

eSTEEeM report

STEM Ambassadors' Project

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Summary

This project, investigated the use of online technologies for the delivery of careers and employability advice to distance learning STEM students with the aim of informing the future development of careers and employability provision. The study used a mixed methods approach, and was conducted as a partnership between two Open University Faculties (Maths, Computing and Technology and Science), the OU Careers Advisory Service, and STEMNET. The study was centred on an online forum with visiting experts from IT and Science industries, recruited as STEM Ambassadors, who volunteered to answer career related questions from students. Following the forum, individual telephone interviews allowed student volunteers to provide information on career history, objectives and motives for study and the value of the forum experience, which was also useful in informing future career development and planning. Finally a self-selected focus group was brought together using the on-line conferencing system, Elluminate. This gave researchers the opportunity to address in more detail the themes that had emerged during analysis of the forum and telephone interviews. The analysis revealed some common topics of concern grouped under the following emerging themes: career development (including forum postings, demographics, course design, curriculum vitae, and age), skills development, and tools to support employability.

Recommendations provided by the volunteers are highlighted under each section and summarised at the end of this report. Students expressed their support for both face-to-face and online asynchronous and synchronous ways of communicating with each other, with the course team and with employers. The main proposals put forward included the opportunity for peer conversations and mentoring; interdisciplinary work within courses; networking with students, professionals and academics; a forum open at different times of the year; career planning using the careers advisory service linked to job centres; provision of notice boards for information; industry webinars; links with the National Vocational Qualifications (NVQ) system to add to qualifications; access to careers fairs, and more opportunities for face-to-face practical class opportunities.

To conclude, this report highlights the importance of the relationship between the OU and prospective employers, inclusion of module teams in responding to employability concerns, and maximisation of both student and tutor skills as well as specific tools that could support students' employability.

Introduction

Why Employability?

The Open University defines Employability as

'...A set of capabilities and achievements that support students in developing their careers, raising their aspirations and enhancing their contribution to society'

Employability is a set of achievements – skills, understandings and personal attributes – that makes graduates more likely to gain employment and be successful in their chosen occupations (ESECT based on Yorke, 2006). Research by Mellors-Bourne *et al* (2011) suggested that one of the most likely reasons why STEM graduates were often not in STEM related jobs is that STEM graduates find non-STEM work more interesting. This implies that institutions should be doing more to promote the image of STEM jobs. Higher Education (HE) institutions are keen to invest in areas of employability and skills development as these can improve graduate employment rates. McQuaid and Lindsay (2005), argue that employability is affected by the interaction of different factors, including external, personal and individual.

Traditional HE institutions are now focussing much more on connections between study and the work-place, and this includes work based learning, placements, employers influencing course design, and students working whilst studying, so that students graduate with the skills necessary to gain and also retain a fulfilling career and employment. Certain graduate attributes like team-working skills and communication need more investment because they take time to develop (Yorke, 2010). For students studying part-time by distant learning, many of whom are already working, it is important to consider how employability can be enhanced in different and innovative ways. In particular, without the opportunity for face to face interventions, it is increasingly important to explore new ways of using technologies and social media to support the development of their employability skills.

The term STEM encompasses a wide range of academic disciplines and employment pathways and it is beyond the scope of the project and this report to examine any specific employability issues in each industry sector. The focus is therefore on highlighting more widespread and 'generic issues' that affect current students of these disciplines and their future employability.

This project (funded by eSTeEM) aimed to investigate the use of online technologies for delivery of careers and employability advice to distance learning students. The OU Careers Service, working in partnership with an external organisation STEMNET, ran an online forum session with visiting experts from the IT and Science industries who volunteered to answer career related questions from students¹. Following this, telephone interviews were conducted with volunteers who had posted in the STEM forum. In order to explore themes in more detail with group interaction, an online focus group of OU students was conducted using Elluminate.

The main objectives of the research were:

- To explore how to use online tools to support students' employability (of which the online forum was one of them) e.g. webinars (perhaps inviting industry specialists)
- To understand the use and value of these forums in order to inform careers provision for STEM students
- To explore, through one-to-one telephone interviews, students previous career history, objectives and motives for study and the value of the forum experience for future career development and planning

¹For a full description of the STEM Ambassadors Forum project see Science, Technology, Engineering and Maths (STEM) Forum 2013 Report by Nan Sherrard and Wendy Woolery

- To deepen and add value to the preliminary findings of the data with group interaction in the form of a Focus group, exploring the themes that had emerged from the analysis of the forum and telephone interviews
- To explore how to improve Employability prospects of students undertaking OU degrees

Project Team

Project Managers/ Academic advisors: Clem Herman (MCT) and Nigel Mason (Science)

Researchers: Rachel Ferris and Rosaria Gracia

Careers and Employability Advisors: Claire Riding and Wendy Woolery.

Methodology

Research tools

The study used three different methods to gather evidence.

- a) STEM Forum: students from two Level 1 STEM modules (TM129 and S104) were invited via a posting on their module Forum to take part in the STEM Ambassadors Forum and ask questions and to share with STEM Ambassadors any issues regarding careers and employability. This forum was open from Monday 8th April to Friday 3rd May, 2013. The STEM Ambassadors were selected by STEMNET and it was stipulated that they should have experience in either IT or Life Sciences. Each Ambassador was asked to be available for one week out of the four and provided an introductory posting outlining their skills and interests, after which they responded to questions posted by individual students. After the closure of the forum, the postings were analysed and categorised according to themes. The sample was of 65 students from a variety of subject disciplines as shown in Table 1:

Table 1. Subject disciplines

Subject Disciplines	Student Numbers
Natural Science (single and combined with Chemistry, Environment, Physics)	16
Maths (single and combined with Physics, Economics, Statistics, Computing and Engineering)	14
Computing/IT (single and combined with Programming, Design and Business)	10
Health Science	5
Physics (single and combined with Cosmology and already mentioned combinations)	4
Psychology	3
Engineering	3
Web development and Programming	3
Earth Science	2
Biomedical Science	2
Biology	1
Geoscience	1
Health and Social Care	1

- b) Telephone Interviews: An invitation was posted in the STEM Ambassadors Forum asking for volunteers to be interviewed. The same invitation was also extended to a sample of students on two Level 1 modules

(TM129 and S104) this time via their personal tutors. There were nine students who agreed to be interviewed and their demographics² are included in Tables 2 below. Telephone interviews lasted from between 20 to 45 minutes and were recorded using an Olympus WS-550M digital voice recorder and transcribed.

- c) Focus group: The interviewees were then invited to attend an online Focus Group to explore themes that had emerged during the analysis of interviews and to ensure that the information and consequent analysis of the responses was consistent, as well as to explore areas that had been underdeveloped. The focus group discussion took place using the on-line conferencing system Elluminate, and was facilitated by the associate lecturers involved in the research. The focus group was composed of four of the students that had been interviewed by telephone (Table 2). Despite a small sample size for the focus group, participants provided valuable information.

Students found out about this research study either through a posting on the careers website, their current associate lecturer or through a link to their particular course.

Table 2. Demographic profile of participants in the study. *These four interviewees took part in both the telephone interviews and focus group session

Age (yrs)	Gender	Location	OU Module	Qualification	Career and why doing this at this particular time
23	F	Guildford	TU100 TM129	Computing degree specialising in solutions and software development	Worked with family (pharmaceutical), also administration. Wanting to change career. Police control room; she wanted to be a police officer but she has a heart condition. First proper job from school
25	F	South Wales	S104	Open degree. Interested in Environment and Biology.	Career reasons. Working from age 15. A few A levels. Voluntary work. A baby at home. 'Messed about' with education. Science interest e.g. working in a lab.
28	F	Somerset	TU100 TM129	IT degree	Worked on retail all her life and care (made redundant). Also studied textiles but did not enjoy and left. Loves working with numbers. This led her into the course, allows her flexibility. Her other half is a software developer, he also influenced her.
*31	M	London	S104	Natural Sciences/ Physics	Long term career. Started off with architectural degree, but decided not for him. Working in private banking. No enjoyment. Voluntary teaching skills.
34	F	Glasgow	S104	Natural Sciences	Left schools at 14, office work. Work part time, she has a young family and going with the OU was the obvious option. Volunteer for children with learning disabilities. A course just for her. She has more time and space to study and wants a new career.
*41	M	Cambridges hire	TU100 TM129	IT degree	Career. Left school at 16. Qualified engineer – apprenticeship. Family carer role at present. Want to be employed. Interest in IT. Hoping to become Oracle DBA.
45	M	London (SW)	S104	Open Degree – interest in going towards Earth Sciences	Ability to do a degree, stopped when younger. Hard to progress above glass ceiling. Interest in science. Work in a laboratory in the oil business, x-raying rock. Earlier in a computer company, but made redundant.
*46	F	Birmingham	B26 SXM390 S240 T357	Two degrees: Molecular Science	Not for career reasons. Maths degree already. Teaching at present. Started OU just for fun. Want to do part-time PhD in future (chemistry current subject).

²Demographics respond to the composition of the sample for the Interviews and focus group.

			TXR220	Open Degree (History and Engineering)	
*53	F	Leeds	K320	Public Health and Ecology	Various paths, conversation, teaching. Combine work situation with university. Currently administrator and does not feel like what she wants to do forever.

In terms of the analysis, qualitative research methods using ‘open style’ questions were used in both the telephone and focus group research, which allowed the participants to expand beyond a yes or no response (see appendices). The telephone interviews followed a semi-structured pattern³. The Careers Forum data were examined and divided into overall category and sub-category (the disciplines as stated in a) above), and by gender, date and topic. Any emergent themes (what students were particularly concerned about) from these all the responses were recorded. Qualitative comparative analysis using a modified manual NVivo⁴ type of classification was conducted on student responses, (i.e. most common and least common themes) in order to shed some light on the issues that were of particular concern to students.

Data findings were triangulated⁵ to assess the consistency of the statements presented, to corroborate the findings and for mutual confirmation (Flick 1991; Kna and Breitmayer, 1991)

General considerations

Authenticity, Confidentiality and Consent

All of the subjects who took part in the study gave their consent to use the information derived from the focus group and the interviews. A confidentiality⁶ clause was read at the beginning of each telephone interview. The consent to complete questionnaires was oral and written (the consent form is in the appendices). The participation of the subjects was voluntary.

Authenticity was a crucial element both for the subjects and the researcher. The subjects were given support and advice at any time during the focus groups and interviews to ensure honesty in their responses and clarify any questions if necessary. Students taking part in both the telephone interviews and the focus group were given a book token in appreciation of their contribution to the research.

³ Questionnaires used in the telephone interviews and focus group are included in the Appendices of this report.

⁴ <http://download.qsrinternational.com/Document/NVivo10/NVivo10-Getting-Started-Guide.pdf>

⁵ Data was compared between the forum and interviews as well as between researchers

⁶ Anonymity of data

Results and Discussion

This section is organised into themes and is drawn from analysis of collated data from the forum, telephone interviews and focus group discussions.

Overview

The majority of initial postings (c. twenty) in the STEM forum were related to Mathematics/OR and IT/Statistics field, and equally close were those grouped into Biology, Ecology, Earth and Natural science questions and the Biomedical, Chemistry and Physics category. There were about four postings related to engineering and six postings of a more general nature. Threads were answered both by STEM ambassadors and other students using the forum and some threads developed into longer discussions.

Common emerging themes and connections across these groups included career pathways (interest in particular jobs), changing careers, career prospects, getting a role without any formal qualification, career progression, which courses to study (subject choice), skills needed for particular jobs, use of maths for programming and career options, age discrimination and barriers as a mature student in terms of ones' confidence, skills (being over qualified), orientation, and family. Other themes included using interdisciplinary experience, transitional arrangements, changing pathways and employers preferences, open degrees and credibility, competition for programmes, lab experience and work experience (how to get it), job opportunities with diplomas, choice of universities, interdisciplinary working such as Maths with Information Technology . Other more general themes that emerged were related to references and unemployment, switching courses and fees, and work experience whilst studying.

Further analysis revealed the most common themes emerging were around age and barriers, career change, changing courses, skills employers wanted, open degrees and value, gaining experience, and options for interdisciplinary experience. These themes are considered in more detail in this report using the information obtained from the telephone interviews and focus group.

Career and progression

Student employability profiles

Three different OU student employability profiles were identified:

- Career changers: students who are currently working but looking at a change of career: *'I am currently an administrator and it does not feel like what I want to do forever'* (Interviews, Public Health student)
Students who have already a career and are trying to expand on their experience: *'long term career decision; I currently work in private banking, fruitless career in terms of getting enjoyment. I want to do something different; a new development/career'* (Interviews, Natural Sciences/Physics student)
- Returners: students who wish to change careers or after acquiring life experience have decided to go back to education: *'I work part time and I have a young family. Going with the OU was the obvious option. It is a course just for me. I have more time and space to study'* (Interviews, Natural Sciences student)
- Career progressors: students who have a career but want to progress: *'I started just for fun. It became addicted. It is useful. I want to do a part-time PhD with the OU in the future thus leading somewhere'*(Interviews, Chemistry student)

This variety of needs and experience is therefore important to keep in mind in terms of the tools and services that could better serve the students. This is particularly important bearing in mind that many OU students have a wealth of work experience already in different areas including self employment, running their own businesses, as well as voluntary work experience, *'Working when about 15, never stopped always*

done something, either in employment or self employed. Voluntary work young carer's project. Working with fund raiser, try to do a lot for charity'. (Interview, IT student).

In addition to the information on demography in Table 2, participants were asked during the telephone interviews what they were aiming to achieve in their career, both in the medium term and in the long term. The common response in the short term was to obtain a degree in five years time and in ten years time to be in a good job, with career prospects or doing research. *'Five years to have a career with meaning and will have finished the degree. Something that has my motto, i.e. a positive impact on the human experience, certainly not in finance' (Interview, Natural Sciences/Physics student).* In the interviews, a public health/Ecology student expressed interest in research *'I really enjoyed the research component of her course and would like to work more on this in the future.... I want to do research but not lose contact with people'. 'In five years: Masters or PhD or job in research and development, ten years: research and development but with more hand on the development' (Interview, computing student).*

Response to the Forum

Some students just browsed, others did a mixture *'I browsed a section about a CV – all the comments, to gain a balanced overview and compared it to the questions I asked about my own CV. I posted a couple of other questions about getting employment, taking people on and also as I have not got the degree yet, but with quite a bit of experience behind me, I want to try to get into a company and get paid while I am learning', (Interview, IT student).*

In terms of participating in a careers forum students said:

- *'yes I would show up and would recommend it and publicise it. I have recommended to others and helped publicise it. I am a moderator for OUSA S104. There were a couple talking about careers and I have pointed them in that direction'. (Interview, Chemistry student).*
- *'It is completely new to me and I would consider taking part in another one. It is good to discuss ideas with other people. The degree I did at the uni was different. Eveybody ignored each other. Here it is a lot easier to talk to people over the computer, it is more relaxed. It is a great idea for people to ask what they can do in the future' (Interview, IT student)*

In terms of 'what was the most useful thing that came out of the forum', there was a variety of responses, but the most frequent was the availability of different STEM advisors. *'Range of interesting careers that the STEM advisors had. I tend to find that 17 year old kids think the only use of science is for doctors and dentists and advisors offered other options for scientists which was useful' (Interview, Chemistry student).* *'It is useful to have that information available so that one can ask directly individuals from industry what skills they are actually looking for. You can do an OU course and spend 4 years studying and it is not what people are actually looking for'. (Interview, Open degree student).*

Other responses pointed towards the importance of exchanging views among the students themselves:

- *'I put a couple of comments but I was mostly there to investigate what other people were doing. Someone contacted me suggesting the idea about PGCE. It was nice to make some friends out of it' (Interview, IT student)*
- *'The peer support is the best thing. Other people's views and concerns... It is not just you' (Interview, Natural Sciences student).*

When asked 'what was the least useful aspect of the Forum', the overwhelming response was the timing and length as well as presence. *'Perhaps it could be more obvious with regard to its presence, could have been open longer – perhaps twice a year (every six months), would be a good idea'. (Interview, Natural sciences/physics student); 'A month is not enough time to spend on the forum. Maybe it could be made*

available at all times or at the end of the courses for about three months as a way to catch up and see what we can do in the future' (Interview Natural Sciences student)

Other sources of advice and support

Students reported that when they had approached the Career Service they have been very useful. Other students had booked an appointment with an adviser. Others mentioned that the information was contradictory 'Sometimes the information one receives when you call is contradictory or sometimes people give you conflictive information' (Interview, IT student). Some students accessed other services: 'There is a national career service available which answers questions to candidates [...] It has been operating for a bit longer and it might be useful to utilise it [...] I am using it and I have used it to modify my CV considerably' (Focus group, IT student). 'I am already trying to make some contacts, asking them whether there are some research opportunities [...] I am trying to contact as many people as possible to have a good guidance of what steps to follow next [...] people that I thought would be related to the topic I am studying' (Interview, Natural Sciences student).

Recommendations (based on evidence above)

- **Maximise students' potential and establish structures for this communication and sharing to take place**
- **The OU could raise the profile of the students; tap on student's knowledge and skills perhaps through networking opportunities**
- **Provide a forum which is open for longer and at least twice a year. Have a general one open permanently and facilitate students supporting each other on careers issues, and specialised forums for a limited time period. Link with course teams and industry specialists**
- **Provide seminars e.g. use online conferencing.**
- **Allow career choice to tie in with particular assignments**
- **Make students more aware of information, use student home and ask module teams to post notes too.**

Being an OU student

Articulating the value of Open University qualifications

Students had the flexibility to work with a named degree or an open degree, which offered them more time and space in finding the course for them than they would have had in traditional universities. Many students in the forum discussed the possibility of changing courses and raised the question of what the employers were looking for. The generic recommendation was to explore the different options available and get in touch with the Careers Service to get more in depth detail.

One specific question was related to the credibility of an Open Degree. The student in question asked whether 'Is an open degree respected?' She was toying with the idea of acquiring a named degree but was doubtful whether there would be an incompatibility with the modules she had already studied. Another student on the forum asked 'do open degrees have less value?' (Forum question, 17.4.13). This thread led to a long discussion, 'I think it's entirely subjective, and/or dependent upon the role being applied for... I believe the points made on the OU website regarding the degree are all valid, but as an employer I would say that I'd be more likely to hire someone with a named degree that I considered to have more depth in a subject that was necessary to perform well at the job. However, if I didn't require such focus on a particular skill, I would perhaps be more likely to hire someone with the open degree..., it's a very subjective thing and I

*can imagine very many employers looking *very* favourably on open degrees. (Forum response, employer 17.4.13). The student still concerned stated 'implies then that an open degree financially has less value as you would have to look for a less specialised position?'*(Forum question, 17.4.13). *'What I meant is, that for me, when I ran my own software company, I would normally favour Computer Science or Software Engineering degrees over those that were more mixed - and that's purely because I was looking for people with quite deep knowledge of those subjects'* (Forum response, employer 17.4.13)

This latter context highlights that although the OU can provide flexibility for the students to find their career and can leave the options open, at times, that flexibility translates into uncertainty and students are in need of a steer to find a proper direction with regard to their future employability. However, in contrast to the above, another student said *'in terms of employers valuing the OU degree, it is well regarded because one is doing it on top of employment – indicates to employers that one is very good at organising ones time.....asked around many colleagues with degrees from Oxford, Cambridge and Russell Group Universities.....colleagues said an OU degree was not a disadvantage'* (Interview, Open degree student).

Another point of discussion was regarding the content included in the courses. It was pointed out that the content was *'less than in the Russell group'* ⁷ which was jeopardising the possibilities of obtaining a job. A student contributed to this discussion: *'a couple of adverts I have seen... if you are not part of the Russell group, do not apply'*. (Focus group, IT student).

The issue of marketing and support was addressed. A student pointed out that the image of the OU and their students are seen positively among employers: *'Contacts have considered the OU courses as good courses because it also shows students' commitment as well as the course in itself. People have been interested in [my] course from High School teachers, Postgraduate courses Admission Officers ...'* (Interview, Natural Science student). However this positive outlook was not shared by everybody. As one student puts it: *'this is something that the OU needs to drive... raise the profile of the actual OU degree itself... I live near Cambridge and a lot of agencies and companies do not take the OU degree as a proper degree... The OU needs to push it with employers... the students cannot push it...the degree as far as I can see it is exactly the same [as in other universities]'*.(Focus group, IT student).

This position was supported by some of the comments in the forum. For example, a student raised his concern about the fact that *'employers seemed to allocate jobs to degrees'* which made it difficult for a student of a varied background to enter the workplace on an equal footing to a student that had followed a more conventional path. One very relevant question was asked, *'has any employer come to the OU asking for students?'* (Focus group, IT student). How does the OU address this aspect for distant learning students who are located both in the UK and abroad, when a traditional University will normally have both specialist and generic open days for employers to visit campuses and attract applicants to their organisations? How does the OU enable students to tap into similar opportunities? Higgins (2012) reviewed the career-development needs of part-time students in employment with a view to how careers services can support them. The study suggested they should be aware of the rich diversity of part-time students' career aims and thus provide relevant guidance which addresses the students' own motivations and experiences.

In this context, there was a sense that despite the fact that the OU offered plenty of opportunities to the students to encounter new subjects, open their horizons and new doors as exemplified by the comments and conversations in the forum - the students did not feel that the OU degree was as widely recognised as it should be by employers. This indicated that closer links needed to be built with employers and existing connections with industry needed to be articulated more clearly to students.

Age as a barrier to employment

⁷ <http://www.russellgroup.ac.uk/> [accessed 22nd July 2013]

Also in the context of employability, students discussed the fact that their age was often a discriminatory factor in some professions. As one student put it: *'** Uni told me I was too old to finish Biology BSc when I was 30!* (Focus group, Public Health student). *'Another barrier is age and the perception of what an OU science degree is. The degree is now titled 'natural sciences' and should not be a barrier now that there is a transcript, but for some people this may be an obstacle and they might need help in marketing that aspect of it'* (Focus group, Chemistry student). *'Dates are an issue in age legislation terms as it makes it obvious your age if you put everything in.....'* (Focus group, public health and ecology student).

Complementing this point, there were a number of accounts where students wanted to change their career and were wondering whether this would be a good decision at their age. As a student put it: *'At what level does an individual who has spent their working life doing something not related, enter into the science field?'* (Focus group, Open Degree student). One student changing career said *'Yes breaking career and age are a big consideration of mine'* (Focus group, natural sciences/physics student).

There were a number of postings on the forum related to being a mature student and other barriers, for example in relation to graduate schemes *'Do graduate schemes tend to consider mature graduates? Would I be ruled out of graduate schemes on account of my age, or can you see me in reality being overlooked in favour of younger graduates? If I am eligible to apply for schemes, when would be the best time to do this?'* (Forum question, 19/4/13). The STEM ambassador was reassuring they would not be ruled out of graduate schemes because of age as it would be illegal and most employers need to view a number of candidates to get the best person

In a similar vein, and as a response to a forum posting, STEM Ambassador and moderators suggested that the solution was to explore different avenues but also to utilise the old career to support the student economically until the new career was established. In an attempt to support students concerned about age, forum responses reiteratively pointed out that *'it is important that applicants show evidence of experience and versatility'* (response 8 – 9.4.13). *'Some employers really value the variety of skills, commitment to a distance learning course [...] previous careers and experience can actually support you in getting the job you want'* (response 34 – 18.4.13)

Recommendations:

- **Provide a clear and specific point of reference where students can go and search for answers regarding employability and course progression**
- **Ensure that Associate Lecturers' advice and dialogue with the students is consistent across all disciplines as well as that offered by students advisers, which at times was conflicting**
- **Create opportunities for employers to come to events face to face with students (along the lines of a careers fair) and/or attend webinars to keep up to date with industry developments**
- **Provide space for more practical sessions or simulations so that more applied sciences could get the necessary experience, both laboratory and field based**
- **Involve both course teams and the industry sector in course design so that there is more alignment of assessments with industry requirements in the relevant sectors. Enable employers to be aware of what an OU student can offer them**

Embedding employability in module design

There was some discussion about to what extent modules were designed to meet the industry requirements. Particularly in courses on Maths, Economics and IT, there was some discussion about what is attractive to employers and how the OU course met those demands. In particular, students were interested in finding out more regarding specific software packages which were not taught in the OU courses and which they thought jeopardised their possibilities to get a job in these fields.

As a student put it: *'there is a big issue with what the OU thinks and what is expected, what is useful to take to an employer. At the moment it does not hit that target. The OU modules are ticking the government*

box... but they are not actually giving the students evidence of the skills the students can take to an interview' (Focus group, IT student). It can be argued that this can lead to a bigger discussion regarding the recognition of skills acquired through the OU courses and whether those skills are completely internalised by the students. A discussion on skills is included later on in this report.

Recommendations:

- **Create tools through which students are able to maximise on current skills and apply them to their chosen field of study and/or work**
- **Produce case studies where issues such as age are demystified and practical solutions about how to maximise one's skills are underlined**
- **Prepare students to be able to discuss in an interview scenario how to intertwine their life skills, knowledge, interpersonal and communication skills needed in the work place.**
- **Links to provide work experience with employers in a wider range of subjects**
- **Links to organisations such as job centres, back to work schemes, NVQ organisations**

Curriculum Vitae and references

Within the context of career progression there was some discussion around Curriculum vitae (CVs) and differences of opinion between different disciplines. *'If you are doing a CV, stick to two pages, rarely go over three, you should never go back further than 10 years on a CV. A lot of people don't realise that. A lot goes over 15 years. Companies are not that interested in what you did 15 years ago, because technology changed over that time.'* (Focus group, IT student). A student and current teacher expressed a different opinion *'it is not universal, we would be extremely suspicious to see a CV with just the last ten years and the person who was older than the last ten years. It highlights gaps. One needs to look at the conventions within the fields they are applying for. Possibly more information needed, i.e. what is the convention in different areas'*. (Focus group, Chemistry student).

Linked to the discussion, there were a few contributions in the forum that brought up the issue of obtaining references from the Open University. *'Some universities require two or three references and the OU offers a very general one, which leaves the student to track down past and present tutors'* (Forum posting 9.4.13).

This also draws attention to the academic career as some students were expressing an interest in research, where CVs are often a lot longer and run into many pages with publication lists. This does highlight perhaps that CV writing is an area that students need help with, particularly in relation to differing conventions between different disciplines.

Recommendations:

- **Provide students with clear information on the conventions in different fields as this is not universal.**
- **Provide some types of CV exemplars for different disciplines**
- **Provide some generic guidance on what to include or not to include in a CV**

Skills

Students pointed out that they felt that the OU supported them in developing a variety of skills:

- **Time management: 'I am organising myself much better [...] It has been quite useful as part of my job as administrator. I am not procrastinating as much'** (Interview, Natural Science student); **'time management and self-motivation'** (Focus group, Chemistry student)

- Personal skills: confidence/mentoring: *'it is useful to support my children too, both with the subject and their motivation. I want to have a new career. They are learning from my mistakes. They are also getting good results'* (Interview, Natural Science student); *'Increased confidence'* (Focus group, Public Health student)
- Specific skills: *'My problem solving and quantitative analysis skills'* (Focus group, Natural Sciences/Physics student); *'Improvement of grammar and report writing'* (Focus group, IT student)

Practical Science

Students recognised that there were however areas of improvement within the current provision. One of the suggestions was regarding providing the opportunity for more practical sessions, which were essentials in some courses such as Chemistry: *'One thing I hear a lot from science students is that they are feeling they lack practical experience. It is a real handicap in this field. It is more challenging in the OU. There is less practical experience than it was. That is one of the main problems'* (Focus group, Chemistry student). *'You cannot talk about practical skills, you have to do it!'* (Focus group, Chemistry student). *'I am interested in conservation, also work in health area for a local charity. Hard to make links with employers for degree level work.'* [Focus Group, Public Health and Ecology].

This issue around lack of practical experience led to a wider discussion regarding the entrance experience that some students had. As one student put it: *'STEM wise a big barrier is the limited High School Science education'* (Focus group, Public Health student). This point was complemented by another student: *'Level 1 is general and it covers what you cover in A levels. And then you have Level 2 and 3 [...] only 60 credits which is not enough [...] there is insufficient specialised knowledge'* (Focus group, Chemistry student) *Perhaps introduce a foundation level, to get people up to scratch, so then include more specialist material in the degree, then competing more on a level playing field'* (Focus group, Chemistry student). There was some discussion around bringing back summer schools to address some of these problems in lack of real practical experience *'essentially yes, I realise about financial implications. If they can hold mini versions at their own labs in Milton Keynes, this could make a real difference'* (Focus group, Chemistry student).

Similarly, the students pointed out that there was a real case for the courses to provide more opportunities to develop team working, which is a skill that can be more easily developed in conventional universities. Peters and McWhinnie (2012) in their summary report, suggested that *'students need to appreciate and practice being team leaders, followers and team members'*. After suggesting the possibility of developing team working at the tutorials and day schools, students raised the issue that many students *'do not get involved'* (Focus group, Chemistry student). When exploring whether the team working could happen online, there were some voices against it: *'I talk to lots of people and they find that the online collaboration is a nightmare'* (Focus group, Chemistry student).

Demonstrating achievements to employers

There was however discrepancy regarding this point. It was suggested that *'it would be useful to give students a problem and the students would need to say how they could solve it. For example, on T129 there has been a lot of grumbling with e-portfolios. The E- portfolio at the moment does not show that you can problem solve. None of the students would be prepared to show their portfolios to an employer. [...] If you can solve a problem (could be part of an EMA, or you design it), you actually know and take in what you have learnt and you are explaining in a report what you have learnt – you can tell an employer at an interview. It would be nice to do a project linking with other students like the engineering and the IT students. It is something that might be worth looking at. It is more real life'* (Focus group, IT student). This point is supported by Pegg *et al.*, (2012) who state that *'it is very important that a learner is able to recognise the part that each activity in which they engage plays in helping them demonstrate the attributes expected of a graduate from their course'*.

One student who had experienced redundancy, was interested in the other avenues one could take, keeping options open and using skills *'Being made redundant once, realise job market so dynamic, so what*

is here today is gone tomorrow, need to be an agile worker and move around, very interested in science part of the OU degree but biggest asset working in corporate organisations, is the skills you learn, analytical thinking, organisational skills, workload, employability skills which if you are not any good at will mean you will flounder in the technology industry (Interview, open degree student). This is an interesting statement and one captured by Smith (2010), who argues that in this fluctuating and uncertain economy one should be continually sharpening ones skills in order to enhance ones marketability in the long term. Perhaps this also highlights the need for tools to help graduates sell these skills. For example a Career Development Toolkit produced by Carr (no date, <http://www.jobs.ac.uk/enhanced/careers-media/career-development-toolkit.pdf>) is a very useful set of interactive activities aiming to help HE professionals with career planning: particularly identifying their next career role and career in general, investigating opportunities and building skills and experience to suit opportunities.

Recommendations:

- **Explore opportunities to develop team working and practical skills appropriate to specific disciplines**
- **Establish closer links between practical experience required by employers and course assignments**
- **Bring back the real practical element to courses, through some sort of mini summer schools and provide students with contacts/organisations where they can get this experience**
- **Invite employers along to the OU, (traditional universities have employers head-hunting students)**
- **Provide opportunities for students to work across disciplines, e.g. IT and Engineering**

Tools to support employability

Employability tools suggested by students included both face-to-face and online asynchronous and synchronous ways of communicating with each other, with the course teams and with employers.

Some of the proposals that they put across were:

- Peer conversations/mentoring – maximise the expertise within the OU student force: *'Career path might be influenced in a normal university through interaction with students and tutors which is not the case studying through the OU. Online forums might help to overcome this'* (Focus group, Natural Science/Physics student) [continuing this thread] *'yeh, sometimes I wish it was easier to chat to other students about what to choose'* *'There is no communication between students on different units so anything central sound good.... Surgery sounds useful to make links'* [Focus group, Public Health student]. *'I was an apprentice a long time ago. I was put alongside someone due to retire. Kept an eye on me, gave me tips, very effective* (Focus group, IT student).
- Interdisciplinary working. *'Within my field, IT, there are aspects of it which are outside of the course route. It would be nice if we could do a project linked in with other students, i.e. engineering and IT students (put both together)... engineering and IT are not separate entities, they have to work together'* (focus group IT student). *'The best way to do that is face to face'* (focus group, Chemistry student).

- Obtain advice through networking with other students, professionals in the field, academics and tutors: *'things like this [focus group] where we can talk with each other who have either been through a similar situation or are currently going through one'* (Focus group, Natural Science/Physics student). *I want to go into research after finishing my degree. I have found OU central staff and past tutors incredibly helpful. They have been quite happy to chat to me about things like that. Many OU students do not utilise their OU tutors to their full potential. Most of them are extremely happy to help, the ones I have talked to say they usually find students don't talk to them enough.... Still in touch with tutors I had in 2008 and 2009. You don't think they are on tap all the time, but no harm in sounding them out and getting advice about things'* (Focus group, Chemistry student). *'I received advice from my latest tutor and I found it very useful. I have also found advice through the OU library'*. (Focus group, IT student). *'I have found involvement of course teams is extremely variable. My main subject is Chemistry – course teams brilliant – central academics very much in touch and involved. I have also done course in engineering and physics and they are not nearly so involved. I think OU would really benefit from is a much more uniform approach so that the students really do feel that they know them.'* (Focus group, Chemistry student). *'Make more use of the expertise of students around in the OU – they represent a wide range of careers – develop inter-student networking opportunities (e.g. I facilitated work experience for a fellow student).* (Focus group, Chemistry student).
- Existence of a forum that is open at different times per year but preferably around January and February when the course commitments are quieter: *'more forums would be good... different degrees have very different needs... Maybe specific strand forums... someone who is studying engineering degree has rather different needs than someone studying biomedical sciences and different again to a mathematician... and a forum open but maybe in January and February ... that is the time when people are also thinking about making changes'* (Focus group, chemistry student)
- Career planning – links in relation to the Job Centre and the Careers Advisory Centre. *'May be worth the OU and Careers Centre tapping into and having close contact. For example, studying is part of my 'back to work program'* (Interview, IT student).
- A notice board or some sort of interface, linking to the website which announces the most relevant information for the students: *'one of the general problems that the OU has is that there is information disseminated in different places... at the moment you miss quite a lot of things... putting information in a prominent place so that people can see it'. 'A standard link [to the career service] on the module homepages and/or within the qualification forums might be useful'. 'Something to help people sort out work experience – maybe a central notice board with what's on offer?' 'Where you see things advertised, e.g. in Chemistry Glaxo Smith Kline scheme'* [Focus group, chemistry student]. *'On student home ... perhaps they should appear there. Do read emails, but student home, has a rolling bar of the latest group wide emails on right hand side, like a news desk'* (Interview, open degree student]
- Join in industry webinars: *'Main companies get together and they do conference calls. Several companies send out an invitation to sit in a seminar or a conference. It is for the general public, industries.... They all get together and discuss what is going on'* (Focus group, IT student)
- Link in with the NVQ system to acquire another qualification while studying at the OU. This could also be applicable to IT courses if specific software packages (such as Oracle's) could be taught as part of the degree : *'the OU could actually work more closely with the industrial qualification... no other university offers that... the OU could offer that if you pass a module you have the option to sit at an exam and get an industry standards qualification...the modules do not meet the requirements of the industry... to it would be a way to meet the standards'* (Focus group, IT student)

- Arrange visits from members of the industry to exchange views and news with students (career fair): *'Not many "Open Near You" events anymore compared to what there was...'* (Focus group, Chemistry student). *'It would be nice to have a way of explaining that as a 'non traditional' graduate you might have something extra to offer?'* (Focus group, Public health student)
- More practical based classes and opportunities, maybe through the creation of selected mini Summer Schools or providing students with the option to attend particular vetted venues. *'well my main study with the OU was Chemistry ... lab stuff, preparing things, handling nasty substances, under vacuum etc.... where preparation will take about three days, so you cannot be doing the equivalent online.'* [Focus group, Chemistry student] This fundamentally needs to address types of courses which in traditional universities would be expected to incorporate practical experience through field courses or for which substantial laboratory experience is undertaken as pointed out in the **Skills** section. This might address the concern that students at present feel they are not competing on a level playing field with traditional universities

The following section (Table 3) summarises the overall recommendations made throughout this report for ease of reference. They are divided per sections although some of them may cross reference to other sections depending on the structural organisation of the OU departments.

Recommendations

Table 3. A summary of the overall recommendations made throughout this report	
Career and progression	
Student employability profiles; response to the forum; other sources of advice and support	<ul style="list-style-type: none"> • Maximise on students' potential and establish structures for this communication and sharing to take place. Use the expertise of students in the OU, perhaps through networking opportunities • Provide a forum which is open for longer and at least twice a year. Have a general one open permanently and facilitate students supporting each other on careers issues, and specialised forums for a limited time period. Link with course teams and industry specialists • Provide seminars e.g. use online conferencing. • Allow career choice to tie in with particular assignments • Make students more aware of information, use student home and ask module teams to post notes too
Being an OU Student: articulating the value of Open University qualifications; age as a barrier to employment;	<ul style="list-style-type: none"> • Provide a clear and specific point of reference where students can go and search for answers regarding employability and course progression • Ensure that Associate Lecturers' advice and dialogue with the students is consistent across all disciplines as well as that offered by students advisers, which at times was conflicting • Create opportunities for employers to come to events face to face with students (along the lines of a career fair) and/or attend webinars to keep up to date with industry developments • Provide space for more practical sessions or simulations so that more applied sciences could get the necessary experience, both laboratory and field based • Involve both course teams and the industry sectors in course design so that there is more alignment of assessments with industry requirements in relevant sectors. Enable employers to be aware of what an OU student can offer them.
Embedding employability in module design	<ul style="list-style-type: none"> • Create tools through which students are able to maximise on current skills and apply them to their chosen field of study and/or work • Produce case studies where issues such as age are demystified and practical solutions about how to maximise one' skills are underlined • Prepare students to be able to discuss in an interview how to intertwine their life skills, knowledge, interpersonal and communication skills needed in the work place. • Links to provide work experience with employers in a wider range of subjects • Links to organisations such as job centres, back to work schemes, NVQ organisations
Curriculum Vitaes and references	<ul style="list-style-type: none"> • Provide students with clear information on the conventions in different fields as this is not universal • Perhaps provide some types of CV exemplars for different disciplines • Provide generic guidance on what to include or not include in a CV
Skills: practical science and demonstrating achievements to employers	
<ul style="list-style-type: none"> • Explore opportunities to develop team working and practical skills appropriate to specific disciplines • Establish closer links between practical experience required by employers and course assignments • Bring back the real practical element to courses, through some sort of mini summer schools and provide students with contacts/organisations where they can get this experience • Invite employers along to the OU, (traditional universities have employers head-hunting students) • Provide opportunities for students to work across disciplines, e.g. IT and Engineering 	
Tools to support employability	
<ul style="list-style-type: none"> • Peer conversations/mentoring – maximise the expertise within the OU student force • Provide interdisciplinary working opportunities • Networking with students, professionals in the field and academics • Existence of a forum that is open at different times per year, but preferably January/February • Career planning to provide links e.g. Careers advisory service and job centres • A notice board or some sort of interface, linked to the website which announces the most relevant information for the students • Join in with industry webinars • Link in with the NVQ system to acquire another qualification while studying at the OU 	

- Arrange visits from members of the industry to exchange views and news with students (careers fair)
- Provide more practical classes e.g. create mini Summer Schools (as pointed out in the Skills section)

Conclusions

This report has attempted to respond to the aims and objectives set out for the project. Analysing the three sources of data provided (forum, interviews and focus group), the report has made specific recommendations.

The recommendations can be classified in three different areas.

1. Specific **OU issues** include establishing structures such as networks, forums, and seminars to help students with career progression; for course teams to establish links with industry sectors with regard to course design and to also provide students with opportunities to work across disciplines, to develop practical skills aligned to specific work disciplines, and to work in teams and alongside employers.
2. More **general issues** include providing students with adequate and timely information on career issues, providing them with CV exemplars for different disciplines, including specific case studies which demystify age, and help students to communicate their skills and achievements appropriately in the work place. At the same time, provide students with the necessary tools to support employability which might include for example, peer mentoring, career planning opportunities, networking with professionals, and having access to industry webinars.
3. Lastly, related to **employability issues** and establishing **professional networks**, the STEM forum, telephone interviews and focus group analysis has highlighted how important it is for the OU to establish and maintain a relationship that links students with module and teaching teams, prospective employers and the careers centre, in order to address any employability concerns. Courses should be designed to maximise and develop students' practical and theoretical knowledge. The provision of specific online tools e.g. webinars, would support and allow enhancement of students' employability skills. In particular students are saying that they expect their degree to be valued by employers and that the skills that they develop and the content of their studies are considered equivalent to those obtained by taking a degree course through a conventional University.

Although the feedback from students was supported and triangulated by three sources of data, further research to explore specific issues that affect different disciplines and how these impact on employability of students would be beneficial.

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Appendix 1

Title of Project: **STEM Ambassadors Project**

Please indicate your willingness or otherwise to take part in this research project by ticking the appropriate box and completing the details below. At any time during the research you will be free to withdraw. Obviously your participation or non participation will not affect your access to tutorial support or the results of your assessments.

The results of any research project involving Open University students constitute personal data under the Data Protection Act. They will be kept secure and not released to any third party. All data will be destroyed once the project is complete.

I am willing to take part in this research, and I give my permission for the data collected to be used in an anonymous format in any written reports, presentations and inclusion in published papers relating to this study. My written consent will be sought separately if I am to be identified in any of the above.

Name:.....

(please print)

Student PI:.....

Signed:

Date:.....

Appendix 2

Draft questions for STEM Ambassadors interviews

1. Demographics – age, gender, location
2. Which OU module/ qualification are you studying?
3. Why did you decide to do this at this particular time? Are you studying for career reasons, e.g. to start a new career; for career development or progression? Subject interest? Other reasons?
4. Are you currently working? If so is this in an IT or Science related job?
5. Skills you are learning? Relevant to the job market?
6. If not, have you ever worked? (if answer is no go to Q4)
7. Can you tell me about your career or working life to date (prompt for previous qualifications and training, job titles or description of roles, career breaks or periods of unemployment, work experience or voluntary work. If career history sounds interesting, ask if they'd be willing to offer a case study)
8. What are you aiming to achieve in your career (medium term 5 years and long term 10 years plus)
9. Are you aiming to develop your personal portfolio? Is it within or outside an organisation?
10. How did you find out about the Forum?
11. How did you participate in the STEM forum? (Did you ask a question; offer advice to other students; just browse?)
12. What did you think about having people from the industry being ambassadors?
13. What would you think about having course faculty members as well as people specialised on careers?
14. Did you receive any help or advice from the forum, from the STEM Ambassador; the careers adviser/moderator; other students? Did you find this helpful? Why/why not?
15. Have you participated in a careers forum before? Would you do something similar again? Recommend it to a friend or fellow student? (Why/why not?)
16. Has the forum helped you with your career decision making, or career planning? How?
17. What was the most useful thing that came out of the forum for you? Did it work for you? How did you feel about it being available for a month?
18. What was the least useful? What didn't work for you? What else would you have liked it to include?
19. Have you used the OU Careers Advisory Service in the past? (e.g. looked at careers website; taken part in a careers forum; had a careers interview, etc) How else can the OU CAS support you with your career planning?
20. Anything else?

Appendix 3

Focus Group Questions and prompts

Main objectives

- To deepen and add value to the preliminary findings of the data with group interaction
- To explore how to improve Employability prospects of students undertaking OU degrees
- To explore how to use online tools to support students' employability (of which the online forum was one of them) e.g. webinars (perhaps inviting industry specialists)

1st part: Career and progression (10 – 20')

- What are the key barriers in getting employment or progressing in the STEM sector?

Prompts: age, gender, break in career, change in career, lack of clarity of where to go next, employers view of a specific degree, relationship between degrees and jobs, OU open degrees, perception that employers go for degrees and not for skills;

Prompts: background of discipline, past experience, main goals, career (Progression: within the organisation or as independent); studies (year); networks

- How can the OU (as a provider of distant learning) help you overcome these barriers?

Prompts life pressures, time management and graduate opportunities. Got skills – where were these acquired: previous experience, acquired through OU learning, but how they evidence the courses of study compared to others in the CV; employers and how much they value OU graduates

2nd part: Tools to support employability (paying special attention to online tools) (20-30)

[Introduce the section by saying something along the lines: 'some of you may have taken part in the online forum but some of you may not....']

- Where would you get advice regarding your career? Why?
- Where have you received advice (Tutors, careers interview) and what was the quality of the experience? At the OU? Outside? If you don't use the OU, why not?

Prompts mentoring advice, jobs, word of mouth, networks, employers, putting yourself out in the world/ interpersonal skills – valuing them and recognising them

Prompts: Pros and cons of both services

- **3rd Part:** What other tools/formats might work for your industry sector? Are there specific things for STEM careers that would be different from general careers advice?(**30-40**)

Prompts: surgeries with industry representative; (webinars) at what point in their degree; discussions with peers; interviews or forums open at different times during the year

- **4th Part** Would you find more STEM careers forums helpful and how would you benefit if real time webinars (with industry representatives) or any other platform were arranged. Can you suggest the best times in the year to hold these? (**40-50**)

Prompts themes and other suggestions too

Any other questions (5'). Thank you and what next?

Appendix 4

Focus group session (Powerpoint) – 2nd July 2013

Focus group questions



eSTeEM Focus Group Tuesday 2nd July 2013

Dr Rachel Ferris
Dr Rosaria Gracia



Content

The focus group aims to explore four parts:

- Career and progression
- Tools to support employability (paying special attention to online tools)
- Specific tools/formats might work for your industry sector
- Effectiveness of forums and other platforms



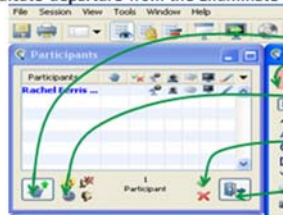
Main Objectives

- To deepen and add value to the preliminary findings of the data with group interaction
- To explore how to improve Employability prospects of students undertaking OU degrees
- To explore how to use online tools to support students' employability (of which the online forum was one of them) e.g webinars (perhaps inviting industry specialists)

Getting involved



- You can participate in the session by using the icons below:
- Raise your hand to ask a question
- Show whether you are happy with or struggling with the material using emoticons
- Take part in votes to indicate answers to questions (this may be yes/no or multiple choice)
- Indicate departure from the Elluminate tutorial for a brief period.



- Raise hand
- Whiteboard symbols
- Emoticons
- Polling buttons
- Leaving the room

The intention is to record this session



1st Part: Career and progression

- What are the key barriers in getting employment or progressing in the STEM sector?



1st Part: Career and progression

- How can the OU (as a provider of distant learning) help you overcome these barriers?



2nd Part: Tools to support employability (paying special attention to online tools)

- Where would you get advice regarding your career? Why?



2nd Part: Tools to support employability (paying special attention to online tools)

- Where have you received advice (Tutors, careers interview) and what was the quality of the experience? At the OU? Outside? If you don't use the OU, why not?



2nd Part: Tools to support employability (paying special attention to online tools)

- Where have you received advice (Tutors, careers interview) and what was the quality of the experience? At the OU? Outside? If you don't use the OU, why not?



4th Part:

- Would you find more STEM careers forums helpful and how would you benefit if real time webinars (with industry representatives) or any other platform were arranged.
- Can you suggest the best times in the year to hold these?



3rd Part:

- What other tools/formats might work for your industry sector? Are there specific things for STEM careers that would be different from general careers advice?



• Any Other Questions?

Thank you for coming

