Development and Use of the Approaches to Teaching Inventory

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This paper describes how research into approaches to university teaching, from a relational perspective, has been used to develop an inventory to measure the key aspects of the variation in approaches to teaching. The Approaches to Teaching Inventory (ATI) is one of several that derive from the research perspective applied by Marton and colleagues in Europe (Marton, F., Hounsell, D., and Entwistle, N. (eds.) (1997). The Experience of Learning, *2nd edn., Scottish Academic Press, Edinburgh) to student learning. A feature of these inventories is that they measure the response of a group to a particular context, rather than more general characteristics of individuals in that group. Studies using these inventories have consistently shown relations between students' approaches to learning and the quality of their learning outcome. The question of interest to many university teachers is whether there are relations between the way teachers approach their teaching and ways their students approach their learning. This question was answered in a study published in 1999 that used the ATI to show that teacher-focused approaches to teaching were associated with students' reproducing orientations. Subsequent research revealed that in subjects where teachers adopted more student-focused approaches to teaching, their students adopted a deeper approach to learning. Some recent research using the inventory is reviewed along with an analysis of the validity of the ATI. The current version of the inventory is reproduced in this paper.*

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INTRODUCTION

The work that is reported in this paper has evolved from the European and Australian studies into student learning that have been conducted from a relational perspective. We report here the results of research to develop an approaches to teaching inventory measuring key aspects of variation in approaches to university teaching, and some research that has made use of it. The research tradition known as "approaches to student learning" has no equivalent in the USA. It derives from a nondualist perspective, where the meaning of a phenomenon is seen as being constituted in the relation between an individual and the phenomenon. How something is experienced is seen as the relation between an individual's prior experience and their perceptions of their situation.

Marton *et al.* (1997) present a detailed summary of this work. Separate studies by Biggs (1978), Entwistle and Ramsden (1983), and Marton and Säljö (1976) identified three qualitatively different approaches by students to learning, that are now labeled deep, surface and achieving or strategic. Relations between the approach adopted by students towards their learning in a specific task, and the quality of the resulting learning outcome were also found (Marton and Säljö, 1976). As more recent studies explored related aspects of learning environments, further relations were found. Students' conceptions of learning are found to relate to the approaches they adopt and to their subsequent outcomes of learning (van Rossum and Schenk, 1984). Students' perceptions of aspects of their learning context show relations with their learning approaches (Entwistle and Ramsden, 1983; Entwistle and Tait, 1990; Meyer and Muller, 1990; Ramsden, 1997; Trigwell and Prosser, 1991).

Deep and surface approaches to learning have been identified in a range of student learning activities from specific reading tasks (Marton and Säljö, 1997) to approaches to study in general (Biggs, 1987) and in all disciplines typically found in universities (Prosser and Trigwell, 1999). In both these general and specific cases the approaches are seen to be composed of two components: a strategy (or what the student does) and an intention or motive (what the student is trying to achieve).

In his study of students' perceptions of their learning environments, Ramsden (1997) found that students' perception of the quality of the teaching they received was related to the quality of their approach to learning. Although this research raises the issue of whether students' perceptions of the teaching drives their approaches to learning or whether their approaches to learning result in their perceptions of teaching, or both, it has been used in performance indicators aimed at the improvement of student learning (Ramsden, 1991). It is argued that students' perceiving their

teaching to be of a higher quality, whether or not the teaching is actually of a higher quality, are more likely to be adopting higher quality approaches to their learning. An important part of what may be needed to change actual teaching and perceptions of teaching is knowledge of what the teachers themselves see as their own approaches to teaching, and how these approaches are experienced by students.

Although there is an extensive international literature on teachers' beliefs and theories of teaching in higher education (McLean and Blackwell, 1997; Menges and Rando, 1989; Mertz and McNeely, 1990 [all USA]; Biggs, 1999; Kember *et al.*, 2001 [both Hong Kong]; Hativa, 2000 [Israel]; Burroughs-Lange, 1996; Samuelowicz and Bain, 2001 [both Australia]; Fox, 1983 [UK]; Scott *et al.*, 1994 [Canada]) considerably less research is reported on differences in how university teachers teach, the topic of this paper. Reports of teaching styles or methods tend to come in the form of lists of characteristics. Among the most common representations are the products of content analyses of observations of teaching, or of the teachers talking about their teaching (e.g. the analysis by Dunkin and Precians (1992) of how award winning teachers see teaching). In their study of effective teaching, Ballantyne *et al.* (1999) list key aspects of the written responses of teachers and note that their discussion should be interpreted as the authors' reflections on university teaching, grounded in the reported experience of practicing academics (p. 241).

Some reports contain more organization in their descriptions of variation, though it is not always clear whether they are describing teaching theory/belief or teaching practice, a point noted in a recent review by Kane, *et al.* (2002). Reinsmith (1992) describes a continuum of archetypal forms in teaching, from presentational to interactive. He talks of teachers' personality-based "teaching style" as a barrier to movement along the continuum and suggests that movement towards the more student-centred interactive forms may be a function of teacher maturation (p. 178).

Pratt (1998, p. 11) presents five perspectives on teaching:

- A transmission perspective: Delivering content
- An apprenticeship perspective: Modeling ways of being
- A developmental perspective: Cultivating ways of thinking
- A nurturing perspective: Facilitating personal agency
- A social reform perspective: Seeking a better society,

which start with simple perspectives and move to the more complex perspectives (at the bottom of the list). However, he makes it clear that he does not see any one of these as the single, universal, best perspective on teaching adults.

What is not apparent in this international literature is evidence that there are some ways of seeing or enacting teaching that are associated with higher quality student learning processes or outcomes. The research approach described in this paper was adopted in order to explore these relations.

To conduct such a study two requirements had to be met. The first was the identification of a hierarchy of key aspects of qualitatively different approaches to teaching. The second was the development of an instrument to measure these key aspects of teachers' approaches to teaching, one that is ontologically consistent with the instruments used to measure students' perceptions of their environment and their approaches to learning. This paper reviews the research designed to explore quantitatively the relations between teaching and learning, including the development of the Approaches to Teaching Inventory (ATI). It concludes with a section on the implications for teachers of the results obtained using this Inventory.

DEVELOPMENT OF AN APPROACHES TO TEACHING INVENTORY

In the first stage of the project, the key aspects of the variation in approaches to teaching adopted by university science teachers were explored using a qualitative approach known as phenomenography (Trigwell *et al.*, 1994).

> Phenomenography is the empirical study of the limited number of qualitatively different ways in which we experience, conceptualise, understand, perceive, apprehend etc, various phenomena in and aspects of the world around us. These differing experiences, understandings etc are characterised in terms of categories of description, logically related to each other, and forming hierarchies in relation to given criteria. Such an ordered set of categories of description is called the outcome space of the phenomenon, concepts in question. Although different kinds of data can be used, the dominating method for collecting data is the individual interview which is carried out in a dialogical manner. The interviewee is encouraged to reflect on previously unthematised aspects of the phenomenon in question. The interviews are transcribed verbatim and the analysis is carried out in an iterative manner on those transcripts. Distinctly different ways of experiencing the phenomenon discussed in the interview are the units of analysis and not the single individuals. The categories of description corresponding to those differing understandings and the logical relations that can be established between them constitute the main results of a phenomenographic study (Marton, 1994, p. 4424).

Five qualitatively different approaches to teaching describing key aspects of variation constitute the outcome space from an analysis of the transcripts of interviews with 24 science teachers. Table I contains the label description for each approach. However, with respect to the development of the ATI it is the extreme categories (Approaches A and E) that are of

Table I. Five Categories of Approaches to Teaching of Teachers of First-Year University Science

Approach A:	Teacher-focused strategy with the intention of transmitting information to students The focus of the transmission in this approach is on facts and skills. The prior knowledge of students is not considered to be important and it is assumed that students do not need to be active in the teaching process—they will learn by receiving the transmitted material
Approach B:	Teacher-focused strategy with the intention that students acquire the concepts of the discipline
Approach C:	A teacher/student interaction strategy with the intention that students acquire the concepts of the discipline
Approach D:	A student-focused strategy aimed at students developing their conceptions
Approach E:	A student-focused strategy aimed at students changing their conceptions This approach is one in which teachers adopt a student-focused strategy to help their students change their worldviews or conceptions of the phenomena they are studying. Like Approach D, students are seen to have to construct their own knowledge, and so the teacher has to focus on what the students are doing in the teaching–learning situation. A student-focused strategy is assumed to be necessary because it is the students who have to reconstruct their knowledge to produce a new worldview or conception. The teacher understands that he/she cannot transmit a new worldview or conception to the students

relevance, and that are the focus of this article. More detailed descriptions of these extreme categories are included.

Like students' approach to learning, the teachers' approaches to teaching were constituted in terms of the strategies they adopt for their teaching and the intentions underlying the strategies. The intentions were found to range from those involving transmission of the content of the subject to the student, to those where the teacher aims to help the student change their conceptions of the content. The extremes of the strategies adopted were seen as being teacher-focused and student-focused. As Table II indicates, logical relations in the five categories, A–E, were found between the four intentions and the three strategies.

Table II. Intention and Strategy Components for Five Approaches to Teaching (A–E)

Intention	Strategy		
	Teacher-focused	Student–teacher interaction	Student-focused
Information transmission	A		
Concept acquisition	B	C	
Conceptual development			D
Conceptual change			E

There are four characteristics of this set of descriptions of approaches to teaching that distinguish it from most of the other sets of teaching styles, forms, theories and perspectives described above. These characteristics are part of the differences between the outcomes of a phenomenographic approach and most other approaches used in the study of university teaching. They are that:

a) the outcomes contain descriptions of approaches to teaching made in response to perceptions by the teachers of a particular context, and a described approach is not a characteristic of an individual;

b) a description of an approach is not necessarily complete. The focus in this set is on what constitutes the *key aspects of variation* in the way a group of teachers experience teaching. It may not include ways of experiencing that are common across and among that group of teachers;

c) it is an hierarchically inclusive set. Approach B includes elements of A, and Approach E includes elements of A–D and so on, but Approach A does not include any of B–E.

d) it does not necessarily contain developmental stages. The approach used to constitute this outcome involves a snapshot in time of variation in a group, not changes over time. As noted above, a teacher may use aspects of Approach D in one context (say PhD supervision) and aspects of Approach B in another (say first-year teaching). Teachers who develop more sophisticated approaches may shift from Approach A to Approach E without "passing through" Approaches B–D.

Further studies of approaches to teaching completed more recently, and conducted with teachers from a wider range of disciplines (Martin *et al.*, 2001, p. 329), identified a different category C, but importantly (with respect to the subject of this paper) they found similar descriptions for the extreme categories A, B, D, and E.

The intensive qualitative methods used to identify this variation in approaches to teaching is not a suitable method for exploring whether teachers who adopt a teacher-focused strategy are more likely to have students who adopt a surface approach to learning than those who adopt a student-focused strategy. But these results are well suited, in two respects, to develop what was needed: An economical way of collecting approaches to teaching data on a large scale. First, the extremes of the categories of description of approaches to teaching, and the range of quotes from the teachers using this variety of approaches, provide starting material for the

development of indicator items. Second, the inclusive hierarchy described in point (c) above is an indicator that the variation is occurring within one broadly defined dimension.

Constructing the Inventory

In developing the ATI we had several key issues in mind. Firstly it had to measure the key variation between an information transmission/teacher-focused view of teaching and a conceptual change/student-focused view of teaching. Secondly the items had to be phrased in a way in which teachers could see their own experience of teaching. Thirdly, it had to be small enough in length that busy university teachers would complete it—too short and it would not capture this key variation, too long and it would not be completed.

The categories of description representing the variation in the approaches to teaching formed the basis for the development of the inventory. For the intention and strategy components of each of these categories, we sought a range of items based upon the component descriptions (Table I) and on extracts from the interview transcripts. The items themselves were written so as to be consistent with our understanding of the meaning of the components, recognizable by teachers as things other teachers might have said, and phrased to evoke a range of responses to create variance in the responses. This resulted in an initial pool of 104 statements. From the pool, 74 items were selected as well representing the four intentions and three strategies in the approaches to teaching outcome space—now constituted as seven subscales. This pool of 74 items was further reduced to a pool of 49 items in five subscales by deleting the Concept Acquisition and Conceptual Development subscales. They were deleted after a test of face validity as it was found that the items in the Conceptual Development subscale could not be differentiated from those in the Conceptual Change subscale and the items in the Concept Acquisition subscale could not be differentiated from those in the Information Transmission subscale. This 49 item version was then taken back to 11 of the staff, representing all five approaches to teaching, who were originally interviewed. After comparing their responses to the items with our analyses of their transcript, a further ten items were eliminated—resulting in a 39 item version.

This version was trialed using a sample of 58 university physics and chemistry teachers, including 11 of the original interviewees (Trigwell and Prosser, 1996). Following a principal components analysis with varimax

rotation and a test of alpha reliability, it was reduced to a 22 item version, with five subscales. The principal components analysis of the five subscales produced results consistent with the theoretical model underlying the development of the inventory and with the congruence of the relationship between intention and strategy found in the research from which it derived. That analysis also showed that the Student/Teacher Interaction subscale loaded heavily on the Student-focused subscale, and we eliminated that subscale.

In late 1999 the wording of some of these inventory items was modified to accommodate more flexible learning contexts than those found in the (science) environments from which the items evolved. This more generalized version of the Inventory is included as Appendix 1. Items 5, 8, 15, and 16 come from the former Intention subscale, and with items 3, 6, 9, 14 from the former Strategy subscale form the Conceptual Change/Student-focused (CCSF) approach scale. Items 2, 4, 11, 13, and 1, 7, 10, 12 are derived from the Intention and Strategy subscales, respectively, and form the Information Transmission/Teacher-focused (ITTF) approach scale. Like the Study Process Questionnaire (Biggs, 1987) responses to all items are on a 5-point scale from *only rarely true* to *almost always true*, and all items are scored positively.

The analyses described above that were used to develop the inventory were based on relatively small samples. The results from a principal components factor analysis of over 650 cases drawn from over 10 studies which have made use of the 16-item version of the ATI are shown in Table III. The data are from teachers in more than 15 countries and from most of the disciplines typically taught in universities.

The rotated factor matrix, using varimax rotation, shown in Table III supports the two-scale structure of the ATI (based upon the scree plot as described by Preacher and MacCallum, 2003). Factor 1 contains high positive loadings on all eight CCSF items, and a high negative loading on one ITTF item (ITTF 6, item 7). Factor 2 contains high positive loadings on all eight ITTF items and no loadings above 0.3 for CCSF items. Scale reliabilities (Cronbach's alphas) for the ITTF and CCSF scales on this sample of 656 are 0.73 and 0.75 respectively. These results suggest that the inventory has statistical validity.

USE OF THE INVENTORY

The main reason for the development of this inventory was to explore the relations between teachers' approaches to teaching and the approaches to learning of students in the classes of those teachers. We are now aware

Table III. Factor Analysis of Items in Final Version of the Approaches to Teaching Inventory

		Factor	
Item	Item number	1	2
ITTF1	2		64
ITTF2	4		67
ITTF3	11		60
ITTF4	13		59
ITTF5	1		37
ITTF6	7	−36	59
ITTF7	10		60
ITTF8	12		55
CCSF1	5	54	
CCSF2	8	66	
CCSF3	15	44	
CCSF4	16	63	
CCSF5	3	69	
CCSF6	6	58	
CCSF7	9	47	
CCSF8	14	74	

Note. Decimal points and loadings less than .30 removed; eigen >1.03 (based on scree plot); Principal components factor analysis with varimax rotation; $n = 656$.

of four studies that have explored these relations at the level of the class. (Gow and Kember (1993) have described relations between orientations to teaching and student learning at the departmental level.) The results of two of the three published studies (Trigwell *et al.*, 1999; Trigwell *et al.*, 1998) are shown in Tables IV and V.

Study 2 shows that higher scores on the Deep Approach to study variable are associated with higher scores on the Conceptual Change/

Table IV. Factor Analyses From Two Studies of Relations Between Student Approaches to Learning and Teacher Approaches to Teaching Variables

	Study 1 factor		Study 2 factor	
Scale	1	2	1	2
Student approaches				
Surface approach	69	−38	−35	73
Deep approach	−76		87	
Teacher approaches				
ITTF	66			85
CCSF		97	73	−39

Note. Decimal points and loadings less than .30 removed; Principal components factor analysis with varimax rotation; Study 1 (Trigwell *et al.*, 1999): $n = 48$, Eigen values = 0.98 and 1.59 based on scree plot; Study 2 (Trigwell *et al.*, 1998): $n = 55$, eigen values >1.

Table V. Pearson Correlation Coefficients for Approaches to Learning and Approaches to Teaching variables for Study 2 (Trigwell *et al.*, 1998)

Variable	Variable			
	SA	DA	ITTF	CCSF
Surface Approach (SA)	—	−.22	.38**	−.48**
Deep Approach (DA)		—	−.15	.38*
Inform. Transm./Teacher-focused (ITTF)			—	−.30
Conceptual Change/Student-focused (CCSF)				—

Note. $n = 55$.
*$p < .05$; **$p < .01$.

Student-focused approach to teaching variable, and both studies show that higher scores on the Surface Approach to study variable are associated with higher scores on the Information Transmission/Teacher-focused approach to teaching variable.

Ingerslev (personal communication), in a small-scale Danish study, has observed statistically significant relations similar to those described in Tables IV and V. In the fourth study, Gibbs and Coffey (2004) note that 97 teachers who supplied ATI data at the beginning and end of a year-long "training" program, on average, increased their Conceptual Change/Student-focused scale score (statistically significantly) and decreased their Information Transmission/Teacher-focused scale score (non-significantly). Over the same period, the students of these teachers reported adopting less of a surface approach, but they had no change in their deep approach score. This is the first report of a quantitative study of *changes* in approaches to teaching being associated with *changes* in students' approaches to learning.

In studies of a variety of teaching environments, the ATI has been used to look at variation between teachers in the relations between a teacher's approach to teaching and the same teacher's perceptions of other aspects of the teaching environment. Trigwell *et al.* (1998), in addition to studying relations between approaches to teaching and approaches to learning, have explored relations between aspects of teaching among their sample of 439 teachers. Their sample was drawn from teachers across all areas typically taught in universities and, for analytical purposes, was organized into four groups—arts and social sciences, business/economics/law, science/engineering, and the health sciences. They report a factor analysis (two-factor solution) of approaches to teaching variables and five teaching environment variables. In one factor, the Conceptual Change/Student-focused approach variable loads positively with perceptions of an appropriate teaching workload, appropriate student characteristics, small class size and control of teaching. In the second

factor, the Information Transmission/Teacher-focused approach variable loads negatively with perceptions of the departmental commitment to student learning, and the control of teaching variables. No significant disciplinary differences in these relations were found in the results for the four groups.

In a recent study, one of us (Trigwell, 2002) studied relations between 67 design teachers' approaches to teaching and some aspects of teaching outcomes. Statistically significant positive correlations between Conceptual Change/Student-focused approaches and affective indicators of teaching outcome (satisfaction in teaching the subject, and more interest in the subject) were found. Information Transmission/Teacher-focused approaches were negatively correlated with the same outcome variables.

DISCUSSION

Implications for Teachers

The results of research conducted using the ATI may have several implications for teachers. Adopting a Conceptual Change/Student-focused approach to teaching is more likely to lead to high quality student learning and to greater teaching satisfaction than the adoption of an Information Transmission/Teacher-focused approach. The study of how approaches to teaching relate to perceptions of the teachers' teaching context suggests that different university teachers focus on different aspects of their situation, and what they focus on is related to their approaches to teaching. Teachers who perceive that their teaching workload is appropriate, that student characteristics are sufficiently homogeneous and at the appropriate academic level, that class sizes are not too large and that they have some control over what is taught, are more likely to adopt a Conceptual Change/Student-focused approach to teaching. When teachers feel that there is no real commitment to student learning in their department, and that they do not have control over what is taught, they are more likely to adopt an Information Transmission/Teacher-focused approach.

Although there are clearly implications for teachers in these results, the systematic relations found between the ways teachers teach and the quality of their students' learning suggest there are also implications for heads of departments and academic leaders. Changing aspects of the teaching situation may lead to changes in teaching and to improved student learning.

The Validity and Use of the ATI

The validity of the ATI is supported in the results from the three reported studies showing relations between teachers' approaches to teaching and their students' approaches to learning (Tables IV and V). Conceptual Change/Student-focused approaches correlate positively with students' deep approaches to learning and negatively with students' surface approaches to learning. Information Transmission/Teacher-focused approaches correlate positively with students' surface approaches to learning and negatively with students' deep approaches to learning. Changes in teachers' approaches to teaching are reflected in changes in students' approaches to learning.

In all reported cases of its use, the Inventory yields interpretable data that are of the form expected using the educational principles from which it has been developed. For example, Conceptual Change/Student-focused approaches are found to be related positively to greater interest in, and enjoyment of, teaching (Trigwell, 2002); to students' deep approaches to learning and to perceptions of a manageable workload, some control over what is being taught, a manageable class size and small variation in student characteristics (Trigwell *et al.*, 1998). The fact that this instrument detects such relations, and that there is consistency in the directions of the relations, and that those directions are as expected from educational principles, are further indicators of its validity.

The ATI has been developed from research using a relational perspective. From this perspective, approaches to teaching (or learning) are seen as being contextual or relational, and the approach adopted by a teacher in one context may not be the same as the approach the same teacher would adopt in a different context. We experienced this relational characteristic during interviews with science teachers about their teaching on first-year subjects (Trigwell *et al.*, 1994). At times they described aspects of the approach they adopted that were quite different to other aspects that they had described earlier. When questioned whether they were still talking about their teaching of first-year subjects, they would generally respond no, and that they were in fact talking of their teaching with graduate students. As shown in the copy of the ATI in Appendix 1, we specifically ask respondents to describe their teaching context. This is done, in part, to help remind them to focus on their experience in that one particular context for the full 16 items. Studies using this inventory that do not clearly define the context, or do not have the same (or similar) context in component aspects of the study, may not observe relations between the target variables of the magnitudes, or even in the same directions, as described in some of the studies reported above.

Because of this relational element we have not published scale score norms for the studies we have conducted, as we believe they will vary according to the context. Although it may be possible to publish norms for a range of contexts once data have been collected from a large number of context specific studies, we do not see this as the best way to use a relational instrument. The studies reported above have all used this instrument in one or both of two ways. Gibbs and Coffey (2004) have used it to monitor changes in approach to teaching over the course of teaching done in parallel with a teaching development program. The second, and what we see as the main use of the Inventory, has been as a way of collecting data for the analysis of relations between approaches to teaching and other elements of the teaching-learning environment perceived by the same teacher in the same context. For example, the studies described above are of this form, and in addition Trigwell *et al.* (2000) have also explored the relations between teachers' approach to teaching and their perceptions of leadership of teaching in their own department for 51 departments.

Although this analysis shows that the ATI is a valid and reliable instrument for the measurement of key aspects of the variation in approaches to teaching related to students' approaches to learning, we are continuing to work on the further development of the instrument.

CONCLUSIONS

In 1999 we reported that teacher-focused approaches to teaching were associated with students' reproducing orientations (Trigwell *et al.*, 1999). Subsequent research revealed that in subjects where teachers adopted more student-focused approaches to teaching, their students adopted a deeper approach to learning (Trigwell *et al.*, 1998). The ATI used to collect data for these analyses was developed from the transcripts of interviews with university teachers and factor and scale reliability analyses of the selected inventory items. Based on these analyses and the nature of the results obtained from its use, the ATI is a valid and reliable relational instrument for measuring key aspects of the variation in the ways teachers see and approach their teaching. The research conducted using the ATI suggests that different university teachers focus on different aspects of their situation, and what they focus on is related to their approaches to teaching. There are systematic relations between the ways teachers' teach and the quality of their students' learning. Although at this stage the direction of those relations is still unclear, changing aspects of the teaching situation may help to improve student learning.

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APPENDIX 1: APPROACHES TO TEACHING INVENTORY

This inventory is designed to explore the way that academics go about teaching in a specific context or subject or course. This may mean that your responses to these items in one context may be different to the responses you might make on your teaching in other contexts or subjects. For this reason we ask you to describe your context.

Please describe the subject/year of your response here: . . . .

For each item please circle one of the numbers (1-5). The numbers stand for the following responses:

1   -   this item was **only rarely** true for me in this subject.
2   -   this item was **sometimes** true for me in this subject.
3   -   this item was true for me **about half the time** in this subject.
4   -   this item was **frequently** true for me in this subject.
5   -   this item was almost **always** true for me in this subject.

Please answer each item. Do not spend a long time on each: your first reaction is probably the best one.

		Only rarely				Almost always
1	I design my teaching in this subject with the assumption that most of the students have very little useful knowledge of the topics to be covered.	1	2	3	4	5
2	I feel it is important that this subject should be completely described in terms of specific objectives relating to what students have to know for formal assessment items.	1	2	3	4	5
3	In my interactions with students in this subject I try to develop a conversation with them about the topics we are studying.	1	2	3	4	5
4	I feel it is important to present a lot of facts to students so that they know what they have to learn for this subject.	1	2	3	4	5
5	I feel that the assessment in this subject should be an opportunity for students to reveal their changed conceptual understanding of the subject.	1	2	3	4	5
6	I set aside some teaching time so that the students can discuss, among themselves, the difficulties that they encounter studying this subject.	1	2	3	4	5
7	In this subject I concentrate on covering the information that might be available from a good textbook.	1	2	3	4	5
8	I encourage students to restructure their existing knowledge in terms of the new way of thinking about the subject that they will develop.	1	2	3	4	5
9	In teaching sessions for this subject, I use difficult or undefined examples to provoke debate.	1	2	3	4	5
10	I structure this subject to help students to pass the formal assessment items.	1	2	3	4	5
11	I think an important reason for running teaching sessions in this subject is to give students a good set of notes.	1	2	3	4	5
12	In this subject, I only provide the students with the information they will need to pass the formal assessments.	1	2	3	4	5
13	I feel that I should know the answers to any questions that students may put to me during this subject.	1	2	3	4	5
14	I make available opportunities for students in this subject to discuss their changing understanding of the subject.	1	2	3	4	5
15	I feel that it is better for students in this subject to generate their own notes rather than always copy mine.	1	2	3	4	5
16	I feel a lot of teaching time in this subject should be used to question students' ideas.	1	2	3	4	5

Thank you