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**Perceptions of academic quality and approaches to studying among  
disabled students and nondisabled students in distance education**

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## **Perceptions of academic quality and approaches to studying among disabled students and nondisabled students in distance education**

### **Abstract**

There is little systematic evidence on the experience of disabled students in higher education. In this study, equal numbers of disabled and nondisabled students taking courses with the UK Open University were surveyed with regard to their approaches to studying and perceptions of the academic quality of their courses. Students with dyslexia or other specific learning difficulties, students with mental health difficulties and students with fatigue were more likely to exhibit a surface approach and less likely to exhibit organised studying than were nondisabled students. In the first two groups, this was associated with lower ratings of the quality of their courses. Nevertheless, the differences were not large, either in absolute terms or in the proportion of variance in the students' scores that they explained. The impact of disability on students' perceptions of the academic quality of their courses and on their approaches to studying appears to be relatively slight.

## **Introduction**

The experiences of disabled students in higher education have become a matter of increasing interest, partly as a result of changes in legislation aimed at promoting equal opportunities for people with disabilities (see Konur 2006; Tinklin and Hall 1999). However, systematic data on the experiences of disabled students are hard to obtain. At a national level, information is available only with regard to the academic attainment of disabled students, not with regard to their experiences (Richardson 2009a). At a local level, the total number of disabled students in a single institution may be relatively small; as a consequence, comparisons with nondisabled students may not be reliable or can only be undertaken by adopting the dubious strategy of treating disabled students as a single group (see, e.g., Healey et al. 2006).

One exception is the Open University, which was created in 1969 to provide degree programmes by distance education across the United Kingdom. The Open University has a commitment to promoting equal opportunities in education, including equal opportunities for disabled people. Conversely, many disabled people turn to distance education to avoid the problems of access that are posed by face-to-face institutions of higher education. Indeed, for many people with severe disabilities or chronic illness, distance learning may be the only practical means of access to higher education (Newell and Debenham 2009). At the time of writing, 10,931 students (or 5.7% of the total student population) who were taking courses with the Open University had declared themselves as having one or more disabilities.

A survey of students who had recently graduated from the Open University found that students with multiple disabilities produced lower ratings than nondisabled students, both of the quality of their courses and of their own personal development as a result of taking those courses; however, other disabled students did not produce lower ratings either of the quality of their courses or of their personal development (Richardson 2009b). Unfortunately, this study was based upon a single cohort of graduates and yielded only 206 disabled respondents. Since this study did not fully address our concerns, we carried out an additional survey of the experiences of students who were currently studying with the Open University, in which for comparison purposes we used equal numbers of disabled and nondisabled students.

We follow Phipps, Sutherland, and Seale (2002) in referring to ‘disabled people’ or ‘disabled students’ rather than ‘people with disabilities’ or ‘students with disabilities’. As they explained:

The term ‘people with disabilities’ implies that the person’s impairment or condition causes them to be ‘disabled’ (and consequently that it is their responsibility to overcome it), whereas ‘disabled person’ implies that the person is disabled not necessarily by their condition or impairment, but by society and its inability or reluctance to cater effectively for that person (and consequently that society must effect change to remove that disability). (p. iii)

Nevertheless, we use person-first language when referring to people or students who have particular disabilities (e.g., ‘students with dyslexia’, ‘students with a hearing loss’).

We focus on two aspects of the students’ experience: their perceptions of the quality of their courses and the approaches to studying that they adopt on those courses. It has been well established that students in higher education exhibit different approaches to studying: a deep approach, based on understanding the meaning of course materials; a surface approach, based on memorising the materials for the purposes of assessment; and a strategic approach, based on obtaining the highest marks or grades. The adoption of one approach rather than another appears to depend on the content, the context and the demands of specific learning tasks. The existence of these different approaches was originally inferred from interview-based research, but it has been confirmed through the application of quantitative instruments in surveys of much larger numbers of students (see Richardson 2000, for a review). We used a questionnaire taken from recent research with campus-based students (Entwistle, McCune, and Hounsell 2003) to compare approaches to studying in disabled and nondisabled students.

Students’ approaches to studying are strongly associated with their perceptions of the quality of their courses: students with positive perceptions are more likely to adopt a deep or strategic approach and are less likely to adopt a surface approach than students with negative perceptions (see Richardson 2007). Accordingly, students’ accounts of their perceptions will complement their accounts of their approaches to studying in illuminating the nature of their

experience. In a previous survey of Open University students, Lawless and Richardson (2002) employed an adapted version of the Course Experience Questionnaire (CEQ), an instrument that had originally been devised by Ramsden (1991) as a performance indicator of the quality of degree programmes in Australia. As adapted by Lawless and Richardson, the CEQ consists of 36 statements in seven scales that reflect different aspects of academic quality. The items that showed the highest loadings on the seven scales are shown in Table 1. Students are asked to respond to each statement with regard to their experience of the courses they have taken on a five-point scale from 5 for 'definitely agree' to 1 for 'definitely disagree'. We used a short version of this questionnaire to compare the perceptions of disabled and nondisabled students.

(Insert Table 1 about here)

## **Method**

### ***Participants***

When registering with the Open University, students have the opportunity to indicate whether they have a disability that might necessitate additional support or adjustments in their studies. They can also notify the University at any point in their academic careers should they become disabled or no longer consider themselves to be disabled. Students who do indicate that they have a disability are contacted to discuss the nature of their disability and the kind of support or adjustments that might be appropriate. About 30% claim a Disabled Students' Allowance (a government grant to support the costs of studying), for which medical evidence is required. Like other students, disabled students may be asked to participate in surveys or other research activities from time to time. However, under the UK's data protection legislation, information about the nature of their disabilities cannot be released to researchers for survey purposes.

In order to ensure that the University complies with its responsibilities under the UK's disability discrimination legislation, from time to time the team responsible for evaluating the accessibility of the University's courses and services contacts a large sample of students who are currently registered to study and who have identified themselves as having a disability. They are asked to disclose the nature of their disabilities and the assistive technologies that

they use in their studies. They are also asked whether they would be willing to take part in accessibility research. This yields a large pool of students with identified disabilities who are willing to participate in relevant research studies.

This pool was screened to exclude any students who were not available to be surveyed under the University's procedures (which among other things prohibit any student from being asked to participate in more than two research studies in a given year), and a random sample of 1000 students was selected from those who remained. For each of these students, another student was identified who (a) had not identified themselves as having a disability, (b) was taking the same course or courses and (c) was of the same gender and of similar age (within five years). This yielded a matched comparison group of 1000 students without disabilities.

### *Materials*

To maximise the response rate, two short questionnaires were employed to monitor students' experience of their courses and the approaches to studying that they adopt on those courses.

- Lawless and Richardson's (2002) version of the CEQ was reduced to 21 items by selecting the three items that showed the highest loadings on each of the seven factors that resulted from their factor analysis. These items were reworded to refer to Open University courses in general and were supplemented by an additional item concerning the students' general level of satisfaction with their courses.
- Entwistle, McCune, and Hounsell (2003) devised a short questionnaire on approaches to learning and studying (ALS). This contains 18 items measuring the use of deep approach, a surface approach and two aspects of a strategic approach (monitoring studying and organised studying).

There were two additional sections to the questionnaire. The third section was concerned with access to and use of information technology. Analysis of the results showed that disabled and nondisabled students were remarkably similar in both respects, and so the findings will not be

discussed further. The final section of the questionnaire was concerned with the personal and technical support provided for disabled students and was included for institutional purposes. The present article is concerned only with the responses given by disabled and nondisabled students to the first and second sections of the questionnaire.

### *Procedure*

The questionnaire was prepared both as an online survey and as a postal survey. Alternative versions containing only the first three sections were prepared for the nondisabled students. Covering letters described the survey as focused on the experiences of disabled students or on the experiences of Open University students in general. All the 2000 students were contacted initially by electronic mail and were invited to participate in the survey through an address on the University's website. However, if they preferred to complete the survey using a paper version of the questionnaire, they were told that they would receive one shortly. After two weeks, any students who had not responded were sent a reminder letter through the regular post, together with a paper version of the questionnaire and a prepaid return envelope. The reminder letter asked them to participate by completing the paper version of the questionnaire or by completing the online alternative. The survey was closed after another four weeks.

## **Results**

### *Respondents*

Completed questionnaires were returned by 655 (or 65.5%) of the disabled students and by 430 (or 43.0%) of the nondisabled students. The difference in response rates was statistically significant ( $\chi^2 = 101.99$ ; d.f. = 1;  $p < .001$ ). The latter response rate would be regarded as adequate for a postal survey (Babbie 1990, 182; Kidder 1981, 150–51). It is lower than the Open University normally obtains in its feedback surveys, but this is not surprising since the questionnaire asked about students' experience of the University's courses in general rather than about specific courses or programmes. The former response rate would be regarded as excellent for a postal survey, but this too is unsurprising, since it probably reflects the focus



of the questionnaire upon the experiences of disabled students themselves.

Of the disabled students, 53.7% had responded online, whereas 46.3% had completed the paper questionnaire. These proportions were exactly reversed in the nondisabled students. The difference in their choice of response mode was statistically significant ( $\chi^2 = 5.78$ ; d.f. = 1;  $p = .02$ ). In other words, when given a choice between responding on paper and online, and when they have similar access to appropriate technology, disabled students are more likely to respond online than nondisabled students. This may reflect difficulties with hand writing (see Debenham 2001), since many disabled students reported restricted manual skills (see below).

The proportion of women among the respondents was 66.9% for the disabled students and 71.6% for the nondisabled students. These proportions were not significantly different ( $\chi^2 = 2.74$ ; d.f. = 1;  $p = .10$ ), which is not surprising since the samples had been matched on the basis of gender. The respondents varied in age from 20 to 80 with a mean of 47.8 years. The mean age of the disabled students (47.1 years) was slightly but significantly lower than that of the nondisabled students (49.0 years) ( $F = 6.75$ ; d.f. = 1, 1083;  $p = .01$ ). Given that the samples had also been matched on the basis of age, this suggests that the older nondisabled students were more likely to respond to the survey than the younger nondisabled students.

The students' highest educational qualifications before joining the Open University were classified into three categories by comparison with the General Certificate of Education, Advanced Level (GCE A-Level), which is the main university entrance qualification in the UK: low, fewer than two passes at GCE A-Level or the equivalent; medium, two or more passes at GCE A-Level, the normal minimum prior requirement at other UK universities, or the equivalent; and high, qualifications beyond GCE A-Level. This information was available for 1,059 of the respondents. The proportions of respondents falling into the three categories were: low, 39.3%; medium, 22.8%; and high, 38.0%. The disabled and nondisabled students were not significantly different in their prior qualifications ( $\chi^2 = 4.84$ ; d.f. = 2;  $p = .09$ ).

#### *Course Experience Questionnaire*

One of the disabled students and five of the nondisabled students had failed to respond to the

CEQ, and so valid data were available from 1079 students. They were assigned scores on the seven scales following the methods described by Lawless and Richardson (2002). Cronbach's (1951) coefficient alpha was used as an estimate of reliability. Table 2 shows that six out of the seven scales produced values of coefficient alpha between .69 and .85, which constitute satisfactory estimates of reliability on conventional research-based criteria (Robinson, Shaver, and Wrightsman 1991). However, the Student Choice scale produced a coefficient alpha of only .53, which would not be regarded as satisfactory.

(Insert Table 2 about here)

A factor analysis was carried out on the students' scores on the scales of the CEQ, and this yielded a single factor. Loadings greater than .30 in absolute magnitude were regarded as salient for the purposes of interpretation. Table 2 shows that all seven scales produced salient loadings. This provides evidence for the construct validity of the CEQ, insofar as the factor can be interpreted as an overall measure of perceived academic quality that subsumes the various aspects of instruction that are measured by the individual scales. A second-order factor-based scale, labelled 'Perceived Academic Quality', was constructed by computing each student's mean score across the seven scales (cf. Pedhazur and Schmelkin 1991, 625–26). This too exhibited good internal consistency, as shown by a coefficient alpha of .77.

All but 10 of the students had responded to the 37th statement included with the CEQ ('In general I am satisfied with the quality of OU [Open University] courses'). Their mean response on a scale from 1 to 5 was 4.48, and their most common response was 5, implying a very high degree of satisfaction. The correlation coefficient between their responses to this item and their scores on the second-order factor-based scale was +.66, and this provides evidence for the criterion validity of the CEQ as a measure of perceived academic quality.

#### *Approaches to Learning and Studying*

Nine of the disabled students and seven of the nondisabled students had failed to respond to the ALS, and so valid data were available from 1069 students. They were assigned scores on the four scales by averaging the responses to their constituent items. Coefficient alpha was

once again used as an estimate of reliability. Table 3 shows the estimates for Deep Approach and Surface Approach were satisfactory, but those for Monitoring Studying and Organised Studying were less so. A factor analysis was carried out on the students' scores on the four scales, and this yielded a single factor. Table 3 shows that Deep Approach, Monitoring Studying and Organised Studying had positive loadings on this factor, whereas Surface Approach had a negative loading. It therefore represents the students' use of desirable as opposed to undesirable approaches to studying.

(Insert Table 3 about here)

Out of the 1085 respondents, 1067 had provided valid data on both the CEQ and the ALS. Table 4 shows the correlation coefficients between their scores on the CEQ and their scores on the ALS. All of the correlation coefficients between the CEQ scores and Deep Approach, Monitoring Studying and Organised Studying were positive and significant, and all of the correlation coefficients between the CEQ scores and Surface Approach were negative and significant, confirming previous findings that students' perceptions of academic quality are positively related to their adoption of desirable approaches to studying and negatively related to their adoption of undesirable approaches to studying (Richardson 2007).

(Insert Table 4 about here)

#### *Disabled students versus nondisabled students*

Table 5 shows the mean scores on the CEQ and the ALS obtained by the disabled students and the nondisabled students. Comparisons may be statistically significant and yet of little practical importance, especially when there are large numbers of participants. This can be addressed by deriving a measure of the size of the relevant effect. When two different groups are being compared, the most common measure of effect size is derived by standardising the difference between their two means by dividing it by the within-groups standard deviation; thus, an effect size of 0.5 means that the two groups differ on average by an amount equal to half of their common standard deviation. Cohen (1988, 24–27) proposed that effect sizes of 0.2, 0.5 and 0.8 should be described as 'small', 'medium' and 'large', respectively.

(Insert Table 5 about here)

In terms of their scores on the CEQ, none of the differences between the disabled and nondisabled students was statistically significant, and all of the relevant effect sizes would be characterised as small in Cohen's (1988) terms. In terms of their scores on the ALS, two of the differences between the disabled and nondisabled students were statistically significant: the disabled students tended to obtain higher scores than the nondisabled students on Surface Approach but lower scores than the nondisabled students on Organised Studying. Even here, however, the relevant effect sizes would be characterised as small in Cohen's terms.

#### *Students with specific disabilities*

Of the 655 disabled students, 23 had not indicated the nature of their disabilities when they responded to the survey about participating in accessibility research, perhaps because they knew that the University already had this information but were unaware that it could not be released to researchers. These students were omitted from further analyses. The remaining 632 students had indicated the nature of their disabilities using the checklist in Table 6. The list includes symptoms and medical conditions as well as disabilities in a narrow sense, and it is probably for this reason that 396 (or 62.7%) of these students had indicated that they had more than one disability. Table 6 shows the prevalence of each disability in all 632 students and, for comparison, the prevalence of each in those who had indicated just one disability.

(Insert Table 6 about here)

To identify the impact of each of these disabilities on the students' perceptions and approaches to studying, a series of hierarchical regression analyses was carried out using the students' scores on the CEQ and the ALS as dependent variables. These analyses included both the nondisabled students and the disabled students who had indicated the nature of their disabilities. The prevalence of particular disabilities might well vary with age, gender and prior qualifications, and so these three variables were forced into the regression equations in the first stage of the analysis. In the second stage, a stepwise approach was taken to determine the additional contribution of each of the 14 disabilities (coded as dummy variables with 0 for

absence and 1 for presence of the relevant disability). Only those disabilities that explained a statistically significant amount of variance were included in the final predictive model.

The disabilities that significantly predicted the students' scores on the CEQ and the ALS are shown in Tables 7 and 8, respectively. In these tables, the unstandardised regression coefficient ( $B$ ) can be interpreted as the difference between the mean score of the students with a specific disability and the mean score of the students without that disability (Pedhazur 1997, 342–47). For instance, in the case of the Appropriate Assessment scale of the CEQ, the mean score that was obtained by students with dyslexia or other specific learning difficulties was 0.26 of a point (on a five-point scale) below the mean score of the nondisabled students when the effects of age, gender and prior qualifications were statistically controlled.

(Insert Tables 7 and 8 about here)

Once again, comparisons may be statistically significant and yet of little practical importance, especially when there are large numbers of participants. The increase in the coefficient of multiple determination,  $\Delta R^2$ , measures the proportion of variance in each dependent variable that is explained by its association with the additional predictor variables (in this case, the presence or absence of specific disabilities). Cohen (1988, 413–14) proposed that 'small', 'medium' and 'large' effect sizes could be characterised as values of  $\Delta R^2$  equal to .02, .13 and .26, respectively. Except in the case of Deep Approach, one or more of the disabilities had a significant relationship with each of the dependent variables, but all of the effects would be regarded as small in Cohen's terms.

## **Discussion**

In this study, we have confirmed the reliability and the validity of the CEQ in the distinctive context of distance education, and we have confirmed that students' scores on this instrument are correlated with their approaches to studying, such that students who evaluate their courses positively are more likely to adopt desirable approaches to studying and less likely to adopt undesirable approaches to studying. These findings are of course correlational in nature and, strictly speaking, say nothing about the nature of the underlying causal relationships between

the two kinds of variable: Richardson (2006) used path analysis and concluded that there was a bidirectional causal relationship between students' perceptions and approaches to studying. More important, through a judicious use of stratified sampling, we have been able to compare the perceptions and approaches to studying of a sample of 655 disabled students with those of a broadly matched sample of 430 nondisabled students.

One overall finding is that the impact of disability, both on students' perceptions of their courses and on the approaches to studying that they adopt on those courses, is relatively slight. This is apparent in the measures of effect size that we obtained by comparing the two samples of students in general terms (Table 5) and by comparing students with and without specific disabilities (Tables 7 and 8). None of the obtained values would constitute even a medium effect on the criteria proposed by Cohen (1988), which are now widely adopted in social and educational research as objective standards of theoretical or practical importance.

Turning to the results in detail, students who had identified themselves as either blind or partially sighted produced scores on both the CEQ and the ALS that were not significantly different from those of other students. This is consistent with evidence that visual impairment has little effect on the attainment of students in higher education (Richardson and Roy 2002), although there were relatively few students in these two categories. The same is true of the students who had identified themselves as either deaf or hard of hearing. Although the latter produced significantly lower scores on the Appropriate Assessment scale, there were otherwise no significant differences in the scores produced by these and other students. Previous studies have found that a hearing loss has little effect on attainment in higher education (Richardson 2001a, 2001b, 2009a) and that distance-learning students with and without a hearing loss have similar perceptions and approaches to studying (Richardson and Woodley 1999, 2001).

Nevertheless, more recent studies suggest that the situation is not so clear cut. First, campus-based students who are deaf and who use sign language are more likely to adopt a surface approach (Richardson, Barnes, and Fleming 2004). Richardson (2008) suggested that this was because they are exposed to literal styles of sign language interpreting on the part of

classroom interpreters. Second, Richardson (2009b) found no difference in the CEQ scores of recent Open University graduates with and without a hearing loss. However, attainment (as judged by the class of their degrees) was much less in graduates with a hearing loss. This may mean that recent changes in course delivery (particularly an increasing trend to provide both course materials and tutorial support online) may be acting to the detriment of such students.

Students who identified themselves as having ‘other conditions’ also produced scores on the CEQ and the ALS that were not significantly different from those of other students. Students in six other categories showed specific differences: students who had restricted mobility tended to produce higher scores on Appropriate Workload; those who had restricted manual skills tended to produce higher scores on Good Tutoring; those who had impaired speech tended to produce higher scores on Generic Skills and Student Choice; those who had pain tended to obtain lower scores on Surface Approach; those who had unseen disabilities tended to produce higher scores on Monitoring Studying; and those with autistic spectrum disorder tended to produce lower scores on General Satisfaction. Only in the latter case could the difference be regarded as deleterious in terms of the quality of the students’ experience. Here, it was large in absolute terms and reflected a decline of 0.84 of a point on a five-point scale. (Even so, it explained little of the overall variation in General Satisfaction ratings because of the very small number of students who reported this particular disability.) In the absence of any other differences associated with autistic spectrum disorder, this may reflect a general decline in personal well-being rather than a specific response to the academic context.

Students who had mental health difficulties showed significant differences on both the CEQ and the ALS. On the one hand, they tended to produce lower scores than other students on Appropriate Workload and Clear Goals and Standards; on the other hand, they tended to produce higher scores on Surface Approach and lower scores on Organised Studying. One possibility is that these students find it harder to work out what is expected of them when studying in higher education and as a consequence are led to adopt less desirable approaches to studying. As Riddell, Tinklin, and Wilson (2005, 129) remarked, the problems that these students encounter in negotiating a complex environment ‘make the difficulties inherent in

the system for all students stand out more clearly'. Even so, it should be noted that attainment in students with mental health difficulties is comparable to that of nondisabled students, both in campus-based settings (Richardson 2009a) and in distance education (Richardson 2009b).

Students with fatigue also tended to produce higher scores on Surface Approach and lower scores on Organised Studying. This is consistent with evidence that in many students fatigue leads to problems in various aspects of studying, including work planning (Debenham 1996, 2001). Nevertheless, students with fatigue tended to produce higher scores than other students on Generic Skills and Student Choice. This pattern suggests that fatigue can affect students' approaches to learning without affecting their perceptions of the academic quality of their courses. This idea certainly warrants further investigation, particularly since fatigue was reported by nearly half of the disabled students in the present study.

Students with dyslexia or other specific learning difficulties were the only group to show a significant decline in their overall ratings of Perceived Academic Quality. This was associated with lower scores on Appropriate Assessment, Generic Skills, Good Materials and Student Choice, as well as with lower scores on General Satisfaction. These students, too, tended to obtain higher scores on Surface Approach and lower scores on Organised Studying. Dyslexia has little effect on the attainment of students in campus-based settings (Richardson 2009a; Richardson and Wydell 2003). However, Richardson (2009b) found that in distance education academic attainment was much poorer in students with dyslexia. He suggested that the reliance on text in distance learning posed specific challenges for these students, but the present results suggest that the decline in the quality of their experience is broader than this.

## **Conclusion**

The more specific findings of this study are that three groups of disabled students (those with dyslexia or other specific learning difficulties, those with mental health difficulties and those with fatigue) exhibited less desirable approaches to studying, evidenced by higher scores on Surface Approach and lower scores on Organised Studying. In two of these three groups, this was associated with lower ratings of the quality of their courses on the CEQ. Nevertheless,



the effects were by no means large in absolute terms, since they reflected differences of less than 0.40 of a point on a five-point scale, and in no case did they collectively explain more than 6% of the variation in students' scores on the individual scales. In short, the impact of these disabilities seems to be relatively slight in terms of the formal aspects of the curriculum that define academic quality and in terms of the approaches to studying that students adopt.

Even so, the experiences of disabled and nondisabled students may well diverge with regard to broader, informal aspects of higher education. For instance, even if they set about studying in a broadly similar way to nondisabled students, many disabled students may have to expend more effort just to achieve the same learning outcomes (Debenham 2001). They may also receive inadequate pastoral, physical or social support: In both campus-based and distance education, this is often marginalised in administrative units and not mainstreamed across academic departments (Riddell, Tinklin and Wilson 2005, 57–77). Interview-based research (e.g. Fuller et al. 2009) is needed to explore more subtle aspects of the experience of higher education which may have profound consequences for disabled students' attainment.

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Table 1. Items showing the highest loadings on the seven scales in Lawless and Richardson's (2002) version of the Course Experience Questionnaire

Scale	Defining item
Appropriate Assessment	Assessment on OU [Open University] courses seems to be more to do with testing what you've memorised than with testing what you've understood.*
Appropriate Workload	The sheer volume of work to be got through in OU courses means that you can't comprehend it all thoroughly.*
Clear Goals and Standards	On OU courses, it is always easy to know the standard of work that is expected of you.
Generic Skills	As a result of taking OU courses, I feel more confident about tackling unfamiliar problems.
Good Materials	The teaching materials for OU courses really try to make topics interesting to students.
Good Tutoring	Tutors on OU courses make a real effort to understand the difficulties that students may be having with their work.
Student Choice	The students on OU courses are given a lot of choice in the work they have to do.

*Note.* Items with asterisks are coded in reverse.

Table 2. Means, standard deviations, coefficient alphas and factor loadings of CEQ scales

Scale	Mean	SD	Coefficient alpha	Factor loadings
Appropriate Assessment	3.93	0.86	.69	.45
Appropriate Workload	3.08	0.99	.74	.39
Clear Goals and Standards	3.73	0.87	.76	.73
Generic Skills	3.99	0.81	.81	.56
Good Materials	4.26	0.68	.75	.77
Good Tutoring	3.95	0.95	.85	.60
Student Choice	3.33	0.83	.53	.56
Perceived Academic Quality	3.75	0.56		
General satisfaction	4.48	0.73		

*Note.* The scores on each scale vary from 1 (low) to 5 (high).

Table 3. Means, standard deviations, coefficient alphas and factor loadings of ALS scales

Scale	Mean	SD	Coefficient alpha	Factor loadings
Deep Approach	4.12	0.58	.73	.87
Surface Approach	2.19	0.81	.68	-.42
Monitoring Studying	3.99	0.59	.51	.72
Organised Studying	3.82	0.78	.64	.52

*Note.* The scores on each scale vary from 1 (low) to 5 (high).

Table 4. Correlation coefficients between CEQ scores and ALS scores

CEQ scales	ALS scales			
	Deep Approach	Surface Approach	Monitoring Studying	Organised Studying
Appropriate Assessment	.15	-.49	.10	.10
Appropriate Workload	.14	-.42	.12	.16
Clear Goals and Standards	.27	-.36	.22	.25
Generic Skills	.35	-.19	.27	.26
Good Materials	.31	-.27	.21	.24
Good Tutoring	.27	-.16	.22	.18
Student Choice	.22	-.22	.18	.17
Perceived Academic Quality	.37	-.47	.29	.30
General Satisfaction	.26	-.25	.16	.17



Table 5. Mean scores obtained by disabled and nondisabled students on the CEQ and ALS

	Disabled students		Nondisabled students		Effect size
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<i>CEQ scales</i>					
Appropriate Assessment	3.90	0.87	3.98	0.85	-0.10
Appropriate Workload	3.06	1.00	3.12	0.99	-0.06
Clear Goals and Standards	3.70	0.89	3.79	0.84	-0.10
Generic Skills	4.03	0.81	3.95	0.81	0.10
Good Materials	4.26	0.68	4.26	0.69	0.00
Good Tutoring	3.99	0.97	3.88	0.90	0.12
Student Choice	3.36	0.84	3.30	0.80	0.07
Perceived Academic Quality	3.76	0.57	3.75	0.53	0.00
General Satisfaction	4.46	0.74	4.50	0.70	-0.05
<i>ALS scales</i>					
Deep Approach	4.11	0.61	4.14	0.51	-0.07
Surface Approach	2.24	0.82	2.11	0.79	0.16**
Monitoring Studying	3.99	0.62	3.98	0.53	0.02
Organised Studying	3.72	0.78	3.97	0.75	-0.32**

*Note.* The measure of effect size is the standardised mean difference between the two groups.

\*\*  $p < .01$ .

Table 6. Prevalence (%) of specific disabilities

	All disabled students	Those indicating just one disability
Blind	0.9	1.7
Partially sighted	5.5	3.0
Deaf	1.1	0.8
Hard of hearing	8.5	7.2
Restricted mobility	38.1	5.1
Restricted manual skills (difficulty handling items)	24.7	3.8
Dyslexia or other specific learning difficulties	20.1	30.1
Mental health difficulties	31.0	30.1
Impaired speech	1.9	0.4
Fatigue (extreme tiredness)	45.1	3.0
Pain	40.3	2.1
Unseen disability (e.g., diabetes, epilepsy or asthma)	26.1	6.8
Autistic spectrum disorder	0.9	0.8
Other conditions	10.9	5.1

Table 7. Results of hierarchical regression analyses on CEQ scores

Dependent variables	Predictor variables	<i>B</i>	<i>SE B</i>	$\beta$	$\Delta R^2$
Appropriate Assessment	Dyslexia or other SLDs	-0.26	0.08	-.10**	.01***
	Hard of hearing	-0.30	0.12	-.08*	
Appropriate Workload	Mental health difficulties	-0.20	0.08	-.08*	.01*
	Restricted mobility	0.15	0.07	.06*	
Clear Goals and Standards	Mental health difficulties	-0.16	0.07	-.07*	.00*
Generic Skills	Dyslexia or other SLDs	-0.19	0.08	-.08*	.02***
	Fatigue	0.13	0.06	.07*	
	Impaired speech	0.53	0.23	.07*	
Good Materials	Dyslexia or other SLDs	-0.13	0.07	-.06*	.00*
Good Tutoring	Restricted manual skills	0.18	0.08	.07*	.00*
Student Choice	Impaired speech	0.56	0.24	.07*	.01**
	Fatigue	0.12	0.06	.06*	
	Dyslexia or other SLDs	-0.16	0.08	-.06*	
Perceived Academic Quality	Dyslexia or other SLDs	-0.15	0.06	-.09**	.01**
General Satisfaction	Autistic spectrum disorder	-0.84	0.30	-.09**	.01**
	Dyslexia or other SLDs	-0.15	0.07	-.07*	

*Note.* The unstandardised regression coefficient (*B*) represents the difference between the mean scores of the students with a particular disability and the mean scores of the students without that disability.  $\Delta R^2$  refers to the increase in the proportion of variance explained by the relevant disabilities beyond that explained by age, gender and prior qualifications. SLD, specific learning difficulty.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

Table 8. Results of hierarchical regression analyses on ALS scores

Dependent variables	Predictor variables	<i>B</i>	<i>SE B</i>	$\beta$	$\Delta R^2$
Deep Approach	None				
Surface Approach	Mental health difficulties	0.25	0.06	.12***	.03***
	Pain	-0.28	0.08	-.15***	
	Dyslexia or other SLDs	0.20	0.08	.08**	
	Fatigue	0.18	0.07	.10*	
Monitoring Studying	Unseen disability	0.11	0.05	.07*	.01*
Organised Studying	Mental health difficulties	-0.36	0.06	-.18***	.06***
	Dyslexia or other SLDs	-0.30	0.07	-.12***	
	Fatigue	-0.12	0.05	-.07*	

*Note.* The unstandardised regression coefficient (*B*) represents the difference between the mean scores of the students with a particular disability and the mean scores of the students without that disability.  $\Delta R^2$  refers to the increase in the proportion of variance explained by the relevant disabilities beyond that explained by age, gender and prior qualifications. SLD, specific learning difficulty.

\*  $p < .05$ ; \*\*\*  $p < .001$ .