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Academic attainment in deaf and hard-of-hearing students in distance education

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This study compared outcomes in deaf and hard-of-hearing (DHH) students and nondisabled students taking courses by distance learning with the UK Open University in 2012. DHH students who had no additional disabilities were more likely to complete their courses than were nondisabled students, and they were just as likely to pass the courses that they completed and to obtain good grades on the courses that they passed. DHH students who had additional disabilities were less likely to complete their courses, less likely to pass the courses that they completed and less likely to obtain good grades on the courses that they pass than were nondisabled students. It is concluded that hearing loss itself has no effect on academic attainment, but that additional disabilities may have an impact on DHH students' academic performance.

Keywords: academic attainment; deaf students; disabled students; distance education; hard-of-hearing students

Introduction

Recent years have seen a considerable growth in distance education in many Western countries (see, e.g. Allen & Seaman, 2011). In distance education, the curriculum has traditionally been provided through correspondence materials. Nevertheless, most distance learning institutions use various kinds of personal support in endeavouring to narrow what Moore (1980) called the 'transactional distance' with their students, most commonly through regular albeit limited face-to-face tutorials. In recent years, there has been an increasing use of information technology in distance education, with a move from paper-based to electronic materials accompanied by a move from face-to-face to online tutorial support. There have been parallel developments in more conventional campus-based forms of postsecondary education.

Recent years have also seen an increase in the number of disabled students in higher education, both in absolute terms and as a proportion of the total number of students.[1] In the United Kingdom, 77,795 disabled students entered higher education in 2013–2014, representing 10.2% of all students who entered UK higher education that year.[2] This is a result of changes in both national legislation and institutional policies to promote equal opportunities for disabled people. It might also be a result of the extension of the Disabled Students' Allowance, which provides financial support for disabled students in meeting the additional costs of their studies. The two phenomena are linked, in that, for some people with disabilities, distance

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learning may be the only practical means of access to higher education (Newell & Debenham, 2009).

This article is concerned with the academic attainment of students who are deaf or hard-of-hearing (DHH) and who are studying by distance learning.[3] It begins by considering the results of previous investigations of the academic attainment of students in both campus-based education and distance education before presenting the findings of a new investigation into the academic attainment of students who are deaf or hard-of-hearing at the UK Open University. Previous research into attainment in UK higher education has been concerned with the kinds of degrees that students obtain; however, within the UK Open University, it is possible to focus on students' completion rates, pass rates and grades.

Attainment in UK higher education

Richardson (2001a) analysed a database of all students in higher education in the United Kingdom in 1995–1996 to compare DHH students and students with no recorded disability. He found that DHH students constituted .22% of all students residing in the United Kingdom. This compared with estimates of .14–.16% in surveys of US students (Lewis & Farris, 1994, 1999). The representation of DHH students varied with their age, gender, ethnicity and entry qualifications and with their level of study (undergraduate vs postgraduate), mode of study (full-time vs part-time) and subject of study.

Most bachelor's degrees in the United Kingdom are awarded with honours, which are usually classified as first, second or third class, and the second class is categorised into an upper and a lower division. A degree awarded with first-class or upper second-class honours is often described as a 'good' degree. Richardson found that DHH students were less likely to obtain good degrees than students with no recorded disability. However, this was due to differences in background variables, suggesting that hearing loss itself had no effect on academic attainment.

Richardson (2009) obtained similar results in an analysis of a database of all students in higher education in the United Kingdom in 2004–2005. However, obtaining a more detailed account of academic attainment in DHH students is difficult because national statistics are not collected about other academic outcomes in either the United Kingdom or the United States. At a local level, the number of DHH students within a single mainstream institution may be too small to make reliable comparisons with the attainment of students without disabilities.

One problem with Richardson's (2001a, 2009) analyses is that they were concerned only with DHH students who had no other disabilities. In his databases, DHH students with additional disabilities were recorded as having 'multiple disabilities' and could not be separately identified as having a hearing loss. Surveys of DHH children in the United States indicate that about a third have some other form of disability (Brown, 1986; Schein, 1975; Shaver, Marschark, Newman, & Marder, 2014), and the same appears to be true of DHH students in higher education in the United Kingdom (Richardson, 2001b). It is clearly important to establish whether these additional disabilities affect DHH students' attainment in higher education.

Attainment in distance education

One higher education institution in the United Kingdom that recruits large numbers of DHH students is the Open University, which delivers courses by distance

learning. Richardson (2001a) excluded Open University students from his more detailed analysis because many of these students had been omitted from his database. Richardson (2001b) examined the attainment of students who had taken Open University courses in 1996. When differences in background variables had been taken into account, DHH students with no additional disability were similar to students with no reported disability on a variety of outcome measures. However, DHH students who reported additional disabilities showed poorer attainment on these measures.

Richardson (2010, 2014) obtained similar results in the case of DHH students with no additional disability who had taken Open University courses in 2003 and 2009. However, in both of these studies, DHH students with additional disabilities were consigned to a separate category of 'multiple disabilities', and the results therefore say nothing about the attainment of these students. Since Richardson's (2001b) original study, the total student population and the number of DHH students at the Open University have increased, so it is timely to undertake a fresh investigation of the attainment of DHH students with and without additional disabilities at that institution.

Accordingly, this study was carried out to compare academic attainment in DHH students and nondisabled students at the Open University. The first part of the analysis describes the demographic characteristics of DHH students and nondisabled students. The second part compares completion rates, pass rates and grades in DHH students and nondisabled students. The third part compares completion rates, pass rates and grades in DHH students and nondisabled students when differences in demographic variables are taken into account.

Context

The Open University was set up in 1969 to provide degree programmes by distance education across the United Kingdom. It accepts all applicants over the age of 16 onto most of its undergraduate courses without imposing any formal entrance requirements. Initially, nearly all of its courses were delivered by correspondence materials, combined with television and radio broadcasts, video and audio recordings, tutorial support offered at a local level, and (in some cases) week-long residential schools. In more recent years, the University has made increasing use of computer-based support, particularly CD-ROMs, dedicated websites, and computer-mediated conferencing. Moreover, nowadays many students are recruited from other European countries, and on some courses, they are recruited from around the world.

The University's arrangements for undergraduates traditionally had a modular structure in which prerequisite requirements were minimised and students were not restricted to prescribed schemes of study. Students enrolled for individual courses rather than for entire degree programmes, and they qualified for a bachelor's degree when they had gained the appropriate number of credit points (equivalent to three years' full-time study) from courses that they had passed. Most of the University's courses are worth 30 or 60 credit points, on the basis that full-time study consists of courses worth 120 credit points in any calendar year. Students may register for two or more courses at a time up to a maximum load of 120 credit points.

In 2012, the UK government required universities in England and Northern Ireland to increase their fees to reflect the true cost of delivering their programmes but also extended the availability of student loans. To qualify for loans, students

have to register for specific qualifications, and since 2012, a majority of Open University students in England and Northern Ireland have registered for entire degree programmes rather than for individual courses.

DHH students

In 2012, a total of 175,924 students registered for undergraduate courses with the Open University, of whom 115,086 (or 65.4%) had registered for a single course, 38,780 (or 22.0%) had registered for two courses, and 22,058 (or 12.5%) had registered for three or more courses. At the time of their registration, the students had been asked to declare whether they had a disability or additional requirements. Those students who did declare any disabilities received follow-up phone calls to ascertain the nature of their disabilities and the accommodations or other support that they might require.

Of the 175,924 students, 21,083 (or 12.0%) had declared that they had one or more disabilities. Information about the nature of these students' disabilities was recorded using the checklist shown in Table 1. The list includes symptoms and medical conditions as well as disabilities in a narrow sense, and this may have contributed to the fact that 9007 (or 42.7%) of the disabled students had been recorded as having more than one disability. Table 1 shows the prevalence of each disability among all 175,924 students.

Of the 175,924 students who registered in 2012, 1323 (or 0.8%) had declared that they were deaf or hard-of-hearing. Within this subgroup, 464 were recorded as having only this disability, whereas 859 were recorded as having one or more additional disabilities. Among the latter students, the most common additional disabilities were fatigue or pain (504 students), restricted mobility (427 students), mental health difficulties (303 students) and restricted manual skills (257 students). In short, 65% of DHH students had one or more additional disabilities. Students taking Open University courses are different from other students in postsecondary education, especially in terms of their age and educational background. Moreover, it might have been their additional disabilities rather than being DHH which had led some DHH students to study with the Open University. The following analyses compare three groups of students: the students with no disability; the students who were DHH who had no additional disabilities (DHH only); and the students who were DHH who had additional disabilities (DHH plus).

Table 1. Prevalence of specific disabilities in Open University students in 2012.

Disability category	*n*
Blind or partially sighted	1724
Deaf or hard-of-hearing	1323
Restricted mobility	4945
Restricted manual skills (difficulty handling items)	3052
Impaired speech	534
Dyslexia or other specific learning difficulties	4961
Mental health difficulties	7291
Personal care support	977
Fatigue or pain	7221
Other disabilities	3205
Unseen disabilities (e.g. diabetes, epilepsy or asthma)	3530
Autistic spectrum disorder	552

Age

Table 2 shows the age distributions of these three groups. (Relevant data were missing for four students.) A chi-squared test showed that these were significantly different from each other, $\chi^2(12, N = 156{,}160) = 1063.34$, $p < .001$. An analysis of variance using a Newman–Keuls *post hoc* test showed that the students with no disabilities ($M = 35.71$ years) were significantly younger than the DHH only students ($M = 46.17$ years) and the DHH plus students ($M = 46.42$ years). The DHH only students and the DHH plus students did not differ significantly from each other.

Similar results have been obtained in national surveys in both the United Kingdom (Richardson, 2001a, 2009) and the United States (Horn & Berktold, 1999, p. 11) and in previous research with Open University students (Richardson, 2001b, 2010, 2014). Hearing loss often results from accidents or illness in adulthood or from processes associated with ageing, so it is not surprising that it is more common in people who study later in life.

Gender

Table 3 shows the percentages of women in the three groups of students. (Relevant data were missing for one student.) A chi-square test showed that these were significantly different from each other, $\chi^2(2, N = 156{,}163) = 23.39$, $p < .001$. Further tests showed that the proportion of women was significantly lower in the students with no disabilities than in the DHH only students and the DHH plus students. The DHH only students and the DHH plus students did not differ significantly from each other.

Previous research in the United Kingdom has found a higher proportion of women among DHH students, both nationally (Richardson, 2001a, 2009) and at the Open University (Richardson, 2001b, 2010, 2014). Richardson (2001a) found that in national data, this gender difference disappeared when variations in age were statistically controlled, and he suggested that it was a result of the increased prevalence of hearing loss with age, combined with the greater longevity of women. However, in Open University students, Richardson (2001b) found that the gender difference in DHH students persisted even when variations in age had been statistically controlled. He noted that there was a general imbalance among DHH students across part-time programmes in the United Kingdom, and he suggested that part-time study was more attractive, acceptable or accessible to DHH women than it was to DHH men. In contrast, in the United States, men comprise 60.6% of DHH undergraduate students (Horn & Berktold, 1999, p. 10).

Entrance qualifications

The Open University accepts applicants over the age of 16 onto most of its courses without imposing formal entrance requirements. 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, less than two passes at GCE A-Level or the equivalent; medium, two or more passes at GCE A-Level, the normal minimum entry requirement at other UK universities, or the equivalent; and high, qualifications beyond GCE A-Level.

Table 2. Percentage frequency distribution by age of students with different disabilities.

	n	21 or under	22–24 years	25–29 years	30–39 years	40–49 years	50–59 years	60 or over
No declared disability	154,837	10.6	9.3	16.7	28.2	21.2	9.2	4.8
DHH only	464	5.8	4.3	8.8	17.7	21.3	18.1	23.9
DHH plus	859	3.5	4.1	6.8	19.1	26.1	21.8	18.7

Table 3. Percentage of women, percentage frequency distribution by prior qualifications and percentage of students receiving financial support in students with different disabilities.

	Percentage of women	Prior qualifications			Percentage with financial support
		High	Medium	Low	
No declared disability	59.3	33.3	37.0	29.6	25.7
DHH only	64.9	43.1	36.4	20.6	27.8
DHH plus	66.4	34.0	30.8	35.2	49.5

Table 3 shows the distributions of prior qualifications for the three groups of students. (Relevant data were missing for 264 students.) A chi-square test showed that these three groups were significantly different from each other, $\chi^2(4, N = 155{,}900) = 44.12$, $p < .001$. Further tests showed that prior qualifications were significantly higher in the DHH only students than in the nondisabled students, significantly higher in the DHH only students than in the DHH plus students and significantly higher in the nondisabled students than in the DHH plus students.

In national surveys in the United Kingdom, DHH students have been found to have somewhat lower entrance qualifications than nondisabled students (Richardson, 2001a, 2009). This was true of both DHH only students and DHH plus students in Richardson's (2001b) original survey at the Open University. However, in more recent studies, DHH only students at the Open University have been found to have similar prior qualifications to nondisabled students (Richardson, 2010, 2014). In short, the prior qualifications of DHH only students seem to have improved in the last 15 years, perhaps due to better access to educational opportunities.

Socio-economic circumstances

On the basis of their personal circumstances, Open University students could apply to the University for financial assistance towards the cost of their registration fees and study materials. The award of such assistance may be taken as a rough proxy for lower socio-economic circumstances. (Disabled students could also apply to national agencies for a Disabled Student's Allowance towards the cost of their studies.) Table 3 shows the percentages of students receiving such assistance in the three groups. A chi-square test showed that these were significantly different from each other, $\chi^2(2, N = 156{,}164) = 252.12$, $p < .001$. Further tests showed that the proportion of students receiving financial assistance was significantly higher in the DHH plus students than in both the nondisabled students and the DHH only students, who were not significantly different from each other.

Subject of study

The students were classified according to their subject of study into the ten categories in Table 4. Students registered for two or more modules were classified according to the first module for which they had registered. (Openings modules are intended for students who are new to higher education or who are changing to a new area of study. They are all assessed on a pass/fail basis.) Table 4 shows the percentages of students across the ten subjects in each of the three groups. A chi-square test showed that these were significantly different from each other, $\chi^2(18, N = 156{,}164) = 148.74$, $p < .001$.

Table 4. Percentage frequency distribution by subject of study in students with different disabilities.

	No declared disability	DHH only	DHH plus
Arts	13.7	22.8	19.2
Business and law	12.0	6.9	9.7
Education	6.4	3.2	5.6
Health and social care	7.3	8.2	8.5
Mathematics and computing	11.1	8.0	6.6
Modern languages	3.4	6.5	6.3
Openings	5.5	4.7	4.8
Science	15.3	12.7	12.5
Social sciences	16.6	20.5	20.3
Technology	8.6	6.5	6.6

Further tests showed that the DHH only students were significantly different from the nondisabled students, $\chi^2(9, N = 155{,}305) = 71.91$, $p < .001$, that the DHH plus students were significantly different from the nondisabled students, $\chi^2(9, N = 155{,}700) = 77.56$, $p < .001$, but that the two groups of DHH students were not significantly different from each other, $\chi^2(9, N = 1323) = 8.95$, $p = .44$. Table 4 shows that, regardless of whether or not they had additional disabilities, the DHH students were more likely than the students with no disabilities to be studying modules in the arts or social sciences but less likely to be studying modules in business and law or in mathematics and computing. Similar trends were noted by Richardson (2001a, 2001b) both in a national study and at the Open University.

Completion rates, pass rates and grades

Out of the 258,820 course registrations at the Open University in 2012, 176,788 (or 68.3%) led to successful completion. Table 5 shows the completion rates for the students in the three groups. A chi-square test showed that these were significantly different from each other, $\chi^2(2, N = 228{,}818) = 43.57$, $p < .001$. Further tests showed that the completion rate was significantly higher in the DHH only students than in the students with no disabilities and significantly higher in the students with no disabilities than in the DHH plus students.

Of the 176,788 completions, 163,366 (or 92.4%) led to passes. Table 5 shows the pass rates for the students in the various disability categories. A chi-square test

Table 5. Percentage of students completing their courses, percentage of completed students passing their courses and percentage distribution of grades for passed students in students with different disabilities.

	Percentage complete	Percentage pass	Course grade				Percentage good grades
			One	Two	Three	Four	
No declared disability	69.0	92.8	21.2	31.0	30.5	17.3	52.2
DHH only	74.4	94.1	27.0	29.4	27.4	16.3	56.3
DHH plus	61.6	88.5	14.8	27.7	30.8	26.6	42.6

Note: Course grades vary from one (distinction) to four (bare pass). Grades One and Two are 'good.'

showed that these were significantly different from each other, $\chi^2(2, N = 157{,}936) = 23.29$, $p < .001$. Further tests showed that the pass rate was significantly lower in the DHH plus students than in the nondisabled students and the DHH only students, but that there was no significant difference between the two latter groups.

Although some courses were assessed simply on a pass/fail basis, on many courses, the passing students were awarded grades between 1 (distinction) and 4 (bare pass). When determining the class of honours degrees, the boundary between Grades 2 and 3 maps onto that between upper and lower second-class honours, and so, Grades 1 and 2 can be regarded as 'good' grades that would merit the award of a good degree. Out of the 85,944 registrations that led to a grade, 44,382 (or 51.6%) led to a good grade. Table 5 shows the distributions of grades and the percentages of good grades for the three groups of students. A chi-square test showed that these percentages were significantly different from each other, $\chi^2(2, N = 77{,}223) = 14.94$, $p = .001$. Further tests showed that the proportion of good grades was significantly lower in the DHH plus students than in the nondisabled students and the DHH only students, but that there was no significant difference between the two latter groups.

One possibility is that attainment (in terms of completion rates, pass rates or grades) varied across the three groups because they tended to choose modules in different subjects. This notion can be tested by examining the interaction between the variation across the three groups and the effect of subject of study. This interaction was not significant in the case of completion rates, $\chi^2(18, N = 228{,}818) = 24.04$, $p = .15$, pass rates, $\chi^2(18, N = 157{,}936) = 13.78$, $p = .74$, or good grades, $\chi^2(16, N = 77{,}223) = 23.36$, $p = 0.10$. In other words, the pattern of attainment in nondisabled students, DHH only students and DHH plus students was similar across different subjects, and so, the differences in attainment are not due to different choices of subject.

Controlling for the effects of demographic characteristics

The analyses that have been described thus far have shown that the three groups of students vary with regard to the likelihood of their completing their courses, passing their courses or obtaining good grades on their courses. In other words, simply at a descriptive level, hearing loss plays a statistically significant role in predicting completion and attainment. However, the three groups of students vary with regard to age, gender, prior qualifications and socio-economic circumstances. It follows that the apparent variation in the completion and attainment of students with hearing loss is confounded with variations in their completion and attainment related to these demographic characteristics. Hierarchical logistic regression analyses were carried out to control for possible effects of age, gender, prior qualifications and financial assistance on completion and attainment in these students.

The results are reported in terms of odds ratios, which can be explained briefly as follows. If the probability of the members of Group 1 exhibiting a particular outcome is p (e.g. 60), then the odds of this are $p/(1 - p)$ (i.e. .60/.40 or 1.50). If the probability of the members of Group 2 exhibiting that outcome is q (e.g. 70), then the odds of this are $q/(1 - q)$ (i.e. 70/.30 = 2.33). The odds ratio is the ratio between these odds (i.e. $[p/(1 - p)]/[q/(1 - q)]$, which equals $[p(1 - q)]/[q(1 - p)]$). In this case, the ratio between the odds is 1.50/2.33 = 0.64. In other words, the odds of the members of Group 1 exhibiting the relevant outcome are 64% of the odds of the members of Group 2 exhibiting that outcome.

Table 6. Odds ratios of completion, passing and obtaining a good grade in DHH students, both unadjusted and adjusted for the effects of age, gender, prior qualifications and financial assistance.

	Unadjusted			Adjusted		
	Complete	Pass	Good grades	Complete	Pass	Good grades
DHH only	1.30*	1.25	1.18	1.21*	1.05	1.07
DHH plus	0.72*	0.60*	0.68*	0.73*	0.60*	0.71*

Note: Data show the odds ratio of each outcome in DHH students compared with students with no declared disability.
*Odds ratios significantly different ($p < .05$) from one.

Odds ratios vary from 0 (when $p = 0$ or $q = 1$) to infinity (when $p = 1$ or $q = 0$). An odds ratio of 1 means that there is no difference in the odds of the two groups' members exhibiting the outcome (when $p = q$); an odds ratio less than 1 means that the members of Group 1 are less likely to exhibit the outcome than are the members of Group 2; and an odds ratio greater than 1 means that the members of Group 1 are more likely to exhibit the outcome than are the members of Group 2. Whether an odds ratio is significantly different from 1 depends on the odds ratio itself and on the number of members in each group.

Table 6 shows the odds ratios comparing the students with hearing loss with the nondisabled students in terms of the completion rate, the pass rate and the proportion of good grades. The numbers in the three left-hand columns are unadjusted and correspond to the data in Table 5. For instance, the odds of the DHH plus students completing their courses were 28% (i.e. $[1 - 0.72] \times 100$) less than the odds of nondisabled students completing their courses. The numbers in the three right-hand columns are adjusted for the possible effects of age, gender, prior qualifications and financial assistance (all treated as categorical variables). For instance, the odds of the DHH plus students completing their courses were 27% (i.e. $[1 - 0.73] \times 100$) less than the odds of nondisabled students completing their courses when these other characteristics had been taken into account.

In the case of the completion rates, the combined effects of age, gender, prior qualifications and financial assistance were highly significant, $\chi^2(10, N = 228{,}477) = 3172.59$, $p < .001$. Students aged less than 30 were less likely to complete their courses than were older students, $\chi^2(6, N = 228{,}477) = 413.31$, $p < .001$; women were more likely to complete their courses than were men, $\chi^2(1, N = 228{,}477) = 31.27$, $p < .001$; students with medium or high prior qualifications were more likely to complete their courses than were students with low qualifications, $\chi^2(2, N = 228{,}477) = 1753.22$, $p < .001$; and students who had financial assistance were less likely to complete their courses than were students who did not, $\chi^2(1, N = 228{,}477) = 511.31$, $p < .001$. When these effects had been statistically controlled, the completion rates for the three groups of students were still significantly different from each other, $\chi^2(2, N = 228{,}477) = 34.23$, $p < .001$. Table 6 shows that the completion rate was significantly higher in the DHH only students than in the students with no disabilities and significantly lower in the DHH plus students than in the students with no disabilities.

In the case of the pass rates, the combined effects of age, gender, prior qualifications and financial assistance were highly significant, $\chi^2(10, N = 157{,}724) = 1423.27$, $p < .001$. Students aged less than 30 were less likely to pass their courses

than were older students, $\chi^2(6, N = 157{,}724) = 390.15$, $p < .001$; women were more likely to pass their courses than were men, $\chi^2(1, N = 157{,}724) = 67.05$, $p < .001$; students with medium or high prior qualifications were more likely to pass their courses than were students with low qualifications, $\chi^2(2, N = 157{,}724) = 263.41$, $p < .001$; and students who had financial assistance were less likely to pass their courses than were students who did not, $\chi^2(1, N = 157{,}724) = 475.95$, $p < .001$. When these effects had been statistically controlled, the pass rates for the three groups of students were still significantly different from each other, $\chi^2(2, N = 157{,}724) = 18.05$, $p < .001$. Table 6 shows that the pass rate was significantly higher in the students with no disabilities than in the DHH plus students but not in the DHH only students.

With regard to obtaining good grades, the combined effects of age, gender, prior qualifications and financial assistance were highly significant, $\chi^2(10, N = 77{,}103) = 1910.83$, $p < .001$. Students aged less than 30 were less likely to obtain good grades than were older students, $\chi^2(6, N = 77{,}103) = 288.70$, $p < .001$; men were more likely to obtain good grades than were women, $\chi^2(1, N = 77{,}103) = 7.08$, $p = .008$; students with medium or high prior qualifications were more likely to obtain good grades than were students with low qualifications, $\chi^2(2, N = 77{,}103) = 723.47$, $p < .001$; and students who had financial assistance were less likely to obtain good grades than were students who did not, $\chi^2(1, N = 77{,}103) = 328.74$, $p < .001$. When these effects had been statistically controlled, the proportions of good grades for the three groups of students were still significantly different from each other, $\chi^2(2, N = 77{,}103) = 10.01$, $p = .007$. Table 6 shows that the pass rate was significantly higher in the students with no disabilities than in the DHH plus students but not in the DHH only students.

Conclusions

In a national survey carried out in the United Kingdom, Richardson (2001a) found that DHH students who had no additional disabilities were less likely to complete their programmes and were less likely to obtain good degrees than were students with no reported disability. However, these effects were both due to differences in background variables, and the differences became nonsignificant when the effects of those variables had been taken into account. In a subsequent national survey, Richardson (2009) confirmed that DHH students with no additional disabilities were as likely as nondisabled students to obtain good degrees. Research at the Open University has consistently shown that DHH students who have no additional disabilities are as likely as nondisabled students to complete their courses, to pass the courses that they complete and to obtain good grades on the courses that they pass (Richardson, 2001b, 2010, 2014).

This picture is confirmed by the findings of this study. DHH students with no additional disabilities tend to be older than nondisabled students, they are more likely to be women, and they are more likely to be receiving financial assistance, but they have higher prior qualifications than nondisabled students. They are more likely to be studying modules in the arts or in social sciences than nondisabled students, but they are less likely to be studying modules in business and law or in mathematics and computing. These differences in subject choice may be due, at least in part, to the difference in their gender distribution, since the former constitute traditionally female subjects whereas the latter constitute traditionally male subjects.

DHH students with no additional disabilities are more likely to complete their courses than are nondisabled students, and they are just as likely to pass the courses that they have completed and to obtain good grades on the courses that they have passed. These conclusions remain the case when the effects of age, gender, prior qualifications and financial assistance on academic attainment have been taken into account. They all tend to corroborate Richardson's (2001a) original suggestion that hearing loss itself has no effect on academic performance.

DHH students who have additional disabilities tend to be older than nondisabled students, they are more likely to be women, they have lower prior qualifications, and they are more likely to be receiving financial assistance than nondisabled students. They too are more likely to be studying modules in the arts or in social sciences than nondisabled students, and they are less likely to be studying modules in business and law or in mathematics and computing. They are less likely to complete their courses, less likely to pass the courses that they have completed and less likely to obtain good grades on the courses that they have passed than are nondisabled students. The disparity in attainment between these students and DHH students who have no additional disabilities (see Table 6) presumably reflects the impact of other forms of disability on students' performance; the effects of these other disabilities were documented by Richardson (2010). These conclusions, too, remain the case when the effects of age, gender, prior qualifications and financial assistance on academic attainment have been taken into account.

The limitations of this study have to do with the paucity of information about the DHH students themselves. The Open University's administrative systems do not differentiate between students who are deaf and those who are hard-of-hearing, between students who are congenitally deaf and those who have become deaf later in life, or between students who prefer to communicate using a spoken language and those who prefer to communicate using a sign language (see Richardson & Woodley, 2001). The attainment of all these groups would be worth studying in detail in future research. The strengths of this study are that it has been able to evaluate different aspects of academic attainment in a large sample of DHH students and to disentangle the effects of additional disabilities from those of hearing loss itself.

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Notes

1. This article follows Phipps, Sutherland and Seale (2002) in referring to 'disabled people' or 'disabled students' rather than 'people with disabilities' or 'students with disabilities': '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)

2. These and other data are available from https://www.hesa.ac.uk/content/view/1973/239/.
3. It should of course be acknowledged that many deaf people regard themselves as members of a distinct cultural and linguistic group and not as disabled. This is conventionally flagged by use of the term 'Deaf' rather than 'deaf' (see Padden & Humphries, 1988). However, in the context of the present discussion, 'deaf or hard-of-hearing' is the appropriate expression.

Notes on contributor

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