

Project Title:

**The experience of students with a disability studying Science in an era of financial, curriculum and technological change**

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## Executive Summary

This project is a study of the experience of students with a disability studying Science at a time of considerable financial curriculum and technological change. The project was initiated in 2013 at a time when the impact of changes to student funding were starting to be felt across the HE sector and the Science programme at the Open University had made significant changes to its curriculum and the way it supported students. At its inception, the project was intended to be much broader in scope and compare the experience of students before and after these changes took place. Given the researchers' role within the Centre for Inclusion and Collaborative Partnerships, it was also intended that the research would examine whether students from widening participation backgrounds were being adversely affected by such changes.

A number of factors has meant that the scope and scale of the project has reduced over time, with the final focus of the project being determined by the response of just five students, all of whom with a disability, to a request for participants. All students were interviewed by the researchers on topics of relevance to the original research focus, which included curriculum issues technological issues and finances. Participants were not asked specifically about their experience as disabled students, although all students referred to their disability to some degree during the interviews. What became a focus of the analysis, therefore, was the extent to which disability, played a role in the experience of the students.

The research found that the experience of the students taking part was similar to that which has been reported of the majority of Open University students. The Open University was chosen in response to personal circumstances and family commitments and was seen a place where study would be flexible. Technology had played a part in this flexibility by enabling students to study in ways and at times to suit. However, there was concern about the implications of the increasing use of online experimentation on students' preparedness for work. Interaction with other students was also seen as an issue and was key to perceptions of the value for money offered by the Open University.

Disability was not a factor in the experience of three of the five students interviewed. However, for two students, their disability had an impact not just on their choice of University, but also on the course they took and their particular degree pathway. Whilst very appreciative of the support given to them as disabled students, it was clear that the availability of such support was a determining factor in what and how they could study. Attention may need to be given, therefore, to the issue of ensuring parity of choice and experience to all Open University students.

## **Aims and scope of project**

The original aim of this study was to investigate the student experience in the light of recent changes to the curriculum offering, financial arrangements and the increasing use of technology. The stance taken by this project was that the offering of the Open University is in many respects different to what it was even five years ago. This study therefore aimed to compare the experiences of Open University students who had commenced their studies prior to the change in funding in 2012 and those who had commenced their studies after this date. These two student groups are often referred to as 'old' and 'new' regime students.

A particular element to the original study was that of widening participation. This focus reflected CICP's role in supporting the Open University's Widening Access and Success Strategy. There is also much discussion both within the research literature and more generally in HE about the effects of the new funding regime on students from widening participation backgrounds, as well as the hurdles they can face in accessing new technologies. This research therefore aimed to examine the student experience more broadly, and to identify whether any particular barriers are faced by widening participation students.

The project has changed radically in both scope and scale since its first inception for several reasons: Firstly, comparison between 'old' and 'new' regime students was judged to be difficult to achieve. Secondly, as time progressed it was felt that a focus specifically on widening participation students would better support the strategic aims of CICP. Thirdly, as will be detailed in the methodology, responses to participate in interviews were only received from students with a disability marker. As a result, the revised aim of this project is to investigate the experience of Science students with a disability in an era of financial, curriculum and technological change. This revised aim has been reflected in the title of the project.

## **Context for project**

### **Research setting**

The particular context of the Science faculty has been chosen for two reasons. Firstly, like many faculties across the Open University, the structure of the programmes has been drastically altered in recent years. Science has faced a radical overhaul of its degree programme, the removal of many of its short courses and the discontinuation of residential schools. It has therefore, perhaps more than most, had to adapt to the new higher education environment. Technology has also been at the forefront of a great deal of the change affecting the faculty, often in response to the financial cuts made as a result of the changes to the curriculum. Delivery is now increasingly online and there have been a number of technical innovations, such as the OpenScience Laboratory, which will support the increasing use of online practical Science to replace the now defunct residential schools.

Five years ago a student starting their studies in Science at the Open University would have registered for an individual module in Science, perhaps S104 or the S154, have paid an upfront fee for that module or taken out a finance agreement with the OU. After completing that particular module they could then take another module, linked or otherwise to one of a number of degrees available in Science. Materials would still have been delivered in book form. Now a Science student can expect to register for a degree in Natural Sciences at the start of their studies, take out a student loan, study prescribed modules and do considerably more of their study online.

## **Who are widening participation students?**

According to the Office for Fair Access (OFFA), widening participation refers to the participation of disadvantaged groups in higher education. OFFA (2013) identifies four groups of students who are classed as disadvantaged: students from lower socio-economic groups and areas of low participation in HE, students from some ethnic groups, students who have been in care and disabled students. In addition to these four groups, the Open University had, at the time the research started, five key priority groups for the Widening Access and Success Strategy. It is these groups which this study has used to identify widening participation students:

- Students from low socio-economic groups
- Black and ethnic minority students from low socio-economic groups
- Disabled students
- Carers
- Students in prison or on licence

Within the context of Science education, there has also been some discussion about whether women should also be included in efforts to widening participation. Research has certainly indicated that women have a lower participation rate in Science than men (Gorard et al, 2008; Smith, 2011). However, it was decided that the focus of this research should be on the Open University's widening participation priority groups.

It should be noted that the numbers of widening participation students studying Science are relatively low. Research gathered by the Science faculty for the 2012/13 equality, diversity and widening participation plans, when this project started, suggests that the difference in attainment rates for low SES and BME students were roughly in keeping with other faculties. Attainment rates for disabled students were also no different to other students.

The point of the study was therefore to understand more about the experience of students from widening participation backgrounds and whether any issues arose in their study experience which could be seen as particular to them.

## **Review of the literature**

There are four key issues which this research aims to address. Firstly, whether funding has made a difference to how students perceive their studies. Secondly, whether the increased use of technology poses a problem for students and, thirdly, what are the effects of the emphasis on qualifications rather than modules. The fourth issue is whether students from widening participation backgrounds are placed at greater disadvantage as a result of these changes. What follows is a brief overview of the literature in relation to each of these areas.

### *Effect of new funding system*

The last five years have seen a steep rise in tuition fees across the Higher Education sector and from September 2012 there was no longer any government funding for undergraduate teaching. The debate around the effect of increased tuition fees has therefore been taking place for a number of years and much of the literature has yet to catch up with latest increase. One of the concerns expressed, particularly in relation to widening participation students, was that the fear of debt was more likely to deter potential applications from lower social classes from applying to university (Adnett and Tuplova, 2008). In a later

study, Johnston (2013) has acknowledged that this concern about the implications of debt was behind the shift from top-up fees to graduate repayment. However, Adnett and Tuplova (2008) also state that the immediate cause of unequal access to higher education is a lack of prerequisites and so the effect of any change in funding is likely to have only marginal effects on widening participation

### *Technology*

A lot of work has been done to identify technology acceptance amongst students found that perceived usefulness and ease of use were key factors in acceptance of that technology. Edmunds et al (2012) also found that there was a strong interrelationship between the students' acceptance of technology in the workplace and that in study. Also, students do not necessarily share the views of academics in accepting the acceptability of technology for learning.

Martinez-Torres et al state that: 'As with any new educational tool, e-learning needs to be justified on the grounds of effectiveness and relevance in relation to the students and the professional groups involved in training and education. If students do not see added value in the learning package, they are not likely to translate the learning objectives of these tools into useful knowledge and skills' (Martinez-Torres et al, 2008, p. 496).

At the Open University there are widely acknowledged issues of accessibility for particular groups, such as offender learners. However, the right access to and support with assistive technologies has also been shown to enable students with disabilities to succeed within the wider HE environment (Seale et al, 2015).

### *Widening participation and Science*

There has been considerable interest over the years in the relationship between low socio economic status and attainment in Science. A report commissioned by the Royal Society (2008) identified that those studying Science, particularly the Physical Sciences, are more likely to be from higher SES groups. However, they concluded that whilst there was a clear link between SES and attainment and participation in science, it was not clear that there was a "strong patterning of science participation and achievement by SES once other variables are accounted for" (Royal Society, 2008, p. 29). Neither did the report find that the situation in science was any different to other subjects or showing signs of getting worse.

The revised focus of this project is on the experience of students with a disability. There appears to be very little research in this area and that which has been done has taken place in the United States. In a study on the interrelationship between disability, minority ethnic status and STEM, Hawley et al (2013) found that large numbers of disabled and minority ethnic students are "'redirected' from STEM long-term goals as well as the educational, social and psychological experiences necessary to achieve them" (Hawley et al, 2013, p. 194).

Of course, this study does not focus on the number of students entering higher education but rather the experience of students within higher education. It is therefore not a study of access but rather experience.

## **Activities**

### **Overall approach**

The approach used in the project was to observe current practice through garnering the experiences of students, particularly disabled students, studying S014 as their first module in a Natural Sciences degree.

Although originally part of the project plan, the decision was taken fairly early on in the project not to conduct a survey with Science students about their experiences as it was felt that existing OU data might be able to provide this information. The difficulty of comparing the experience of pre-2012 and post-2012 students was also felt to be very difficult to achieve. As a result, and with the prospect of the project achieving nothing, the decision was taken to focus entirely on the experience of WP students. As indicated above, this was felt to be in keeping with the strategic aims of the Centre for Inclusion and Collaborative Partnerships whilst hopefully delivering some findings of interest to the Science faculty.

### **Planned activities of the project**

A request was made to IET for a sample of 100 students who met the following criteria:

- Studying the 2103J presentation of S104
- New to OU study
- With at least one of the following characteristics:
  - Students from low socio-economic groups (as determined by income)
  - Black and ethnic minority students
  - Disabled students

At the time, there was no specific marker for carers and so this group was not included in the sample. Offender learners could be identified but the logistical difficulties of doing research with such learners meant that they were also excluded. The sample also excluded students from outside the United Kingdom, although, crucially, not from outside England.

All students meeting the criteria identified were sent an email requesting their participation in an interview about their experience of studying S104. In the event, only five students responded (students A to E), all of whom had a disability marker. It was for this reason that we decided to focus specifically in the experience of students with a disability. Three of the students came from the Celtic nations (Students B, C and E), which meant that financial issues could not be addressed in the way intended. As such, the findings should be treated with caution.

### **Methods**

Telephone interviews were conducted with each of the five students. The interviews covered a range of topics related to the purpose of the research. It was decided that there would be no questions focussed specifically on disability but to see whether this was raised by students. The themes of the interviews were, therefore, as follows:

- Curriculum issues
  - Why the OU and particular module
  - Qualification choice and guidance received
  - Workload
- Technological issues
  - Use of online technologies to support learning
  - Attitudes to online learning
- Financial issues
  - Funding for studies
  - Perceptions of value for money

Interviews ranged in length between 20 minutes and one hour and were recorded and then transcribed. Thematic analysis was used to identify the key themes emerging from the interviews.

## **Findings**

The findings have been grouped into the broad themes which emerged from the interviews

### **Differential identification as disabled students**

Although disability was not mentioned in the interview questions, all five students referred to their disability to some extent. Students D and E made specific reference to their disability, which affected their mobility, and it was clear that this had a corresponding influence on their experience as students. Consequently, each of the themes emerging from the interviews will be addressed generally, and then with reference to disability, where appropriate.

### **The Open University as a flexible and grown up option**

For all five students, the part-time and distance nature of the Open University was the principal reason for choosing it. None of the students was currently in full-time employment, but the OU offered a means to fit studies in with caring responsibilities or other commitments.

Well because I can't afford childcare costs to go back to work or to go to university or university fees it was the more cost effective option for us as a family (Student C).

For Students D and E, the level of their disability meant that a campus University was not an option and, in the case of Student D, she had to rely on family and friends to support her in her studies in a way that would not be possible on campus.

With the Open University obviously it's completely flexible when I study and how I study so I can mix and match the hours that I've got available with actually how I'm feeling with drugs I've had to take or whatever. So really that's what decided me (Student E).

Although Students A made very little reference to his disability, it was clear that agoraphobia had played a part in his decision to study with the Open University.

The term 'grown up' has been used here because two students specifically referred to the mature age of Open University as a benefit. Although, as mentioned below, Student B missed the interaction with students possible at a campus university, he nonetheless felt that he would not want to 'get down with 20 year olds'. Student D reported severe bullying during previous attempts to study at a campus universities and felt that Open University students were more mature.

So the benefit of distance learning is that you don't have any sort of problems with the other students in that respect so that's brilliant. But also I think that maybe the Open University students are of different ages, they're more mature, they're more focused anyway so I would quite like to meet my classmates (Student D).

### **Why Science?**

There was a wide variety in reasons given by students to study Science. Naturally enough, all student expressed an interest in Science but not all had prior qualifications in the subject. Students A, B and C had A level or equivalent in Science subjects, but, in the case of students B and C, they had gone on to study other subjects at University. Students D and E had no prior experience of Science and the choice to study Science seemed to be, at least part, the check the 'brain was still working' (Student E). In both cases, they had they had done a considerable amount of preparation prior to starting their studies.

Career options played a part in the decision to study Science for Students A, C and D, and for Student D, this was very much down to her disability, which means that an office-based job was not an option. She hoped, therefore, that the study of Science would offer a range of career options where she would not be tied to a computer.

It was striking that for Students D and E curriculum choice, and therefore degree pathway, was determined by disability. Student D admitted that module choice would be influenced by the availability of recorded materials.

At the beginning I thought of an earth science degree but now that I've been working with these audio recordings I do think it'll be dictated by which modules have those recordings because they make my life so much easier. So I may not end up doing earth science, it just depends (Student D).

Similarly, Student E had already excluded the option of geology as a result of her mobility problems and the difficulty she would face in doing fieldwork.

The inter-disciplinary nature of S104 was differently viewed by students. For those with no particular interest in particular specialisms, the experience of study could be quite difficult. Student B was particularly forthright in his opinion of some of the subject areas covered in the module: "Earth history and rocks are dull as dishwater to me, they're a slog." However, even this student found the overall experience as "more interesting than I thought it was going to be in some of the other areas". For those students without a background in Science, such as Student E, the experience of studying a broad range of subject was both daunting and enlightening:

I've been surprised with is really how in depth it feels. It probably isn't, it's because I'm so new to it but the information contained in the books I was finding initially that it was really quite a lot for me to take in. Especially the maths and physics sides of it. But what I was also finding way that I've found that I can actually appreciate the beauty of maths and physics (Student E).

### **The experience of blended learning**

The term "blended learning" has been used here to broadly indicate the experience of study, including online learning, the use of technology and also the workload.

A key feature of the way the Science curriculum is delivered is the increasing use of online materials. Student E particularly valued the visual nature of online learning, but, as the views of students E and A make clear, it is the opportunity to pick and choose between online and paper-based materials which was seen most very positively by students:

I like it from the point of view that it's very visual. I like that it's very visual. I'm thinking of, you know, the activities etc. that we have to do online. And I feel that I remember the material much easier than just reading (Student E).

I find it superb being able to use both the books and the online copies at the same time. The way in which I can be predominantly studying online and online highlighting of the pdf file and what have you as I want to but frequently when I want to go and look something else up I can reach up, get the book, flick through it and there (Student B).

Well I would prefer to have the books sort of material books in front of me cos I prefer books cos they don't run out of batteries even though they're heavier ... I do like to physically have it and then I can flick through at any time (Student A).



Students were asked about doing online experiments. Two students (A and E) reported that they had already used some online experiments to in their their studies. However, the idea that online experimentation would be used to replace laboratory experience was treated with some caution. There was a particular worry about how well prepared students would be in the workplace:

You don't learn how to prepare a Petri dish ... and obviously at home you can't do it because you're going to have to view it. But when you go into the real world in a lab you do need that skill. So you may have the knowledge but you haven't got the experience (Student C).

The other area of student experience where the increasing use of online resources was treated with caution was in relation to interaction with other students. All reported using the OU forums and particularly the S104 Facebook group to support their students. Students D and E, in particular, spoke about the friendships they had made in such forums. There was a desire, however, amongst students for physical as well as online interaction with students.

I think you speak to these people online and you go to the tutorials every so often but it would be nice to have some social interaction with a human face to face rather than via Skype or the online system, the blackboard system, you know, that kind of tutorial set up that we've got (Student C).

For Student B, as mentioned below, this was a principal benefit of campus based Universities and closely associated with a sense of value for money:

Yeah and for that factor of two in the brick university you get all the student contact with hundreds of students, you get the face to face lectures, the tutorials, all the informal social space that goes with it, the whole university lifestyle, is a much, much richer experience for the student (Student B).

At the same time, students expressed a degree of pragmatism when it came to the limitations of online or blended learning and accepted that, in order to study at a distance, there would have to be certain concessions.

it's sort of an equivalent sort of thing, you know, you have to sort of lose certain aspects of experimental understanding to be able to do a home degree (Student A).

Students were specifically asked about workload and there was a varied response. Student E, who had no prior experience of Science study, found the initial experience 'overwhelming'. Student C thought that the number of hours expected of study was an under-estimation and she spent roughly double the time. Other students, however, generally thought that ten to fifteen hours a week was about right, although workload did vary depending on the week in question.

### **Value for money**

The fact that three of the five students interviewed lived in the Celtic nations meant that finances and value for money could not be addressed in the way intended. However, both England-based students (A and D), who had taken out students loans, thought that Open University represented good value for money. A key factor in value for money for Students B and C was the level of support they received, with Student B considering that the Open University would not represent the same value for money as a campus University for those paying full fees. This was not related to the quality of materials or support, but rather the interaction with other students which distance learning could not offer.

A particular example of how value for money was perceived was the case of Student B. She lived just inside the Welsh border and felt there was a difference in student support offered by the Open University on the basis of the lower fees she paid in Wales. In particular, she cited the lack of day schools in Wales and

bemoaned the fact that she would be offered such opportunities if she lived in England. Although she was glad to pay lower fees, she blamed the Welsh Assembly for opting for lower student fees at the expense of student support.

[T]he English students pay more for their studies and they get more because that's the price of the fees there. Our Government chose to help the Welsh students paying some of their fees but they OU have then cut the support we get with tutorials and day schools (Student C).

### **Disability specific support**

Disability was not intended as a focus of this project and so reference to it came about naturally as interviews progressed. As already mentioned, all students referred to their disability to some extent, but, with the exception of Students D and E, it did not really feature as part of their experience of study. Both students had undergone disability assessments and had been provided with materials in alternative formats. For Student E, it was clear that the support she had received as a disabled student had played an important role in her ability to continue with her studies and also her appreciation of the Open University:

I've been quite humbled by it really because, as I said to my family, you know, I'm doing this course really just for my own benefits and not for a career. I don't know that it will benefit anything else that will be able to use it. It's really just something for me so it feels quite selfish in a way for to be given all this support (Student E).

For Student D, there was a slight note of caution in she felt it unfair that invaluable resources, such as recorded materials, were not available to all students.

### **Conclusions**

This project, marred as it has been by a considerable and pragmatic change in scope and scale, can only offer a very limited insight into the experience of students with a disability studying Science. What has been shown is that disability is not necessarily a factor in determining the experience of these students, and that the issues they raise will be common to many of those studying at the Open University. For some students however, such as Students D and E, disability can have an impact not just of where and how they study but also what they study. As a result, attention may need to be given to how the Open University can ensure that such students are able to exercise the same degree of choice as all other students when it comes to study pathways.

### **Deliverables**

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