

Students' perceptions of academic quality and approaches to studying in distance education

John T. E. Richardson*

The Open University, UK

(Submitted 6 August 2003; conditionally accepted 11 December 2003; accepted 4 February 2004)

Attempts to demonstrate a relationship between students' approaches to studying in higher education and their perceptions of their academic context have been bedevilled by limitations of the research instruments and the problem of aggregating students' perceptions and approaches across different course units. The extended version of the Course Experience Questionnaire (Wilson *et al.*, 1997) and the Revised Approaches to Studying Inventory (Entwistle *et al.*, 2000) were adapted for use in distance education and administered in a postal survey to students taking seven courses by distance learning with the Open University. Usable responses were obtained from over 2100 students. Both instruments proved to be remarkably robust, and the students' scores on these two instruments shared 61% of their variance. Students' perceptions of the academic quality of courses in distance education are strongly associated with the approaches to studying that they adopt on those courses.

Introduction

Interview-based research that was carried out in both Britain and Sweden during the 1970s identified three predominant approaches to studying in higher education: a deep approach, based upon understanding the meaning of course materials; a surface approach, based upon memorising course materials for the purposes of assessment; and a strategic approach, based upon obtaining the highest grades. The choice of one approach rather than another appeared to depend on the content, the context and the demands of specific learning tasks (Marton, 1976; Laurillard, 1979; Ramsden, 1979; for a detailed review, see Richardson, 2000, ch. 2). More recent quantitative studies have shown that the same students may exhibit different approaches, depending upon the demands of different course units (Eley, 1992), the quality of the teaching (Vermetten *et al.*, 1999) and the nature of the assessment (Scouller, 1998).

* Institute of Educational Technology, The Open University, Walton Hall, Milton Keynes MK7 6AA, UK. Email: J.T.E.Richardson@open.ac.uk

These findings suggest that changes in the design and the delivery of specific courses will affect how students tackle those courses. In particular, they imply that the choice of appropriate course design, teaching methods and modes of assessment will induce desirable approaches to studying. Unfortunately, there is very little empirical evidence that educational interventions can induce desirable changes in students' approaches to studying (Gibbs, 1992; Kember *et al.*, 1997; Hambleton *et al.*, 1998). One explanation for this is that the impact of contextual factors is mediated by students' perceptions of their academic environment. It follows that educational interventions will not be effective unless they serve to modify the students' perceptions. However, this kind of account assumes that there is a direct association between students' approaches to learning and their perceptions of the academic environment.

In this article, I first review the evidence for this assumption that has been obtained in research carried out at campus-based institutions of higher education. The evidence proves to be equivocal because of limitations of the survey instruments and the problem of aggregating students' accounts across different course units. I then present a new study that evaluates the assumption of a link between students' perceptions and approaches to studying using robust instruments to obtain data from students taking individual courses by distance learning.

Initial evidence on students' perceptions and approaches to studying

In the light of the results of interview-based research, Ramsden and Entwistle (1981) devised the Approaches to Studying Inventory (ASI) to obtain self-reports from students on various aspects of studying, subsumed under a 'meaning orientation', a 'reproducing orientation', an 'achievement orientation' and a 'nonacademic orientation'. They also developed the Course Perceptions Questionnaire (CPQ) to obtain students' accounts of eight different aspects of their academic environment. Ramsden and Entwistle obtained data on both instruments from 2208 students at 54 institutions of higher education, and they carried out a factor analysis on these data in order to identify scales of the CPQ and subscales of the ASI that loaded on the same factors. This yielded a number of relationships between the two instruments:

- (a) Perceptions of a heavy workload on the CPQ were associated with higher scores on the subscales of the ASI that defined a reproducing orientation (namely, Surface Approach, Syllabus-Boundness, Fear of Failure and Extrinsic Motivation).
- (b) Perceptions of clear goals and standards on the CPQ were associated with higher scores on the subscales of the ASI that defined an achieving orientation (Strategic Approach, Disorganised Study Methods, Negative Attitudes to Studying and Achievement Motivation, where the second and third of these subscales were scored in reverse).
- (c) Higher scores on the subscales of the ASI concerned with intrinsic motivation and the use of evidence were associated with a positive evaluation of the quality of teaching in general according to the CPQ.

Even so, Ramsden and Entwistle acknowledged that there was 'not a great deal of overlap' between the two sets of measures (p. 375; see also Entwistle & Ramsden, 1983, p. 184). Parsons (1988) gave the ASI and the CPQ to English-speaking and Afrikaans-speaking students at a South African institution of higher education. In both cases, perceptions of a heavy workload on the CEQ were associated with high scores on the ASI scales defining a reproducing orientation. In general, however, Parsons' results confirmed the impression from Ramsden and Entwistle's study that there are few associations between scores on the ASI and the CPQ, and that even those associations that do attain statistical significance are relatively weak and unlikely to be of much practical importance (see also Meyer & Parsons, 1989).

Measuring students' perceptions of their academic context

The failure to find stronger links between these two instruments might have been due to inherent weaknesses in the CPQ. Meyer (1988) developed a more detailed questionnaire, and he found a number of associations between students' responses to the individual items and their scores on the ASI. On the basis of these results, Meyer and Muller (1990) devised six scales to measure 'deep' and 'surface' perceptions of the learning context and added the workload scale from the CPQ to yield a new instrument, the Qualitative Context Inventory. When this was administered together with the ASI, it was found that scores on the scales that measured deep perceptions of the learning context were closely associated with scores on the ASI subscales defining a meaning orientation, a phenomenon that Meyer and Muller called the 'contextual orchestration' of approaches to studying (see also Meyer, 1991).

Entwistle and Tait (1990) used a modified version of the ASI and a new instrument concerned with students' experiences and evaluations in a survey of engineering students at five Scottish institutions. On the one hand, students' perceptions that the content of their courses was interesting and professionally relevant were associated with higher scores on meaning orientation. On the other hand, students' perceptions of a difficult content and a heavy workload were associated with higher scores on reproducing orientation and non-academic orientation. In general, however, the degree of overlap between the two questionnaires was again relatively weak. In particular, there was no clear link between perceptions of good teaching and students' scores on meaning orientation.

On the basis of his experience with the CPQ and a similar questionnaire intended for use with schoolchildren (Ramsden *et al.*, 1989), Ramsden (1991) devised a new instrument, the Course Experience Questionnaire (CEQ). This was specifically intended as an indicator of the quality of teaching on particular degree programmes, and it contained 30 items in five scales corresponding to different aspects of effective teaching. The defining items of these scales are shown in Table 1. For each item, respondents indicate their level of agreement with a particular statement on a scale from 1 to 5. Half of the 30 items are consistent with the meaning of the scale to which they belong; the other half of the items have a meaning that is opposite to that of the scale to which they belong, and so these items are scored in reverse.

Table 1. Defining items of the scales in the original Course Experience Questionnaire

Scale	Defining item
Good Teaching	Teaching staff here normally give helpful feedback on how you are going.
Clear Goals and Standards	You usually have a clear idea of where you're going and what's expected of you in this course.
Appropriate Workload	The sheer volume of work to be got through in this course means you can't comprehend it all thoroughly.*
Appropriate Assessment	Staff here seem more interested in testing what we have memorised than what we have understood.*
Emphasis on Independence	Students here are given a lot of choice in the work they have to do.

Note: adapted from Ramsden (1991, p. 134). Items with asterisks are scored in reverse.

Trigwell and Prosser (1991) administered the CEQ and a questionnaire containing just three subscales from the ASI to 55 nursing students. They found that the adoption of a surface approach was linked to perceptions of an inappropriate workload and perceptions of inappropriate assessment. However, other relationships between the students' scores on the two questionnaires were small and not statistically significant. Even so, it could be argued that both the sample size and the research instrument that Trigwell and Prosser had used to measure approaches to studying were too limited and consequently were unlikely to detect more subtle associations with the students' perceptions of their programme.

Since 1993, an adapted version of the CEQ has been administered annually to all new graduates from Australian universities. This version contains only 17 of the original 30 items, and it entirely omits the Emphasis on Independence scale. However, it includes an extra scale that consists of six items concerned with the fostering of generic skills. The resulting 23-item version of the CEQ is usually supplemented by an item that is concerned with whether or not the respondents are satisfied with their courses in general. For research purposes, Wilson *et al.* (1997) proposed that the original 30-item version of the CEQ should be augmented with the Generic Skills scale to yield a 36-item questionnaire. Wilson *et al.* presented evidence from Australian students to demonstrate the reliability and validity of the latter instrument.

Measuring approaches to studying

Nevertheless, the failure to find stronger links between the CPQ and the ASI might also have been due to inherent weaknesses in the ASI. In particular, some of the ASI's subscales do not appear to be very robust, particularly those intended to measure an achievement orientation and a non-academic orientation (see Richardson, 2000, pp. 90–96, 101–105, for a review). Richardson (1990) argued that it was appropriate to abbreviate the ASI to the subscales that had been consistently identified with a meaning orientation and a reproducing orientation in the original data reported by Entwistle and Ramsden (1983, p. 52). This yields

a shortened instrument containing 32 items in eight scales, and this version of the ASI was successfully used in several research studies (see Richardson, 2000, pp. 113–118).

Sadlo and Richardson (2003) administered Ramsden's (1991) version of the CEQ and the 32 item version of the ASI to 225 students at schools of occupational therapy in six different countries. They found that the students' scores on the two instruments shared more than half of their respective variance. They concluded that there was an intimate relationship between approaches to studying and perceptions of the academic environment. A canonical correlation analysis showed that high scores on the CEQ were associated with low scores on the ASI subscales concerned with a reproducing orientation rather than with high scores on the ASI subscales concerned with a meaning orientation. However, Sadlo and Richardson noted that their students' scores on meaning orientation were relatively high in comparison with normative samples, which they ascribed to the applied nature of occupational therapy.

Since 1992, Entwistle and his colleagues have been developing a new questionnaire, the Revised Approaches to Studying Inventory (RASI; Entwistle *et al.*, 2000). In its latest version, this consists of 52 items in 13 subscales that measure various aspects of a deep approach, a strategic approach and a surface approach. The subscales themselves are listed in Table 2. Once again, respondents indicate their level of agreement with each statement on a scale from 1 to 5. Entwistle *et al.* considered that the first three subscales in each approach were more consistently related to one another, but that the others were more peripheral and likely to show varying relationships across different samples of students.

Kreber (2003) obtained data from 1080 Canadian students on the 52-item version of the RASI, the 23-item version of the CEQ and 11 new items concerned with the fostering of student independence. The students were asked to respond with regard to their perceptions and approaches to studying on particular course units rather than across their programmes of study. Analysis of the results confirmed the reliability and the intended factor structure of the 13 subscales in the RASI. Multiple regression analyses demonstrated that, taken together, the students' demographic characteristics and their perceptions of their course units accounted for 20.3% of the variance in their scores on Deep Approach, 16.5% of the variance in their scores on Strategic Approach and 36.7% of the variance in their scores on Surface Approach.

Table 2. Subscales contained in the Revised Approaches to Studying Inventory

Deep Approach	Strategic Approach	Surface Approach
Seeking Meaning	Organised Studying	Lack of Purpose
Relating Ideas	Time Management	Unrelated Memorising
Use of Evidence	Alertness to Assessment Demands	Syllabus-Boundness
Interest in Ideas	Achieving	Fear of Failure
	Monitoring Effectiveness	

Unfortunately, when Kreber carried out a factor analysis of her students' responses to the CEQ, the Good Teaching scale split into two separate scales concerned with the provision of feedback on students' work and with the quality of classroom instruction, respectively. In the context of individual course units, the former is likely to depend on institutional policies and practices, whereas the latter is likely to depend on the competence of particular teachers. Perhaps more crucially for present purposes, Kreber did not report separately the proportion of variance in her students' scores on the RASI that could be explained by variations in their scores on the CEQ rather than by variations in demographic variables such as age and gender.

Nevertheless, Kreber's study raises a more fundamental issue. The CEQ was intended to measure the quality of teaching across entire degree programmes, and Wilson *et al.* (1997) explicitly advised that it should not be used to obtain feedback on specific topics or teachers. However, the same students may evaluate different course units in different ways, depending on their perceptions of the teachers' competence and of the assessment demands (Eley, 1992; Scouller, 1998; Vermetten *et al.*, 1999). If the CEQ is used at the programme level, therefore, it provides merely an aggregate view that fails to reflect variations in the students' experience across different course units. It may similarly not be useful to ask about students' approaches to studying at the programme level if these, too, show variations across different course units.

In fact, Prosser *et al.* (1994) modified the CEQ to refer to particular topics (such as mechanics in a physics programme or photosynthesis in a biology programme), while Lucas *et al.* (1997) used a version of the CEQ concerned with students' perceptions of individual course units to compare their experience of large and small classes. However, it is not clear how easily students on full-time programmes can differentiate their experiences of different topics or course units. This issue may be less serious for students on part-time programmes and especially for those studying part-time by distance learning, because these students may be taking only one or two course units at a time. Accordingly, research in distance education may provide a clearer picture of the relationship between students' perceptions of the quality of their courses and the approaches to studying that they adopt on those courses.

Students' perceptions and approaches to studying in distance education

Distance-learning students may have perceptions and approaches to studying that are different from those of campus-based students. At a purely descriptive level, distance-learning students are less likely to have a social, extrinsic orientation to studying and are more likely to have a personal or intrinsic orientation to studying than campus-based students (Taylor *et al.*, 1981). Distance-learning students also produce higher scores on the subscales of the ASI measuring a deep approach and lower scores on the subscales of the ASI that measure a surface approach (Morgan *et al.*, 1980; Harper & Kember, 1986; Wong, 1992; Richardson *et al.*, 1999).

However, distance-learning students also tend to differ from campus-based students in a number of demographic characteristics. Most obviously, perhaps,

distance-learning students tend to be older than campus-based students. In terms of their orientations and approaches to studying, distance-learning students resemble older campus-based students and differ from younger campus-based students. Richardson (2000, pp. 179–180) concluded that differences between campus-based and distance-learning students could be ascribed to differences in age and other background variables rather than to differences in the mode of course delivery.

Many Australian institutions deliver their programmes both in a campus-based mode and in a distance-learning mode. Both modes are included in the annual surveys of Australian graduates, and students' scores on the 23-item CEQ have been compared in published reports. The consistent pattern is for graduates from distance-learning programmes to obtain higher scores on Good Teaching and Appropriate Assessment and to be more likely to agree that in general they are satisfied with the quality of their programmes. Johnson (1997, pp. 39–40, 1998, pp. 56–57, 73–74) suggested that these trends were due, not to the mode of study per se, but to the fact that campus-based students and distance-learning students tended to enrol on programmes in different disciplines that employed different modes of assessment.

However, questionnaires developed for use with students at campus-based institutions of higher education may well need to be adapted for use with students in distance education. In particular, items that refer to 'lecturers' or 'teaching staff' may be inappropriate when the curriculum is delivered primarily by written course materials rather than through face-to-face instruction. In fact, most distance-learning institutions use various kinds of personal support (such as face-to-face tutorials, residential schools and teleconferencing) to try to narrow what Moore (1980) called the 'transactional distance' with their students. This means that teachers in distance education have specific roles as writers of course materials and as tutors, and this needs to be taken into account in the construction and analysis of student questionnaires.

Richardson and Woodley (2001) amended the 36-item version of the CEQ for use in distance education by removing references to 'lecturers' or 'teaching staff' so that the items in question referred to tutors or to teaching material. The aim of their study was to compare perceptions of students with and without a hearing loss, and so they also amended the CEQ in accordance with good practice in the construction of assessment materials for people with a hearing loss (Nickerson *et al.*, 1986; Vernon & Andrews, 1990, ch. 10). This required the use of simple vocabulary and syntax as well as the elimination of abstract and metaphorical constructions. These modifications might be expected to enhance the reliability and validity of the CEQ for respondents with no hearing loss, too (Miller & Herrmann, 1997).

Richardson and Woodley obtained responses to the modified CEQ from 265 students with a hearing loss who were taking courses by distance learning with the Open University in the UK and from 178 students taking the same courses with no form of disability. The results confirmed the reliability and the intended factor structure of the CEQ except in two respects. First, the Good Teaching scale split into two separate scales concerned with good materials and good tutoring. This was

not surprising, given the manner in which its constituent items had been reworded. Second, the original Emphasis on Independence scale was reflected in a factor that was more narrowly focused upon student choice rather than student autonomy.

Lawless and Richardson (2002) administered Richardson and Woodley's version of the CEQ together with a similarly modified version of Richardson's (1990) 32-item ASI to students taking six different courses by distance learning with the Open University. Results from more than 1200 students confirmed the reliability and intended factor structure of the CEQ, except that once again the Good Teaching scale split into two separate scales relating to good materials and good tutoring, and the Emphasis on Independence scale proved to be more narrowly concerned with student choice. In addition, the students' scores on the CEQ and the ASI shared 47% of their respective variance, confirming the idea of an association between students' approaches to studying and their perceptions of their academic environment.

Richardson and Price (2003) repeated Lawless and Richardson's study with students who were taking two different courses in computing with the Open University. In both cases, tutorial support was provided by electronic mail rather than by face-to-face tutorials. Results from 241 students generally replicated Lawless and Richardson's findings with regard to the reliability and factor structure of the CEQ, and the students' scores on the CEQ and the ASI shared 64% of their respective variance. Although Lawless and Richardson and Richardson and Price also confirmed the intended factor structure of the 32-item ASI, in both cases the reliability of several of its subscales was fairly poor by conventional psychometric criteria.

In other words, distance education appears to provide an appropriate context in which to assess the hypothesis of an association between students' perceptions of particular courses and the approaches to studying that they adopt on those courses. Nevertheless, the results of previous studies may be qualified by the limitations of the survey instruments that have been employed. The CEQ and the RASI are psychometrically superior to the CPQ and the ASI, and therefore the present study was carried out to evaluate approaches to studying according to the RASI and perceptions of academic quality according to the CEQ in students taking seven courses by distance learning. The main interest lay in evaluating the extent and nature of the overlap between the students' scores on the subscales of the RASI and the scales of the CEQ.

Method

Context

The Open University was established in 1969 to provide degree programmes by distance education throughout the UK. Originally, nearly of all its courses were delivered by correspondence materials, combined with television and radio broadcasts, video and audio recordings, tutorial support at a local level and (in some cases) week-long residential schools. In recent years, however, the University has made increasing use of computer-based support, particularly CD-ROMs,

dedicated websites and computer-mediated conferencing. It accepts all applicants over the normal minimum age of 18 onto its courses without imposing formal entrance requirements, subject only to limitations of numbers on individual courses.

The majority of the Open University's courses run from February to October and are weighted at either 30 or 60 credit points, on the basis that full-time study would consist of courses worth 120 credit points in any calendar year. Students are permitted to register for two or more courses up to a maximum load of 120 credit points, but the majority register for just one course at a time. Courses contributing to the University's undergraduate programme are classified as introductory, intermediate or honours, and since the year 2000 schemes of study that lead to a wide range of named degrees have been introduced. Nevertheless, the programme retains a modular structure in which prerequisite requirements are minimised. Most courses are assessed by a combination of written assignments (submitted by post or electronic mail) and traditional unseen examinations (taken at regional assessment centres).

Participants

Seven courses presented in 2001 were chosen for this study. To maximise the response rates, courses were chosen that had not been included in the annual survey conducted under the University's quality assurance procedures during 2001. Four courses were chosen from the Arts Faculty, two were chosen from the Science Faculty, and the last was a multidisciplinary course. Three of these courses were rated at 30 credit points, and the rest were rated at 60 credit points. The courses themselves will not be identified here but will be simply referred to as Courses 1–7. Table 3 shows the number of students registered on each course and of those who responded to the present survey.

Materials and procedure

The 52-item RASI was modified for use with students in distance education and combined with the 36-item version of the CEQ devised by Richardson and Woodley

Table 3. Characteristics and response rates for seven courses

Course	Faculty	Level	Credit points	Number of students	Number of respondents	Response rate (%)
1	Arts	Intermediate	30	621	358	57.6
2	Arts	Intermediate	60	654	454	69.4
3	Arts	Honours	30	384	240	62.5
4	Arts	Honours	60	633	430	67.9
5	Science	Intermediate	30	541	278	51.4
6	Science	Intermediate	60	305	136	44.6
7	Multidisciplinary	Intermediate	30	455	281	61.8

(2001). The CEQ was further modified to refer to the specific course that each student had taken in 2001, and the instructions referred to 'your personal experience of studying [course] in 2001'. For each item, the participants were asked to indicate the extent of their agreement or disagreement with the relevant statement on a 5-point scale from 5 for 'definitely agree' to 1 for 'definitely disagree', where the midpoint (3) was 'only to be used if the statement doesn't apply to you or if you really find it impossible to give a definite answer'. The questionnaire was mailed to students in January 2002, and a reminder was sent out later that month.

Results and discussion

A total of 2177 students returned completed copies of the questionnaire, representing an overall response rate of 60.6%; 36% of the respondents were male, 64% were female; and they were aged between 21 and 87 with a mean of 48.0 years. Table 3 shows the response rates for the seven courses. These varied significantly from one another, $X^2(6, N=2177)=90.62, p=0.00$, but in each case they would be considered adequate for a postal survey (Babbie, 1973, p.165; Kidder, 1981, pp. 150–151).

The first part of the data analysis was concerned with the psychometric properties of the CEQ and the RASI in the context of distance education. Their internal consistency was evaluated using Cronbach's (1951) coefficient alpha; their construct validity was evaluated using exploratory factor analysis; and their discriminant validity was evaluated by means of comparisons among the students taking the seven courses, adjusted for the possible effects of variations in age and gender. The second part of the analysis was concerned with identifying relationships between scores on the CEQ and scores on the RASI using canonical correlation analysis. Values of η^2 (equal to the complement of Wilks' lambda) are provided as measures of effect size (Tabachnik & Fidell, 1996, p. 390).

CEQ scores

On examining the responses to the CEQ, it was found that 393 students had failed to provide a response to one or more of the 36 items. In most cases, these were isolated instances, and it was felt appropriate to regard them as items that did not apply to the student in question; accordingly, they were coded as '3' (i.e., 'doesn't apply to me'). However, 25 respondents had missed more than four items, and they were dropped from further analysis. Accordingly, the final sample consisted of 2152 students who had provided usable sets of data.

The different scales identified by Richardson and Woodley (2001) contain varying numbers of items, and so the students were assigned scores on each of these seven scales by computing the mean response across the relevant items. Descriptive statistics are provided in Table 4. The scores on all seven scales showed a satisfactory level of internal consistency, as evidenced by values of Cronbach's (1951) coefficient alpha between 0.63 and 0.86.

Table 4. Means, standard deviations, coefficient alphas and factor loadings of CEQ scales

Scale	No. of items	Mean	SD	Coefficient alpha	Factor loadings
Appropriate Assessment	6	4.14	0.75	0.63	0.53
Appropriate Workload	5	3.08	1.09	0.85	0.47
Clear Goals and Standards	4	3.67	0.95	0.81	0.73
Generic Skills	7	3.23	0.83	0.82	0.60
Good Materials	3	4.01	0.84	0.76	0.74
Good Tutoring	8	3.72	0.81	0.86	0.58
Student Choice	3	2.73	0.79	0.67	0.52
Perceived Academic Quality		3.51	0.58		

Note: $N=2152$.

An exploratory factor analysis was carried out on these scale scores. First, a principal components analysis was used to determine the number of factors to extract. This identified one component with an eigenvalue greater than 1, which explained 45.0% of the total variance. The idea that just one factor should be extracted was supported by Cattell's (1966) scree test using both visual inspection and Zoski and Jurs' (1996) objective procedure, and it was also confirmed by a comparison with the results of a parallel analysis of 1000 random correlation matrices using the program devised by O'Connor (2000). For the main analysis, the aim was to identify global dimensions underlying students' perceptions. Principal axis factoring was therefore used to extract just one factor with squared multiple correlations as the initial estimates of communality.

The loadings of the seven scales on the single extracted factor are shown in Table 4. All seven scales showed loadings greater than 0.30 in magnitude, which indicates that this factor can be interpreted as an overall measure of perceived academic quality. However, the precise pattern of loadings implies that students' perceptions of academic quality were determined somewhat more by their perceptions of receiving good materials and clear goals and standards than by their perceptions of receiving generic skills, good tutoring, appropriate assessment, choice in their studies, or an appropriate workload. A second-order factor-based scale, labelled 'Perceived Academic Quality', was constructed by computing each student's mean score across the seven CEQ scales (cf. Pedhazur & Schmelkin, 1991, pp. 625–626). This scale exhibited good internal consistency, as shown by a coefficient alpha of 0.79.

A 37th item ('In general, I am satisfied with the quality of [course]') is often included in the CEQ to validate its use as a measure of perceived quality. All of the students who had provided usable responses to the CEQ had responded to this item. The overall mean response on a scale from 1 to 5 was 4.25, and the modal response on all seven courses was 4, which implies a high degree of satisfaction. The correlation coefficients between the scores on the seven scales and the responses to Item 37 were: Appropriate Assessment, +0.39; Appropriate Workload, +0.43; Clear

Goals and Standards, +0.57; Generic Skills, +0.43; Good Materials, +0.66; Good Tutoring, +0.40; and Student Choice, +0.35 ($p=0.00$ in each case).

In other words, the students' reported level of satisfaction with Open University courses was determined rather more by their perceptions of receiving good materials and clear goals and standards than by their perceptions of receiving generic skills, an appropriate workload, good tutoring, appropriate assessment, or choice in their studies. This is very similar to the pattern of loadings of the seven scales on the single extracted factor, and this in turn provides further support for the interpretation of this second-order factor as a measure of perceived academic quality.

A univariate analysis of variance was carried out on the measure of perceived academic quality to compare the students who had taken the seven courses, controlling for the covariates of age and gender (which were unavailable for one student). There was a weak but statistically significant difference among the students who had taken the seven courses, $F(6, 2142)=3.57$, $\eta^2=0.01$, $p=0.00$. However, the effects of age, $F(1, 2142)=0.43$, $\eta^2=0.00$, $p=0.51$, and gender, $F(1, 2142)=2.84$, $\eta^2=0.00$, $p=0.09$, were not significant.

In short, the seven scales of the CEQ proved to have satisfactory internal consistency according to the values of coefficient alpha. The construct validity of the CEQ was shown by the fact that they collectively defined a single higher-order factor that could be interpreted as a measure of perceived academic quality. Its discriminant validity was shown by the fact that it differentiated among students who had taken different courses. The latter variation was not particularly great, but this can be attributed to the common 'house style' of Open University courses and the impact of a rigorous and centralised system of quality assurance (Lawless & Richardson, 2004).

RASI scores

On examining the responses to the RASI, it was found that 89 students had not provided a response to one or more of the 52 items. In most cases, these were again isolated instances, and it was felt appropriate to regard them as items that did not apply to the student in question; accordingly, they were coded as '3' (i.e., 'doesn't apply to me'). However, 28 respondents had missed more than four items, and so they were dropped from further analysis. Accordingly, the final sample consisted of 2149 students who had provided usable sets of data. Following Entwistle *et al.* (2000), subscale scores were assigned by computing the *total* scores across the relevant items, and therefore these scores vary between 4 and 20; scale scores were similarly assigned by computing the total scores across the relevant subscales. Descriptive statistics are summarised in Table 5. The scores on the 13 subscales generally exhibited a satisfactory level of internal consistency, as evidenced by values of Cronbach's (1951) coefficient alpha between 0.50 and 0.82.

An exploratory factor analysis was carried out on these subscale scores. First, a principal components analysis was again used to determine the number of factors to extract. This analysis identified three components with eigenvalues greater than 1,

Table 5. Means, standard deviations, coefficient alphas and factor loadings of RASI subscales

Subscale	Mean	SD	Coefficient alpha	Factor loadings		
				1	2	3
Deep Approach						
Seeking Meaning	16.35	2.73	0.68	0.67	-0.04	0.20
Relating Ideas	15.20	2.85	0.63	0.84	-0.03	-0.08
Use of Evidence	15.85	2.53	0.61	0.77	0.11	0.09
Interest in Ideas	17.24	2.58	0.70	0.58	-0.13	0.03
Total	64.63	8.72				
Strategic Approach						
Organised Studying	13.15	3.44	0.55	0.02	-0.19	0.68
Time Management	15.03	3.86	0.82	-0.11	-0.17	0.85
Alertness to Assessment Demands	13.31	3.19	0.58	0.07	0.25	0.40
Achieving	16.45	2.71	0.65	0.17	-0.17	0.63
Monitoring Effectiveness	16.76	2.75	0.69	0.32	0.05	0.52
Total	74.69	11.85				
Surface Approach						
Lack of Purpose	5.85	2.57	0.63	-0.12	0.48	-0.16
Unrelated Memorising	9.24	3.01	0.50	-0.10	0.66	0.02
Syllabus-Boundness	10.98	3.39	0.59	-0.31	0.43	0.07
Fear of Failure	11.90	4.47	0.80	0.12	0.62	-0.12
Total	37.97	9.64				
Factor correlations						
Factor 1				1.00	-0.27	0.44
Factor 2				-0.27	1.00	-0.17
Factor 3				0.44	-0.17	1.00

Note: N=2149.

which explained 60.8% of the total variance. The idea that three factors should be extracted was supported by Cattell's (1966) scree test both through visual inspection and using Zoski and Jurs' (1996) procedure, and it was also confirmed by comparison with the results of a parallel analysis of 1000 random correlation matrices using the program devised by O'Connor (2000). For the main analysis, the aim was to identify more global approaches to studying. Consequently, principal axis factoring was used to extract three factors with squared multiple correlations as the initial estimates of community.

Finally, the extracted factor matrix was submitted to oblique rotation using a quartimin method. The loadings of the subscales on the three extracted factors are shown in Table 5. It is clear that the factors reflected a deep approach, a surface approach and a strategic approach, respectively. There was a positive correlation between the first and third factors, but there were smaller negative correlations between the second factor and both the first and third factors.

A multivariate analysis of variance was carried out on the students' scores on the three main scales of the RASI to compare the students who had taken the seven

courses, controlling for the covariates of age and gender. There was once again a statistically significant difference among the students who had taken the seven courses, $F(18, 6045)=8.08$, $\eta^2=0.07$, $p=0.00$, and there were statistically significant though weaker effects of age, $F(3, 2137)=20.15$, $\eta^2=0.03$, $p=0.00$, and gender, $F(3, 2137)=22.97$, $\eta^2=0.03$, $p=0.00$.

Univariate tests demonstrated that there were statistically significant differences among the students who had taken the seven courses in terms of their scores on Deep Approach, $F(6, 2139)=11.95$, $\eta^2=0.03$, $p=0.00$, Strategic Approach, $F(6, 2139)=4.43$, $\eta^2=0.01$, $p=0.00$, and Surface Approach, $F(6, 2139)=7.55$, $\eta^2=0.02$, $p=0.00$. Age was positively correlated with scores on Deep Approach, $F(1, 2139)=29.04$, $\eta^2=0.01$, $p=0.00$, and on Strategic Approach, $F(1, 2139)=50.31$, $\eta^2=0.02$, $p=0.00$, but negatively correlated with scores on Surface Approach, $F(1, 2139)=22.97$, $\eta^2=0.01$, $p=0.00$. Women produced higher scores than men on Strategic Approach, $F(1, 2139)=26.57$, $\eta^2=0.01$, $p=0.00$, and on Surface Approach, $F(1, 2139)=21.80$, $\eta^2=0.01$, $p=0.00$, but not on Deep Approach, $F(1, 2139)=1.83$, $\eta^2=0.00$, $p=0.18$.

In short, the 13 scales of the RASI proved to have satisfactory internal consistency according to the values of coefficient alpha. The construct validity of the RASI was shown by the fact that they collectively defined three higher-order factors that corresponded to the three original approaches to studying. The discriminant validity of the RASI was shown by the fact that it differentiated among students who had taken different courses. The latter variation was not particularly great, but this can again be attributed to the common 'house style' of Open University courses and the impact of a rigorous and centralised system of quality assurance.

Relationships between CEQ scores and RASI scores

Of the 2177 respondents, 2137 students produced usable responses to both the CEQ and the RASI. Table 6 shows the correlation coefficients between their scores on the CEQ and the RASI. All but three of these correlation coefficients were statistically significant ($\alpha=0.05$, two-tailed tests), which is in itself unsurprising, given the size of the sample. A multivariate analysis of variance showed that the proportion of variance shared between the scores on the CEQ and the scores on the RASI was 61%, $F(91, 13205)=23.80$, $\eta^2=0.61$, $p=0.00$.

A canonical correlation analysis was carried out on the within-group regression between the scores on the seven scales of the CEQ and the 13 subscales of the RASI. All seven canonical correlations were statistically significant, but only the first two canonical correlations accounted for an overlap in variance of more than 10%. The correlation coefficients between the first two canonical variates and the scores on the 20 dependent variables are shown in Table 7.

The first canonical variate was positively associated with all of the scales of the CEQ, with the four subscales defining a deep approach, and with four of the five subscales defining a strategic approach, but it was negatively associated with the four subscales defining a surface approach. In other words, perceptions of academic

Table 6. Correlation coefficients between RASI subscale scores and CEQ scale scores

RASI subscales	CEQ scales						
	AA	AW	CG	GS	GM	GT	SC
Deep Approach							
Seeking Meaning	0.26	0.19	0.22	0.28	0.24	0.19	0.13
Relating Ideas	0.23	0.16	0.16	0.29	0.24	0.17	0.16
Use of Evidence	0.20	0.10	0.10	0.21	0.15	0.12	0.06
Interest in Ideas	0.27	0.15	0.20	0.34	0.35	0.19	0.20
Strategic Approach							
Organised Studying	0.15	0.13	0.17	0.18	0.13	0.10	0.08
Time Management	0.16	0.10	0.17	0.17	0.14	0.09	0.04
Alertness to Assessment Demands	-0.01	-0.04	0.04	0.17	0.06	0.09	0.02
Achieving	0.25	0.18	0.26	0.30	0.25	0.21	0.10
Monitoring Effectiveness	0.20	0.10	0.22	0.27	0.21	0.21	0.12
Surface Approach							
Lack of Purpose	-0.33	-0.31	-0.39	-0.28	-0.42	-0.27	-0.22
Unrelated Memorising	-0.42	-0.42	-0.40	-0.21	-0.30	-0.22	-0.17
Syllabus-Boundness	-0.27	-0.23	-0.16	-0.11	-0.15	-0.14	-0.11
Fear of Failure	-0.19	-0.53	-0.30	-0.02	-0.15	-0.13	-0.06

Note: AA, Appropriate Assessment; AW, Appropriate Workload; CG, Clear Goals and *Standards*; GS, Generic Skills; GM, Good Materials; GT, Good Tutoring; SC, Student Choice. $N=2137$.

quality were positively related to the more desirable approaches to studying (a deep approach and, to a lesser extent, a strategic approach) and negatively related to undesirable approaches to studying (a surface approach). The absolute magnitude of the associations tended to be greater for the subscales defining a surface approach: in other words, positive perceptions of academic quality tended to be more strongly related to the discouragement of undesirable approaches to studying than to the encouragement of more desirable approaches.

The second (and less important) covariate was positively associated with scores on Generic Skills, Good Materials, Fear of Failure, Monitoring Effectiveness, and Interest in Ideas, but negatively associated with scores on Appropriate Workload. This suggests that students who combined the peripheral aspects of all three approaches to studying perceived their courses as enhancing their generic skills at the expense of incurring a heavier workload.

Conclusions

In this study, the RASI was administered to a large, representative sample of students taking courses by distance learning. The results demonstrate that, like the CEQ (cf. Richardson & Woodley, 2001), the RASI is remarkably robust in the highly distinctive context of the Open University. This study also enabled a direct comparison to be made between students' scores on the RASI and the same students' scores on the CEQ. The results are consistent with those obtained by

Table 7. Correlations from canonical correlation analysis of CEQ scores and RASI scores

	Variate 1	Variate 2
Canonical correlations	<i>0.65</i>	<i>0.42</i>
Course Experience Questionnaire		
Appropriate Assessment	<i>0.72</i>	0.16
Appropriate Workload	<i>0.77</i>	-0.57
Clear Goals and Standards	<i>0.77</i>	0.07
Generic Skills	<i>0.55</i>	<i>0.61</i>
Good Materials	<i>0.70</i>	<i>0.40</i>
Good Tutoring	<i>0.50</i>	0.27
Student Choice	<i>0.40</i>	0.23
RASI: Deep Approach		
Seeking Meaning	<i>0.48</i>	<i>0.32</i>
Relating Ideas	<i>0.42</i>	<i>0.32</i>
Use of Evidence	<i>0.30</i>	<i>0.24</i>
Interest in Ideas	<i>0.50</i>	<i>0.50</i>
RASI: Strategic Approach		
Organised Studying	<i>0.31</i>	0.19
Time Management	<i>0.31</i>	0.19
Alertness to Assessment	0.05	<i>0.32</i>
Achieving	<i>0.51</i>	<i>0.34</i>
Monitoring Effectiveness	<i>0.40</i>	<i>0.40</i>
RASI: Surface Approach		
Lack of Purpose	-0.73	-0.26
Unrelated Memorising	-0.81	0.16
Syllabus-Boundness	-0.43	0.06
Fear of Failure	-0.63	<i>0.69</i>

Note: $N=2137$. Correlations greater than 0.30 in absolute magnitude are shown in italics.

Ramsden and Entwistle (1981) and by Parsons (1988) in demonstrating a link between students' approaches to learning and their perceptions of the academic environment. The latter researchers compared students' responses to the ASI and the CPQ, and the amount of overlap between the two instruments was far from impressive, suggesting that perceptions of the academic environment were not an important determinant of approaches to studying.

Nevertheless, recent investigations have found a far higher degree of overlap between students' responses to the 32-item version of the ASI and their responses to the CEQ: in three different studies, students' scores on these two instruments shared between 47% and 64% of their respective variance (Lawless & Richardson, 2002; Richardson & Price, 2003; Sadlo & Richardson, 2003). The results of the present study are entirely consistent with this pattern: the students' scores on the RASI and the CEQ shared 61% of their respective variance. (In a bivariate relationship, this would correspond to a correlation coefficient of 0.78.) The present results confirm that there exists an intimate relationship between students' perceptions of the quality of their courses in higher education and the approaches to studying that they adopt on those courses. This, in turn, is consistent with the notion that approaches to

studying depend on the perceived content, context and demands of the learning task.

In the present investigation, neither the age nor the gender of the students was related to their scores on the CEQ, which suggests that they were capable of evaluating their courses in a manner that was essentially independent of their personal circumstances. Nevertheless, both age and gender showed statistically significant but weak relationships with their scores on the RASI. As in other studies (for a review, see Richardson, 1994), older students were more likely to exhibit desirable approaches to learning and less likely to exhibit undesirable approaches to learning than were younger students taking the same courses. Moreover, as in previous research in distance education (Richardson *et al.*, 1999), although not in campus-based education (Richardson & King, 1991), women were more likely to adopt a surface approach than men, but there was no gender difference in the adoption of a deep approach.

Even so, the finding of an overlap between students' scores on the CEQ and their scores on the RASI is correlational in nature. Strictly speaking, it says nothing about either the existence or the direction of a causal relationship between approaches to studying and perceptions of the academic environment. It is usually inferred that variations in students' perceptions of their learning context give rise to variations in their approaches to studying (e.g. Ramsden, 1988; Trigwell & Prosser, 1991; Prosser & Sendlak, 1994; Prosser *et al.*, 1994; cf. Biggs, 1987, pp. 9, 96). Nevertheless, it is in principle possible that variations in students' approaches to studying give rise to variations in their perceptions of the learning context. Marsh (1987) suggested that students might rate their courses more highly if they received better grades; analogously, students might judge their programmes more favourably *because* they find they have adopted more congenial ways of studying.

Yet another possibility is that the causal link between students' perceptions of their academic environment and their approaches to studying is bidirectional, so that variations in perceptions give rise to variations in approaches to studying and vice versa (cf. Biggs, 1993). Finally, Trigwell and Prosser (1997) proposed that there was an internal relationship between perceptions of the academic environment and approaches to studying, so that perceptions and approaches 'are not independently constituted but ... are considered to be simultaneously present in the students' awareness' (p. 243; see also Prosser & Trigwell, 1999a; 1999b, p. 13). All of these accounts are equally consistent with the finding of an association between students' perceptions of their academic environment and their approaches to studying.

However, if variations in students' approaches to studying give rise to variations in their perceptions of the learning context, then factors that affect their approaches to studying should, in turn, influence their perceptions of the learning context. It is hard to square this idea with the findings of the present investigation that students' age and gender predicted their scores on the RASI but were essentially unrelated to their ratings on the CEQ. Similar results with regard to the effects of age were obtained by Sadlo and Richardson (2003). A fortiori, these findings are also

inconsistent with the idea that the causal relationship between perceptions of the learning context and approaches to studying is bidirectional and with the idea of an internal relationship between perceptions of the learning context and approaches to studying: on both these accounts, any factors that influence students' approaches to studying should also influence their perceptions of the learning context.

In short, the present findings provide indirect evidence that students' perceptions of their academic environment influence their approaches to studying, rather than vice versa. The fact that age and gender were related to scores on the RASI but not to ratings on the CEQ entails that demographic characteristics and perceptions of the academic environment are individually salient but mutually independent influences on approaches to studying. This conclusion is contrary to a model of student learning that was put forward by Prosser *et al.* (1994; Prosser & Sendlak, 1994), according to which perceptions of the learning context are influenced by demographic characteristics of the students themselves. However, it supports the more common assumption that student characteristics and contextual factors are distinct influences on approaches to studying (e.g. Newble & Entwistle, 1986; Biggs, 1987).

Acknowledgements

The author is grateful for James Hartley for his comments on an earlier version of this paper.

References

- Babbie, E. R. (1973) *Survey research methods* (Belmont, CA, Wadsworth).
- Biggs, J. B. (1987) *Student approaches to learning and studying* (Melbourne, Australian Council for Educational Research).
- Biggs, J. B. (1993) From theory to practice: a cognitive systems approach, *Higher Education Research and Development*, 12, 73–85.
- Cattell, R. B. (1966) The scree test for the number of factors, *Multivariate Behavioral Research*, 1, 245–276.
- Cronbach, L. J. (1951) Coefficient alpha and the internal structure of tests, *Psychometrika*, 16, 297–334.
- Eley, M. G. (1992) Differential adoption of study approaches within individual students, *Higher Education*, 23, 231–254.
- Entwistle, N. J. & Ramsden, P. (1983) *Understanding student learning* (London, Croom Helm).
- Entwistle, N. & Tait, H. (1990) Approaches to learning, evaluations of teaching and preferences for contrasting academic environments, *Higher Education*, 19, 169–194.
- Entwistle, N., Tait, H. & McCune, V. (2000) Patterns of response to an approaches to studying inventory across contrasting groups and contexts, *European Journal of Psychology of Education*, 15, 33–48.
- Gibbs, G. (1992) *Improving the quality of student learning* (Bristol, Technical & Educational Services).
- Hambleton, I. R., Foster, W. H. & Richardson, J. T. E. (1998) Improving student learning using the personalised system of instruction, *Higher Education*, 35, 187–203.
- Harper, G. & Kember, D. (1986) Approaches to study of distance education students, *British Journal of Educational Technology*, 17, 212–222.

- Johnson, T. (1997) *The 1996 Course Experience Questionnaire*. Report prepared for the Graduate Careers Council of Australia (Parkville, Victoria, Graduate Careers Council of Australia).
- Johnson, T. (1998) *The 1997 Course Experience Questionnaire*. Report prepared for the Graduate Careers Council of Australia (Parkville, Victoria, Graduate Careers Council of Australia).
- Kember, D., Charlesworth, M., Davies, H., McKay, J. & Stott, V. (1997) Evaluating the effectiveness of educational innovations: using the Study Process Questionnaire to show that meaningful learning occurs, *Studies in Educational Evaluation*, 23, 141–157.
- Kidder, L. H. (1981) *Research methods in social relations* (New York, Holt, Rinehart & Winston).
- Kreber, C. (2003) The relationship between students' course perception and their approaches to studying in undergraduate science courses: a Canadian experience, *Higher Education Research and Development*, 22, 57–70.
- Laurillard, D. (1979) The processes of student learning, *Higher Education*, 8, 395–409.
- Lawless, C. J. & Richardson, J. T. E. (2002) Approaches to studying and perceptions of academic quality in distance education, *Higher Education*, 44, 257–282.
- Lawless, C. J. & Richardson, J. T. E. (2004) Monitoring the experiences of graduates in distance education, *Studies in Higher Education*, 29, 353–374.
- Lucas, L., Gibbs, G., Hughes, S., Jones, O. & Wisker, G. (1997) A study of the effects of course design features on student learning in large classes at three institutions: a comparative study in: C. Rust & G. Gibbs (Eds) *Improving student learning: improving student learning through course design* (Oxford, Oxford Centre for Staff and Learning Development).
- Marsh, H. W. (1987) Students' evaluations of university teaching: research findings, methodological issues, and directions for future research, *International Journal of Educational Research*, 11, 253–388.
- Marton, F. (1976) What does it take to learn? Some implications of an alternative view of learning in: N. Entwistle (Ed) *Strategies for research and development in higher education* (Amsterdam, Swets & Zeitlinger).
- Meyer, J. H. F. (1988) Student perceptions of learning context and approaches to studying, *South African Journal of Higher Education*, 2, 73–82.
- Meyer, J. H. F. (1991) Study orchestration: the manifestation, interpretation and consequences of contextualised approaches to studying, *Higher Education*, 22, 297–316.
- Meyer, J. H. F. & Muller, M. W. (1990) Evaluating the quality of student learning: I. An unfolding analysis of the association between perceptions of learning context and approaches to studying at an individual level, *Studies in Higher Education*, 15, 131–154.
- Meyer, J. H. F. & Parsons, P. (1989) Approaches to studying and course perceptions using the Lancaster Inventory: a comparative study, *Studies in Higher Education*, 14, 137–153.
- Miller, L. A. & Herrmann, D. (1997) Improving survey design: the linguistic complexity of survey questions and the quality of responses, *Cognitive Technology*, 2(2), 31–40.
- Moore, M. G. (1980) Independent study in: R. D. Boyd, J. W. Apps & Associates (Eds) *Redefining the discipline of adult education* (San Francisco, CA, Jossey-Bass).
- Morgan, A., Gibbs, G. & Taylor, E. (1980) *Students' approaches to studying the social science and technology foundation courses: preliminary studies*. Study Methods Group Report No. 4 (Milton Keynes, The Open University, Institute of Educational Technology) (ERIC Document Reproduction Service No. ED 197 639).
- Newble, D. I. & Entwistle, N. J. (1986) Learning styles and approaches: implications for medical education, *Medical Education*, 20, 162–175.
- Nickerson, W., Zannettou, I. & Sutton, J. (1986) *Succeeding with the Deaf Student in College* (Special Needs Occasional Paper No. 4) (York, Longman Group Resources Unit).
- O'Connor, B. P. (2000) SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test, *Behaviour Research Methods, Instruments, and Computers*, 32, 396–402.

- Parsons, P. G. (1988) The Lancaster Approaches to Studying Inventory and Course Perceptions Questionnaire: a replicated study at the Cape Technikon, *South African Journal of Higher Education*, 2, 103–111.
- Pedhazur, E. J. & Schmelkin, L. P. (1991) *Measurement, design, and analysis: an integrated approach* (Hillsdale, NJ, Erlbaum).
- Prosser, M. & Sendlak, I. (1994) Student evaluation of teaching questionnaire, *Research and Development in Higher Education*, 16, 551–555.
- Prosser, M. & Trigwell, K. (1999a) Relational perspectives on higher education teaching and learning in the sciences, *Studies in Science Education*, 33, 31–60.
- Prosser, M. & Trigwell, K. (1999b) *Understanding learning and teaching: the experience in higher education* (Buckingham, SRHE & Open University Press).
- Prosser, M., Trigwell, K., Hazel, E. & Gallagher, P. (1994) Students' experiences of teaching and learning at the topic level, *Research and Development in Higher Education*, 16, 305–310.
- Ramsden, P. (1979) Student learning and perceptions of the academic environment, *Higher Education*, 8, 411–427.
- Ramsden, P. (1988) Context and strategy: situational influences on learning in: R. R. Schmeck (Ed) *Learning strategies and learning styles* (New York, Plenum Press).
- Ramsden, P. (1991) A performance indicator of teaching quality in higher education: the Course Experience Questionnaire, *Studies in Higher Education*, 16, 129–150.
- Ramsden, P. & Entwistle, N. J. (1981) Effects of academic departments on students' approaches to studying, *British Journal of Educational Psychology*, 51, 368–383.
- Ramsden, P., Martin, E. & Bowden, J. (1989) School environment and sixth form pupils' approaches to learning, *British Journal of Educational Psychology*, 59, 129–142.
- Richardson, J. T. E. (1990) Reliability and replicability of the Approaches to Studying Questionnaire, *Studies in Higher Education*, 15, 155–168.
- Richardson, J. T. E. (1994) Mature students in higher education: I. A literature survey on approaches to studying, *Studies in Higher Education*, 19, 309–325.
- Richardson, J. T. E. (2000) *Researching student learning: approaches to studying in campus-based and distance education* (Buckingham, Open University Press).
- Richardson, J. T. E. & King, E. (1991) Gender differences in the experience of higher education: quantitative and qualitative approaches, *Educational Psychology*, 11, 363–382.
- Richardson, J. T. E., Morgan, A. & Woodley, A. (1999) Approaches to studying in distance education, *Higher Education*, 37, 23–55.
- Richardson, J. T. E. & Price, L. (2003) Approaches to studying and perceptions of academic quality in electronically delivered courses, *British Journal of Educational Technology*, 34, 45–56.
- Richardson, J. T. E. & Woodley, A. (2001) Perceptions of academic quality among students with a hearing loss in distance education, *Journal of Educational Psychology*, 93, 563–570.
- Sadlo, G. & Richardson, J. T. E. (2003) Approaches to studying and perceptions of the academic environment in students following problem-based and subject-based curricula, *Higher Education Research and Development*, 22, 253–274.
- Scouller, K. (1998) The influence of assessment method on students' learning approaches: multiple choice question examination versus assignment essay, *Higher Education*, 35, 453–472.
- Tabachnik, B. G. & Fidell, L. S. (1996) *Using multivariate statistics* (3rd edn) (New York, HarperCollins).
- Taylor, L., Morgan, A. & Gibbs, G. (1981) The 'orientation' of Open University foundation students to their studies, *Teaching at a Distance*, 20, 3–12.
- Trigwell, K. & Prosser, M. (1991) Improving the quality of student learning: the influence of learning context and student approaches to learning on learning outcomes, *Higher Education*, 22, 251–266.

- Trigwell, K. & Prosser, M. (1997) Towards an understanding of individual acts of teaching and learning, *Higher Education Research and Development*, 16, 241–252.
- Vermetten, Y. J., Lodewijks, H. G. & Vermunt, J. D. (1999) Consistency and variability of learning strategies in different university courses, *Higher Education*, 37, 1–21.
- Vernon, M. & Andrews, J. F. (1990) *The psychology of deafness: understanding deaf and hard-of-hearing people* (New York, Longman).
- Wilson, K. L., Lizzio, A. & Ramsden, P. (1997) The development, validation and application of the Course Experience Questionnaire, *Studies in Higher Education*, 22, 33–53.
- Wong, S. L. (1992) Approaches to study of distance education students, *Research in Distance Education*, 4(3), 11–17.
- Zoski, K. & Jurs, S. (1996) An objective counterpart to visual test for factor analysis: the standard error scree, *Educational and Psychological Measurement*, 56, 443–451.

Copyright of British Educational Research Journal is the property of Carfax Publishing Company and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.