

CHOOSING THE RIGHT STEM DEGREE COURSE

INVESTIGATING THE INFORMATION
AVAILABLE FOR PROSPECTIVE APPLICANTS



BACKGROUND

There is a growing demand for Science, Technology, Engineering and Mathematics (STEM) skilled individuals from industry, business and the research community¹. In order to help meet this demand, the Government and others have invested in a range of initiatives to raise young people's awareness of the opportunities that are available through studying STEM. It is important that this work is supported by transparent and easily accessible information that allows students to make informed decisions about subject choice at all stages of their education, and that also supports those advising students. The clarity and transparency of information and admission policies is particularly pertinent for the drive to widen participation in these subjects at the higher education level.

The wide range of degree courses offered by UK universities provides a richness of provision in the higher education sector. It also forms a complex landscape for students to negotiate. According to information available from UCAS², there are 4,815 different degree titles available in UK universities that require STEM qualifications for entry in 2010³. In total, these amount to 14,805 first degree courses that are available in UK universities. There is clearly a large disparity between the relatively small number of subjects studied pre-university and the wide range of degrees offered by the higher education sector. The magnitude of this disparity presents a major challenge for communication between the higher education sector, UCAS, schools, colleges, parents and students.

This report focuses on progression from post-16 education in schools and colleges into STEM first degree programmes and proposes a number of recommendations for improving levels of communication among the main stakeholders.

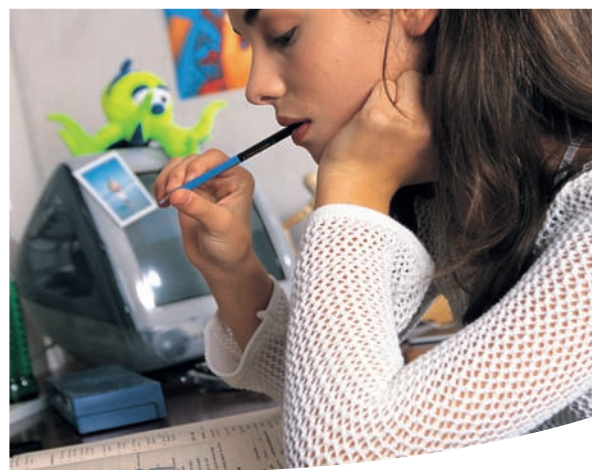
AIMS

SCORE commissioned the Centre for Education and Industry, which is based at the University of Warwick, to collect evidence about the qualifications and combinations of subjects that enable students to progress into STEM degrees in the UK. The study was designed to confirm or disprove commonly held perceptions and identify any underlying policy issues for SCORE to address. The evidence and information gained through the research was intended to assist the development of clear and accurate guidance for students, teachers and parents, with a view to ensuring that all candidates can have access to the same information. In particular, the key findings will inform the information made available to young people through the Future Morph⁴ careers website, which is being led by the Science Council. The full report '*Choosing the right STEM degree course: investigating the information available for prospective applicants*' is available on the SCORE website⁵.

METHODOLOGY

The research methodology comprised two key elements:

- Desk research – investigating the subject requirements for entry into STEM first degree courses as stated in publicly available sources. This included the Course Search facility on the UCAS website⁶, individual university prospectuses and information accessed online via individual university websites. Data were also collected from the UCAS statistical services.
- Field research – investigating actual practice in admissions of students into these degree courses, using an online questionnaire and telephone interviews with university admissions tutors.





The research investigated sample groups across a range of UK universities. For the purposes of this research sample universities were categorised under four groupings or ‘types’ as follows:

- Russell Group⁷;
- Other universities chartered before 1960;
- Other universities chartered between 1960 and 1992;
- Universities chartered after 1992.

After some initial investigation, it was decided to exclude the universities of Oxford and Cambridge from the sample as entry to these universities involves additional features. These features introduced some complexities that could not be covered adequately within the scope and methodology of this research.

The research did not gather evidence relating to degrees in medicine (and related subjects), veterinary sciences or dentistry.

KEY FINDINGS OF THIS STUDY

Entry requirement information

Multiple sources of information often needed to be consulted before a full picture of entry requirements could be obtained. These sources included university prospectuses (paper and online), contact with university admissions tutors and the UCAS website. Students, teachers and parents would also need to take a similar approach to understand fully the precise requirements for a specific degree course.

The identification of requirements is further complicated by the wide variations in style and presentation of information. There are inconsistencies in the way entry requirements are displayed between the various sources of information. While each university will have its own website design and style, key information about entry requirements could and should be presented in a more consistent way both to ease navigation and to facilitate comparison across courses.

The research also confirmed some previously-identified issues relating to the variation of entry requirements. Grades or points requirements for degree programmes with very similar titles varied between different university ‘types’ and between different universities within the same ‘type’. For example, entry for 2010 to BSc Chemistry to one pre-1960 non-Russell Group university will require 260-290 UCAS points, compared to 160-220 UCAS points for one post-1992 university. For two Russell

1 CBI Education and Skills Survey 2008

2 UCAS Universities and Colleges Admissions Service

3 This figure is inclusive of medicine, veterinary science and dentistry degree titles.

4 www.futuremorph.org

5 www.score-education.org

6 www.ucas.ac.uk/students/coursesearch/

7 The Russell Group is an association of 20 major research-intensive universities in the UK. The group was formed in 1994.

Group universities the maximum stated entry requirement for BSc Chemistry was found to vary by 60 UCAS points, equivalent to the difference between 3As and 3Bs at GCE A-level.

For different STEM degrees within an individual university there can be significant differences between grades and points requirements, again, as much as 60 points. For example, UCAS course search information for one Russell Group university gave a GCE A-level grade requirement of AAB for BSc Mathematics and a range of BBB-BBC for BSc Chemistry. In addition, many universities state specific requirements in terms of named subjects and grades, but the study also found these to vary significantly among universities. This variation further emphasises the need for extensive research by prospective candidates and has implications for students who are unsure of their higher education aspirations when making post-16 subject choices.

Grouping of STEM subjects

The desk research highlighted the lack of connection between the relatively small number of subject options available in pre-university education and the very large number of options available at universities. Whilst UCAS and HESA⁸ have an agreed coding system (JACS⁹) which relates to the content of degree courses, this system is not currently utilised to simplify entry requirement information through the grouping of courses. JACS appears to have been set up principally to communicate information about course content across the higher education sector and between UCAS and HESA. The UCAS website states the purpose of JACS to be:

“To transmit information about the subject matter of all courses to universities and colleges, and ultimately HESA.”

A system which builds on JACS and groups STEM subjects could assist young people and their advisers in navigating the range of courses available and identifying those relating to their interests.

Mathematics

When universities are considering applicants for science, technology and engineering degree courses, mathematics is highly valued as a subject, and capability in mathematics is regarded as a very important element in preparing young people for such degrees. Over 40% of admissions tutors ($N=105$) made some unprompted reference to promoting or improving mathematics ability when asked to name one specific change they would like



to see in pre-19 education in order to prepare students better for STEM-related degree courses. Whilst the majority of these respondents were from the subject areas of mathematics and engineering, these comments were also recorded from tutors in physics, chemistry and the biological sciences.

Subject combination and grades

Students wishing to gain entry to degrees in STEM would be best advised to attain A-levels (or equivalent qualifications) in at least two science-related subjects. The ‘traditional’ sciences (biology, chemistry and physics) and mathematics carry universal ‘currency’ and repeatedly featured in the ‘top five’ A-level subjects taken by students accepted on a STEM degree course across the four different types of university. However, it should be noted that the top five subjects held by students who have been accepted on to courses may not wholly reflect the subjects that universities consider to be best preparation for their courses.

Although other science and technology subjects can be an acceptable basis for entry, applicants need to check their overall subject combination against the specific course at a specific university. The data further highlight the admissions tutors’ focus on the whole subject combination and level of achievement offered by an applicant. If all key subject requirements are met, there can be flexibility e.g. in the third or fourth A-level taken by the student.

When considering applicants for entry to STEM degree courses, the evidence gathered through field research indicates that admissions tutors consider the predicted or actual grades and the subjects studied by the applicant. (The accuracy of predicted grades is an issue, but these remain important indicators because most applications and offers for degree places are made before final examination grades are known.) References and personal statements are also important, but the evidence suggests these are usually secondary to the subjects studied and grades achieved.

RECOMMENDATIONS

This study has highlighted the sheer volume and complexity of information available to young people considering applying to enter higher education. There is a need to improve current communication systems and processes between the stakeholders involved.

SCORE recommends that the higher education sector should:

1. Ensure that the admissions process is transparent, particularly that all aspects of selection criteria used by admissions tutors for STEM courses are clearly communicated to prospective students.
2. Assist students by presenting entry requirements in a clear and consistent manner across all information sources, particularly university websites and prospectuses.
3. Provide guidance regarding the subjects that university departments believe offer the best preparation for their courses alongside entry requirements.
4. Promote greater awareness and understanding of the large range of STEM first degrees through direct and effective communications with school and college staff and prospective students.



SCORE believes that the UCAS Course Search facility is not meeting the needs of students wishing to search the large number of STEM courses available. SCORE recommends that UCAS:

5. Urgently reviews all aspects of the UCAS Course Search facility on the UCAS website in order to improve the design and therefore the effectiveness of the site. This review must be guided by consultation with the website's primary users: the higher education sector, teachers, other professionals with advisory roles, and students.

SCORE recommends that teachers, careers advisers, students and parents:

6. Have access to a list of key questions when searching for information regarding degrees and entry requirements.
7. Consider and explore a range of related degree courses within the individual student's area of interest.
8. Use multiple sources to identify precise requirements for entry at each university such as hard copy and online prospectuses, UCAS online information and discussion with admissions tutors at open days.
9. Raise awareness that studying at least two well established STEM subjects post-16 will keep options open for entry to a large range of STEM degree courses.

FURTHER RESEARCH

In addition to the issues highlighted in this study, SCORE has identified a number of areas that would merit further exploration:

1. Whether any priority given to students with mathematics A-level is supported by evidence of enhanced performance by these students at degree level.
2. To what extent are universities favouring candidates holding triple science GCSEs.
3. Whether universities consider the date(s) students completed their qualifications during the admissions process.
4. The practices around the use of clearing to fill course places.
5. How university admissions tutors compare candidates holding different types of qualifications.

SCORE partner organisations represent a wide range of people involved in the higher education admissions process, and as such have a responsibility to take this report forward. As a consequence of this work:

1. SCORE will work with stakeholders to develop key questions for prospective students to consider when applying for higher education courses. These will be disseminated through routes such as the Future Morph careers website.
2. SCORE will discuss the findings of this report with UCAS, Universities UK and other stakeholders, particularly with reference to the transparency of the admissions process and the ease of access to information.
3. SCORE partners will support the Royal Society in compiling its 'state of the nation' report on transition to STEM higher education in the UK.



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Technical Education Projects

The SCORE partnership, working together on science education:

Association for Science Education
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Institute of Physics
www.iop.org

Royal Society
www.royalsociety.org

Royal Society of Chemistry
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