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Approaches to learning, evaluations of teaching, and preferences for contrasting academic environments

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Abstract. Previous research has demonstrated that the academic environments provided by departments in higher education have direct effects on students' approaches to studying. But other studies have indicated that these effects are mediated by the students' own perceptions of those environments. Here two studies are reported which explore the relationships between approaches to learning, or study orientations, and perceptions of the academic environment. Those perceptions are measured in two distinct ways, one which minimises the effects of differential perceptions, and one which highlights them. Factor analyses of the responses of three groups of students taking engineering and psychology are used to clarify the nature of the relationships between study orientations and perceptions of the academic environment. It is found, as in earlier studies, that there are relationships which associate deep approaches with perceptions of relevance, and surface approaches with a heavy workload. But here it is also shown that students with contrasting study orientations are likely to define effective teaching in ways which reflect those orientations. Implications both for the design of feedback questionnaires and for the improvement of teaching and learning in higher education are discussed.

Introduction

In the literature on student learning there is a growing interest in the influence on learning of teaching, and of the academic environment in general. There is a voluminous literature, emanating mainly from North America and Australia, on the use of student feedback questionnaires as one component in the evaluation of teaching effectiveness, which has been reviewed by Marsh (1987). Factor analyses have been used to identify the ways in which the items group together to form dimensions describing aspects of good teaching. Marsh describes nine such dimensions which summarize the responses of both students and self-ratings of lecturers. These can be described as interest and relevance (of content), workload (including pace and difficulty), organisation (of course and individual lectures), explanation (discussing background and implications), enthusiasm (including effort and style), openness (encouraging group involvement), empathy (showing interest in students), assignments (including resource material provided) and assessment procedures (including quality of feedback). Although the line dividing the different groups of items varies between researchers, depending on the particular set of items included in the questionnaire and the nomenclature used to describe the groupings, this

list represents a fair level of consensus about how to describe teaching in higher education.

In the process of establishing the validity of the feedback questionnaires some substantial correlations (up to 0.5) have been obtained, particularly between the overall rating and student performance (Cohen, 1981). It is not clear in most of these studies, however, to what extent the correlation simply reflects the positive or negative feelings about the course created by the experience of high or low marks in assignments (Marsh, 1987). Murray (1986) was able to relate the rating of trained observers on classroom behaviour to student ratings of instructors, to indices of student motivation, and to the students' performances in a single common examination. The ratings of the observers suggests similar underlying dimensions for 'good teaching' to those found in the previous literature, as summarized by Marsh. But there were also interesting differences between the observed characteristics of lecturers on which students appeared to rate their lecturers and those which were most closely related to academic performance. Although observed enthusiasm correlated with all three sets of criteria, student ratings were also correlated with conceptual clarity, speech clarity, rapport, and informality, while examination performance was most closely related to use of class time (avoiding digressions or labouring the obvious) and task orientation (indicating what was expected of students). Overall, the rating of teaching correlated 0.52 with a self-rating of 'amount learned' and 0.30 with actual examination grades.

This study confirms the anticipated subjective element in student ratings, but to explore those subjective elements further requires a rather different approach. The implicit theory of teaching underlying the use of student ratings relies on a supposed direct relationship between teaching and learning in higher education. In fact, the relationship is rather indirect (Hounsell, 1984), as so much of the studying takes place in the student's own time. And the activities that a student is asked to carry out, through reading specified textbooks, background reading, and carrying out assignments of various kinds are all part of a broader academic environment which affects learning probably as much as, if not more than, the classroom skills of the lecturer.

The study by Murray described above did have separate indices of behaviour, one of which was a self-rating of the amount of studying carried out by the student. But the research on student learning has indicated that it is important to take account, also, of qualitative differences in the independent work carried out by students. Then it becomes possible to investigate whether different ways of studying are differentially influenced by particular methods of teaching, and by contrasting aspects of the academic environment. To investigate this more varied description of learning, and the broader view of what influences learning outcomes, it is necessary to be able to describe the quality of student learning itself. Such a description has been provided by

Marton (1976), with the identification of differing approaches to learning and studying – deep, surface, and later strategic (Ramsden, 1981). An *Approaches to Studying Inventory* (ASI) has been developed to cover a range of concepts describing approaches to learning, learning styles, motivation, and study methods, while in parallel with that a *Course Perceptions Questionnaire* (CPQ) has been used to try to identify influences on approaches deriving from the academic environment (Entwistle & Ramsden, 1983). Factor analyses of the ASI, given to a national sample of 2208 British students in their penultimate year, suggested the existence of four *study orientations* most of which brought together approaches with learning styles and contrasting forms of motivation. Thus, the deep approach was associated with a holistic style (the use of a broad focus in learning, making use of a wide variety of information, such as analogies and real-world experience, see Pask, 1988) and intrinsic motivation (interest in the subject matter itself) to form a *meaning orientation*. Surface approach went with serialist style (a narrow, cautious stance relying on evidence and logical analysis) and fear of failure within a *reproducing orientation*, while strategic approach indicated a use of both deep and surface approaches supported by a competitive form of motivation (need for achievement) combined with vocational motivation within an *achieving orientation*. The final grouping showed low levels of motivation associated with negative attitudes and disorganised study methods and was described as a *non-academic orientation* (Entwistle & Ramsden, 1983, p. 49).

A very similar factor structure was reported by Biggs (1987) in the earlier development of a *Study Behaviour Questionnaire*, although Biggs did not include learning styles in his inventory, nor was there any equivalent to the non-academic orientation in the factor analyses. One important finding from work with this inventory is that the factor structure vanished for certain sub-groups – those of below average ability and those who relied on extrinsic attributions for success or failure in their academic work (for example, blaming others for their failure). And in the ASI analyses, rather different factor strucures were found in different subject areas with some merging of the four factors found on occasion, indicating that repeated analyses by sub-group are essential.

Factor analyses of the CPQ produced only two identifiable factors. The strongest factor brought together a series of scales which indicated a positive evaluation of their departments and the courses they were taking, with the highest loadings on *good teaching, openness to students* and *freedom in learning*. The second factor brought together *formal teaching methods* and *clear goals and standards* with *vocational relevance*, a factor which seems to be describing differences between the methods of teaching generally adopted in science and arts faculties. A final scale, *workload*, was left rather isolated, but came into play when approaches to learning were brought together with

course perceptions. Then, workload produced a substantial loading on the factor described as reproducing orientation. There was no course perceptions scale related to meaning orientation in the factor analysis of students' individual responses. However, when an analysis was carried out of the 66 departments involved in this study, it was found that those departments rated by students as having a heavy workload and less freedom in learning had higher than average scores on reproducing orientation, while good teaching combined with more freedom in learning was associated both with higher levels of meaning orientation and with more positive attitudes (Entwistle & Ramsden, 1983, p. 188).

In the questionnaire survey, 'good teaching' was rather inadequately described within the five-item scale, while the questionnaire did not contain any mention of assessment procedures. In subsequent interviews with students, a fuller definition of 'good teaching' from the student's perspective became possible, while the important influence of assessment procedures on approaches to studying was repeatedly mentioned. Good teaching was seen as involving pitching the material at the right *level*, presenting it at an appropriate *pace* and within a clear logical *structure*, providing an *explanation* which facilitated understanding, and demonstrating both *enthusiasm* and *empathy*. Students explained how *assessment procedures* which emphasized factual information led them to adopt surface approaches to learning, and this relationship has been convincingly demonstrated in a quantitative study by Thomas (1986). Additional components of the learning environment which influence approaches to learning, including *feedback* on assignments and provision of *resource materials*, were subsequently incorporated into a heuristic model of the teaching-learning process in higher education (Entwistle, 1987). This model, which is shown as Figure 1, was designed to draw attention to the ways in which aspects of the academic environment might be expected to interact with the individual characteristics of the learners in affecting both approaches to learning and the quality of the learning outcomes. In this model it is implied that it is the *perceptions* of the academic environment, rather than the environment in an objective sense, which most directly influences learning. Thus the effects of teaching and assessment procedures will depend, to some extent at least, on the individual student's evaluation of those experiences. (For a description of the model, see Entwistle, 1987, pp. 23–24).

Additional evidence for the influence of the learning environment on approaches to learning comes from comparisons between a conventional and an innovative medical school (Newble & Clark, 1987). In conventional medical education, the emphasis on the initial learning of detailed factual information unrelated to the clinical situation was found to be associated with lower levels of meaning orientation and higher levels of reproducing orientation, while the reverse was true of the innovative medical school which emphasized problem-

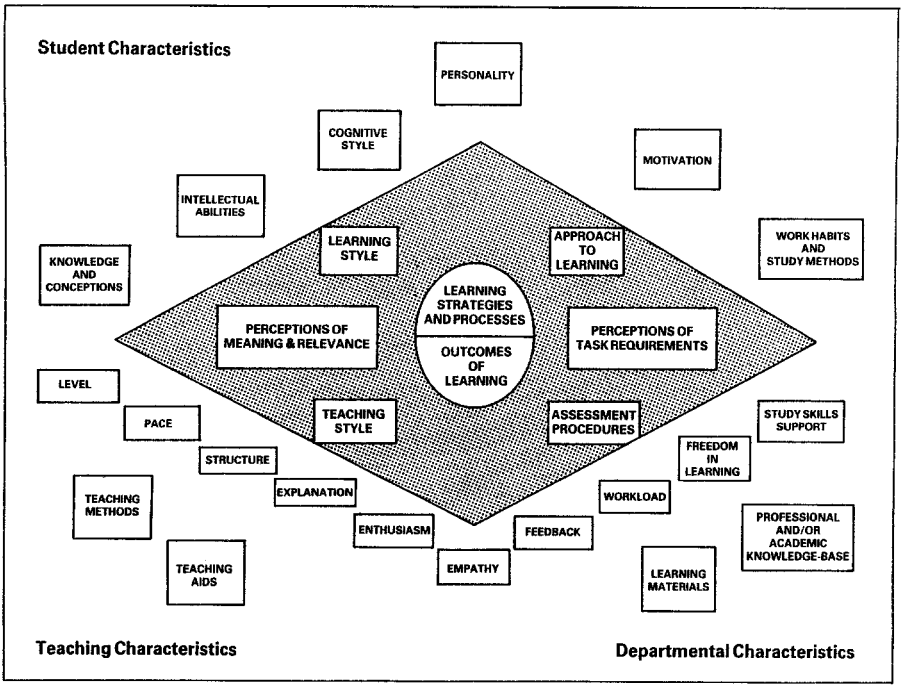

Fig. 1. A heuristic model of the teaching-learning process in higher education

based learning. The differences were larger in the earlier stages, reducing after the conventional course introduced clinical teaching.

Although there is substantial evidence for the influence of the academic environment on approaches to learning, Meyer and Parsons (1989) were concerned about the low correlations they found between CPI and ASI scale scores. They suggested that there might be two particular reasons for this lack of any clear relationship. Firstly, Meyer and Parsons found it impossible to replicate the factor structure of the CPQ to justify the scales used in the scoring, and secondly it was felt that the items used in the CPQ did not allow sufficient scope for individual perceptions. Meyer (1988) had earlier argued that the academic environment might be more appropriately defined in terms of highly specific descriptions at item level, as he had found that analysis of a set of items describing students' *awareness of context* produced interpretable relationships with approaches to learning. He also pointed out that the items describing course perceptions did not include many items specifically designed to highlight the contrasting perceptions anticipated by the theory (personal communication).

In a comment on the paper by Meyer and Parsons, Entwistle (1989) has pointed out that there may be good reasons why the CPQ fails to produce relationships when analysed in terms of the scores of individual students. If, for example, students were in substantial agreement about the quality of teaching within a single department, any analysis of their perceptions, in

relation to approaches, would inevitably show no relationship, as there would be little variance in the course perceptions scores. Analysis within a single department, or in a series of departments providing a similar academic environment, might suggest that items which were unrelated to approaches could be safely dropped from subsequent analyses, but that would not be a justifiable conclusion. Such items might still have important relationships with approaches which could only be demonstrated by looking for relationships *across* departments, rather than between individual students.

The research reviewed above does suggest interesting avenues for further exploration. In particular, it seemed useful to investigate, in relation to influences on students' approaches to learning and studying, a wider range of items contributing to the evaluation of courses drawing generally on the previous literature on student feedback questionnaires, but more specifically on the components within the heuristic model. It also seemed important to create additional items in which individual perceptions of the academic environment might be seen more clearly. The two studies reported here deal with these extensions in turn. They thus allow further examination of the relationships between individual perceptions and approaches to studying, although the small number of departments involved prevents analyses across departments to examine the direct effects of the academic environment.

First study

Method

As part of a larger study into correlates of success and failure in electrical engineering courses in higher education (Entwistle & Tait, 1989), first-year students completed a lengthy questionnaire which contained a shortened and modified version of the ASI, together with a range of items describing evaluations of various aspects of their academic environments.

Sample

The analysis was carried out on 431 first-year students registered for a BEng Degree in electrical engineering departments in two universities ($N=255$) and three polytechnics or Central Institutions ($N=176$) in Scotland. The data was extracted from an extensive questionnaire, which took between 35 and 45 minutes to complete, and which was given to students during timetabled class periods. The response rate, in relation to students registered for these courses, was 87%.

Methods of measurement

Table 1 shows the scales used to describe the approaches to studying, organised within the four main study orientations, together with indicative items. It also shows additional questions used to amplify the description of students' study methods and habits. The scales were made up of five items each rated by the student in terms of five response categories (definitely agree, agree with reservations, unsure, etc.). The responses were then summed to produce a scale score. The Cronbach alpha reliability of the scales included in the analyses,

Table 1. Scales from approaches to studying inventory and items covering study habits and methods

Scale	Indicative items
Meaning orientation	
Deep approach	I always set out to understand thoroughly the meaning of what we we have to learn
Intrinsic motivation	Often I follow up interesting ideas mentioned in class
Holist style	Interesting problems often set me off on long chains of thought
Serialist style	I generally prefer to tackle each part of a topic or problem in order, working out one step at a time
Study skills	I always concentrate on trying to get a really full set of notes in lectures
Achieving orientation	
Strategic approach	I keep an eye on the syllabus and on previous exam papers to decide my own priorities in studying
Need for achievement	It's important for me to get better marks than my friends if I possibly can
Time management	I organise my study time carefully to make the best use of it
Reproducing orientation	
Surface approach	I find I have to memorise a good deal of what we have to learn
Vocational motivation	My main reason for being here is to get a good job afterwards
Fear of failure	I worry a good deal about whether I'll do well enough to stay on the course
Non-academic orientation	
Low self-confidence	I don't seem to have a good grasp of the subjects I'm studying yet
Distractability	Personal relationships seem to distract me from my work, one way or another
Negative attitudes	Often I find myself wondering whether the work I'm doing here is really worthwhile
Study habits and methods	
Time spent in studying (excluding class time)	
Relative time spent in	
understanding lecture notes	
using textbooks, journals, etc.	
working on problems or assignments	
being stuck and so unable to get on	

showing the extent to which the items were measuring the same dimension, was found to lie between 0.46 and 0.77, with a median value of 0.61. These values, with the exception of the two below 0.5, are within the range considered acceptable for scales of this kind.

In all but one of the additional questions, the variables were measured in terms of a single five-point rating, while the number of hours studied was derived from a grid used to enable students to estimate the number of hours they spend in independent studying in a typical week (Entwistle & Entwistle, 1970).

Table 2. Factor loadings of scales from approaches to studying inventory and items covering study habits and methods

Variable	Factor			
	I	II	III	IV
Meaning orientation				
Deep approach	70			
Intrinsic motivation	73			
Holist style	69			
Serialist style	46			
Study skills	61			
Achieving orientation				
Strategic approach	35	44		
Need for achievement	42			
Time management		76		
Study habits and methods				
Time spent studying		56		
Understanding notes		53		
Using textbooks, etc.		31		
Working on assignments		49		
Being stuck			49	
Reproducing orientation				
Surface approach				42
Vocational motivation				52
Fear of failure			81	
Non-academic orientation				
Low academic self-confidence			55	
Distractability		−51	35	
Negative attitudes	−35	−40	31	50
Percentage of variance	23	10	5	3

Four factors explain 52% of the variance.
Decimal places and loadings less than 0.3 are omitted.

Finally, two indices of academic performance were obtained. One was a self-rating of academic progress up to about the middle of the second term, and the other was an average of the grades obtained across all courses at the end of the first year.

Table 3. Factor loadings of items covering course evaluations

Variable	Factor				
	I	II	III	IV	V
Experiences of the course					
Good relations with staff	31	39			
Interesting content			45		
Professionally relevant			44		
Emphasis on applications			39		
Good industrial contacts			53		
Emphasis on management			52		
Heavy workload				52	
Ideas presented fast				63	
Difficult content				62	
Emphasis on theory				32	
Much time on mathematics				45	
Evaluation of lecture course					
Parts of course coordinated	48				
Courses clearly structured	54				
Brought down to our level	64				
Lectures well organised	65				
Lecturers explain clearly	75				
Applications made clear	58				
Lectures lively and varied	54		33		
Lecturers are enthusiastic	56				
Staff discuss difficulties	43	35			
Markers' comments helpful	43	30			
Evaluation of staff advice					
From lecturers about courses	31				
On how to study effectively		40	31		
From year or personal tutors		48			
Evaluation of tutorials					
Tutors seem interested		52			
Explanations are helpful		53			
Opportunities to discuss		46			
Evaluation of practicals					
Instructions easy to follow					58
Purpose usually clear					61
Demonstrators are helpful					43
Percentage of variance	17	5	4	3	3

Four factors explain 43% of the variance.
Decimal places and loadings less than 0.3 omitted.

Table 3 lists the items used for students to make their evaluations of the main course they were attending and of the teaching and other aspects of the academic environment they had experienced. The items included here were derived from a review of the literature, but guided by the heuristic model, and by the specific needs of the engineering project.

Results

The intention in analysing the data was to confirm the relationships between the scales within the modified ASI and to investigate those between the items describing course evaluations. Thereafter, it would be possible to see whether there were connections between the approaches to studying and the course evaluations among this sample of first-year engineering students. The patterns of relationship were identified using the SPSS programs (Nie *et al.*, 1975) to carry out maximum likelihood factor analysis followed by varimax rotation. This technique enables the pattern of interconnections between sets of variables to be identified, showing what can be taken to be underlying dimensions, made up of items and scales to which students consistently respond in similar ways.

Orientations to studying

The first step in the analysis was to establish whether the scales in the modified ASI produced the same four study orientations that had been found in the original investigation (Entwistle & Ramsden, 1983). Table 2 presents the four-factor solution for the combined sample of university and polytechnic students.

Table 2 shows considerable similarity to the previous findings in spite of the additional items included here. The high loadings on deep approach, intrinsic motivation and holist style show that Factor I represents *meaning orientation*. Factor II is the *achieving orientation*, although in this analysis 'need for achievement' has moved over on to the first factor. The additional items, with one exception, come within this second factor to extend the description of 'good study methods' in terms of the time spent in studying, and on the emphasis on trying to understand lecture notes and carrying out assignments. This factor in its present form represents organised and conscientious approaches to studying.

In other studies it has been found that there is often an overlap between the scales defining the two other orientations, and this has happened here. Factor IV represents the *reproducing orientation* but in this analysis fear of failure has been replaced by vocational motivation as the dominant motive, while

negative attitudes to studying have moved into this factor. Perhaps it should now be described as an *instrumental orientation* in this particular sample. Factor III is another facet of the original reproducing orientation which describes a lack of self-confidence and a feeling of anxiety about the outcomes of learning. Such students report themselves as spending time 'being stuck' in their studying more often than others.

Components of course evaluation

The factor analysis of the course evaluation items is reported in Table 3. In this case there was no way of deciding in advance what number of factors to extract. Using statistical criteria to limit the analysis often produces a large number of trivial factors from individual questionnaire items. The aim in factor analysis is to replace the large number of items with a small number of factors which adequately describe the mose important components covered by the items. A series of exploratory analyses, with differing numbers of factors, was undertaken to establish how the pattern of interconnections between the items changed and to identify the minimum number of factors which adequately represented the items. It was decided that the five-factor solution satisfied these criteria most closely, and the factor loadings from that analysis are reported in Table 3.

Factor I contained all the positive evaluations of lecturing included in the heuristic model and so could be described as *good teaching*. Factor II covered all the items describing good experiences with tutors and the provision of helpful advice. In terms of previous studies it seems to represent a specific form of *openness* to students. Factor IV represents a negative evaluation, based on the ideas presented being found difficult and the pace being too fast. The other high loading is on a heavy workload while, in engineering apparently, difficulty is also associated with an emphasis on theory and mathematics. In the light of previous studies, *demanding workload* seems to convey the meaning of this set of negative evaluations most clearly. Factors III and V are specific to this particular kind of course and describe respectively *professional relevance* and *good practicals*.

Study orientations and course evaluations

Having looked at study orientations and course evaluations separately, it is now possible to find out to what extent there are overlaps between the two sets of ratings. The previous research suggested that the evaluations of courses and teaching should be kept, initially, at item level, while the approaches to studying should be reduced to the four orientations. It was decided to retain the original definitions of the four study orientations for this analysis, rather

Table 4. Factor loadings of study orientations and evaluations of teaching

Variable	Factor				
	I	II	III	IV	V
Study orientations					
Meaning orientation			45		49
Achieving orientation			71		
Reproducing orientation		75			
Non-academic orientation		58	−49		−31
Study habits and methods					
Time spent studying			65		
Understanding notes			55		
Using textbooks, etc.					
Working on assignments			48		
Being stuck		45			
Experiences of the course					
Good relations with staff	33				
Interesting content					69
Professionally relevant				50	43
Emphasis on applications					34
Good industrial contacts				46	
Emphasis on management	30			39	
Heavy workload		52			
Ideas presented fast		47			
Difficult content		67			
Emphasis on theory					
Much time on mathematics		31			
Evaluation of lecture course					
Parts of course coordinated	49				
Courses clearly structures	55				
Brought down to our level	63				
Lectures well organised	65				
Lecturers explain clearly	76				
Applications made clear	58				
Lectures lively and varied	51				
Lecturers are enthusiastic	55				
Staff discuss difficulties	42			45	
Markers' comments helpful	45				
Evaluations of staff advice					
From lecturers about courses	32			32	
On how to study effectively				51	
From year or personal tutors				49	
Percentage of variance explained	16	7	6	3	2

Four factors explain 42% of the variance.
Decimal places and loadings less than 0.3 omitted.

than producing composite scales as indicated by the factor structure in Table 2. This strategy allows comparisions to be made more readily with other findings.

Again there was no certainty about the number of factors to extract and the same procedure was used to identify the most interpretable solutions. The five factor solution proved to be the most informative and this was produced for the university and polytechnic samples separately to check on the stability of the relationships between the variables. The two analyses were so similar that the overall sample has been used to report the factor loadings in Table 4.

Inevitably the factors that were obtained within the initial separate factor analyses can be seen again here, but what is more interesting is the extent to which there is overlap. In other words, which aspects of the academic environment, as perceived by the students, are related to the various study orientations? Factor I is *good teaching* as it appeared before without any connection with approach to studying. This replicates the previous lack of connection found by both Entwistle and Ramsden (1983) and Meyer and Parsons (1989). Factor III brings together all three main study orientations to summarize the characteristics of a *good student*, while Factor IV is a combination of *professional relevance* and *openness* to students.

More interesting, for the present purpose, are the two remaining factors which show the anticipated overlaps. Factor II brings together the perception of the course as having a *demanding workload* with the reproducing and non-academic orientations. This factor contains the linkage established in earlier research (Entwistle & Ramsden, 1983) between a surface approach and a heavy workload or perceived time pressure. Factor V may be specific to this engineering sample in that it shows an association between perceptions of *professional relevance*, meaning orientation, and positive attitudes. Again this finding is in line with theoretical ideas about influences on approaches to learning, but it is still surprising to find no link between *good teaching* and either meaning or achieving orientations.

To check whether that relationship is entirely missing, or has been suppressed by the factor analysis, it is possible to examine the intercorrelations between the study orientations and scale scores created by combining the evaluation items according to their factor structure. In Table 5, 'hours spent in studying' is added to the four study orientations to create the set of composite variables describing approaches to studying, while from Table 2, the five items with the highest loadings from Factors 1–3, the four highest in Factor 4, and the three loadings in Factor 5, are used to create five composite variables describing students' evaluations of the academic environment. In addition, the average mark obtained by students in their end of year examinations is used as the criterion of academic performance, supplemented by the students' own estimate of their progress up to about the middle of the second term.

The full correlational matrix is not reported here, as the main interest is in

relationships between study orientations and evaluations of teaching. However, it is worth noting that meaning orientation is quite closely related to achieving (0.50) and non-academic orientation (−0.43), but is unrelated to reproducing (−0.03). As expected, this latter orientation is closely associated with non-academic (0.48), but only weakly linked with achieving (0.13).

The inter-correlations between evaluations and approach to studying inevitably show the same pattern of relationships as was summarized within the factor analyses, but now the links with 'good teaching' can also be seen. There is also an opportunity in Table 5 to examine how closely the study orientations are related to academic performance in the two sectors of higher education. Whereas the correlations between evaluations of teaching and academic performance across the different departments are uniformly low (not shown in Table 5, but all less than 0.15), those with the study orientations are mainly above that level. Although it is risky to read too much into differences between relatively small samples, the largest differences show that, in the university sample, the reproducing orientation is more obviously penalised, although the meaning approach does not bring so much advantage as in the polytechnic sample. Achievement and non-academic orientations produce comparable and substantial correlations in both sectors, but there is an interesting difference in the effects of time spent in studying. Students in universities relate time spent to their own estimates of progress, but the connection is much weaker in the actual examination performance. In polytechnics the reverse is true, with time spent on independent work showing a considerable relationship with the end-of-year results.

Students high in meaning orientation tend to perceive the content as particularly relevant, whereas those with a non-academic orientation are more likely to see the same content as irrelevant. A reproducing orientation seems to lead to a perception of the course as having an overdemanding workload, which can be seen in conjunction with the higher level of anxiety which forms part of the definition of this orientation. These students could be interpreted as

Table 5. Correlations between study orientations and evaluations of teaching for university ($N=187$) and polytechnic ($N=172$) separately

Evaluations of teaching	Meaning Uni (Poly)	Reproduc. Uni (Poly)	Achieving Uni (Poly)	Non-Acad. Uni (Poly)	Time Spt Uni (Poly)
Good teaching	0.19 (0.08)	0.02 (−0.06)	0.16 (0.02)	−0.26 (−0.14)	0.21 (0.01)
Openess to students	0.28 (0.08)	−0.05 (−0.17)	0.20 (−0.03)	−0.28 (−0.20)	0.07 (−0.15)
Relevant content	0.45 (0.35)	−0.01 (0.02)	0.23 (0.30)	−0.35 (−0.37)	0.27 (0.20)
Demanding workload	−0.08 (0.05)	0.44 (0.47)	0.12 (0.17)	0.26 (0.29)	0.12 (0.07)
Good practicals	0.22 (0.12)	0.04 (0.05)	0.28 (0.11)	−0.25 (−0.08)	0.24 (0.05)
Progress (self-rating)	0.19 (0.17)	−0.37 (−0.43)	0.36 (0.28)	−0.50 (−0.50)	0.25 (0.09)
Examination marks	0.12 (0.22)	−0.30 (−0.23)	0.31 (0.32)	−0.36 (−0.42)	0.13 (0.32)

Correlations of above 0.12 (Uni) and 0.13 (Poly) are statistically significant at the 0.05 level.

being intrapunitive, seeing themselves as largely to blame for their difficulties, whereas students with a non-academic orientation, through their negative evaluations of the course, seem to be directing blame for their admitted difficulties away from themselves, towards the lecturers and the content of the course. The colouring of evaluations of teaching by the level of grades being obtained, discussed in relation to the previous literature, is less clearly seen in this study because the analyses are carried out across five different courses. However, it is still clear from the correlations between non-academic orientation and evaluations of teaching, that students' attitudes are likely to influence the ratings they make.

Another interesting set of correlations, not reported in Table 5, shows that time spent on independent studying is associated most closely with the achieving orientation (0.46), which is almost tautological in view of the items used to define that orientation, but it is also related to meaning orientation (0.29) and to non-academic orientation (−0.30). The lack of relationship between time spent and reproducing orientation (0.05) shows that although these students seem to blame themselves, they are doing an average amount of work. In contrast, the non-academic students, who blame others for their academic weakness, seem to be spending rather less time on studying, presumably due to their lack of interest and failure to perceive relevance in the content.

These interpretations are, of course, bedevilled by the lack of evidence of causality. To some extent the interpretations are drawing on additional analyses not reported here (mean scores and standard deviations of the various sub-groups), but ultimately they can be understood only in relation to other findings reported elsewhere in the literature. Before attempting that fuller interpretation, however, the results of the second study have to be considered.

Second study

Method

The first study had shown that an extended set of items could produce interesting links between perceptions of courses and study orientations, but the second study was designed to investigate another of the suggestions made by Meyer (1987), namely that increased correlations with study orientations would be obtained from items devised to accentuate differences between individual perceptions.

There is, of course, a particular difficulty in asking students to make general evaluations of teaching which include several different lecturers. Inevitably, correlations between approaches and perceptions would be greater within a specific lecture course. It was not possible to obtain separate ratings of

individual lecturers in this study, but by asking students to express a preference for different styles of teaching and examining, it seemed possible to produce items which encouraged contrasting perceptions and might also suggest differential reactions to different types of lecturer. These items thus asked students about their *preferences* for contrasting aspects of their perceived academic environment – various types of lecturing, examining, tutoring and courses – with the alternatives presented in terms of the contrasts in perceptions to be expected of students with differing predominant study orientations.

A new, shortened questionnaire was developed in which those items which most strongly defined the study orientations, study habits and methods, and the general factors covering evaluations of the academic environment, were used to support the new items relating to preferences.

Sample

The shorter questionnaire was given to samples of 123 electrical engineering and 148 psychology first-year students in one university. The electrical engineers had not been involved in the first study. The sampling ratio was difficult to estimate in this study due to uncertainty about which students were continuing on the course, but it seems that the response rate was about 60%. The reduced response rate is likely to underestimate the strength of relationship as the absence from the lectures of a greater proportion of the less successful students increases the homogeneity of the samples.

Methods of measurement

The questionnaire contained 28 items covering approaches to studying, seven in each orientation. The Cronbach alpha reliability values for these scales lay between 0.51 and 0.73. The additional information about study habits was derived from the same items as in the first study. A much reduced set of items covering evaluations of the academic environment was included, followed by a section on preferences. These items are shown, in an abbreviated form, in Table 6.

Results

Although the initial item analyses were again carried out, they are not reported here. Several factor analyses were carried out to find the clearest and most consistent patterns of relationships between study orientation scores and the items describing study habits, evaluations, and preferences. These proved to be the five (engineering) and six (psychology) factor solutions, each of which explained just under 40% of the variance. In Table 6 the factor loadings are

Table 6. Factor loadings of study orientations, evaluations of teaching and perceptions of academic environments in engineering and psychology

Variable	Factor									
	I		II		III		IV		V	
	Eng	Psy	Eng	Psy	Eng	Psy	Eng	Psy	Eng	Psy
Study orientations										
Meaning orientation	37	39			50	31				
Achieving orientation					74					
Reproducing orientation			51	47			50	34		
Non-academic orientation							76	52		
Study habits and methods										
Time spent studying					46		34			
Understanding notes					47					
Using textbooks, etc.					42	50				
Working on assignments						41				
Being stuck			35				69	63		
Evaluation of teaching										
Presented too fast										
Heavy workload								37		
Brought down to our level									63	53
Lectures well organised									48	56
Lecturers explain clearly									84	81
Lecturers are enthusiastic										31
Staff discuss difficulties										
Markers' comments helpful							32			
Can follow own interests							33			
Good advice on study skills										
Preferences for lecturers who										
— relate to outside world	44									
— tell us what to put in notes			53	58						
— show what they think	52	44								
— entertain rather than inform	33				−43					
Preferences for exams which										
— show thinking about course	39	60		−36						
— are direct from lect. notes			67	59						
— indicate effort for each part			39	35						
— allow various different lines	38									
Preferences for tutors who										
— discussions among group		44								
— go over lectures			41	39						
— comment on students' ideas	55	44								
— clarify, even if critically		33	38							
Preferences for courses where										
— personal interest catered for	48	59								
— books to be read are indicated			68	62						
— reading around is encouraged		60			41	49				
— topics linked directly to exam			57	58						
Percentage of variance	4	8	9	16	10	4	4	3	3	4

Five factors explain 37 (34)% of the variance.
Decimal places and loadings less than 0.3 omitted.

shown separately for each subject area as there are some differences between them.

Factor I describes preferences for the types of courses, teaching, tutoring, and examining which might be described as *promoting understanding*, and there is a corresponding loading on meaning orientation for both groups. Factor II is defined mainly by loadings relating to those aspects of the learning environment which might be thought to be *promoting rote learning*, and a parallel loading on reproducing orientation is found in both groups. Factor III brings together meaning and achieving orientations in engineering and is associated with time spent on understanding notes and using textbooks. This factor is more narrowly defined in psychology, without the achieving orientation, but in both departments it is related to a preference for courses where reading around the subject is encouraged. The final two factors cover the evaluation factors found in the first study, representing respectively perceptions of the course as having a demanding *workload* and *good teaching*. In the engineering sample the negative evaluation factor seems to contain two disparate elements, suggesting that a contradictory element, equivalent to *openness* to students, has been compressed into Factor IV by the restriction on the number of factors extracted. (In the six factor solution it moves back to its previous association with meaning orientation but the other factors were less clearly defined.)

The final analysis again involved an examination of the correlations between the study orientations and the perceptions factors. Scale scores were created from the items which showed the highest loadings in Table 6 and/or contributed to that factor in the first study. There were three scales from the section on evaluation of teaching: good teaching (in terms of the items 3–6 in the

Table 7. Correlations between study orientations, evaluations of teaching, and preferences for contrasting academic environments, in departments of engineering ($N=123$) and Psychology ($N=148$)

Evaluations and perceptions	Meaning Eng (Psych)	Reproduc. Eng (Psych)	Achieving Eng (Psych)	Non-Acad. Eng (Psych)	Time Spt Eng (Psych)
Evaluation of teaching					
Good teaching	0.24 (−0.02)	−0.06 (0.06)	0.35 (0.15)	−0.27 (−0.24)	0.05 (0.05)
Openness to students	0.26 (0.14)	0.04 (−0.13)	0.26 (−0.05)	−0.09 (−0.11)	0.04 (0.08)
Demanding workload	−0.02 (0.10)	0.26 (0.28)	−0.09 (0.18)	0.32 (0.07)	0.12 (0.12)
Preferences					
Promoting understanding	0.38 (0.34)	0.31 (−0.09)	0.26 (−0.03)	0.00 (−0.10)	0.18 (−0.07)
Promoting rote learning	−0.10 (−0.22)	0.55 (0.38)	0.14 (0.06)	0.26 (0.12)	−0.02 (0.13)
Examination marks	0.16 (N/A)	−0.39	0.07	−0.29	0.05

Correlations of above 0.15 (Eng) and 0.14 (Psych) are statistically significant at the 0.05 level. Examination marks were available for the engineers only.

Evaluation of Teaching); courses having a demanding *workload* (items 1–2); and *openness* to students (items 7, 8 and 10). The preferences section produced two scales: *promoting understanding* (Lecture 2, Exam 2,3, Tutor 2, and Course 2,4). Unfortunately, it was not possible to create a scale from the shortened questionnaire which evaluated the content as relevant.

The inter-correlations, shown in Table 7, show a close parallel between the engineering students in the two studies, with meaning and achieving orientations being associated with good teaching and openness to students rather more strongly in the second study than in the first. Psychology students, however, showed much weaker relationships. In this second study, engineering students high on either reproducing or non-academic orientation again perceived the courses as having a demanding workload, but with only the non-academic group making negative evaluations of the teaching. Among psychology students the pattern was somewhat different. Although reproducing was still linked to workload, non-academic was associated with negative evaluations but with no perception of a demanding workload.

The preferences for the contrasting academic environments shows, to a large extent, the anticipated connections. Students who adopt deep approaches to learning show a clear preference for an environment which is likely to promote understanding, while those with a surface approach prefer situations which are thought to facilitate rote learning. However, among engineering students, those with high scores on reproducing also favour those aspects of the environment which promote understanding. Students with a non-academic orientation show no preference for teaching which facilitates understanding, although in engineering they show some preference for teaching which promotes rote learning. Again these reactions seem to reflect their negative attitudes towards studying.

The psychology students high in achieving orientation show no marked preferences for either style of teaching, while the non-academic students are the only group to reject procedures likely to promote understanding. Among the correlations with time spent in studying, there is a suggestion that in engineering more time is spent by students who prefer methods promoting understanding but who also find the course demanding, while in psychology the highest correlation is with the heavy workload, but that is at a non-significant level.

General discussion

Earlier it was said that the relationships between study orientations were difficult to interpret on the basis of the first study alone. What does the second study add? First of all, the second study sounds a note of warning

about the generality of findings. Psychology students show some similarities, but with rather weaker relationships being found and some marked differences.

Study orientations and preferences for alternative teaching styles

More significantly, the second study shows, generally speaking, that students who adopt meaning or reproducing orientations also prefer the methods of teaching and assessing which encourage those approaches to learning. The negative evaluations of the non-academic group seem to mirror generally unfavourable attitudes towards studying, leading to a substantial likelihood of less time and effort being put into the course and poor end-of-year marks being obtained. All in all, we are seeing here a parallelism between approaches to studying and preferences for different methods of teaching and assessing, which can be interpreted with more confidence by drawing on other research findings.

Janssen (1989) has carried out factor analyses, separately, of items describing three domains; study strategies, perceptions of examination requirements, and lecturing behaviour. By relating all three analyses to the same theoretical model, interesting correspondences emerge suggesting, for example, parallels between, on the one hand, feeling overloaded and using memorizing without understanding, and on the other hand, attributing difficulty in exams to an overdemanding course and to bad teaching. Empirical interconnections have, however, yet to be demonstrated.

Another indirect indication of this type of interconnection can be seen in an interview study by van Rossum and Taylor (1987). They showed a parallelism between students' conceptions of learning (equivalent to the distinction between deep and surface approaches; see Marton & Saljo, 1984) and their descriptions of 'good teaching'. As the conception progresses from an emphasis on the reproduction of facts towards the reconstruction of meaning, the definition of good teaching moves from methods which "make things stick" in a painless manner, through clear structure and appropriate emphasis, towards a view of the lecturer as the facilitor of independent learning. Piecing together what several students said produces the following composite quotation (van Rossum & Taylor, 1987, pp. 14, 16, 18).

> 'Good teaching' in my opinion stimulates self-activity, i.e. not only knowing dry facts, but awakening curiosity for backgrounds, relationships, etc. ... (It).. involves the students as much as possible in the subject matter... (through) being open to criticism ... and discussing (the topic) ... with the students, so that all gain something from it. The teacher is then a guide. ...

> 'Good teaching' is presenting the subject matter in such a way that those who were already interested remain so, or become more so.

The change from seeing good teaching in simple procedural terms to recognizing its powerful but indirect influence can be seen as a developmental trend equivalent to that found by Perry (1970) in intellectual and ethical development. He showed how students moved away from

> the simplistic acceptance of facts presented by authority, through a period of confusion about the nature of knowledge and belief, to a recognition that we need to establish a personal philosophy of life which is built out of our own interpretation of relevant evidence, but which recognizes, and is tolerant of, other people's alternative, even conflicting, interpretations of 'reality' (from a summary of Perry's study by Entwistle & Ramsden, 1983, p. 11).

The shift observed in the perception of 'good teaching' is of crucial importance, as it involves an important change in beliefs about the causes of learning. In the undeveloped conception of learning and teaching, effective teaching causes learning in a direct way. From this view-point, the student relies on the lecturer's skill to facilitate learning, but in the more developed conception, the responsibility for learning is taken over by the student who looks to the lecturer for intellectual stimulation and guidance.

We shall come to implications of these different perspectives later in this discussion. Here it is sufficient to note that students with these contrasting conceptions of learning are likely to define 'good teaching' in different ways. Thus a high rating from a reproducing student could be a low rating from someone high on meaning orientation, yet both might be describing their version of effective teaching. If the criteria used are as different as this implies, the ratings given on evaluation scales may be composed of endorsements of quite different items, or be based on quite different criteria of 'good teaching', thus making interpretation of general student ratings very difficult indeed.

Study orientations and the effect of differing academic environments

So far in this discussion, the direction of causality has been taken to suggest that the different perceptions of the academic environment are a product solely of the different characteristics of the learner. In other words these perceptions are entirely subjective. However, when there is substantial agreement about certain facets of a course, for example, the workload or the factual emphasis of the assessment procedures, then the average ratings become a more objec-

tive indicator of the actual academic environment, and in these circumstances different patterns of causality can be inferred. The students' approaches to learning can then be seen, in part at least, as reactions to the environment provided by the department. Then good teaching *causes* a deep approach, and reproducing is seen as a *product* of the workload or the assessment procedure, rather than being a facet of the particular conception of learning, or attitudes towards studying, of the student.

Evidence from previous questionnaire studies, supplemented by students' comments on the reasons why they adopt different approaches with different lecturers (Entwistle & Ramsden, 1983), make the effects of teaching and assessment on the quality of learning very clear. Yet, as argued in the review section, these important relationships may be obscured in correlational analyses of evaluation items on which there is substantial consensus among the students, or where the evaluation scale scores are built up from different sets of items between students of contrasting study orientation. Only in analyses across varying departments can the direct influence of the academic environment be demonstrated, and yet by using only the mean scores of students in those departments, varying perceptions between individual students are removed from that analysis.

Interactions between study orientations and academic environments

It is becoming clear that the effects of academic environment on approaches to learning occur in at least four different ways. Firstly, there is the rather spurious effect noted in the review section. The level of performance reached by a student affects the general attitudes to the course and these, in turn, are reflected in the evaluations. In the present studies this was seen particularly clearly in the negative evaluations of students with high scores on the non-academic orientation who also obtain rather low marks. This relationship was not seen with the more anxious students who also did badly, but who did not make such negative evaluations. This qualification between different kinds of weak student may be of considerable importance.

Secondly, analyses at departmental level have demonstrated how the academic environment can directly influence the approach to learning. For example, it has been shown that those departments where there is consensus among the students that the department is allowing little freedom in learning, or is imposing a particularly heavy work load, are likely to contain a higher proportion of students relying on rote learning. And the students themselves recognised that they used rote learning procedures to cope with tests which depend on detailed factual knowledge (Entwistle & Ramsden, 1983).

However, a change in the method of assessment will not affect all students

equally, which brings us to the third type of effect. Changing to multiple-choice tests will affect students high on meaning orientation more than those already concentrating on reproducing. It has been found that such a change affects the overall mean score on surface approach, and perhaps the range of scores, but not the rank order within those scores (Thomas, 1986). Most of the students are shifted towards a surface approach, but those who were originally more reliant on a deep approach retain that tendency, compared with other students on that course, even though their position will have dropped relative to students in other courses where more open questions have been retained. So this third effect is a differential one, in which the reaction to a commonly agreed perception of the academic environment depends on the individual differences between the learners.

The final type of relationship between academic environment and approaches to learning can be seen where there are wide variations in the perceptions of students with contrasting predominant study orientations. Items or scales designed to evoke these differences will show substantial correlations between approaches to studying and perceptions of the academic environment. This effect was clearly demonstrated in the preferences shown by students in our second study, but it also contributed to the relationships with evaluations of the courses in both studies. There, however, the correlations are also likely to reflect direct effects created by different procedures adopted across the various departments.

Implications for teaching and learning in higher education

The first implication relates to the use of student feedback questionnaires in evaluating the quality and effectiveness of teaching. If the correlations found in our studies are interpreted in the light of the other work, it becomes clear that ratings by students of the quality of teaching cannot be taken at face value. Good teaching is commonly described by educationists in terms of those features found to promote understanding, yet these may not be the features most valued by students who are satisfied solely with reproducing information. They will be most impressed by lecturers who 'package' the main points in ways which are entertaining and easy to grasp. The criteria by which they judge effectiveness in a lecturer will apparently differ markedly from students who are trying to develop understanding. When the overall ratings are considered by lecturers, or by management in the pursuit of performance indicators, these variations in criteria would be obscured, at least in global ratings. Generally, the use of feedback questionnaires is intended to help lecturers to improve their teaching, yet without additional information to distinguish between the pattern of responses of different students, the implications for the lecturers will

be far from clear. There would thus be a case for using an approaches to studying inventory, both to monitor the approaches being used and relating these to the various aspects of the academic environment provided in the department, and to allow a more sensitive interpretation of the feedback to be made. Of course, the collection of additional data and the use of more complex analyses would only be practicable through a computerised system backed up by appropriate training courses for the academic staff. However, a simple comparison could be readily made by looking at the responses in terms of students with high, medium, and low achievement levels.

It also becomes clear from the studies reviewed and presented here that feedback questionnaires should cover aspects of the courses beyond the simple rating of lecturing skills. Bringing together the factors identified by Marsh (1987), with those presented in the heuristic model, it appears that full feedback would have to cover the following components.

Basic lecturing skills, such as
audibility, visibility, handouts
Provision of clear goals and standards
Systematic organisation of course
Workload and level of difficulty

Interesting and relevant content
Level at which material is pitched
Pace at which topics are covered
Clear structure within lectures

Quality of explanations provided
Use of real life illustrations
Humour and enthusiasm in presentation
Empathy with needs of students

Assignments providing choice and resources
Full explanations in feedback on assignments
Assessment procedures related to course aims
Advice on study skills and strategies

Although there would be a substantial level of agreement among students that all these components contributed to good teaching, we have seen that students would have varying priorities. Thus the first two sets of qualities would be endorsed most strongly by students focusing on reproducing, while the second two sets would appeal more strongly, on the whole, to those concerned with developing personal meaning. There has been a tendency in staff development programmes to overemphasize the importance of the technical skills in lectur-

ing or small-group teaching, without giving equivalent weight to the other aspects of the academic environment which strongly influence the quality of learning. Fuller feedback questionnaires would provide one way of redressing this balance, and ensuring that the academic environments provided in departments were more likely to promote thorough understanding than a concentration on rote memorisation.

A review of the components within the academic environment which support the meaning orientation in students is likely to demonstrate that many of the practices currently found are inadvertently pushing students towards reproducing knowledge, contrary to lecturers' intentions. Ways of correcting this tendency are currently being explored by examining each component of the academic environment in turn and deciding how each can be used to promote deeper levels of understanding (Eizenberg, 1988; Ramsden & Marton, 1988).

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