

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.

World

International student markets

As university funding sources become more difficult to tap, universities in the United Kingdom are looking for increased 'exports' of education by attracting more foreign students. Australia is exporting engineering education by opening up branches in Southeast Asia (see *EEW* in 8 (3)). These drives are conspicuous in more market-driven higher education systems such as the USA, UK and Australia. Leaders in foreign student enrolment are the USA, by far the biggest, then France, Germany and the UK, in that order. This order may be misleading. France and Germany are essentially not charging student fees. Moreover the students in these countries present more special cases. In Germany, the biggest contingent of foreign students, for example, comes from Turkey. This needs to be put in a proper context. Children of Turkish parents who came to Germany as 'guest workers', are going to German schools and grow up in Germany, but are not German citizens. Consequently, although the Turkish students have lived their lives in Germany, they do not count as Germans.

Europe

The new commissioner is an engineer

Antonio Ruberti, past Rector of the Università la Sapienza in Rome, and former Minister for Higher

Education and Research in Italy, has taken up the post of European Commissioner for Science, Research and Development, Human Resources, Education Training and Youth. The post is significant in that it includes responsibility for the programmes ERASMUS, COMETT and TEMPUS, which have a large chunk of engineering education involvement. Ruberti is keen to see an increase in the educational allocations within the community; this accounts for only 8.6 per cent of the total budget. He is planning to extend the implementation of European training systems to school level, complementing the current concentration on higher education. By also holding the post of Commissioner for Scientific Innovation and Research he will play a major role in the development of the new community policies geared to strengthen ties in education and research within Europe.

International Dual Engineering Award

The need for internationally recognized engineering degrees is being pursued by the International Dual Engineering Award (IDEA) group, now encompassing 14 member institutions in France, UK, Ireland, Spain, The Netherlands and Germany. For the next academic year, 150 students have applied for an exchange to a foreign partner institution in mechanical engineering and materials science. The acceptance of such studies is both economically and prestige driven, as students need to complete parts of their studies in a foreign country and study in a foreign language. While

German students seem to profit economically—with starting salaries up to DM1000 higher for graduates in Germany—UK companies are reluctant to honour the extra qualifications. In view of the increasing flows of engineers within Europe, it is likely that language skills will enhance job opportunities of engineers in foreign countries as well as contributing to the creation of a more horizontal market for engineering graduates. All this is valid under the assumption that recessionary conditions fluctuate between the countries of the community. The constraints on the study methodology range from completing academic and project work in the host country in tandem to the national studies—the model of FH Hamburg and Portsmouth University—to more integrated variations exemplified by the model of the FH Osnabrück and Coventry University. The studies are on the Bachelor of Engineering–Diplom (FH) level. Further developments of master degrees on an international basis are going well with a joint degree in automobile engineering between the University of Hertfordshire and the FH Hamburg. The first group of students are graduates of engineering schools in The Netherlands, UK, Greece, France, Belgium and Germany, and are completing their second term in Germany, after starting at the University of Hertfordshire last Autumn. The students get a combination of academic- and industry-based courses, ending with a project. With the current turmoil in world automobile manufacturing, closer co-operation within the European motor industries is called for, and European graduates of transnational courses can further contribute to the already crumbling communication barriers between the major European automobile manufacturers.

Engineering salaries compared

Starting salaries for engineers across Europe show large differences according to a recent study by Groupe Egor for Paris for 1990. Starting salaries in Germany averaged DM36,700 followed by France, Spain, Italy, Belgium, The Netherlands, Denmark, UK, Ireland, Sweden and Portugal. The lowest salaries paid in Portugal are DM16,000 at the start. Compared to average salaries, Spain has the highest ratio of four times the average pay for its engineers, whereas Germany pays double the average, and The Netherlands only one and a half times the average for engineering starting salaries.

UK–North America

A new transatlantic university exchange organization has been established linking 84 institutions of higher education between the UK and North America. For information contact **the British Universities Transatlantic Exchange Association, the University of Swansea, Singleton Park, Swansea SA2 8PP, UK.**

UK–Germany

Ageing academics create a gap in new faculty quantity and quality

In the United Kingdom the number of faculty aged between 35 and 54 rose from 58 per cent to over 70 per cent between 1979 and 1989 according to the *University Statistical Record*. The group aged under 35 fell from 29 to 15 per cent. A similar picture is presented by the academic situation in Germany. This creates a serious gap in follow-up academic staff for higher education. Furthermore, due to extensive recruiting in the seventies academic positions became blocked, and are now opening up faster than qualified staff can be hired. In the UK, one way to resolve this problem is the advent of part-time Ph.D. studies advocated by the Economic and Social Research Council (ESRC). The problem of quality will remain. Large-scale hiring is required in order to replace current staff, and the choice is not always the best under these conditions. On the other hand, some good prospective academics could be moved to join universities due to the economic recession.

Germany

Can German higher education be saved?

We have repeatedly mentioned the crisis in German higher education in editorials and in this column. It may not be an overstatement of the case, although this is still not being taken seriously enough by the responsible organs. In a recent interview with the weekly *Die Zeit* (12 February 1993), **Konrad Schily**, Rector of the first German private university, discussed a number of open secrets and possible remedies to the situation. One of the main assumptions is that the published numbers of students are inflated by up to 35 per cent due to opaque statistical methods. Many of these students are so called 'file corpses' who have abandoned their studies long ago. A further complication is the over-booking of study places due to concurrent applications by prospective students in a number of schools. Another major point of criticism is the tenure of all academics; one of its results, is that engineers whose industrial careers are less than brilliant, take up tenured teaching jobs where they continue to pursue their less than brilliant careers. A further problem is that budgets are steered by the ministries according to fixed guidelines. The decision of hiring staff is globally determined by formal guidelines, which do not necessarily ensure that the best choice can be made by the individual departments. As an editorial comment, we can add that the situation in higher education probably poses a real crisis. This is because the mechanisms for real reform are not built into the system, which originated in the student unrest of the late sixties. The ideas behind this, now over 20-year-old state of affairs, was self-administered democracy in the sense that every-

body is equally responsible for the system, i.e. professors, technical staff, other staff as well as students. Although there is a weighting in favour of the professors, once the academics have divided opinions, weak solutions may prevail. All this is coupled to a multitude of formal and legal constraints, and in particular immovable budgetary operations, where the status quo is paramount. This implies that with the study reforms produced by the student unrest 25 years ago a fossil was created, which is possibly even more conservative than the system it superseded. The question is whether a reform is at all possible within such a rigid system, especially in view of the fact that there will always be support from within the system to keep the system as it is, or it may burst under increasing pressure by a new generation of academics.

*And suddenly the school-times are too long—
politics in action*

Another 'holy cow' of the German education system has come under attack. The thirteenth school year, which has been thought to better prepare German school-leavers for entering higher education has come under the high level attack of the prime ministers of the Länder (the federal states). In former East Germany, the schools end with twelve years of studies, and it now seems that one of the only things that will be taken over from the old regime is this shortening of school-times. Savings of 15,000 teaching positions in the west are anticipated. This reduction is another blow for the conservative education system dominated by encrusted interest groups. The shorter school-times, like the shorter university times have now become a serious consideration. Reforms of this kind are 20 years behind the times, and ironically seem to be triggered by the financial crisis. Another probable factor in these new approaches is that knowledge of education systems in other countries has penetrated into the national conscience. European programmes such as ERASMUS with international exchanges have contributed to the mutual appreciation and evaluations of educational systems in neighbouring European countries, so that the reforms are partly copies of what has already been tried abroad.

Does anyone know how many students there really are?

It is symptomatic of the German situation that the number of students is unknown. Repeated statements that 30 per cent of any year's population are students are difficult, if not impossible, to prove. Statistics by the Federal Ministry for Education and Science show student percentages in the age-group of 19 to 26. These however comprise only 57.4 per cent of the student population, and according to the statistics would show only about 12 per cent within this age-group being in higher education. These statistics also reveal that the highest percentage of the population, namely 15.3

per cent, are students in the age-group of 23-year-olds. It is unclear how the figure of 30 per cent has been arrived at. Many speculations are possible; one is that students register in different universities at the same time, another is that the figures are simply untrue. To further contribute to the confusion the Ministry states that for 1991, 21.3 per cent are registered as students. As students are free of tuition, accounting is, in fact, redundant. A verifiable picture is to count the number of graduates, as certificates of graduation are official pieces of paper which could be added up. Then the fraction of graduates countrywide related to the number of registered students will help to reveal how many are registered but have given up their studies.

*Mechanical engineering—the first industry to be hit
by the recession*

'The deepest recession since the Second World War' is how the executive director of the German Federation of Mechanical and Plant Engineering (VDMA) **Hans Jürgen Zechlin** describes the current situation. This year, 1993, is expected to see a reduction in output between 3 and 5 per cent, after reductions of 2 per cent in 1991, and 6 per cent in 1992. Production retreated from 82.4 per cent of capacities in 1991 to 78.7 per cent in 1992. In addition to the world-wide recession, the following factors were mentioned as burdening German industries. A neglect of southeast Asian and Latin-American markets, over-engineering too many expensive features which may not be required, long development times for new products, and the lack of co-operation between the mostly mid-sized enterprises in the branch. Such economic trends, are traditionally very quick in being interpreted by prospective students, especially in Germany. The number of applications for mechanical engineering courses has declined significantly, so that the overpopulation in engineering courses may revert quickly to normal or even subnormal conditions (see survey by **E. Wiebe** to be published in *IJEE*).

*High-speed telecommunications data-transfer
network becomes operational in Hamburg*

High-speed communications between computers are a necessary requirement for the transmission of data for research and development. With the Fibre Distributed Data Interface of 158 km of glass-fibre connections, Hamburg's main centers for R&D are now interconnected. The institutions are the University, the Technical University, the Armed Forces University, the German Electron Synchrotron (DESY), the national research centre GKSS, and the Meteorological Centre. The connection is between 3900 computers and the vector-computers 2 Cray, 3 Convex and 1 SNI. With transmission speeds of 100 Mbit/s, they can cope with many times more data than before. Industrial enterprises may also co-operate in the future. These communications will relieve the slow networks currently overloaded with e-mail and

conferencing at the rate of 64 kbit/s. These facilities are considered as only a step towards the 1 Bbit/s facilities which will be covered in the intermediate stages by 600 Mbit/s B-ISDN facilities planned by Telekom.

Czech Republic

Academy of sciences financial plight

The Czech Academy of Sciences, incorporating both humanities and sciences research institutes is destined to shrink substantially with budget cuts of 30 per cent, to over US\$40m. The academy based on the former soviet model of separation of teaching and research stands to lose half of its 8000 staff. Natural attrition helps, in that younger scientists are switching to the market sector. Others will undergo a merit scrutiny. The academy is now separated from its Slovak branch, now located in a 'different' country. One model being considered for the future academy is that of the Max Planck Institutes in Germany. These institutes are specialized subject-oriented research institutes, located all over the country and may award postgraduate degrees alongside the universities.

Malaysia

Science and engineering courses expansion

Concern about the ratio of science to arts students which is 35:65 prompted the Ministry of Education to co-operate with the Ministry of Science, Technology and the Environment in projects to make science more attractive for prospective students. Within the next decade the country needs 75,000 science teachers, 56,000 engineers and 130,000 engineering technicians. The aim is to reverse the ratio to 60:40 science to engineering.

Japan

Machine tools in recession

As in Germany, machine tool orders in Japan are on the decline. From a peak of 1412 billion Yen of new orders in 1990, orders have nearly halved in 1992, to 722 billion Yen. Some optimism is being expressed due to the considerable investments that Japanese machine tools manufacturers such as Yamazaki and Toyota have made in the development of labour-saving robots. At the Mechatronics fair in October 1992, it was apparent that with the increasing installation of flexible manufacturing production systems the market for robots to complement machine tool operations will be on the increase.

USA

Master of Science in pollution prevention

A number of environmental engineering programmes exist in higher education. Most of them deal with the skills needed to clean up the environment. Now, the New York Institute of Technology is offering new bachelor and master degrees in the specialization areas of pollution prevention with alternative fuels, waste management, pollution control, and regulatory compliance. The courses are based on mechanical engineering technology rather than the more traditional civil engineering and biology. The courses are co-ordinated by **Professor Stanley Greenwald**, Chairman of Environmental and Mechanical Technology at NYIT.

Technology college closes

A small engineering technology college, Spring Garden College of Philadelphia, the oldest school of technology, established in 1851, has closed its doors due to financial difficulties. The college offered courses in computers, electronics and mechanical engineering technology. It had 34 full-time and 40 part-time faculty. Enrolment was 250 full-time and 275 part-time students at the time of closing. With a US\$5.5 million budget, US\$10 million debts and high tuition fees, the college could not keep afloat. It is sad that with the new administrations thrust in the direction of technology education, such private establishments cannot survive unless they receive state support.

New engineering school

A new school of engineering is planned for Glassboro State College in Camden, New Jersey. A US\$100 million endowment has been presented by an industrialist, **Henry Rowan**, to add engineering to the already existing business administration, education and arts schools. The name of the college—in the wake of such a gift—will be changed to the name of the donor, to the Henry Rowan University. Approval by the State Board of Higher Education may take a couple of years. The example of private capital in higher education provides such contrasting developments to the closure of a college (see the previous item). In particular, we note that Camden, New Jersey is in fact adjoint to Philadelphia, and the campuses of the revitalized and the closed institutions are only a few miles apart.

How to increase student retention rates—provide orientation courses

The problem of retaining students is a feature of free access university systems such as in the USA and Germany, but much less so in Japan where those who enter university are usually highly selected, and experience a reduced pressure as students, compared to their school-days. The University of Texas in Austin has been trying to combat student frustration by introducing introductory courses in electrical and computer

engineering. This measure is geared to combat the failure of 30 per cent of the departments' students to finish their studies within 6 years. The introduction includes a calculus course related to computer and electronic studies, laboratory sessions, and even a computer lab dedicated to the freshmen. The department head **Professor Mario Gonzalez** hopes that such introductory courses will be taken up by other departments. The practice of orientation sessions and so-called 'bridge courses' is also common in German higher education institutions, and it would be interesting to make a comparative evaluation of the success of these measures.

Conferences

International Conference on Electronics Higher Education

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

Informatics and Changes in Learning

IFIP Open Conference
7-11 June 1993, 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

Co-operation between higher education and industry—the experience of COMETT

13-15 June 1993, Aalborg, Denmark
Information: J. Thuesen, COMETT Information Centre, DK
c/o Ministry of Education, Fredriksholms Kanal 26, DK-1220 Copenhagen K
Tel: +45 33925436/42 Fax: +45 33925075

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: Klvl—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