

Engineering education world

Contributions are invited for this new feature. News items on policies that concern the engineering education world, new courses and curricula either of a unique nature or of international interest, new innovative laboratories and concepts, funding news for engineering research projects involving international participation, special international continuing education courses and news, industry-university interaction, engineering faculty news, and developments in engineering education of international interest. Please send news items and conference information to the Editor-in-Chief. Public relations offices of universities and human resources divisions in industry are requested to contact the Editor with news items concerning engineering education and training.

Europe

Study reveals unexpected results on the way to top management

A study by management consultants **Egon Zehnder** of Munich reveals that although German students have the longest study times—on average Germans graduate at 25.8 years, after studying for two years longer than their counterparts in France and other European countries—career development in Germany is faster than in the rest of Europe. Seven per cent of German top managers have reached this position by the age of 40. In the UK, where graduates are younger, only 2% reach top management by 40; a similar situation exists in Italy, and in France practically no one reaches top management by this age. An exception is Spain, where the average graduation age is only 24, and 13% reach top management by the age of 40. Moreover, 60% of top managers in Spain are engineering graduates; in Germany and the UK they are overwhelmingly economists, whereas in France they are natural scientists, with Italian graduates being both engineers and economists. Another interesting trend is the decline in the number of top management positions occupied by law graduates.

Programme to publicize electronic information

The European Commission has appointed 16 'National Awareness Partners' to promote awareness of electronic information services. The move

is part of the IMPACT programme of Directorate General XIII of the Commission and has an initial budget of 1m ECU. The programme will comprise seminars, mailing, and special workshops on databases. One of the main aims is to improve access to information services and business awareness.

Students dislike the Commission's views on higher education

The European Community Memorandum on Higher Education has been criticized at the European Student Forum meeting. The meeting was attended by students from EC and EFTA countries, as well as from the core countries active within the TEMPUS programme: Hungary, Czechoslovakia and Poland. Students feel the goals are geared too much towards the role of industry. A representative commentary came from the Swedish students who claimed that Swedish educational policy, which was geared to supplying the labour market, has failed. The views presented can be accounted for by the traditional attitudes of student union representatives in the not too distant past. It is understandable that the Commission is partly leaning towards technological advance related to European industry, as educational policies are not free from economic considerations. As another side of this attitude, one cannot fail to notice the increasing trend for students to enrol in Fachhochschulen—the professionally oriented colleges—in Germany, in preference to universities (see **Germany** below).

United Kingdom

UMIST—champion in exporting research

The University of Manchester Institute of Science and Technology (UMIST) has been awarded the Queen's Award for achievements in exports. From 1987 to 1992 its research revenue has increased fourfold to over £2 million. Funding has come from Japan and the USA. **Kobe Steel** has contributed to research into sheet moulding for trucks and containers. **Matsushita** has contracted machine translation research from Japanese into English. Research at UMIST also includes ultrasonic stress monitoring, colour fastness in textiles and a new plasma method for the production of magnesium.

Risk issues—a new code

Two years ago the Engineering Council set up a working party under the chairmanship of Sir William Francis to examine risk issues. This has led to a series of consultation documents being circulated for comment. The latest is a booklet entitled 'Engineers and Risk Issues', which will form the basis of a code of professional practice. The booklet presents a ten-part code of professional practice for risk issues, backed up by brief explanations. The code itself is presented in tabular form and includes the following features: professional responsibility, law, approach and evaluation. People interested in this code include engineers, employers, managers, trade unions, government bodies, professional institutions and higher education institutions. The central theme of debate is whether this document will prove to be of benefit to engineers or a hindrance to their work.

Qualifications labyrinth—the usual

The different qualifications in the vocational and regular school certificates have become so numerous that the government is considering a more transparent baccalaureate system for school leavers. Currently there are seven schemes for graduation from school. A levels, introduced in 1951 with 730,000 entries in 1991, and 52,000 candidates for Advanced supplementary levels, which were added in 1989. The General National Vocational Qualifications (GNVQ) are broader based; level 3 of GNVQ is roughly equivalent to A levels. Then there is the BTEC First, which progresses to BTEC National, introduced in 1991. The Diploma of Vocational Education applies to the age groups 14–19 for occupational studies. The National Vocational Qualification has five levels based on competence set by industry. Lastly the Technological Baccalaureate, for over 16s, offers three certificates between GNVQ level 2 and an equivalent of three A levels. No wonder the British government thinks of reform—again.

If you don't have the money you cannot become a university

New regulations require colleges to pay £19,000 to the Department for Education if they want to be

considered for membership of the university circuit. Paying the fee entitles colleges to a quality control inspection by the Higher Education Quality Council. Some colleges may hold back applying for an upgrading of their courses due to the fee. The Standing Conference of Principals of Colleges resists the tendency to create a new binary divide as exemplified by the past existence of polytechnics alongside universities.

Germany

Best paid jobs—economists and engineers

Economists and engineers have better career and pay prospects than social scientists. A survey of 1,400 university and Fachhochschule graduates completed by the University of Kassel for the Ministry of Education reveals that economists and mechanical engineers have good career prospects after graduation: 75% of graduates in these areas had a permanent job six months after graduation. Adaptable economists have the best salary development prospects. They earned an average of 12% more than the engineers five years after graduation, when engineers averaged 75,000 DM per year. The study also revealed that the difference in salaries between graduates of universities and Fachhochschulen shrank from 12% two years after graduation to only 3% five years after graduation.

The trend is towards the professional colleges

The boom in student enrolments in Fachhochschulen continues. A survey published by the University of Konstanz reveals that 15,000 students who would have enrolled with Fachhochschulen diverted to universities because of a lack of places. The Minister of Education, **Rainer Ortleb**, has plans to increase the number of student places in Fachhochschulen to a total of 40%, up from 28%. Engineering graduates from Fachhochschulen dominate the professional market, with 80% of all advertised positions available to Fachhochschule graduates. Expansion of the types of study courses offered by Fachhochschulen is also planned in medical technology, languages and law. The economic advantages of Fachhochschulen are the shorter study times coupled with higher teaching loads. The debate on the amount and desirability of including more extensive research and development programmes at these institutions involves both economic and philosophical considerations. The German Education Trade Union has criticized the overemphasis of the European Commission on education for the needs of industry, which is the *de facto* purpose of the Fachhochschulen.

The north-south salary gradient

A survey by the German Association of Engineers (VDI) reveals that salaries of engineering managers in Hamburg are around 25% lower than in Stuttgart. However, factors other than money may

determine the choice of location for work. These factors include working climate and leisure opportunities. For a mountain climber Hamburg is too flat; for a sailing enthusiast the north is just the right spot. As a point of information, a department head in Stuttgart averages 156,000 DM (around \$100,000) a year.

A MITI for Germany?

New studies deal with the coordination between state and industry and with the impact of technology. In a study called 'Politics and Responsibility' (in German) by the Association of Electrical Engineers, a number of prominent authors discuss the consequences of technology abandoning its subsidiary service functions and the need for an advisory institution similar to the 'Wissenschaftsrat'—the science council which advises on research and education policies. Such an organization should coordinate technical know-how and advise on future developments, i.e. perform a similar function to Japan's MITI. Another aspect of current concern is technology assessment, which is dealt with in two publications by the German Association of Engineers.

France

Research and development is government dominated

About two-thirds of research in France is shared by nine companies, seven of which are owned by the state. The largest company is Aerospatiale, leading the Airbus consortium with a budget of 15 billion francs, followed by Alcatel Alsthom, the telecommunications, transportation and power company. Thomson in electronics, Rhône Poulenc in chemicals, the auto makers, Peugeot and Renault, followed by Bull in computers and the oil companies Total and Elf-Aquitaine. A total of 44% of French research is handled by industry. This compares with 64% in Germany. The government is keen to stimulate research investment in small and medium-sized companies. The Ministry of Research and Technology is supporting 8,800 companies with a tax credit in 1992. Whether support for smaller companies in all sectors or support concentrating on future industries such as biomedical companies should be preferred is currently debated in view of the tight public monetary situation.

The number of faculty vacancies is soaring

An increase in public spending on higher education of 9.7% creating 3,000 new faculty jobs, and allowing for 70,000 new students per year, has been decided by the government. Concurrently the research budget is being raised by over 5%. This can be accounted for by the crisis in the education system. Whether these plans can be implemented remains to be seen, as the budget is a social democratic move. The fate of the current government

will be decided by elections in March. The opposition may be less enthusiastic over the spending plans.

France-Hungary

Joint studies—international nationalism

The Technical University of Budapest and a number of French universities and companies have established a joint studies programme for engineering students. Leading the French initiative is the Institut National des Sciences Appliquées (INSA) in Rennes. The study courses consist of a basic unit of technological studies for two years, after the equivalent to the baccalaureate in France, and subsequently another three years of joint studies. Hungarian students, following language courses in technical French, spend several months in a French institution and receive industrial training. Final projects can be carried out in the host country. Engineering options include civil, electrical, mechanical and transportation.

Italy

Lecturer absenteeism on the increase

Crowded classes usually affect the attendance of students; in Italy lecturers are affected. Many students complain of non-appearance of lecturers to assigned classes. At the University of Bologna the rector, **Fabio Roversi Monaco**, has installed a student hotline for complaints about absence of lecturers. Monaco has been wandering incognito to inspect lecturer presence. Things were not too bad as only one case was found, displaying a notice 'no lectures today' signed by the lecturer. At least he was there on the day to pin up the notice. Or did he send a deputy?

Russia-Eastern Europe

Studying and teaching are part-time activities

With economic conditions deteriorating, students and teaching staff in Eastern Europe cannot make ends meet. University professors earn just enough to buy a pair of shoes. With free floating prices in the new Community of Independent States (CIS), students receiving a grant of 300 roubles (now worth \$2.5) per month are unable to survive. At the Moscow Institute of Gas and Oil, students sell flowers on the underground, earning 1,000 roubles a day. Another business is 'selling' diplomas: 13,000 roubles buys a diploma in chemical engineering at the renowned Moscow Institute of Chemical Engineering (reported in *Moskovski Komsomolets*, a Moscow daily). In Poland and Czechoslovakia it is common for university engineering staff to be involved in outside contracts that supplement their meagre salaries many times over, as personally reported to the editor. Such diversions will obviously influence the quality of

academic work, though the experience gained may be useful.

Israel

Restructuring of higher education—a result of new redefined requirements

With a population of 5 million and 24% of school graduates acquiring higher education, Israel sees a need to redefine its higher education system. The realization that funding and needs do not justify only top-level institutions such as the Hebrew University and the Technion, education policy planners propose a three-tier system, including a binary divide. Professor **Amnon Pazy**, head of the planning committee of the council of higher education, sees 15% of universities at the top level, 15% again at a middle level and 70% at college level, with the growth of the colleges determined by market forces. This will create a binary divide of 30/70 between higher-level universities and colleges. This divide is also seen as a quality selector. The analogies with other systems, such as the American, are apparent.

USA

Will the Clinton administration divert funding from basic to applied research?

'The public hears that we are no. 1 in science, and they want to know why that is not making our lives better. That one thing that works in this country doesn't seem to be paying off', says **Walter Massey**, director of the National Science Foundation. The USA is spending \$28 billion on non-military research but the economy does not seem to profit from it. It is expected that the Clinton administration will shift emphasis from basic science to more application-oriented work. Government will increase its support for fibre-optic communications, computer networking, biotechnology, robotics and magnetic levitation rail transportation. A new intensified link between science and industry is aimed for. US scientists understandably protest that if the shift is going to be at the expense of basic research, then the country will trade off short-term political profit against long-term scientific leadership. Similar attitudes in Germany, for example, are somewhat on the wane. Although in Germany, too, despite the traditional argument that research is a goal in itself, for the advancement of human knowledge, more and more applied research, especially in engineering, is being conducted in institutions of higher education.

Poor in teaching working skills—a known national deficit

Vocational education—or the lack of it—may be a prime reason for difficulties with the economy. A report by state higher education executive officers recommends that higher education institutions can

help improve vocational qualifications through several actions. These include an association between schools and community colleges in tech prep programs, in which students move from high schools to two-year programmes at community or technical colleges; a more direct link between schools and career counselling; and a more direct relation between courses and work. A better qualification assessment scheme, as in Europe, is also recommended. The report, 'Building a Quality Workforce', is available from SHEEO, 707 17th St Denver, CO 80202-3427, USA.

Australia

Australian engineering compact disc

The Royal Melbourne Institute of Technology has issued an Australian Engineering and Applied Science CD-ROM. It comprises seven databases covering subjects from transport to water resources management. The CD will be updated every six months. The cost is \$725 per year.

China

First private university

High tuition fees of 4,000 yuan (\$650) are asked for at the new private university of Shanghai. Even with the promise of a raise from 400 to 1,000 yuan for Chinese faculty, this sum is four months of this raised salary, and would compare well with top fees for US universities on a relative scale. Nevertheless there were 1,500 applicants for 180 places at this university, which is fathered by Beijing's Qinghua and Beijing universities and the Jiaotong University in Shanghai. Study courses offered initially are in international business and accounting and applied computer sciences. Fees are also common at other Chinese institutions, but not on this level. It will be interesting to watch whether tuition fees will be introduced in 'capitalist' countries such as Germany, France and Sweden—which pride themselves on having 'socially adjusted' education systems.

Conferences

CAL 93—Computer Aided Learning into the Mainstream

5–8 April 1993, University of York, UK
Information: Françoise Vassie, Centre for Continuing Education
University of York, York YO1 2EP, UK
Tel: +44-904-433901 Fax: +44-904-433906

Project-organized Curricula in Engineering Education

5–7 May 1993, Engineering College, Copenhagen
Hoekaer 12A DK-2730 Herlev, Denmark
Information: Ole Vinther, IKT
Tel: +45-44-92261 Fax: +45-44-922891

Hypermedia in Vaasa

Computers and Hypermedia in Engineering Education
24-26 May 1993, Vaasa Institute of Technology, Finland
Information: Professor Matti Linna, Wollffintie 30
65200 Vaasa, Finland
Tel: +358-61-3263142 Fax: +358-61-3263112

Informatics and Changes in Learning

IFIP Open Conference
7-11 June, Gmunden, Austria
Information: Secretariat for Gmunden '93,
Salesianumweg 3
A-4020 Linz, Austria
Tel: +43-732-772666-62 Fax: +43-732-772666-17
email: q000070@ALIJKU11

International Conference on Electronics Higher Education

7-9 June 1993, University of Electronic Science and Technology of China, Chengdu Sichuan, China
Contact: Professor Zhao Shan Zhong
610054 Chengdu, Sichuan, PR China
Tel: +86 028 333312 2320 Fax: +86 028 334131

American Society for Engineering Education

1993 Annual Conference
20-24 June 1993, University of Illinois, Champaign-Urbana, IL., USA
Contact: ASEE, Conference Department, 11 Dupont Circle, Washington, DC 20036, USA
Tel: +1 202 986 8530

Computer Graphics International 93

Communicating with Virtual Worlds
21-25 June 1993, Swiss Federal Institute of Technology, Lausanne, Switzerland
Information: Mrs J. Botarelli, Computer Graphics Lab,
Swiss Federal Institute of Technology, CH-1015 Lausanne, Switzerland
Tel: +41-21-693-5215 Fax: +41-21-693-5328

SEFI—The European Society for Engineering Education

1993 Annual Conference
28 June-1 July 1993, Lulea University of Technology, Sweden
Contact: Ms Elisabeth Johnsson, Conference Secretary
CENTEK Lulea University of Technology, 95187 Lulea, Sweden
Tel: +46 920 91322 Fax: +46 920 99020

International Conference on Engineering Design ICED '93

17-19 August 1993, The Hague, The Netherlands
Information: KIVI—Congress Office
PO Box 30424, 2500 GK The Hague, The Netherlands
Tel: +31-70-3919890 Fax: +31-70-3919840

Eighth World Conference on Cooperative Engineering Education

30 August-3 September 1993, Dublin, Ireland
Contact: Conference Administrator, Dublin City University, Dublin 9, Ireland
Tel: +353 1 7045424 Fax: +353 1 7045505

Second East-West Congress on Engineering Education

20-24 September 1993, Technical University Lodz, Poland
Contact: Z. Pudlowski, Electrical Engineering, University of Sydney, Sydney, NSW 2006, Australia
Tel: +61 2 6922000 Fax: +61 2 6604706

Computer Aided Engineering Education

22-24 September 1993, Polytechnic Institute of Bucharest
Contact: Professor Daniel Joan
Polytechnic Institute of Bucharest
spl.Independentei 313
77206 Bucharest, Romania
Tel: +400 121190 Fax: +400 120188