



AUSTRALASIAN ASSOCIATION FOR ENGINEERING EDUCATION

NEWSLETTER

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The 7th AAEE Annual Convention and Conference will be held at The University of Melbourne between 10 and 13 December 1995 with the Dean of the Faculty of Engineering, Professor William W.S. Charters chairing the Conference. The AAEE President, Professor Peter LePoer Darvall, Members of the AAEE Executive Committee and the Conference Chairman, cordially invite you to attend this important gathering of engineering educators, wishing you fruitful and productive discussions, as well as an enjoyable stay in Melbourne. Picture above shows an aerial view of The University of Melbourne.

FROM THE PRESIDENT



Prof. P. Darvall

International Conferences

Since our last newsletter, which was distributed at the end of June this year, your Association has played a prominent role in two international conferences. The first was the *1995 International Congress of Engineering Deans and Industry Leaders* held at Monash University in July. About 200 delegates from thirty five countries attended this Congress, and they were both impressed with the proceedings, and entertained by the extra-curricular events, including an address from ex-Senator John Button at the Congress Dinner.

Significant goodwill and networking benefits were generated. Dr Adnan Badran, the Deputy Director-General of UNESCO, made a special effort to attend and to address the Congress. All participants gained information and insights on how engineering education is developing in other nations, which can only have the effect of generating a richer intellectual environment for our students. A detailed report from the Congress is available from the Executive Vice-President of our Association, Associate Professor Zenon Pudlowski.

There was significant discussion of internationalisation of engineering education and opportunities to develop international collaboration. One moral that I have drawn from this is that academic staff must be at least as outwardly and internationally focused as we expect our graduates to be, not only in research, but also in education.

The second international event was the *4th World Conference on Engineering Education* held in St. Paul, Minnesota, in October. This Conference was also co-sponsored by your Association, and by the International Liaison Group on Engineering Education (ILG-EE), whose headquarters, like that of our Association, is contained within the UNESCO Supported International Centre for Engineering Education (USICEE) at Monash University.

The Australasian Association was very well represented at the Conference, being the third largest group (after the US and the UK) in a total of about 300 delegates from forty countries. Excellent plenary presentations were given by representatives from industry and professional societies, and there was a great variety of innovations reported in the technical sessions.

The message from employers is consistent with what we often hear here in Australia: they are mostly satisfied with the technical expertise of graduating engineers, but believe they need to know more of the global and societal context of their work, and the business perspective. They lack leadership skills, the ability to cross cultural boundaries, and communication skills. The curriculum needs to be more appropriate for a changing world.

Again, drawing my own moral from this, we cannot expect to inspire our students with the larger context unless staff themselves are inspired by it, and, by example, show the importance of higher order skills. Just as important as curriculum and teaching technology is style and tone, and this is set by staff. The importance of adaptability to change was emphasised, and this is true of institutions as well as individuals. Engineering schools, like commercial organisations, must be agile, and be able to learn as well as to teach.

Association members may find benefit in obtaining a copy of the extensive conference program from Professor Pudlowski, and making contact with their international colleagues who are developing new programs or introducing innovations in engineering education similar to their own.

I am also pleased to report that at this Conference I was elected as Chairman of the

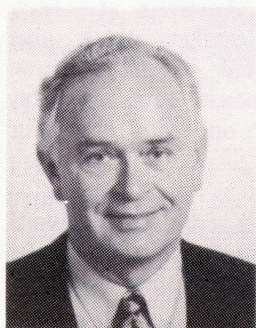
ILG-EE for the next three years, with Professor Pudlowski as Secretary. Vice-Chairmen are drawn from Germany, Canada, and Poland, and the Treasurer from the UK. A proposal by USICEE to hold the next World Conference in 1998 in Krakow, Poland, was accepted.

The Conference will become a global Congress, being held in conjunction with the *4th East-West Congress on Engineering Education*, the *Central and Eastern European Congress of Engineering Deans and Industry Leaders*, and also the next in the sequence of *UNESCO Congresses of Deans and Industry Leaders*.

It is a mark of great recognition for our Association that Australians should be playing such a prominent role in these international events. I look forward to seeing many members of the Association at the *7th AAEE Annual Convention and Conference* at the University of Melbourne between 10 and 13 December next.

Professor Peter LePoer Darvall
Deputy Vice-Chancellor
Monash University
President of AAEE

CHAIR OF THE AUSTRALIAN COUNCIL OF ENGINEERING DEANS ADDRESSES THE 1995 UNESCO CONGRESS OF ENGINEERING DEANS



I shall try to speak this afternoon in my role as Chair of the Australian Council of Engineering Deans. Speaking for the deans is not easy, because we are a diverse lot; there is diversity among our universities and there is diversity among our engineering faculties. We are coming to value that diversity and, I anticipate, we will come to nurture it in the years ahead.

An event last Friday focused my attention on this 1995 International Congress of Engineering Deans and Industry Leaders. I refer to the announcement of balance of trade figures for Australia which, by any measure, are not good. I believe that this situation impacts on Australian engineering deans, and industry leaders, in a number of ways.

Prof. J.M. Simmons

We Australians have been given a stark reminder that our nation is doing business in a rather unprotected manner in the new global community. As economies develop rapidly in our own region, new opportunities are arising for us, but they require new attitudes on our part. Individual deans will not be able to *go it alone*. Instead, we will be forming new national and international alliances for the delivery of engineering education. It appears to me that such thinking should be very much on the agenda of this Congress. The Congress could not be more timely. At this point in time, engineering education is a product which Australia exports for the mutual benefit of the cultures and economies of Australia and our neighbours. This activity is taking place on the eve of a dramatic change in the mode of delivery of engineering education; a change which is being brought about by the revolution in communications and information technology.

We have a good system of engineering education in Australia. If we are to maintain market share of international engineering education, Australia's engineering deans will have to face some real challenges. We must be active in continuous improvement of the quality of our product. That will necessitate changes in our modes of delivery. I am sure deans are shuddering at the thought of each engineering lecturer spending months developing his or her own multi-media presentation for each subject. Obviously, we must pool resources to some extent. The charter of the UNESCO Supported International Centre for Engineering Education, which is co-sponsoring this Congress, is breaking new ground in this regard.

There are some exciting examples in Australia of engineering deans collaborating. The three Advanced Engineering Centres spring to mind. I am sure that much greater collaboration will be essential in the future if we are to provide students with access to high quality curricula and teaching laboratories and world class expertise in our academic staff. In this time of economic difficulty in Australia, we can really only seek increased government support if we lever our requests with commitments to increased collaboration.

Visiting deans and industry leaders will be interested to learn that the Australian Government is currently funding a major visionary *Review of Engineering Education*. The initiative began in a modest way with the Council of Engineering Deans, and quickly snowballed with the joining of The Institution of Engineers, Australia and the Australian Academy of Technological Sciences and Engineering. All parties, including government, clearly recognise the rapid changes in the environment in which engineering education must operate into the next century. I believe government is now recognising the absolute importance of our manufacturing and engineering service industries, and hence our engineering education system, to the reversal of our decline in balance of trade.

The Review is being conducted through six task forces, with membership drawn from all stakeholders. I draw this Congress's attention to one Task Force that is addressing the engineering education/industry interface. The task force leaders are meeting as part of this Congress.

We have reached a stage in the development of engineering education in Australia at which a balance must be achieved between individual competition in the market place and collaboration for the benefit of overall quality and performance. Deans will engage in new dialogues with fellow deans, with leaders of industry and with Centres such as the UNESCO Supported International Centre for Engineering Education. I, for one, am changing my thinking on collaboration rapidly.

At the end of each day at the office, we Australian deans of engineering can easily dwell on three concerns that are not all compatible; how we might steal a march on our rivals, the bad balance of trade figures announced on the TV news, and the future for our daughters and sons.

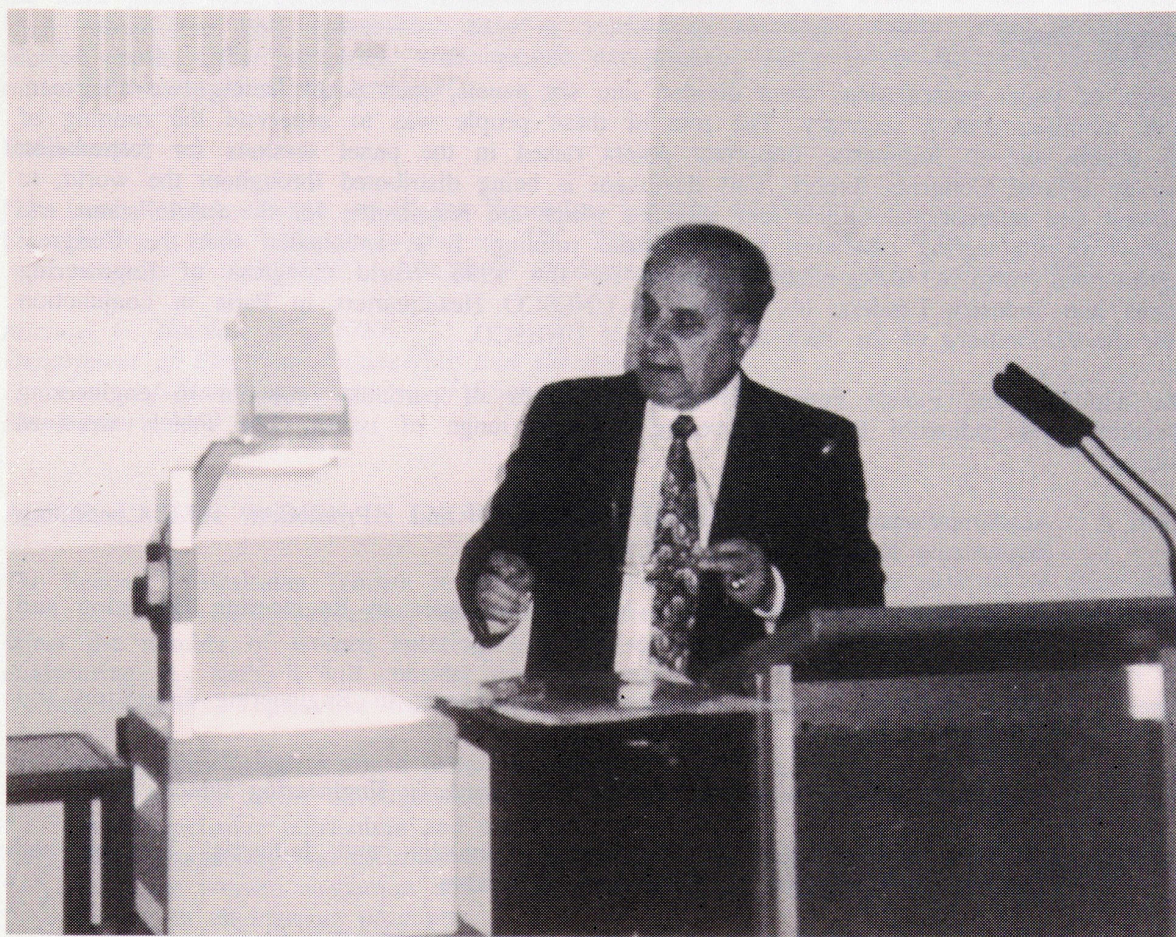
This Congress gives us all a wonderful opportunity to focus more on collaboration and the richness of diversity so that our engineering education systems will be key contributors to the development of our nations into the 21st century.

*Prof. John M. Simmons
Dean of Engineering
The University of Queensland
Chairman of the Australian Council of Engineering Deans*

UNESCO 1995 INTERNATIONAL CONGRESS OF ENGINEERING DEANS AND INDUSTRY LEADERS - BRIEF REPORT

Introduction

This Congress, which was held at Monash University between 3 and 6 July 1995, was the fourth in an international series and the first to be held in Australia. The main Congress sponsor was the Institution of Engineers, Australia, and co-sponsors included UNESCO, the Australasian Association for Engineering Education (AAEE), and Monash University. The Congress was hosted by the UNESCO Supported International Centre for Engineering Education (USICEE), which is based in the Faculty of Engineering at Monash University.



The picture shows Dr Adnan Badran, Deputy Director General of UNESCO, addressing Congress participants at the concluding forum.

The Congress was well attended by close to 200 participants from 35 countries, representing 5 continents. Expressions of interest and abstracts of papers had been received from many who did not make it to the Congress owing to financial constraints. The Congress organiser received numerous requests for financial support from prospective delegates, particularly from engineers in Central and Eastern Europe and Asia. UNESCO provided support for a few participants from developing countries. The USICEE made many applications to various funding agencies on behalf of a number of potential participants and was successful in obtaining assistance from Ausaid for five participants and from the Australia-India Council for one participant.

It is interesting and gratifying to note that the Australian and New Zealand delegates were outnumbered by those from further afield, Asia being well represented by 47 delegates from 13 countries, including a delegation of 17 (the largest national delegation at the Congress) from Thailand. A large proportion of the delegates from Asia, 40 of the 47, came from developing countries.

European participants totalled 39, of whom 26 came from Central and Eastern European countries which are currently undergoing the process of change to a free market economy.

As one of the major aims of USICEE is to promote collaboration in the field of engineering education between institutions in developed and developing countries, it can be claimed that this Congress made a considerable contribution towards achieving this aim.

Congress Panels

Topics of paper presentations were divided into six panels, each panel having two chairmen, three members and a secretary. The role of these people was to supervise the running of the panels and to summarise important points raised in the panel sessions for formulation into an official Congress Report. This document is being distributed throughout the world, to national and international bodies and agencies which are responsible for the future status and quality of engineering education and industrial training. It is anticipated that the Congress Report will form a background document for the 1996 World Congress of Engineering Deans and Industry Leaders, to be held at UNESCO Headquarters in Paris in conjunction with the celebrations of the 50th anniversary of UNESCO.

The six Congress Panels considered specific themes of particular concern to engineering education and industrial training, covering a broad range of issues. The Panels were as follows:

- Panel A Academia/Industry Collaborative Programs and Promotion of Continuing Engineering Education and Industrial Training
- Panel B Application of New Media and New Technologies in Engineering Education and Industrial Training
- Panel C New Academic Courses and Contemporary Issues in Engineering Education and Industrial Training
- Panel D Curriculum Development and Curricular Standards in Engineering Education
- Panel E Effective Methodologies in Engineering Education and Industrial Training and Transfer of Information on Engineering Education
- Panel F Management of Engineering Institutions and Engineering Faculties

An additional role of panel secretaries was to select one or two papers from their panel for expansion and future publication in the *Australasian Journal of Engineering Education*.

Summary Recommendations

The work of the panels led to the formulation of panel recommendations which were presented at the closing session of the Congress. Subsequently, the panel recommendations have formed the basis for the creation of the following summary recommendations:

Engineering education should shift its emphasis to student **learning**, away from faculty **teaching**. It should utilise:

- * problem based learning (including industry perspectives)
- * diagnostic testing
- * computer aided instruction
- * mentoring
- * assessment of results

Curricular reform is needed in engineering education:

- * include more engineering content in the early years (motivation, contexts)
- * rebalance emphasis on theory versus practice
- * make more user friendly to attract and retain women and minorities
- * broaden to include international aspects, environmental concerns (eg sustainable

development), business issues (eg international competitiveness) - a holistic approach - while maintaining an emphasis on the technical ability of engineering graduates

- * consider a masters degree as the professional credential for entry into practice (or a combined degree for broadening, career flexibility)
- * build upon the formal education period to create an adequate base for lifelong learning.

We must follow changes in engineering **practice** with appropriate changes in engineering education:

- * involve practitioners in advisory councils, design courses, evaluations
- * focus on country/society specific needs.

Major concentration on preparation of engineers for international practice is needed:

- * study abroad
- * co-op work experience abroad
- * faculty exchanges

Due to high resource demands, we must utilise co-operative development and sharing of high technology courseware:

- * multimedia courses, laboratories
- * software development
- * exchange of case studies
- * satellite delivery of courses
- * special purpose short courses (including CAI).

Academic/Industry/Government collaboration is needed so that our outputs fuel the local economy:

- * flow of appropriate graduates
- * continuing education
- * utilisation of R&D results generated at universities.

Quality assurance methodology must be embraced in engineering education:

- * TQM applied within engineering schools, faculty upgrading, etc
- * have students learn to use TQM effectively
- * benchmark against world standards, make continuous improvement to reach parity
- * use accreditation systems to evaluate, provide basis for mutual recognition.

Continue exchanges concerning engineering education, at the international level:

- * periodic conferences for exchange of ideas, experiences
- * develop clearing house/transfer mechanisms for ongoing interchange (eg USICEE)
- * utilise electronic means for interactions (Internet, World Wide Web).

Conclusion

The prime aims of this Congress were to provide an international forum for continued dialogue on adapting engineering education and research to the needs of national and international economies and cultures, and the development of international collaboration in this area, as well as encouraging and stimulating academia/industry co-operation, with particular emphasis on developing countries and countries evolving towards a market economy. The Congress organisers can justly claim to have met these objectives and to have attracted participation by our target groups.

Acknowledgements

The Congress organisers are grateful to all those who provided support for the Congress and, in particular, to Monash University, the Institution of Engineers, Australia (IEAust), the Australasian Association for Engineering Education (AAEE), UNESCO, Australian Program of Training for Eurasia (APTEA) (Australian Embassy in Warsaw), Ausaid and the Australia-India Council for their valuable support of some of the delegates to the Congress.

The Congress Report, summarising the working sessions and recommendations is now being distributed. Copies are available from the USICEE.

A NEW SCENARIO IN UK ENGINEERING EDUCATION A SHARED EXPERIENCE?



Introduction

This contribution to the Newsletter of the Australian Association for Engineering Education (AAEE) is a brief synopsis of the content of a Seminar to be given at Monash University, Melbourne, during December, 1995. Inevitably such a short paper cannot achieve more than an outline of the content and provides no hint of what it is hoped will prove a valuable exchange of opinions. The views expressed here are those of the author though I believe that they are representative of those of many among the academic community in Britain. Academics in Australasia may have similar views.

Prof. M. Hartley

The Transfer of the Polytechnics to the University Sector.

Until June 1992 there were rather more than 50 universities in the UK with its population of something more than 50 million ie about one university for each million of the population. Now 35 of the former polytechnics have been designated as universities and indeed one or two further institutions are in the process of making the change.

In addition there are a multitude of colleges, typically former teacher training colleges which have moved away from their original objectives and have diversified, and now offer a wide spectrum of studies, often within the liberal arts sector, and are now degree-granting institutions, sometimes designated university colleges, under the patronage of a parent university which may be local or might even be situated at some considerable distance.

The transition of the polytechnics to universities was a step-function. The proliferation of the degree-granting colleges under the wing of a university has been a gradual process which has gained momentum over recent years.

These two phenomena taken together constitute the most fundamental change on the university scene in Britain since the Robbins Report of 1963 [1] propounded the ideal that a university place should be available to all those leaving high school who were capable of profiting from such an education. The Robbins Report came at a time when university education was a privilege afforded only to the most gifted young people in the nation. It led to the creation of a significant number of new universities. Some grew out of existing institutions. Salford and Bradford arose from Colleges of Advanced Technology (CATS). Others were entirely new, built as campus universities on green-field sites. York and Essex were two examples. Parallel to the expansion in the University sector came the establishment of a significant number of polytechnics offering a range of courses which were validated by the Council of National Academic Awards (CNAA). The CNAA exercised significant control as to curriculum content, appointment of external examiners and standards generally. These are the institutions which have been transformed overnight.

With the present situation no less than one third of school leavers now find a place at university, university college or similar institution. This dramatically different situation has occurred over a period of some thirty years which much of the expansion in recent years. It is no exaggeration to assert that the recent expansion, typified by the nomination of the 35 plus new universities is the most significant development in tertiary education of the quarter century in the UK.

The object of this paper is to highlight aspects of the above developments and to refer to other changes, many of which are directly associated.

Funding

The reduction in university funding, first begun in the mid-1970's, further implemented at the beginning of the eighties decade, continues year by year, with the result that university staff from vice-chancellors to newly-appointed lecturers are pre-occupied with budget considerations. Many staff have been encouraged to leave the university under early retirement schemes. This has been necessary to balance the books. In some cases, including my own, staff have been re-engaged on short-term part-time contracts in order to carry out limited teaching duties as part of re-structuring activities. As a result of worsening staff/student ratios, tutorial arrangements and pastoral care, for which the British university system has always been justifiably proud, are becoming increasingly difficult to implement. By way of illustration the student/staff ratio at UMIST in 1983 was about 9.5:1. The current value is about 13.5:1.

Against this background it is important to appreciate that the emergence of the 35 new universities has not resulted in additional funding. The transition has been very much a cosmetic exercise at no more cost than that of providing new letterheads, the new and snappy university title displayed on bill-boards at the front entrance and change of designation, such as principal to vice-chancellor, and head of department to professor and head of department. Staff, lecture rooms, laboratories, libraries and the rest remain unchanged. A wide range of sub-degree work continues. However a very substantially increased fraction of the age group can claim that it is *at university* rather than at college.

The above comments may seem somewhat cynical but they represent the current situation. With time, and as a result of evaluation exercises to be discussed later, the position will change as a new pecking order for universities emerges with some of the new universities moving up the list as longer-established institutions sink in the ratings.

Research Assessment Exercise

Academics in the UK are looking forward to April 1996 with some trepidation. It is in that month that the next research assessment exercise will be conducted. Papers published over the three years to April 1996 will be subject to assessment by peer review. Research funds for the next three-year period will be allocated on the basis of the review. Assessment is on the basis of a grading 1 to 5 with 5 representing the best quality, with a coding A to E to indicate the proportion of staff in the relevant department who are active in research. Considerable sums depend on the result of the research assessment exercise. Those departments gaining a 5A will be very significantly better off than those with say 3C while departments with say, a 1E grade will receive nothing by way of research funding. In addition, since the results are widely available, the departments graded 5A may expect to recruit the best students seeking university entrance. Conversely departments with a poor grade will be forced to accept students with very much poorer school-leaving qualifications. Effectively these departments will become teaching departments and as a result their chances of recovering a research rating will diminish over the years.

Staff in all departments will be spending an increasingly large fraction of their limited research time, as April 1996 approaches, in the preparation of their research profiles.

Departmental administrators will find that their administrative burdens increase dramatically. Members of assessment panels are already viewing April 1996 as a period of frantic activity. Many people wonder if there might be a more effective way of determining the quantity and quality of research activity.

Naturally there is considerable interest in the UK at present the lead times prior to publication. Editors of research journals are receiving plaintive phone calls from authors as to the status of the journal, the quality of the refereeing procedures and anxious as to the progress of their papers. In some cases departments are *buying-in* new staff who are in the happy position of having an excellent research record in terms of papers published and research funds achieved over the preceding three-year period.

Teaching Assessment Exercise

In parallel with the research assessment exercise comes a teaching assessment. Here emphasis is on every aspect of teaching performance, not least as determined by staff assessment. Once more the exercise is most time consuming but again a good rating is essential for future success.

Perhaps a personal note is in order. When teaching assessment was introduced in my own Department of Electrical Engineering at UMIST, I was given responsibility for assessing the quality of lectures given by younger colleagues in order to assist them when decisions are made as to their possible promotion. I was impressed with the professional approach of my colleagues. Lectures were well prepared and delivered, often to very large classes approaching 200 in number. Perhaps my only general criticism would be that while the lectures are full of relevant facts, they are perhaps too closely geared to manufacturers' specific products.

Curriculum Developments

Space considerations allow mention of only a couple of topics. However these may be considered representative of current attitudes. Further coverage will be found in Reference 2.

One of the most controversial changes imposed on the universities is modularisation of courses. The intention is to make for greater flexibility which will permit students to move from one university to another, and to select a range of topics which are attractive to the individual. While this approach might well be suitable for arts-based courses, the same is far from true with engineering. Proficiency in mathematics, for example, is a prerequisite for most science and engineering-based courses. In some cases modularisation permits students in say electrical engineering to take a substantial fraction of courses offered by a department of computation. Often such arrangements are formalised and run in parallel with the mainstream electrical and computation courses. While there is merit in such cooperation, the result is often a totally inflexible timetable for both the participating departments.

Semesterisation has also been adopted within the UK University system, again at the behest of government. Two semesters replace the traditional three terms. A little extra teaching time is achieved as a result. Fears are expressed that the semester notion might be extended to a three semester system for some departments with the consequence of year round-teaching and the award of a degree after only two years. Such a course of action would be most distressing to our European Community (EC) partners.

The Future

The expectation is that the result of the new situation in the UK university system will be a three tier system with perhaps eight or so universities in the super-league and well endowed as teaching and research institutions attracting the best undergraduate and graduate students from all over the world. The second rank will have limited research funding while

the third group will be teaching institutions. The position will be similar to that in say the USA where the best universities have a world-wide reputation while some universities scarcely rank. Other countries, with notable exceptions, seem to be following a similar route. Is this the best way forward?

References

- [1] Lord Robbins, Report on Higher Education. London. HMSO (1963).
- [2] Hartley, M.G., Developments in UK Engineering Education: What Relevance for members of AEESEAP? AEESEAP Conference. Christchurch, New Zealand (1991).

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AUSTRALASIAN WOMEN IN ENGINEERING FORUM

The Second Australasian Women in Engineering Forum, to be held on Saturday 9 December 1995 at RMIT, aims to present, debate and discuss aspects of the engineering culture which affect the number of women entering, and the subsequent number of women remaining in, engineering. As such, it will consider many aspects of both the education and the careers of women engineers. Topics that will be addressed include:

- * Management practices for a better workplace.
- * Strategies for career development.
- * Gender inclusive curriculum and teaching.
- * Equal opportunity and affirmative action.
- * Issues for women academics and students.
- * Women in engineering programs.
- * Engineering and familial responsibilities.

The Forum brings together a diverse range of people and perspectives and is open to all interested women and men. For further information, contact Wendy Smith, Tel: (03) 9905 4976, Fax: (03) 9905 5033, email: wendy.smith@eng.monash.edu.au.

3RD EAST-WEST CONGRESS ON ENGINEERING EDUCATION

The 3rd East-West Congress on Engineering Education under the theme *Re-vitalising Academia/Industry Links* will be held in Gdynia, Poland from 16-20 September 1996 with the AAEE as a co-sponsor. This Congress is a follow-up to the extremely successful 1st and 2nd East-West Congresses on Engineering Education held in Cracow, Poland in 1991 and in Lodz, Poland in 1993, and it is hoped that the Congress will raise the profile of engineering education on a worldwide basis.

The Congress is organised jointly by engineers and educators representing Australia and Poland, and is sponsored by the UNESCO Supported International Centre for Engineering Education (USICEE) at Monash University, the Australasian Association for Engineering Education (AAEE) and the International Liaison Group for Engineering Education (ILG-EE).

The objective of the Congress is to bring together educators from east and west to continue the dialogue about common problems in engineering education in the context of rapidly changing technology, to discuss the need for research on methodology and curriculum development, and to foster the links, collaboration and friendships established during the previous East-West Congresses on Engineering Education.

The theme *Re-vitalising Academia/Industry Links* has been chosen to emphasise the importance of systematic and comprehensive collaboration between the two parties in engineering education and industrial training. The emerging new industry of a market driven economy in a post-centralised system has a special role to play in the process of modernisation of education institutions. Suggested topics for Congress papers include, but are not limited to, the following areas:

A wide range of activities is envisaged for the social and accompanying persons programs. The highlights of the Congress attractions are a half-day Baltic Sea cruise on *Dar Młodzieży* and an excursion to a medieval castle of the knights of Teutonic Order in Malbork.

An initial circular about the Congress has been widely distributed inviting potential participants to submit abstracts by 20 December 1995. The USICEE is a Congress co-sponsor and all interested should contact the Centre for further information.

USICEE UPDATE

AJEE on the Internet

The Australian Vice Chancellors Committee has awarded Monash University a grant to investigate the electronic publishing of technical journals. A project committee involving Monash University Library, the Unit of Medical Informatics and USICEE has been set up and the *Australasian Journal of Engineering Education* has been selected for this research. As a result, a full electronic version of the journal (Vol.6, No.1) has been produced and is currently available on the Internet. The address of the first electronic issue of the journal on the World Wide Web is: <http://elecpress.lib.monash.edu.au/ajee/>

We are seeking reader reaction to the electronic version and have circulated a questionnaire (both electronically and in hard copy) with the issue.

Australasian Association for Engineering Education

The 7th Annual Convention and Conference, under the theme, *Internationalisation of Engineering Education*, will be held at The University of Melbourne from 10 to 13 December 1995. Further information is available from the Conference Secretariat, c/o USICEE.

International news

A further four co-operative agreements (bringing the total to 11) have been signed between USICEE and academic organisations in Germany, Italy, Pakistan and Ukraine.

The USICEE Director, A/Prof. Zenon Pudlowski has been appointed Honorary Dean of the English Engineering Faculty at Donetsk State Technical University in the Ukraine. This appointment follows the successful operation of the International Faculty of Engineering at the Technical University of Lodz, Poland, of which he has been Foundation Dean and Professor (in absentia) since 1992.

Cross-cultural workshops and seminars

In September, USICEE conducted a seminar for technical personnel on *Cross-cultural Negotiation Skills, Case Study Vietnam*. The aim of the seminar was to assist the development of communication skills critical for completing successful business negotiations in Vietnam.

This was followed by a workshop entitled *Interviewing Across Cultures*, which helped

participants to identify professional staff with appropriate skills to access target markets for the expansion of their business.

It is anticipated that further workshops and seminars on related themes will be held in the next few months.

1995 Engineering Excellence Awards

USICEE submitted an entry for this years Engineering Excellence Awards sponsored by IEAust. Over 100 entries were submitted, of which 15 were selected by the IEAust judging panel to be worthy of Excellence Awards, with 23 projects being Highly Commended. Although the Centre was not amongst these, it was successful in being shortlisted for an award, a considerable achievement in itself.

Central European Project

In September, 30 libraries within academic institutions in the Czech Republic, Slovakia and Poland, were sent publications and literature relating to engineering education. This is another phase completed in USICEE's APTEA HOM project, whereby expertise in engineering education is shared with other countries developing engineering education. So far, each of these libraries has received publications worth more than \$3000.

USICEE is also currently collecting data to expand the project to include eight other Central and Eastern European countries. Albania, Bulgaria, Estonia, Hungary, Latvia, Lithuania, Romania and Macedonia will be the next countries to benefit from this initiative.

Open Day

USICEE joined with Electrical & Computer Systems Engineering for an Open Day display. Professor Fred Symons and Ms Linda Wilkins of Department of Electrical and Computer Systems Engineering (ECSE) at Monash University designed a display, *Teaching and Learning Styles in Engineering Education*, whereby visitors could answer a computer based *Learning Type Measure*. This provided a profile of their learning preferences, together with comments on their learning strengths, and made suggestions concerning activities and approaches that could be adopted to strengthen weaknesses.

USICEE publications were on display and visitors could take a computer-based aptitude test on their suitability for electrical engineering. Ms Sophia Paffrath of the USICEE supervised the Centre activities.

USICEE Women in Engineering Education Scheme

Recognising the under-representation of women on academic staff of engineering faculties worldwide, USICEE has established a scholarship scheme. The *USICEE Women in Engineering Education Scheme* is offering research scholarships in engineering education leading to the award of the degree of Master of Engineering Science by research, in the first instance. Possibilities will exist to continue exceptional research projects which then would lead to the award of the degree of Doctor of Philosophy.

In the program, particular emphasis will be placed on research into human aspects of engineering, engineering pedagogy, training methodologies in engineering, educational technology, multimedia and computer-aided engineering education.

At this stage, the scheme provides two scholarships for women in 1996, each up to \$20,000 per annum tax free, for an exceptional candidate with a first class honours degree. The possibility of extension of these scholarships for future years is subject to the availability of funds.

Applications close on 1 December 1995. Further details and application forms are available from the USICEE.

Electronic mailing lists

The Centre runs several electronic mailing lists for the benefit of the engineering educational community: The most recent addition is the APHEN-EE list. APHEN-EE is the *Engineering Education Sub-network* run by this Centre. The list is open to all those interested in engineering education.

- * AAEE - The Australasian Association for Engineering Education
- * USICEE - The Centre's Newsletter
- * APHEN-EE - Asia-Pacific Higher Education Network - Engineering Education
- * CBLG - Computer Based Learning Group
- * PBL-LIST - Problem Based Learning
- * HYDROLOGY - Australian hydrology
- * MATHCAD - Use of the Mathcad program

You may subscribe to any of these by simply sending a one line e-mail message of: subscribe *listname* to MAJORDOMO@eng.monash.edu.au, where *listname* is one of the list names from above. Thereafter, send messages to other people on the list by sending to *listname*@eng.monash.edu.au, eg USICEE@eng.monash.edu.au.

Should you wish to unsubscribe yourself at a later date, just send a one line message of: unsubscribe *listname* to the MAJORDOMO address (above).

Contact Roger Hadgraft, Associate Director of the Centre about these lists.

MATHEMATICA FUZZY LOGIC PACK



Prof. M. Stachowicz

Mathematics based on classical set theory is only able to describe situations where a sharp boundary distinguishes elements having a certain property from those that do not. In terms of logic, a proposition is either true or false, with nothing in between. More commonly in the real world, however, we have to deal with imprecise situations in which it is difficult to find a boundary between truth and falsehood.

Fuzzy systems are able to deal with vague and ambiguous information that is common in natural language. Since we live in an imprecise and uncertain world, it is pretty certain that fuzzy logic will be an important engineering tool in the next century.

My main idea was to develop a software and the on-line notebooks for fuzzy set theory which could be applied in teaching and researching using elegance of Mathematica, and which could be modified and extended by users familiar with Mathematica. The pack assumes no prior knowledge of fuzzy logic, so both experts and novices can benefit and quickly learn how to build useful, practical fuzzy systems.

The term fuzzy logic is used here in its broad sense and is almost synonymous with fuzzy set theory. The Fuzzy Logic Pack contains a wide variety of functions for creating, working with, and visualizing fuzzy sets and fuzzy relations. Along with a comprehensive collection of fuzzy operations, the pack also includes functions for performing fuzzy arithmetic, fuzzy modeling, and fuzzy logic control. In addition, the pack includes practical, worked examples demonstrating all of the features.

You can acquire the Fuzzy Logic Pack from Wolfram Research in the US at 1-800-441-MATH (6284), email: info@wri.com in Europe, call +44-(0) 1993-8883400, email: info-europe@wri.com in Asia: +81-(0)3-5276-0506, email: info-asia@wri.com

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A CALL FOR RENEWAL OF MEMBERSHIP

The AAEE annual fees have not been changed since the establishment of our Association. The increasing costs of running the AAEE have forced us to increase slightly all membership and subscription fees. In accordance with the AAEE By-laws, the AAEE Executive Committee has decided to increase the AAEE individual membership fee to \$40 from 1996. The increase is only \$5, which does not cover the inflation rate since 1989. IEAust financial members, who have nominated the AAEE as a society of their choice (in the IEAust 1996 membership form), will still enjoy a \$15 subsidy towards their AAEE membership. The AAEE institutional and industry fees have been increased accordingly (see the 1996 Membership/Remittance Form). The AJEE individual and institutional subscription fees have also been increased to \$35 and \$70, respectively.

Association members are kindly asked to renew their membership, and to encourage their colleagues who are not members of the AAEE to join our Association. Although fees are payable by 30 January each year, AAEE members who are corporate members of the IEAust are encouraged to renew their AAEE 1996 membership through the IEAust, using the IEAust's 1996 Subscription Form.

A call for renewal of membership is therefore made and a single-page reminder is included in this issue for those who are not members of the IEAust.

OUR PRESIDENT GAINS ANOTHER TITLE

This northern hemisphere summer, several members of the AAEE attended a number of international conferences and meetings on engineering and engineering education. It is significant that Australians are very well represented at international meetings, and that Australian research and development projects in engineering education have made a strong impact on the international scene.

The highlight of these conferences was the recent 4th World Conference on Engineering Education, held at Minneapolis/St Paul, USA, at which Professor Peter Darvall, Monash University's Deputy Vice-Chancellor and the President of the AAEE, was elected Chairman of the International Liaison Group for Engineering Education (ILG-EE) and Associate Professor Zenon Pudlowski, the 1st Vice-President and Executive Director of the AAEE, was re-elected Secretary.

ILG-EE is a working group on Engineering Education, registered in the UK as a charity organisation. The Group was established in 1989 at the 2nd World Conference on Engineering Education held at the University of Sydney. The main mission of the Group is to foster engineering education worldwide. Many outstanding international engineering educators are members of this Group.

Another coup for Australia, and indeed for Monash University, is that the USICEE has been appointed as the organiser of the 5th World Conference on Engineering Education, to be held in Cracow, Poland, in September 1998. It is envisaged that the 5th World Conference

will be a part of a large Global Congress on Engineering Education organised and coordinated by Australians in Central Europe. The Global Congress will also incorporate the 4th East-West Congress on Engineering Education and a Central and Eastern European Congress of Engineering Deans and Industry Leaders.

A number of regional conferences on engineering education, preceding the Global Congress, is being instigated by the USICEE, and will be held in 1997. The objective of this series is to raise the profile of engineering education in such regions as Africa, South America, Asia and the countries of the former Soviet Union, and to prepare the stage for the Global Congress.



The picture above shows Prof. M. Yadarola, Chairman of the WFEO Committee on Education and Training, addressing participants at the opening ceremony of the UNESCO 1995 International Congress of Engineering Deans and Industry Leaders, held at Monash University last July. Seated are (l-r) A/Prof. Z.J. Pudlowski, Dr I. Mair, Prof. M.L. Brisk, Dr S. Hill, Prof. M.I. Logan, Prof. P. LeP Darvall, Prof. J.M. Simmons, Prof. S. Bordia.

For details of the Association and membership applications write to the Editor:

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Association members and academic institutions are invited to contribute to the Newsletter on matters relating to membership and engineering education.

Send contributions to the Editor at the address above.