The disposition to understand for oneself at university

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The disposition to understand for oneself at university: Integrating learning processes with motivation and metacognition

Noel Entwistle and **Velda McCune**

University of Edinburgh

Background A re-analysis of several university-level interview studies has suggested that some students show evidence of a deep and stable approach to learning, along with other characteristics that support the approach. This combination, it was argued, could be seen to indicate a *disposition to understand for oneself*.

Aims To identify a group of students who showed high and consistent scores on deep approach, combined with equivalently high scores on effort and monitoring studying, and to explore these students' experiences of the teaching-learning environments they had experienced.

Sample Re-analysis of data from 1896 students from 25 undergraduate courses taking four contrasting subject areas in eleven British universities.

Methods Inventories measuring approaches to studying were given at the beginning and the end of a semester, with the second inventory also exploring students' experiences of teaching. K-means cluster analysis was used to identify groups of students with differing patterns of response on the inventory scales, with a particular focus on students showing high, stable scores.

Results One cluster clearly showed the characteristics expected of the disposition to understand and was also fairly stable over time. Other clusters also had deep approaches, but also showed either surface elements or lower scores on organized effort or monitoring their studying.

Conclusions Combining these findings with interview studies previously reported, reinforces the idea of there being a disposition to understand for oneself that could be identified from an inventory scale or through further interviews.

Background

Approaches to learning and perceptions of teaching

The original interview studies that led to the description of approaches to learning, carried out by Marton and his colleagues (reported in Marton, Hounsell & Entwistle, 1984), described approaches to learning as 'relational', arguing that approaches depended on both the content of the learning task and on its context (Marton & Svensson, 1979). Although this effect has often been found, one of the early studies suggested a qualification to that finding (Ramsden, 1979). Students were found to differ in the extent to which they adapted their approach to their experiences of teaching. Although most students in his sample were affected by their perceptions of the teaching, Ramsden reported that:

> One small group of students stands out from the majority. These students are seemingly less negatively influenced by the course and departmental context than the rest, make special efforts to use assessment systems to their own ends, have a single-minded assurance that they will do well in their work, and are often extremely successful. (p.424)

Quantitative studies on approaches to learning and studying have shown a clear relationship between approaches and perceptions of the teaching and learning environment (Lizzio, Wilson & Simons, 2002; Entwistle, McCune & Hounsell, 2003; Vermunt, 2005; Richardson, 2006), but that relationship tends to act in both directions. Teaching influences approaches, but existing approaches also influence perceptions of teaching (Richardson, 2010), suggesting an element of stability. Vermunt and Vermetten (2004) reported test-retest reliabilities over a sixth-month interval for learning strategies in the range 0.51 and .72, again implying stability with some variability.

Thomas and Bain (1984) investigated the effect of changes in assessment procedure on students' approaches to learning, systematically changing assessment from essay to multiple choice and back again. The change to multiple choice format led to a general lowering of the deep scores and increases in surface, and yet the rank order of the students with a predominantly deep approach had stayed much the same, implying considerable consistency in their approach. And Vermetten, Lodewijks and Vermunt (1999) reported that student groups could change approaches between courses, and yet individual students had inventory scores that indicted considerable consistency in their approaches across courses. Two studies have focused specifically on differential stability in approaches to learning (Eley ,1992; Nijhuis, Segers & Gijselaers, 2008), but neither study looked at stability specifically for different levels of deep approaches.

Thinking dispositions and the disposition to understand for oneself

The existence of substantial stability in individual differences in cognitive processing has been consistently reported (Gustafsson & Undheim, 1996), but recently there has been an interest in linking ability with motivational and metacognitive characteristics of individuals through the idea of *dispositions*. In a review by Riveros *et al*. (2012), dispositions are described in general terms as being long lasting, displayed regularly and widely, and yet remaining to an important extent malleable.

In earlier psychological research, the idea of a *need for cognition* had been explored alongside the 'need for achievement', as one of an array of motivational needs affecting learning at university. From an extensive review, Cacioppo and his collaborators (1996) concluded that the 'need for cognition' reflected individual differences in the inclination to engage in and enjoy effortful cognitive activity that were relatively stable over time and contributed to high levels of academic achievement.

More recently, Perkins and Tishman (2001) have been exploring the idea of a *thinking disposition,* which also reflects relatively stable ways of reacting to situations or

tasks. The disposition to think critically involves three essential components in carrying out an intellectual task, namely a *willingness* to apply effort, the *ability* or cognitive skills required to carry out the task effectively, and an *alertness* to situations in which thinking is required or previous understanding can be used.

In an early study using cluster analysis, Entwistle and Brennan (1971) identified clearly defined groups of students that were replicated in large split-half samples. One of these clusters contained students with high scores in school attainment, mathematical ability, theoretical interests and emotional stability, as well as consistently high scores on motivation and study methods. These students also obtained high marks in the first-year and obtained very good degree results. This pattern of scores might well suggest a thinking disposition, but more focused evidence would be needed.

Following this line of thinking, Entwistle and McCune (2009) re-examined earlier interview transcripts describing students' revision for final exams and found parallels between descriptions of the deep approach and a critical thinking disposition. Some students who described reaching a thorough understanding during their revision, said that they 'just had to' study in that way. Talking about an exam answer, one such student explained:

> I had to go through all the stages of working through (the topic) and showing that I had understood it: I couldn't gloss over the surface. I have to explain it in that way - you can't cut it up and avoid bits: half an understanding doesn't make sense! It's essential to demonstrate your understanding of the whole, and its implications and limitations and you also need to demonstrate a critical approach to any evidence. I have to do it that way, because that's me. Among many of my friends, it's more underlying than that; it's not even the will to succeed, it's almost an obsession. (Entwistle & McCune, 2009, pp. 43-44)

The underlined words reflect the strength of feeling put into these responses, showing a need both to understand and to demonstrate that understanding to others. This strong feeling of commitment to understanding suggests that it has become a part of that

student's sense of identity as a learner ("that's me"), and the reinforcement coming from the feeling of achievement may well lead to more stability than is usually associated with a deep approach. Interviews conducted in other studies have also provided indications of this strong form of deep approach with students studying medicine (Fyrenius, Wirrell & Silen, 2007; Lonka & Lindblom-Ylänne, 1996); neurology (Hay, 2010); and psychology (Karagiannopoulou & Entwistle, under review). A fuller description of this evidence can be found in Entwistle and McCune (2009).

Interpreting the findings from such studies in the light of the defining features of *thinking dispositions* led to a description of the *disposition to understand for oneself* as having three main elements, similar to those found in thinking dispositions. First, there are the *learning processes* used (cognitive skills as an aspect of ability), seen in the interplay of relating ideas and the critical use of evidence with careful attention to detail. The second component of the disposition is the *willingness* to put in the necessary time, effort, and concentration to apply the learning strategies effectively (using organized effort), while the final element relates to several forms of *alertness to the context* within which the learning is taking place, or might take place in the future. There is an alertness involved in monitoring understanding in relation to the demands of the task, along with a recognition of the opportunities provided by the whole learning environment to further one's understanding. The disposition to understand for oneself is also likely to foster a continuing determination to use acquired knowledge and disciplinary ways of thinking and practising in new contexts, as well being more alert to possibilities for applying them. The idea of such a disposition can thus be seen as having important educational relevance, particularly in a society of increasing complexity that is making new demands on graduates (McCune & Entwistle, 2011).

Aims of the present study

The previous work on this disposition had drawn on a variety of sources, without having a fully coherent evidential base or being supported in large or diverse samples of students. It was therefore decided to re-analyse an existing large data-set, collected as part of the UK Teaching and Learning Research Programme (ETL project – Experiences of Teaching-Learning Environments – Entwistle, McCune & Hounsell, 2003; TLRP, 2007; Entwistle, 2009), focusing specifically on evidence of the existence for a strong form of deep approach that was substantially stable, and which was also supported by the motivational and metacognitive characteristics indicative of a disposition to understand.

Method

Sample and measurement instruments

During the ETL project samples of mainly first- and final-year students were drawn from four contrasting and populous subject areas (electronic engineering, biological sciences, economics, and history) on 25 undergraduate course units in 11 British universities. They were given two inventories assessing approaches to studying at the beginning and towards the end of a specific module with an interval varying between three and four months. Identical items and sub-scales on approaches to studying could be found within each instrument, although the rubric differed. The first instrument – *Learning and Studying Questionnaire* (LSQ) – included more sub-scales and items than the subsequent questionnaire. It asked students how they had typically studied in the courses taken so far in their main subject. The approaches items in the first questionnaire produced four main factors - deep approach (including sub-scales of *intention to understand* and processes of learning), surface approach, organized effort, and monitoring study effectiveness, understanding and generic skills.

The second questionnaire (ETLQ – Experiences of Teaching and Learning Questionnaire) contained abbreviated scales of approaches to learning relating to the specific approaches used in the particular module. It also collected information about

students' experiences of the teaching-learning environment, together with self-ratings about the demands of the course, what had been learned from it, and their academic progress in that course. Another study using ETLQ was carried out in the University of Helsinki and included a reanalysis of the ETL data (Parpala *et al*, in press). The approaches scales produced the three main factors, but a fourth factor was also found - *intention to understand* - which included both items used in that subscale of ALSI. Details of the scales identified and used in the analysis can be found on the project web site at http://www.etl.tla.ed.ac.uk/publications.html in a document entitled 'Introduction to the ETL Project Questionnaires'.

Analytic procedure

The analysis sought to provide further evidence of the disposition by:

- identifying a specific group of students with very high scores on scales related to the expected characteristics of a disposition to understand for oneself and also showed substantial stability in the scores obtained on the two occasions; and
- exploring the characteristics of this group, and others identified in the analysis, in relation to their reported experiences of the teaching and their learning in the module.

The group of students we were seeking to identify would be expected to show stable scores on scales derived from the two inventories that were indicative of the three defining aspects of a disposition to understand for oneself, namely *willingess* (such as intention to understand and effort), *deep learning processes*, and *awareness of context* (monitoring understanding and study effectiveness).

We decided to use repeated sets of cluster analyses to explore the possible existence of our target group. The first step was to carry out parallel clustering of the matched data collected at the beginning and at the end of the semester. The sets of clusters were then examined to see whether there was a comparable target cluster in each and, if so, to what

extent there was overlapping membership of that cluster. However, the matched data missed out additional dispositional aspects found in the LSQ and had shorter scales, so a further cluster analysis was carried out using the full data available, and was repeated for each of the four subject areas to ensure there was consistent evidence of our 'target' group. The final step involved looking at the descriptive statistics for the most clearly distinguishable clusters in relation to students' experiences of the course they had taken.

Results

Cluster analyses of data from the ETL project

K-means cluster analyses using the SPSS statistical package was chosen, as it had been found to produce conceptually meaningful and replicable clusters in our previous studies (e.g. Entwistle, Tait & McCune, 2000). Although there are statistical ways of indicating an appropriate number of clusters, here we were using clustering in an exploratory fashion. The initial analysis was carried out for 20 down to 6 clusters, with the 7 –cluster solution being chosen to show the main distinctions between clusters in the clearest way. Statistical guidance on the use of cluster analysis in the social sciences recognizes the need to balance parsimony with the retention of adequate discrimination between clusters (Hair *et al*., 2008).

Cluster analyses of the matched data collected at the beginning and end of the semester

The variables used to form the clusters were the sub-scales of the main factors identified in the previous research, as explained above. The sub-scales shown in Table 1 each contained the two items common to each inventory. Separate cluster analyses were carried out for scores obtained from the LSQ at the beginning of the semester and those from the ETLQ towards its end. The results are shown in Tables 1 and 2 with the clusters set out in an order based on diminishing scores on 'intention to understand', which contains the item, 'I usually set out to understand for myself'.

It was possible to identify equivalent clusters in each analysis, except for Clusters 5 and 6, where there was much less overlap of cluster membership on the two occasions (see Table 3 below). Cluster 1 has the highest scores on all the scales covering deep intention and process, monitoring studying, and organized effort, along with the lowest scores on both surface approach scales. Clusters 2 and 3 both show high scores on the deep approach sub-scales, but each contains weaker elements in other scales. Cluster 2 had above average surface approach scores, while Cluster 3 was lower on organized effort and, to a less extent, on monitoring studying. Cluster 4 was somewhat lower on deep approaches and markedly lower on relating ideas, but high in organized effort. Clusters 5 and 6 showed consistent patterns only in their high surface approach scores. Cluster 7 includes students who have the opposite pattern to Cluster 1, with the lowest scores on deep, monitoring, and organized effort. Cluster 1* contains the group of students who were in Cluster 1 on both occasions (see Table 3).

[insert Table 1 about here]

[insert Table 2 about here]

Table 3 compares the membership of clusters formed from LSQ data at the beginning of the semester with those produced from ETLQ data at the end. The pattern of membership shown in Table 3 indicates that all the clusters, with the exception of 5 and 6, have the highest number in the equivalent cluster on both occasions. Cluster 1 has 59.4% common membership, with that for Clusters 2, 3, 4 and 7 lying between 40.5% and 34.7%. The 258 students common to both analyses (Cluster 1*) show very high and stable scores on all the elements defining the concept of *disposition to understand for oneself*, along with notably low scores on surface approach.

[insert Table 3 about here]

Cluster analysis of the full set of data collected at the beginning of the semester

The comparison of the clusters created from the matched data found in both LSQ and ETLQ made use of only the reduced number of items and sub-scales common to both instruments, so the fullest description of the clusters comes from the complete set of data available in the LSQ. Table 4 reports the seven-cluster solution for that analysis.

[insert Table 4 about here]

Cluster 1 again contains all the characteristics expected of a disposition to understand, namely high scores on willingness (intention to understand and effort), deep learning processes (using evidence and relating ideas), and awareness of context (all the monitoring scales), while the other clusters either have much lower scores on at least one of these aspects or have higher scores on surface approach.

[insert Table 5 about here]

The same analysis was then carried out for each of the four subject areas included in the ETL project. Table 5 shows, for illustrative purposes, the scores for students in Clusters 1 and 7. The similarity of these two clusters across subject areas is apparent. That was also true for all five consistent clusters, indicating impressive consistency the patterns of scores.

Experiences of teaching and ratings of learning and performance for selected clusters

The next step was to look at the remaining scales from the ETLQ inventory, looking at students' reactions to the teaching they had experienced, the demands made by the course, the knowledge they felt they had gained, and their ratings of their academic progress on a nine-point scale.

The four columns at the left-hand side of Table 6 present mean scores for students' ratings on their experiences of the module for four of the clusters, chosen to show decreasing scores on the variables related to disposition to understand. The scores shown on the right-hand side will be explained later.

[insert Table 6 about here]

The pattern of responses is similar to that of the approaches to learning and studying across these clusters, with Cluster 1 reporting the most favourable ratings on experiences of teaching and the relative easiness of requirements for prior knowledge and generic skills. Importantly, they also report having gained more knowledge and skills, and made more academic progress than the other clusters. Not surprisingly, Cluster 7 shows the opposite pattern of results, with the lowest scores on all scales describing their experiences of the module.

The findings reported so far indicate that it is possible to identify consistently a group of students who have the general pattern of responses expected of those with a disposition to understand for themselves, but it was decided to carry out a further analysis that focused more specifically on the defining characteristics of the disposition.

Identifying students with high scores on a scale of disposition to understand

This analysis identified individual items found in both inventories that specifically related to our definition of the disposition to understand. These items, shown below, then formed a *disposition to understand* scale.

Intention to understand for oneself

• I have usually set out to understand for myself the meaning of what we had to learn.

Willingness to apply effort

• I have generally put a lot of effort into my studying.

Learning processes contributing to that intention

• I've looked at evidence carefully to reach my own conclusions about what I'm studying.

Monitoring own learning

• I've been over the work I've done to check my reasoning and see that it makes sense.

Awareness of links to real-world contexts

• In making sense of new ideas, I've often related them to practical or real life contexts.

This scale proved to have internal reliability coefficients of 0.62 for the LSQ inventory and 0.66 for the ETLQ, based on the full sample of 1896 students.

Patterns of response of students with differing scores on the disposition scale

The distribution of scores on the new scale at the beginning of the module suggested using five categories for the analysis: very high (above 4.79 out of 5); high (4.40-4.79); an extensive middle range (3.60-4.39); low (3.00-3.59); and very low (2.99 and below). We then examined the distributions of scores on the scale based on responses at the end of the semester. The means, standard deviations and group size for the five groups were: very high (4.22, 0.54; 131); high (3.97, 0.59; 322); medium (3.63, 0.60; 972); low (3.25, 0.61; 313); very low (2.80, 0.70; 158). Comparing the standard deviations of the two extreme groups, the very high group has considerably less spread of scores, indicating rather more stability in the disposition score, as would be expected from the earlier analyses.

The final stage of our exploration of the disposition scores involved looking at the means of four high or low groups on the main sub-scales shown at the right-hand side of Table 6 above, to allow direct comparison with the equivalent clusters. The clusters and the disposition groups proved to be closely similar, suggesting that the two ways of identifying students are equally good at suggesting the expected characteristics of a disposition to understand.

Conclusions

Although the time interval between the two inventories was relatively short (3-4 months), the inventories had a different focus and students were asked to focus on their

experiences in differing ways, thus reducing any likelihood of them remembering previous responses. It should also be recognized that the 'disposition' cluster maintained their very high scores in spite of expected regression to the mean. We are thus confident of the existence, in this large and diverse sample, of the existence of the group of students we were expecting to find.

Our short scale, based on just five items, produced groups that closely paralleled the pattern of descriptive scores of the equivalent clusters formed from sub-scales. Such a scale offers a simpler and more consistent way of assessing the disposition. By wording the current items more strongly and by using the interviews to suggest additional defining items, a more robust scale of this kind could be produced. Future longitudinal research could combine inventory and interview methods to investigate the consequences of differences among students in the disposition to understand.

The current analyses indicated group differences in the stability of scores on approaches to learning, motivation and metacognition on the two occasions. They also provided evidence of a group of students with consistently high scores on all these aspects, as would be expected of a disposition to understand. These students also reported very favourably on their experiences of the teaching-learning environment.

The interpretation of the quantitative analyses reported here must also be seen in relation to the qualitative findings already reported, as they provide complementary indications of a disposition to understand for oneself. This concept groups together the three contributory elements which, as Perkins and Tishman (2001) argue, work together in improving the effectiveness of learning. It also helps us to explain why elements of stability have to be taken into account when considering the relationships between perceptions of teaching and approaches to learning, such as those reported recently by Gijbels, Segers and Struyf (2008).

The educational significance of the idea of a disposition to understand for oneself comes from its likely impact on the level of conceptual understanding reached. Table 6 showed that Cluster 1 students rated their academic progress as 6.76 at the beginning and 6.37 at the end of the module, while the equivalent scores for Cluster 7 were 5.22 and 5.18. Finding a group of students with a disposition to learn for themselves who show very high self-ratings on academic progress is evidently important, as deep levels of conceptual understanding represent a crucial goal in all degree courses. Possible ways of encouraging the development of this disposition have been discussed elsewhere (Entwistle, 2009; McCune & Entwistle, 2011).

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Table 1 Cluster centres for the seven cluster solution from matched LSQ data

	Cluster centres and cluster size – at beginning of the semester							
	1*	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Sub-scales Cluster size	258	434	257	231	341	331	155	147
Intention to understand	**4.42**	**4.36**	**4.19**	3.94	3.63	3.50	3.08	2.80
Relating ideas (Deep process)	**4.20**	**4.19**	**4.02**	3.84	2.92	3.46	2.44	2.56
Use of evidence (Deep process)	**4.57**	**4.51**	**4.23**	4.14	3.75	3.62	2.85	2.81
Monitoring generic skills	**4.36**	**4.31**	**4.17**	3.74	3.54	3.58	3.08	2.71
Monitoring understanding	**4.35**	**4.25**	**4.16**	3.63	3.67	3.65	2.92	2.59
Organized studying	**4.32**	**4.26**	**4.26**	2.34	4.07	2.66	3.63	1.93
Concentrated effort	**4.38**	**4.33**	**4.21**	3.19	4.08	3.15	3.78	2.28
Fragmented memorizing	1.83	1.91	**3.45**	2.14	2.10	**3.28**	**2.95**	2.90
Unreflective studying	1.75	1.79	3.34	2.11	2.56	**3.53**	**3.65**	**3.50**

All scale scores converted into a five-point scale with 5 high and 3 the mid-point of the scale.

The three highest scores on each scale are shown in bold to help to see the pattern of scores.

Cluster 1 is the group of students who are common to Cluster 1 in both analyses (see Table 3)*

Table 2 Cluster centres for the seven cluster solution from matched ETLQ data

	Cluster centres and cluster size – at end of semester							
Sub-scales	**1***	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Cluster size	258	455	301	302	335	206	188	109
Intention to understand	**4.28**	**4.21**	**3.81**	3.74	3.26	3.32	2.84	2.06
Relating ideas	**3.92**	**3.88**	3.55	**3.63**	2.57	2.34	3.06	2.04
Use of evidence	**4.40**	**4.35**	3.95	**3.96**	3.26	3.08	3.17	2.25
Monitoring generic skills	**4.09**	**4.08**	**3.82**	3.51	3.11	3.01	3.18	2.34
Monitoring understanding	**4.17**	**4.14**	**3.91**	3.64	3.58	3.31	3.14	2.35
Organized studying	**4.21**	**4.16**	**3.94**	2.26	3.66	2.53	2.43	1.89
Concentrated effort	**4.42**	**4.37**	**3.90**	3.11	3.98	3.57	2.37	2.14
Fragmented memorizing	1.87	1.87	**3.51**	2.29	2.13	**3.70**	3.03	**3.35**
Unreflective studying	1.82	1.95	3.44	2.26	2.85	**3.68**	**3.49**	**4.03**

Table 3 Cluster membership count from LSQ (before) compared with ETLQ (after)

	ETLQ1	**ETLQ2**	**ETLQ3**	**ETLQ4**	**ETLQ5**	**ETLQ6**	**ETLQ7**	Totals
LSQ 1	**258**	52	49	45	12	13	5	434
LSQ 2	64	**95**	19	35	28	12	4	257
LSQ 3	54	24	**134**	41	30	37	11	331
LSQ 4	61	57	37	**120**	40	22	4	341
LSQ 5	10	43	41	36	33	**49**	19	231
LSQ 6	6	19	11	**46**	37	21	15	155
LSQ 7	2	11	11	12	26	34	**51**	147
Totals	455	301	302	335	206	188	109	1896

Figures in bold show the largest group in each row

Table 4 Cluster centres and cluster size for seven-clusters from the full set of LSQ data

Scale (No. of items)	Cluster centres and cluster size from LSQ data						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Cluster size	528	261	283	258	300	114	152
Intrinsic orientation (4)	**4.40**	**4.37**	**4.17**	4.11	4.03	3.66	3.82
Intrinsic course choice (3)	**4.19**	**4.10**	3.94	**3.96**	3.87	3.60	3.59
Intention to understand (2)	**4.27**	**4.11**	**4.03**	3.64	3.39	2.87	3.00
Relating ideas (4)	**4.20**	**4.10**	**4.03**	3.75	3.28	3.05	3.09
Use of evidence (2)	**4.42**	**4.15**	**4.25**	3.73	3.42	2.95	2.91
Monitoring understanding (3)	**4.35**	**4.28**	**3.89**	3.75	3.71	2.96	3.21
Monitoring study effectiveness (2)	**4.35**	**4.33**	3.50	3.61	**3.62**	2.57	3.01
Monitoring generic skills (3)	**4.05**	**3.99**	**3.67**	3.41	3.14	2.61	2.85
Study organization (2)	**4.06**	**4.13**	2.45	2.72	**3.62**	1.85	2.60
Time management (4)	**4.14**	**4.15**	2.60	2.85	**3.72**	1.99	2.67
Effort (4)	**4.47**	**4.46**	3.49	3.70	**4.01**	2.67	3.41
Concentration (2)	**4.03**	**3.87**	3.22	2.82	**3.69**	2.41	2.60
Extrinsic course choice (5)	2.15	**2.61**	2.12	**2.51**	2.29	2.41	**2.66**
Memorising w/o understanding (2)	2.74	**4.14**	2.34	**3.68**	3.00	2.57	**3.97**
Fragmented knowledge (2)	1.96	**3.37**	1.91	**2.93**	2.30	2.55	**3.64**
Unreflective studying (2)	1.92	**3.24**	2.43	3.10	2.69	**3.38**	**3.87**
Unthinking acceptance (2)	1.99	**3.40**	2.02	2.89	**3.20**	3.17	**3.88**

Table 5 Descriptions of Clusters 1 and 7 across four subject areas

	Engineering		Biology		Economics		History	
Sub-scales	**1**	**7**	**1**	**7**	**1**	**7**	**1**	**7**
Cluster size	67	12	130	33	148	11	145	3
Intention to understand	**4.38**	2.63	**4.22**	2.64	**4.24**	2.55	**4.37**	2.50
Relating ideas	**4.40**	2.73	**4.29**	2.90	**4.17**	3.02	**4.13**	2.67
Use of evidence	**4.44**	2.25	**4.41**	2.65	**4.42**	2.14	**4.58**	2.50
Monitoring generic skills	**4.09**	2.31	**4.03**	2.81	**3.98**	2.15	**4.18**	2.67
Monitoring understanding	**4.40**	2.81	**4.38**	2.90	**4.27**	3.06	**4.40**	2.67
Study organisation	**4.05**	1.58	**3.90**	2.03	**3.97**	1.95	**4.16**	1.17
Effort	**4.54**	2.50	**4.43**	3.05	**4.33**	2.93	**4.60**	1.92
Fragmented knowledge	1.98	**3.46**	1.95	**3.91**	1.91	**2.68**	1.74	**3.00**
Unreflective studying	1.83	**4.04**	2.04	**3.68**	1.91	**3.68**	**1.86**	1.83

Table 6 Experiences of teaching and levels of performance for selected clusters and score levels

	Cluster level and number					Level of disposition		
Scales (No. of items)	**V Hi 1**	**High 3**	**Low 6**	**V Lo 7**		**V Hi**	**High**	**Low**	**V Lo**
Group size	528	283	114	152		131	322	313	158
Clarity of aims & structure of topics (3)	**4.01**	**3.93**	3.57	3.53		**3.92**	**3.94**	3.76	3.54
Alignment of aims and teaching (3)	**4.14**	**4.08**	3.65	3.61		**4.13**	**4.10**	3.78	3.64
Integration of teaching & learning (3)	**4.02**	**3.96**	3.57	3.53		**4.08**	**4.01**	3.74	3.55
Choice (2)	**3.16**	**2.96**	2.68	2.58		**3.34**	**3.00**	2.81	2.65
Encouraging high quality learning (5)	**3.76**	**3.63**	3.12	3.12		**3.98**	**3.73**	3.31	3.07
Clarity&feedback about assessment (5)	**3.77**	**3.60**	3.30	3.23		**3.87**	**3.71**	3.36	3.24
Assessment for understanding (4)	**4.10**	**3.88**	3.49	3.63		**4.26**	**4.06**	3.73	3.50
Staff enthusiasm and support (4)	**4.11**	**3.94**	3.80	3.60		**4.18**	**4.04**	3.77	3.64
Support form other students (3)	**4.11**	**3.88**	3.64	3.70		**4.16**	**4.07**	3.85	3.61
Interest, enjoyment and relevance (5)	**3.79**	**3.63**	3.11	3.10		**3.91**	**3.71**	3.36	3.09
Relative easiness of know. demands (5)	**3.42**	**3.32**	3.24	3.13		**3.35**	**3.30**	3.28	3.13
Relative easiness of skills demands (5)	**3.87**	**3.67**	3.48	3.39		**3.95**	**3.78**	3.55	3.43
Knowledge acquired (3)	**4.04**	**3.81**	3.50	3.48		**4.11**	**3.94**	3.62	3.45
Generic skills developed (5)	**3.83**	**3.47**	3.37	3.38		**3.95**	**3.75**	3.48	3.29
Academic progress rating Beginning**	**6.76**	**6.25**	5.70	5.22		**6.73**	**6.55**	5.80	5.54
End of module	**6.37**	**5.96**	5.53	5.18		**6.35**	**6.29**	5.60	5.33

** Self-ratings on a 9-point scale. Here, the two highest scores on each variable are shown in bold.