowest mean score. This is consistent with the suggestion made by Naqvi (1997) that medical students in Pakistan experience great pressure due to an overloaded curriculum.

Moreover, the second-order factor analysis confirmed the idea, well established in Western research, that there is a broad relationship between students' perceptions of their courses and the approaches to studying that they adopt on those courses. It also confirmed the finding of Ullah et al. (2011) that this relationship can also encompass students' preferences for courses, teaching and assessment that support their understanding as opposed to courses, teaching and assessment that involve the bare transmission of information. In the particular context of Pakistani medical education, Table 6 shows the following:

- Those students who rated their courses positively on the CEQ tended to adopt an organised approach to studying, regardless of their learning preferences.
- Those students who rated their assessment and workload as less appropriate preferred a transmissive approach to teaching and tended to adopt a surface approach to studying.
- Those students who preferred a student-centred approach to teaching tended to adopt a deep approach to studying, regardless of their perceptions of their courses.

Intriguingly, Table 6 shows that these three constructs were not independent of one another. There was a moderate correlation between organised learning and deep learning (r = 0.23)

and also a moderate correlation between surface learning and deep learning ($r = 0.35$). This suggests that, to be successful when confronted with an overloaded curriculum and continual examinations, Pakistani medical students need to adopt a judicious combination of the three approaches.

There are two respects in which the present results are at variance with those of Ullah et al. (2011). First, in the medical students the idea of monitoring studying was subsumed within a deep approach, whereas it was explicitly identified in the general undergraduate population. This might suggest that the learning activities of medical students are so rigidly prescribed that there is little scope for self-regulation in their studies. Second, Ullah et al. obtained just two second-order factors reflecting deep learning and surface learning, whereas the medical students yielded a third second-order factor concerned with organised learning. The findings of Ullah et al. suggest that, for students in the general undergraduate population in Pakistan, being organised in one's learning is simply one aspect of taking a deep approach in one's studies. In contrast, the present findings suggest that, given the conditions in which medical students in Pakistan have to study, being organised in one's learning constitutes a distinct and potentially valuable trait.

Even so, there is sufficient similarity between the results of the two studies to make it sensible to compare the factor scores of the two groups. Overall, the medical students obtained similar scores to the general undergraduate population. They obtained somewhat higher scores on *both* Deep Approach *and* Surface Approach, but they obtained somewhat lower scores on Appropriate Workload, Supporting Understanding, and Organised Studying. On the face of it, when compared with the results obtained by Ullah et al. (2011) in the general undergraduate population, the limited incorporation of problem-based learning in the medical curriculum did not appear to have led to any enhancement of the students' perceptions and preferences, nor did it appear to have led to an unambiguous improvement in

their approaches to studying. This is in line with the results of previous research in Pakistan (Huda, 2004; Jaleel et al., 2001; Mahmud & Hyder, 2012; Naqvi, 1997; Talati, 2001). It will however be important for future longitudinal studies to obtain follow-up data to compare the two populations of students in more depth.

There are at least two possible reasons for this somewhat negative pattern of results. First, Sadlo and Richardson (2003) found that the effects of problem-based learning were "dose-related", so that the students' perceptions and approaches to studying both tended to improve to the extent that problem-based learning had been incorporated into the curriculum. Fully problem-based programmes tended to exhibit larger effects than hybrid programmes; indeed, Sadlo and Richardson found that the perceptions and approaches of students on hybrid programmes did not differ significantly from those of students on traditional subject-based programmes. In fact, in hybrid programmes, a greater proportion of the students might well adopt the unproductive, individualistic, de-contextualised conception of problem-based learning that was identified by Prosser and Sze (2014).

Second, three recent studies found that a majority of students at Pakistani medical schools (including the college where our survey was conducted) report moderate or high levels of anxiety and stress in their daily lives associated with a variety of academic and psychosocial factors (Alvi, Assadi, Ramzan, & Khan, 2010; Shah, Hasan, Malik, & Sreeramareddy, 2010; Sohail, 2013). In fact, Yousafzai et al. (2009) found that the main factor causing stress among students at six medical colleges in Pakistan was their heavy workload. Anxious students are less likely to adopt a deep approach to studying and more likely to adopt a surface approach to studying (Tooth, Tonge, & McManus, 1989), in which case high levels of anxiety and stress may well have counteracted any benefits from exposure to problem-based learning.

In short, when evaluating the impact of any innovative pedagogy or curriculum

design, regardless of the academic discipline in question, it is necessary to take account of the context in which it is being introduced: both the academic context (including the assessment regime) and the personal context in which students are experiencing the relevant innovation. This is an important lesson arising from the investigation of the interrelationships among approaches to studying, learning preferences and perceptions of the learning environment in the distinctive context of medical education in Pakistan.

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Highlights

- Students' perceptions of their environment correlate with their study approaches.
- This relationship was confirmed in students at a medical college in Pakistan.
- The use of problem-based learning did not enhance their perceptions and approaches.
- This is ascribed to the programmes' hybrid nature and to anxiety in the students.

(Parpala, Lindblom-Ylänne, Komulainen, & Entwistle, 2013; Parpala, Lindblom-Ylänne, Komulainen, Litmanen, & Hirsto, 2010; Richardson, 2005; Richardson, Gamborg, & Hammerberg, 2005; Rytkönen, Parpala, Lindblom-Ylänne, Virtanen, & Postareff, 2012; Sadlo & Richardson, 2003; Smith & Mathias, 2010).

This research was carried out in Australia, Belgium, Canada, Denmark, England, Finland, Sweden and the United States (Parpala, Lindblom-Ylänne, Komulainen, & Entwistle, 2013; Parpala, Lindblom-Ylänne, Komulainen, Litmanen, & Hirsto, 2010; Richardson, 2005; Richardson, Gamborg, & Hammerberg, 2005; Rytkönen, Parpala, Lindblom-Ylänne, Virtanen, & Postareff, 2012; Sadlo & Richardson, 2003; Smith & Mathias, 2010).

Is this pattern peculiar to Western systems of higher education or does it generalise to other countries?

Higher education in Pakistan originated in institutions created in the 19th century during the colonial occupation by the United Kingdom. Pakistan gained its independence in 1947 and became an Islamic republic in 1956. The number of institutions increased rapidly during the second half of the 20th century, but overall participation remained less than 3%, and the underfunding and inadequate regulation of higher education were serious problems (Isani & Virk, 2003; World Bank, 2006).

In response to this situation, the Higher Education Commission (HEC) was created in 2002. It instituted a programme of reforms aimed at enhancing the quality of the provision in universities and other degree-awarding institutions (Akbari & Naqvi, 2008). As a result, the number of students increased from 276,000 in 2001–02 to more than one million in 2010–11 (NEMIS-AEPAM, 2011, p. 17). The HEC now recognises 92 public universities and 90

private universities, plus 1,994 affiliated colleges funded by the provincial governments (HEC, 2012). Since 2008, however, further expansion has been threatened by political instability, economic crises, and consequent budgetary restrictions (Hayward, 2009).

English is used for formal instruction, but Urdu is predominantly used for informal communication among students and between students and teachers. A majority of students have first languages other than Urdu, but these regional languages are rarely used in educational situations. Nevertheless, most students describe themselves as being not fully competent in either English or Urdu for educational purposes (Mansoor, 2004).

Some researchers in Pakistan have used questionnaires on student learning developed in Western countries. Ahmad and Bashir (2009) found that, like their Western counterparts, students reported both mastery goals (aimed at understanding) and performance goals (aimed at demonstrating competence); students who reported mastery goals were likely to exhibit sophisticated study strategies, whereas students who reported performance goals were not. Nausheen and Richardson (2013) used a short form of the Course Experience Questionnaire (CEQ) devised by Wilson, Lizzio, and Ramsden (1997) and found that postgraduate students who had stronger motivational beliefs rated their courses more positively on the CEQ.

This study used questionnaires taken from the survey of students in the general undergraduate population carried out by Ullah et al. (2011) to explore the relationship between perceptions of the learning environment, learning preferences and approaches to studying among students at a medical school in Pakistan. Unlike the undergraduate students surveyed by Ullah et al. or the postgraduate students surveyed by Nausheen and Richardson (2013), our students had the opportunity to apply knowledge that they had acquired in encounters with clinical patients. However, these problem-based activities did not have the

same importance as traditional examinations in the institution's overall assessment regime.

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