

European Exchange Schemes within a Bachelor of Engineering Course at Coventry University*

K. A. TUBMAN, D. LLOYD AND S. J. HARVEY

School of Engineering, Coventry University, Coventry CV1 5FB, England UK

This article describes the setting-up and operation of exchange schemes within a BEng Course in Engineering at Coventry University and educational institutions in France, Germany and Spain. The conditions necessary for establishing exchange programmes are discussed together with the philosophy used. Data is presented which shows the achievements of the schemes. A total of 946 exchange students have participated in the scheme since 1980, spending one year at the host institution. Student performance data shows that, on average, the French, German and Spanish exchange students perform similarly to the home UK students at Coventry University. However, some differences are highlighted, and the reasons for these differences are explored. The article concludes with discussing the impact of such schemes at both individual and institutional levels.

INTRODUCTION

THE ENGINEERING undergraduate course at Coventry University began operation in 1973. It is of a credit-modular structure and spans Mechanical, Electrical and Electronic, and Manufacturing Engineering. The course incorporates several innovative features and one of these is that French, German and more recently Spanish language studies can be included as an optional but integral part of each year's study programme. This option has been described elsewhere [1, 2, 3], but is also briefly included below. The course taken with the language option is intended to educate potential professional engineers, and give them the cultural and language skills and experience to operate within the EU. Originally the course design permitted Coventry students to spend the penultimate year in industry in a French or German company, the course being of a four-year full-time structure. However, few Coventry students took advantage of the language option, and very few, of the year abroad.

The course was modified in 1978 to encourage more participation in the language studies. Student exchanges with French and German Educational Institutions were established in 1980 and with a Spanish Institution in 1987. The exchanges are two-way, with Coventry students spending their penultimate year abroad at one of seven Institutions in France, Germany and Spain. These seven Institutions are listed in Appendix 1 in the order of their introduction into the Coventry exchange scheme. Able students on these schemes can gain double awards; a UK BEng and an appropriate recognised national award of the

exchange country e.g. a German Dipl.-Ing.(Fh) or a French DUT. (Appendix 2 lists these qualifications in full).

This article describes the setting-up and operation of these exchange schemes. Student progress is reported. The article finishes with a discussion on the impact such schemes have had on both the individuals and Institutions concerned.

THE SETTING-UP AND OPERATION OF THE EXCHANGE SCHEMES

The objectives of the courses in Coventry are to produce professional engineers linguistically competent and able to function effectively in an international context.

To achieve this it is necessary for students to spend a significant period abroad. An effective and efficient way of utilising this time is for them to attend an academic institution and to follow a programme of technical studies integrated with that in their home institution. These studies can be recognised by giving credit towards the home qualification thus minimising the total period of study and making space for the inclusion of integrated language studies prior to the period abroad.

In identifying suitable partner institutions for this type of student exchange programme academic compatibility is the first and greatest problem to be solved.

The different traditions and approaches to the education and training of engineers across the EU are well documented with the latest authoritative information being published by the CAESER conference [4].

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The debate regarding the comparison and recognition of qualifications is well rehearsed and will not be repeated here. It was quickly realised that a flexible and pragmatic approach would have to be used towards academic compatibility. A simplification of the philosophy adopted was that basically one year spent studying say mechanical engineering in one country was much the same as in another provided the students had equivalent qualifications on entry to the course. Subjects may be taught in a different order and content may be distributed differently across modules but once identified this could be accommodated. Incidentally this process has now been greatly simplified with the introduction of the ECTS system (European Credit Transfer System) through the auspices of the EU SOCRATES programme. An invaluable aid to comparison of modules were examination papers and coursework exercises which placed the syllabus descriptions in context.

Apart from the purely academic factors questions of student tutoring and welfare are also crucial to a successful exchange programme. This is especially true for UK students who tend to be younger, less experienced and with poorer language skills than their continental counterparts.

Following initial contacts with a range of institutions and visits by staff it was decided in Coventry to establish links with the Fachhochschulen of Osnabrück and Konstanz in Germany and the I.U.T. of Lyon in France. All these institutions had excellent laboratories and workshops and offered courses of an applied nature which complemented those in Coventry. The institutions were relatively small and could offer students individual and sympathetic treatment.

Co-operation started with the introduction of pilot schemes involving the exchange of small numbers of students in 1983/84 following intensive discussions and exchange of information. In this way the actual performance of the students was assessed and confidence was built up between institutions paving the way for the double award programmes and expansion in numbers.

Students were prepared for their year abroad in a number of ways in addition to the language programmes. Regular meetings were held with each language group to describe all aspects of the partner institution and to discuss the study options. Students who had returned from their year abroad spoke to the students and also prepared a guide based on their experiences, an 'alternative prospectus'. Staff from the host institution who would act as tutors also gave presentations during this period and students spending their year in Coventry were introduced to the respective students. In this way students knew what to expect, what was required of them and who they could contact if questions arose.

Based on this experience the main factors involved in setting-up and operating exchanges are:

1. The participating institutions must have compatible course structures and standards. In particular, the following must be reasonably similar: syllabus content; teaching methods; the mix between analytical, design, experimental and project contents; examination methods and standards; equivalence of subjects studied; and equipment facilities (experimental, computational hardware and software etc.).
2. Effective language teaching programmes must be available in the home institution before the students start the one year exchange. In addition, continuing language instruction must be supplied, if required, during the exchange year by the host institution. This consideration was not so vital for the Continental European countries because the foreign language teaching in their schools is generally very effective. However, it has been and continues to be a serious problem for the British engineering students. Hence the need to integrate language studies into Coventry's Engineering course. In addition, vacation work placements and short intensive language courses have been well provided by some of the host institutions for the Coventry exchange students prior to starting at the host institutions.
3. The exchanges must have the full support of each institution's staff. Individual modules or subjects may need to be modified to accommodate the exchange students, and the teaching and support staff must be so willing and flexible. This may be particularly so during the early part of each academic year whilst the exchange students acclimatise to the year abroad.
4. Sufficient finance must be available to set-up and operate each exchange programme. Students require extra finance to allow for increased travel expenses and usually more expensive living costs. In addition, staff must visit each others institutions in setting-up the schemes, and also regularly thereafter to maintain liaison and to discuss the progress of the exchange students. EU grants have been invaluable in this respect with ERASMUS awards (European Commission Action Scheme for the Mobility of University Students).

PROGRESS DATA ON THE EXCHANGE SCHEMES

Table 1 shows the numbers of exchange students from 1980 to 1995.

Up to 1995 a total of 946 students had participated in the one-year exchange schemes with 698 students coming to Coventry University from France, Germany and Spain whilst 248 Coventry students went to the Continent. This imbalance in the two-way exchange is not large in terms of UK engineering programmes. Indeed the Coventry Programme can claim to be one of the largest

Table 1. Numbers of students on the exchange scheme

	Decade 1980–1990	Academic years					Totals
		90/91	91/92	92/93	93/94	94/95	
Coventry students	107	27	70	24	9	11	248
French							
German	263	85	99	78	87	86	698
Spanish							
TOTAL							946

Table 2. The performances of the exchange students at Coventry

	Percentage of marks in subject areas					
	Management	Project	Design	Mech.	Elect.	Manuf.
Subject Average	55	60	59	48	50	53
Av. for French	51	55	57	38	43	41
Av. for German	62	69	62	55	57	59
Av. for Spanish	68	*	61	71	59	*
Av. for French, German, Spanish	57	61	59	47	49	51

* These subjects are not available for the Spanish exchange students because of incompatibility with home course requirements.

Table 3. The differences in performances compared with the subject averages

	Difference from subject average mark					
	Management	Project	Design	Mech.	Elect.	Manuf.
French students	−4	−5	−2	−10	−7	−12
German students	+7	+9	+3	+7	+7	+6
Spanish students	+13	−	+2	+23	+9	−
All exchange students	+2	+1	0	−1	−1	−2

and most successful in the UK in terms of the number of BEng students it has sent abroad.

Tables 2 and 3 compare exchange student performance with British student performance, averaged over the 7 academic years from 1988/9 to 1994/5. Marks are shown as percentages and are on a scale of 40% is a pass mark, and greater than 70% is a first-class performance. These tables show that the French, German and Spanish exchange students as a group perform very similarly to the UK home students. The Spanish perform much better, and the Germans better, but both are offset by the larger numbers of French exchange students who generally perform slightly worse than the UK home students. The Spanish exchange students are of high calibre (from a very elitist system) and work very hard; the Germans are mature, well motivated and organised students with prior industrial experience, and both groups come to Coventry with excellent English language abilities. These attributes apply to a lesser degree to the French exchange students whose ability and motivation tend to be more variable. Nevertheless, the general performance of the French students is very satisfactory.

Another factor to be noted when making these comparisons is that in France, Germany and

Spain, engineering is a high status profession and attracts high calibre students.

Considering the differences in performances between analytical, design and project-based work in Tables 2 and 3, the Spanish perform particularly well in the examinable analytical subjects, and the Germans particularly well in projects. This reflects on their respective attributes mentioned in the previous paragraph. There appears to be little difference between the performances of each group (UK, French, German and Spanish) regarding design work.

CONCLUSIONS

The statistics presented above indicate the success of the exchange schemes operating within the BEng in Engineering course at Coventry University. Seven exchange schemes are in operation, and since 1980, 946 students have taken advantage of them. Tables 2 and 3 provide ample evidence of the ability of the French, German and Spanish students to cope successfully on the scheme. The authors believe that much goodwill has been fostered on both sides of the English

Channel by the operation of these schemes over the past years.

The success of the exchange programmes has led to other schools within Coventry University adopting similar schemes. Further developments have also taken place in the School of Engineering during the 1990s.

The operation of the exchange programmes has been very beneficial for the School of Engineering and Coventry University as an institution. The outlook of all staff and students, whether directly involved in the exchanges or not, has been broadened by contact and working with exchange students. Staff have been exposed to different traditions and approaches to education and its management, and new ideas have been adopted. A number of exchange students have returned to Coventry to undertake postgraduate work and have completed doctorates. Numerous British

graduates have gained employment in mainland Europe, as detailed in Reference 2.

Although it is considered an accepted practice for continental engineers to be fluent in English, it is relatively rare for UK engineers to be fluent in a second language. Experience has shown that such graduates obtain their first job because of this skill and generally command higher salaries.

The pragmatic approach to equivalence and compatibility of courses described earlier enabled rapid progress to be made in organising the programmes. Experience and hindsight have shown that this approach has been justified both in the opportunities it has opened up for students and in the success rate of the students participating.

The key factors in the success of the programmes has been the commitment of staff and the effectiveness of the language programmes.

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APPENDIX 1: LIST OF PARTNER INSTITUTIONS

In order of their introduction into the Coventry exchange schemes:

1. Fachhochschule Osnabrück, Germany
2. Fachhochschule Konstanz, Germany
3. Institut Universitaire de Technologie Lyon, France
4. Institut Universitaire de Technologie Grenoble, France
5. Institut Universitaire de Technologie St Etienne, France
6. Universidad Politecnica, Valencia, Spain
7. Fachhochschule Braunschweig/Wolfenbüttel, Germany

APPENDIX 2: QUALIFICATIONS IN DOUBLE EXCHANGE PROGRAMMES

1. UK: B.Eng.—Bachelor of Engineering
2. France: D.U.T.—Diplome Universitaire de Technologie
3. Germany: Dipl.-Ing.(Fh)—Diplom Ingenieur (Fachhochschule)

Keith Tubman is a Senior Lecturer in Thermofluids in the School of Engineering at Coventry University. He has BEng (Hons), MEng and PhD degrees in Mechanical Engineering from Liverpool University. Upon joining Coventry Polytechnic (now University) in 1973, his research interests widened to include engineering education. He has analysed the data presented in this article.

David Lloyd is a Principal Lecturer and Course Tutor in the School of Engineering, Coventry University. Together with Professor Harvey, he was influential in setting up the engineering exchange programmes in the early 1980s which have developed into one of the largest and most successful in the UK. He now acts as Director of European Engineering Studies within the School.

Stan Harvey is Head of the School of Engineering at Coventry University. He gained his BSc in 1959 and PhD in 1966 from Leeds University. His research has been in the fields of Metal Forming, Creep and Fatigue, and Cyclic Plasticity. He worked for 15 years in the manufacturing industry before entering University. In recent years he has been involved in research in engineering education and has published several papers on European exchange programmes.