AUSTRALASIAN ASSOCIATION FOR ENGINEERING EDUCATION

NEWSLETTER

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Close to 90 papers have been accepted for presentation at the 2nd Annual Convention and Conference of the AAEE. An invitation to attend the Conference, written by Professor Peter LeP Darvall, Conference Chairman, is included overleaf. Picture above shows The University of Sydney's Main Building with its Clock Tower. Sydney University hosts the AAEE headquarters.

This issue is sponsored by ILGEE International Liaison Group on Engineering Education

2ND ANNUAL CONVENTION AND CONFERENCE

under the theme

NEW PATHWAYS AND METHODS IN ENGINEERING EDUCATION

Monash University, 9-11 December 1990

AN INVITATION TO ATTEND THE CONFERENCE

Engineering educators have a noble, difficult and under-funded cause. I believe that they will find inspiration in the sharing of their experiences and ideas at the AAEE Convention and Conference at Monash University. The setting up of the Australasian Association for Engineering Education will prove to be of enormous value to Australia, since the area in which we work is one of national priority.

Ninety papers have so far been received for the Conference on the themes listed in the last Newsletter. In reviewing these papers we have been most impressed with the neatness of concepts and the many demonstrations of thoughtful and innovative responses to the challenges of engineering education, whether in school, at university, or after graduation.

The proceedings volume(s) will be a valuable resource for engineering educators in many fields. Publication of papers in the proceedings will rightly bring credit to the authors in the teaching part of their personal professional profile. This factor will make the AAEE Conference of the same kind of enduring value as technical conferences are. It has been particularly pleasing to have contributions from the armed forces, from industry and from students (*the users*).

The first keynote speaker will be Professor Curtis J. Tompkins, President of the American Society for Engineering Education (ASEE), who will speak about the key issues facing the ASEE and collaboration between ASEE and AAEE. The speaker at the Conference Dinner, to be held on Monday 10 December, will be Dr Mike Sargent, the President of The Institution of Engineers, Australia. There is likely also to be a mystery speaker who is entertaining in a different style.

The Organising Committee is endeavouring to provide an enlivened conference format. Parallel sessions will be necessary since there are so many good papers.

A number of exhibitors of teaching equipment, computer software and hardware, materials and books, will be set up in an area adjacent to where delegates to the Conference will have their morning and afternoon teas. Engineering lecture theatres are even being painted for this conference!

Registration forms have been sent to all Faculties and Schools of Engineering in Australia, and further forms may be obtained by contacting Dr Michael Taylor on (03) 565-4959 or by fax on (03) 565-4944.

We are expecting over 150 registrants. I look forward to seeing many of you there.

Professor Peter LeP Darvall
Dean of Engineering
Monash University
Conference Chairman

Dr Brian Lloyd, Vice-President of the Institution of Engineers, Australia, addressing participants of the 1st Annual Convention and Conference of AAEE. Seated next to Dr Lloyd is the Dean of Engineering at The University of Sydney, Associate Professor John R. Glastonbury. Dr B. Lloyd will be a keynote speaker at the 2nd Annual Convention and Conference of AAEE.

FROM THE PRESIDENT

An issue of immediate and increasing importance to engineering educators is the supply of, and demand for, engineering graduates. If we believe that engineers have an important role to play in the nation's development, then we should be very concerned that there are enough engineers - of the right type - to carry out the needed tasks.

I have had several occasions over the last month or two to look at this question. There were two things that raised my ire. The first was the continuing cry that Australia's ills

could be solved if we only had yet more scientists. The second one was a statement I heard from a Canberra economist that *there is no problem with the supply of engineers because the job advertisements for engineers dropped significantly last month.*

On the other hand, I have been looking at three recent publications. The first was *Labour Market Commentary* for New South Wales (NSW) and Australian Capital Territory (ACT), issued by Department of Employment, Education and Training (DEET). This reviewed the market demands for the 1989-90 year and found that, for the engineering professions, there was essentially a balance between supply and demand. The exceptions were an oversupply of aeronautical engineers, a medium oversupply of new entrant civil engineers, but medium shortages in experienced electronic, mechanical and mining engineers. There was also a medium shortage in new entrant electronic engineers.

Of higher interest was a study by Michael Rice and Brian Lloyd of the EPM Consulting Group called *Professional Engineers in Australia.* This highly recommended study analysed in some detail the development and structure of our current engineering workforce, its training, distribution, composition and age. Some interesting conclusions emerged which differ significantly from other studies, including the CTEC (*William's*) review. Of special interest is the clear trend of changing balance between the different branches of engineering. Such trends will continue.

So what is the importance of all this? It is quite simple. We hear a lot of the need to diversify our economic base, to develop manufacturing industry, to get *smart*, to correct our environmental problems. This is all good stuff and is to be encouraged. But do we have the skilled professionals this will need? Can we create them through education?

Quite bluntly, the answer is NO!

Very few people understand that a university engineering school is a little like a sausage factory requiring, at one end, a suitable and sufficient supply of the raw materials. At the other end, there needs to be a market willing to buy the product types being produced. In the middle are the educators, trying to maximise the quality of education so that progression rates are high and the factory *doesn't become constipated.* What is rarely understood is the very long time constants involved within the factory. One just cannot produce a new *product type* in less than four or five years. We educators are already making decisions which impact on the situation close to the end of this decade, let alone into the next century.

So this brings me to that third publication, *The Supply of People Skilled in Information Technology*, issued last April by the Information Industries Education and Training Foundation. It also should be compulsory reading. One of its most dramatic conclusions is that, in order to satisfy the demand at the end of this decade, Australian higher education institutions will have to graduate THREE TIMES AS MANY ELECTRONICS ENGINEERS PER YEAR AS THEY DO NOW, AND MORE LIKE FIVE TIMES AS MANY INFORMATION SPECIALISTS PER YEAR AS THEY DO NOW!

If your institution is anything like mine, then you realise how impossible this will be within the existing higher education structures and attitudes. Here at The University of Sydney, the faculty's attempts to increase production rates by 50% has to be in the context of no funds up-front for planning, no funds for extra laboratory equipment, no funds to pay market salary loadings necessary to attract and retain good staff, and a rapidly decreasing funding level. The current draft budget for 1991 has a 13% decrease on 1990 in terms of dollars per student! This story can be repeated in many institutions.

As educators, we should be spending much time to address issues like these.

We need to recognise the magnitude of the task required of us. We need to recognise that

it is engineers, not scientists or social scientists, that are needed. We need to recognise that the projected demands are not the same for all branches of engineering.

This brings me to the next phase of study being undertaken by Rice and Lloyd. They are projecting those age profiles I referred to above. They are making reasoned arguments about the potential use of immigration as a source of graduates. They are looking at the demographics of our own children. The university graduates of the year 2010 are already born; we know how many there are likely to be. This work deserves all the support it can get because it is on the basis of facts alone that we will achieve changes in priority.

Our sausage factories are running out of their primary source of supply. We can get technology and design into the schools in a hope to increase the supply marginally. We need to do much more.

We need to look at alternative raw materials. Besides women, we need to look at mature age students, we need to look at bridging courses for those who missed out on physics and maths at school, and we need to look to further and continuing education via satellite, television or whatever, as a means to maximise the supply of required products.

Even more contentiously, we may have to take deliberate action to alter the balance of the product types we produce.

We will certainly need to look outside the current DEET and university attitudes.

If we do not achieve the supply we need, then the long term predictions for Australia are not good. Already, we are on a relative slide in living standards which could only accelerate. We owe it to our children to do all we can - it is in our hands.

Professor Trevor W. Cole
School of Electrical Engineering
The University of Sydney
President of AAEE

The University of Sydney NEWS

September 18, 1990

ENGINEERING EDUCATION JOURNAL

The *Australasian Journal of Engineering Education* (AJEE), a new publication of the Australasian Association for Engineering Education (AAEE), was launched on Wednesday 5 September when those associated with the historic enterprise gathered in the staff room of the School of Electrical Engineering.

This first issue of Volume One of our new journal marks a significant milestone for own Association and for the status of engineering education with Australasia, said Professor Trevor W. Cole of the School of Electrical Engineering and AAEE President. *The AAEE is one year old but already has a strong presence throughout higher education institutions involved in engineering education. AAEE is attracting an increasing number of industrial members as realisation grows within Australasia that only through a skilled workforce and an enhanced program of engineering education and training will we develop those*

wealth-creating industries needed for future stability and a high standard of living. The journal is set to become the key point of reference on matters relating to engineering education in Australasia and South East Asia.

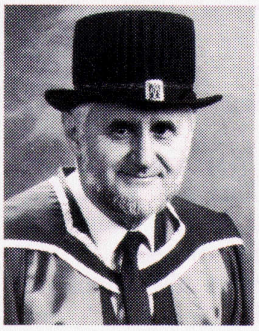
Dr Zenon Pudlowski of the School of Electrical Engineering and Editor-in-Chief of the AJEE stated that the journal would provide an international forum for discussion and a source of information exchange on research and developmental activities in engineering education, with particular emphasis on the improvement of the supply and quality of those engineering skills needed to develop and advance Australasia. *International co-operation and interaction with academics and institutions concerned about engineering education is also an important objective of the AJEE,* he said.

The first issue, supported and sponsored by the Institution of Engineers, Australia, consists of mostly expanded versions of selected papers presented at the first annual convention and conference of AAEE held in December '89 at the University. With the availability of electronic mail communication around Australia and overseas, it has been possible to establish a computerised version of the journal as a new service to AAEE members, according to Dr Pudlowski.

It is planned to produce a special issue of the journal - with selected papers from the AAEE Second Annual Convention and Conference, to be held 9-11 December at Monash University, Melbourne - that will be published before the AAEE Convention. A similar issue is planned for the East-West Congress on Engineering Education to take place 16-20 September 1991 in Cracow, Poland.

The *Journal* has local and international advisory boards. The local board has representatives from New South Wales, South Australia, Queensland, and Victoria. Representatives on the international board are drawn from India, New Zealand, the United Kingdom, the People's Republic of China, Poland, Spain, South Africa, West Germany and Japan.

PRESTIGIOUS AWARD FOR MEMBER OF AAEE EXECUTIVE COMMITTEE



Prof. M. Darveniza

A University of Queensland professor and a member of the Executive Committee of the AAEE has recently received a prestigious honorary science doctorate from a Swedish university.

Professor Mat Darveniza of the Electrical Engineering Department was awarded the degree of Honorary Doctor of Science (Engineering) from Chalmers University of Technology, Gothenburg, Sweden. The University rarely awards honorary science doctorates to non-Swedish academics. Awarding the degree, Chalmers University Rektor Professor Anders Sjöberg described Professor Darveniza as *an expert in modern high voltage engineering and an inspiring teacher and research leader.* Prof. Darveniza was a visiting professor at Chalmers University in 1987.

Professor Darveniza, whose research interests include lightning protection and high voltage and insulation engineering, has written more than 100 scientific and engineering publications.

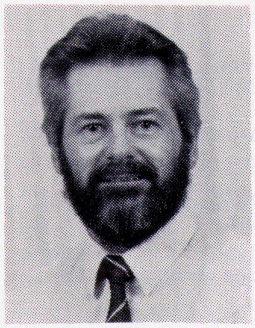
He has had a long association with the Institution of Engineers, Australia, and is a Fellow of the IEAust. He is currently Chairman of the Editorial Panel of the Electrical Engineering College, responsible for IEAust papers submitted for publication in the *Journal of Electrical and Electronic Engineers Australia (JEEEA).*

In addition to being a personal tribute, the award recognises the high calibre of The University of Queensland and its Electrical Engineering Department, Professor Darveniza

said. He believes that the award will help extend co-operative research between Queensland and Sweden.

(Source: Queensland University Press Release
and Electrical Engineering College Technical News Update)

THE LECTURER AS MANAGER OF LEARNING



Dr Robert Clinch

In the lecture theatre, very often, engineering students are formally dispensed information by lecturers. Just as often, lecturers are indifferent to students. Sensing this indifference and emotional distance, many students will, in turn, distance themselves, mentally and physically: no bond of mutual trust develops. Communication is not open and is prone to misinterpretation. This process is counterproductive to healthy learning.

However, a shift in lecturers' attitudes, from lecturer-centred content-based lecturing to that of management of learning processes, could reform all of this.

When learning is viewed in this context, the lecturer takes on a role broader than content expert. The student is viewed holistically. Formal and informal patterns of communications meld. Conscious instruction, teaching and communication are directed toward facilitating the teaching-learning process. The processes involved in learning, as well as the outcomes of learning, assume importance. The stage is set for students not only to attend to, and respond to, learning episodes with commitment, but to value that learning. The path becomes open for enthusiasm and excitement to be experienced, both in teaching and in learning. That elusive concept of a stimulating lecture becomes a reality.

Introduction

Most higher education organisations allow a moderate to high degree of autonomy of lecturers. Concomitantly, the individual faculty member generally has a personal preference for moderate autonomy and selects the higher education environment to satisfy that preference. The four traditional academic roles of teaching, administration, researching and publishing are given priority by individuals, based on the reward structure which they perceive is most beneficial to them personally. Unfortunately it is often the case that the emphasis placed on teaching is less than that placed on research and publishing, because the rewards for researching and publishing are more obvious and tangible.

In a typical interview for a teaching position in engineering, the experience of the lecturer in terms of area of research competence, industrial experience and knowledge of subject content becomes the central focus, rather than the demonstrated ability of the person to teach, manage students' learning or develop their human potential.

In the majority of cases, lecturers of engineering have had little or no formal training in the teaching role. Most of those lecturers have no theoretical basis for any of their classroom teaching strategies. Any teaching skills which they may have gained were probably developed over long periods of time, by trial and error.

At a time when higher education is progressively becoming more accessible to students of highly variable academic backgrounds and abilities, a shift in emphasis toward the concept of management of students' learning could be viewed as a desirable objective. The teacher in the role of manager of learning must develop several foundation skills, the most important of which are the abilities to communicate, manage and enthuse students.

THE INTERNATIONAL LIAISON GROUP ON ENGINEERING EDUCATION (ILG-EE)

The International Liaison Group on Engineering Education (ILG-EE) is an independent Working Group, promoting international activities in the field of engineering education. It is sponsored by international and national organisations and supported by member countries with active programs in engineering education.

Objectives:–

- To promote the exchange of information and facilitate scientific co-operation among national programs of common interest.
- To propose and co-ordinate the organisation of meetings in the field, in particular international conferences.
- To identify problems of practical interest and stimulate co-ordination of research and developmental efforts.
- To assist members and sponsoring organisations in carrying out activities relevant to their programs.
- To serve as a means of disseminating information on progress to member countries and sponsoring organisations.

Membership

The ILG-EE includes one or two members and one or two alternate members nominated from member organisations and/or individuals who have an interest in engineering education. In nominating members of the ILG-EE and their alternates, organisations or individuals should be guided by the following:–

- Each member and his/her alternate will be a scientist or an engineer, having an active interest in engineering education or having broad responsibilities for programs in this field.
- Each member and his/her alternate may be nominated by an organisation or an individual known to the ILG-EE.
- Each member or his/her alternate may be accompanied by advisers or specialists to any meetings of the ILG-EE.

The ILG-EE may invite to its meetings observers and consultants on an ad-hoc or continuing basis. The nomination of members and alternates is confirmed by the ILG-EE.

Sponsorship:–

- National and international organisations are invited to become sponsors of the ILG-EE. International sponsoring organisations are recognised as international sponsors, national sponsoring organisations as sponsors. Sponsors may apply for membership for a specified term, as approved by the ILG-EE. After acceptance by the ILG-EE as members, they will have voting rights.
- Industrial organisations are invited to become sponsors of the ILG-EE for a specified term, on the basis of support rendered as approved by the ILG-EE. Industrial sponsoring organisations are recognised as industrial sponsors. They may participate in all ILG-EE activities and attend its meetings. They have no voting rights. They may invite observers to participate in activities and meetings of the ILG-EE.

Professor Hugo K. Messerle
Chairman

Dr Zenon J. Pudlowski
Secretary

For further details on membership and sponsorship please contact the AAEE Newsletter Editor.

WORLD CONFERENCE ON ENGINEERING EDUCATION

20-24 September 1992
Portsmouth Polytechnic and University of Surrey
England, United Kingdom

THE CONFERENCE

This major World Conference on Engineering Education, the third in the series, follows the World Conference on Education in Applied Engineering and Engineering Technology, held in Cologne, Federal Republic of Germany, in April 1984, and the World Conference on Engineering Education for Advancing Technology, held at the University of Sydney, Australia, in February 1989. It is organised by Portsmouth Polytechnic in partnership with the University of Surrey, co-sponsored by the Société Européenne Pour La Formation des Ingénieurs (SEFI), and will be a joint event integrating with the SEFI Annual Conference.
The Conference is supported by the **International Liaison Group on Engineering Education (ILG-EE)**, the British National Committee for International Engineering Affairs, the European Commission, the Fellowship of Engineering, the Engineering Council, other international professional bodies and institutions, and substantial industrial organisations.

AIMS

The main and central theme of the Conference will be Engineering Education for the 21st Century. Within this central theme the main objective will be that of sharing experiences and ideas within the international engineering community to prepare engineering educators for the future of increasingly complex and sophisticated technology with likely diminishing resources. In particular, the Conference will address the following general important issues:–

- The shortfall in recruitment of engineers for industry that is currently affecting both the developed and developing world.
- The importance of enterprise, both as a component in the formation of engineers and as an aspect of the implementation and presentation of engineering education; strengthening the interaction between industry and academia to enhance engineering education.
- Consideration of developments in the European Community (particularly in view of the significance of 1992), the integration of Eastern Europe and the likely influence on engineering education in Europe.
- Differences between engineering education in the developed and developing world and the importance of strategic interaction.
- The necessity to change international attitudes towards engineering education and strive to extend the general awareness amongst the overall world population of the significance of engineering and its relevance to society, quality of life and economic growth.

For further information of the Conference write to the Conference Chairman:

Eur Ing Prof. Terry Duggan
World Conference on Engineering Education
Faculty of Engineering
Portsmouth Polytechnic
Anglesea Road, PORTSMOUTH PO1 3DJ
England, United Kingdom

Communication in Teaching and Learning

There are many ways to teach and bring about learning, but teaching in engineering is most often conducted as lecturing, in the style of a formal dispensing of information, often referred to as the *stand and deliver* style. In this style, communication is one way. In fact it is not true communication, it is simply a one way transmission of a series of messages, because an important component of communication is missing: the component of *feedback*. This is not a facilitative communication mode, and it can lead to misinterpretation.

In some cases in this style, the lecturer is indifferent to students, often as a result of large classes and lecture theatres which reinforce emotional distance and lack of interest. The lecturer rarely makes eye contact, except perhaps with students in the first row. There is often a distinct lack of interpersonal warmth. The ambience is not conducive to effective communication: it is, in fact, an unfriendly, even hostile, communication environment. In this atmosphere, students feel it would make little difference to the lecturer whether they attended or not, and often they do not.

Unfortunately, some students in this environment will perceive the lecturer as an adversary and give messages to this effect, ranging from subtle to blunt. The lecturer, untrained in terms of effective communication with large groups, may pick up on those cues and begin to view all students as a potentially threatening mob. Non-verbal messages given by the lecturer in the survival mode are often different from verbal messages. In this atmosphere, the lecturer's prime concerns are to do with credibility, control and survival. Sometimes survival is the paramount concern. A situation of conflict develops.

Some lecturers overcome this by behaving in a strictly clinical way, for example by eliminating any sign of emotion. Some go so far as to show deliberate disdain for students. It may be an effective way to survive, but it certainly is not conducive to human development, for either students or the lecturer. There is a loss of enjoyment of the learning process on the part of students, a loss of commitment and job satisfaction on the part of the lecturer, and, worst of all, an acceptance of a dysfunctional mode as the norm.

Lecturers who are aware of their total self in terms of verbal and non-verbal communication work to establish an emotional climate of trust and comfort. Usually such lecturers will go into the teaching-learning session thinking as much about what the students will be doing and how students will be genuinely involved in the interaction during the session, as much as what they, the lecturer, will be doing and saying. The skill of getting students involved in the teaching-learning session is one that can be developed fairly readily, and there are well-tested communication principles which can be used in such development.

A basic working knowledge of simple interpersonal techniques such as transactional analysis, non-directive communication and the facilitative conditions of accurate empathy, true warmth and concreteness is extremely helpful. There are many popular books which cover these concepts, and are easily available. In addition, these concepts and the attendant techniques are invaluable when advising students.

One of the most obvious and effective ways to involve students is to address them individually, make eye contact, ask questions often and check constantly for understanding. There are techniques for asking questions in such a way as to elicit full participation of students. Students readily respond to personal recognition (as we all do), and liberal sprinklings of warm personal interaction will enhance the educational experience. This process is best begun from the first day of classes, encouraging questions from students, being supportive of their contributions, and, most importantly, developing trust. In this way students realise they will not be humiliated if they ask for clarification. Also, it is beneficial to all when students can, for example, with confidence indicate mistakes in a lecturer's line of instructional development.

In a climate of mutual trust, students will become supportive of the lecturer and of each other. It is a case of the lecturer being more than a good person; it is a case of being a purposive communicator, both verbally and non-verbally; it is a case of being an effective manager of groups and individuals.

Management of Students' Learning

The real challenge in education is to bring students to a stage where they can learn for themselves. They must learn how to learn, and it is the educator's task to establish the conditions to bring this about. That is, the teacher must manage learning in a way which is process-oriented as well as content-oriented. In order to do this, the teacher must have an educationally sound view of the process of learning and recognise that students have different learning styles.

In the management of this learning environment, the student is viewed as a complete person, not just as a *mind.* It is for this reason that individual diagnosis of, and prescription for, students' learning is important. An effective educator will find out something of the previous academic experiences and accomplishments of the individual learner and be cognisant of these when designing or introducing new learning experiences. Also, it is possible to have students demonstrate competency and *test out* of units in a subject as a matter of course.

Learning and the demonstration of competence does not need to be tied to the lecturer dispensing information and conducting a summative final written examination. There are many ways in which learners can learn and be assessed. For example, individual learning contracts can be set up with students; they do not have to track through the same learning path.

Getting Students Enthused

No matter what teaching-learning strategy has been selected for a particular learning episode (whether individual face-to-face, in small groups or large groups or by the use of any of a large range of media, including print), an effective teacher first establishes conditions for a student to attend to the episode, respond to it and value it.

As a manager of learning, an effective teacher develops a management leadership style which, to be effective, should transform students. This transformational style of leadership is one where the teacher not only recognises the goals and tasks of learning and the needs of students to attain these goals, but develops in students the motive to succeed. A knowledge of the principles involved in achievement motive can help a teacher to develop the capacity to inspire students and create enthusiasm for learning.

Students can develop an achievement motive if they are helped to recognise that they will have, among other thoughts, feelings of failure and success. When a student can establish a balance between these feelings, that student is better prepared to cope with the demands of coursework. Most often this process occurs when a student *weathers* several semesters and learns by experience. However, the process can be accelerated by the teacher consciously addressing the process, making sure students are cognisant of it and giving timely, effective and reinforcing feedback.

It should not be taken for granted that a student will, without guidance, develop an awareness, be willing to receive, and develop a controlled or selected attention to a learning episode. These factors, or objectives, are significant, and should be deliberately addressed.

As a first step, a teacher should establish conditions to enable students to develop that awareness, reception and attention. It may not be easy to arrange, but it is an extremely important beginning. If a communication pattern is developed which is open, mutual trust

will develop. The task is not a difficult one, but it has to be consciously addressed.

In the next step, a teacher establishes conditions for the student to respond, not just in a compliant way, but to exhibit a willingness to respond, and, furthermore, to gain satisfaction from responding. Again, the open, supportive communication model is essential for this to come about. The emotional factor of a student gaining enjoyment from responding is of great importance. When a student takes pleasure in responding to a learning episode, the next step is a small one for a teacher to arrange. It may evolve naturally or it may need a modicum of teacher prompting or facilitating.

In that third step, the student values the learning episode; that is, the student develops an emotional acceptance of a proposition or body of knowledge, develops a preference for it and develops a conviction or commitment toward it. In time, that student may go on to increase involvement with it, or even consider the possibility of developing it further. This can extend to an internalisation of values which eventually becomes organised into a consistent system or philosophy of life for the individual student.

During the time this attending, responding and valuing is going on in the learning episode, the student is, of course, learning the body of knowledge in the area of the discipline. However, in emotional terms (or affect) these are the essential elements which lead a student to experience joy, enthusiasm and excitement in learning.

Conclusion

In a climate where there is obvious enthusiasm for learning, and students are excited about what they are doing, teaching-learning episodes can be very enjoyable. When the role of the teacher of engineering is viewed as that of a manager of learning and of human resources, the student, rather than the teacher is the star player and students are viewed holistically as workers ultimately responsible for their own active, rather than passive, learning.

Dr Robert Clinch
Associate Dean
School of Engineering
University College of Central Queensland
Executive Committee Member of AAEE

AAEE ESTABLISHES CONTACTS WITH ASEE

The recent visit to Australia by Professor Virgil W. Snyder, of Michigan Technological University, who is one of the directors of the American Society for Engineering Education (ASEE), starts a new era for our Association. Prof. Snyder and AAEE Executive Director, Dr Z.J. Pudlowski discussed a number of important topics of mutual interest. These included key issues such as collaboration, communication and co-ordination between AAEE and ASEE, regarding future activities and possible joint ventures in engineering education.

It has been suggested that the first step in establishing future contacts should be to exchange representatives who would inform their counterparts about their own associations. President of the ASEE, Professor Curtis J. Tompkins of West Virginia University (WVU) has accepted our invitation to address the 2nd Annual Convention and Conference at Monash University, in Victoria. Prof. Tompkins is the Dean of Engineering at WVU and is active in the Engineering Directorate of the National Science Foundation. He was co-founder and Director of Health Resource Corporation, Resource Management Corporation and Snow Products. It is expected that Prof. Tompkins will speak about major issues facing the ASEE and future co-operation between the two societies.

Professor Tompkins also has accepted an invitation to visit the Faculty of Engineering, at

the University of Sydney, where he will speak about world-wide collaboration on engineering education. He will give his lecture on Friday, December 7, 1990 at 12 noon in lecture theatre 450 at the School of Electrical Engineering (building JO3). All are cordially welcome.

MIXED FORTUNES IN AAEE MEMBERSHIP

With the end of year approaching and the short time span between the publication of the AAEE Newsletter, Vol.2, No.3, and this issue, the number of new members is low. However, existing members who owed late fees for 1990 have affirmed their commitment and support to our worthwhile Association by submitting their membership payment.

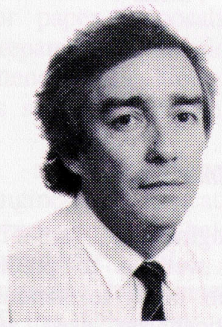
Overall, our financial situation is very good. We have enjoyed continuous support and sponsorship by the Institution of Engineers, Australia, and such generous industrial organisations as Telecom Network Engineering and BHP Engineering. Therefore, the Executive Committee will not be seeking a raise in membership fees for 1991. Despite the fact that the AAEE is not growing in number, by as much as it was anticipated initially, the quality of our members is very much appreciated. Membership includes over 60 professors, who represent respectable and renowned tertiary education institutions in Australia.

In this issue we feature **Professor John M. Simmons** and **Professor Paul F. Greenfield**, distinguished academics from The University of Queensland.

Professor John M. Simmons was last month appointed Dean of the Faculty of Engineering at the University of Queensland. He studied at The University of Sydney and was awarded a BSc degree in 1960 in Mathematics and Science, a BE with 1st Class Honours in Mechanical Engineering in 1963, and a PhD in 1967.

After obtaining his doctorate, Prof. Simmons worked as a Senior Dynamics Engineer for the Lockheed Aircraft Company in Atlanta, Georgia, USA. In 1969 he was appointed as Adjunct Professor at the Georgia Institute of Technology. In 1970 Prof. Simmons returned to Australia as a lecturer in the School of Mechanical and Industrial Engineering at the University of New South Wales, and in 1972 joined The University of Queensland as a Senior Lecturer in the Department of Mechanical Engineering. He was promoted to Reader in 1981.

Prof. Simmons has extensive research and teaching experience in the fields of fluid mechanics, vibration and control, aeroelasticity, hypersonics and spacecraft dynamics. He is a past chairman of the IEAust National Committee on Applied Mechanics and was founder and first chairman of the National Committee on Space Engineering. Prof. Simmons has played a significant role through the IEAust in initiating, developing and promoting the Cape York Spaceport project.



Paul F. Greenfield is currently Professor and Head of the Department of Chemical Engineering, University of Queensland. He is also the deputy director of both the Centre for Molecular Biology and Biotechnology, and the Technology Management Centre at the University. He gained his undergraduate degree in Chemical Engineering from the University of New South Wales in 1969, his PhD (also from UNSW) in 1973, and a Bachelor of Economics degree from Queensland in 1981. Prof. Greenfield has wide university, industrial and research experience. He has worked at the University of Massachusetts and the University of Minnesota, as well as a number of Australian companies.

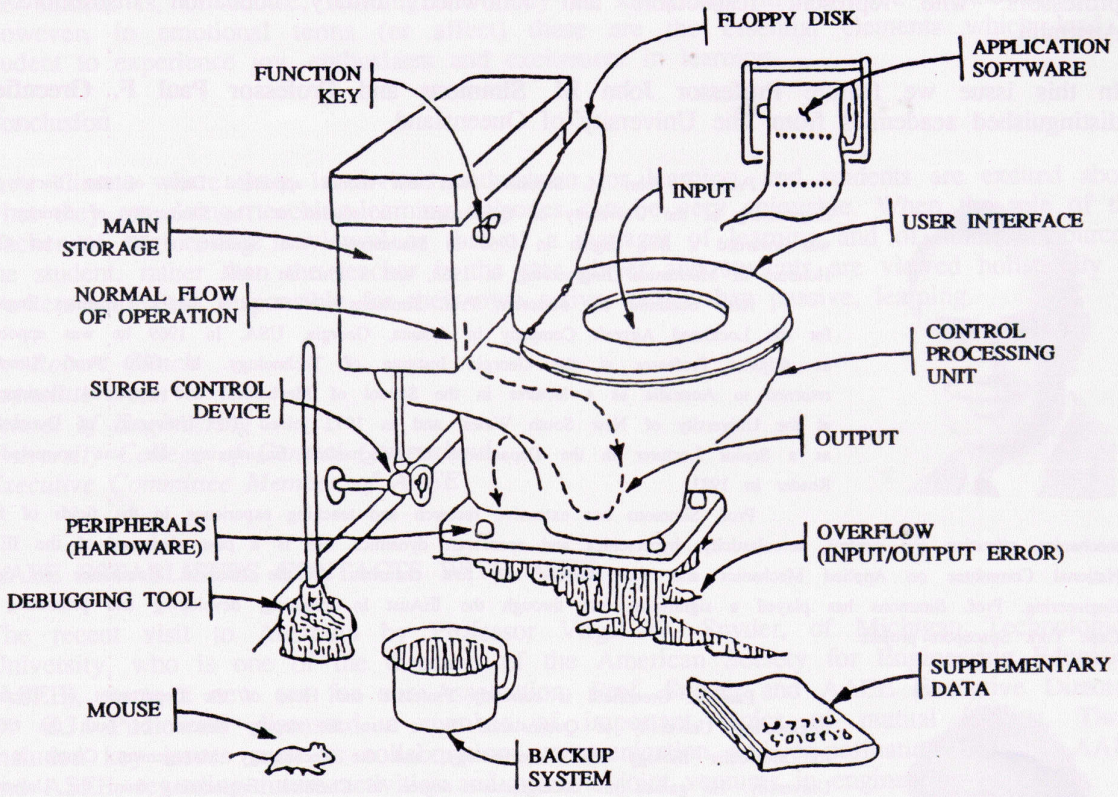
Prof. Greenfield consults in the areas of biochemical engineering, wastewater treatment and waste management, and economic evaluation of projects, and has been awarded grants totalling $2 million from government and industrial sources. He is a member of the Scientific Industries Steering Committee within the Commonwealth Department of Industry, Technology and Commerce. He is also Chairman of the National Committee on Biological Process Engineering.

Prof. Greenfield is currently on the editorial boards of four international journals - Biocatalysis, Environmental Technology, Asian Environment, and Biochemical Engineering Journal, and has published over 200 journal and conference articles.

TECHNOLOGICAL AWARENESS IN THE COMMUNITY

Much concern has been expressed about the attitudes of Australians toward technology and technological advances that have taken place in recent years. It is now a truism to say that technology, which lately has been described not as science, mathematics or physics, but as the knowledge, skills and attitudes which human beings need to be able to produce goods and services, will have a decisive impact on the future well-being of Australia. Technological advances such as those that have occurred in recent years require a broadening of technological content in the Australian educational system. Society needs to be prepared for a future rapid technological change. One way to improve this is to raise technological awareness in the community and to devise and develop a comprehensive training system that can introduce and teach a new technological programme for primary and secondary education in Australia.

UNDERSTANDING THE TECHNOLOGY



An (unknown) artist's impression of the present understanding of modern-time technology.

Attempts have been made by the Warren Centre for Advanced Engineering, at The University of Sydney, to identify attitudes and establish basic issues, as well as to predict the medium-term outlook of the Australian economy and work practices in order to increase our children's social and practical knowledge on how goods and services are used and produced. A project on *Preparing Australians for a future with technology, Future Directions in Engineering* was completed in October 1988. Over 60 individuals, representing academia, schools, industry and commerce worked on the project under the leadership of Dr Peter Miller.

The project has stimulated a number of actions which may have important implications for the Australian educational system. Several recommendations were made in the project report, with one of them being to establish technology and engineering teachers' training. Now a number of universities in Australia have looked at the possibility of establishing courses for technology teachers' training.

The New South Wales Educational and Training Foundation recently awarded the Centre for the Advancement of Engineering Education and Training within the School of Electrical Engineering at The University of Sydney a grant of $A947,000 for a project on Continuing Engineering Education for Electrical Technology. To prepare training programmes for engineering teachers and to deliver relevant educational courses is one of the objectives of this project. The project enjoys strong support from key industry organisations such as Telecom Australia, BHP Engineering, OTC Limited, the Electricity Commission of NSW and the Sydney City Council. It is envisaged that activities relating to the development of training programmes for engineering teachers will commence in the beginning of 1991. Any person or institution interested in contributing to this particular activity should contact the Newsletter Editor.

A paper on *Engineering Teachers' Training in Australia - Proposed Programmes and Structures* will be included in the *Australasian Journal of Engineering Education*, Vol.1, No.2, with the objective of evoking useful discussion and eliciting important information from teachers, academics and industry leaders interested in this project.

EAST-WEST CONGRESS ON ENGINEERING EDUCATION DRAWS EXCELLENT RESPONSE

September 30, 1991, was the deadline for submission of abstracts for the East-West Congress on Engineering Education, to be held at Jagiellonian University in Cracow, Poland, in September 1991. The response to the call for papers, circulated in April and May this year, has been excellent, with over 170 paper proposals received from 30 countries world-wide. Most of the proposed papers involve joint authorship so that over 250 persons are included in the list of authors and co-authors. In addition, more than 100 individuals have so far expressed an interest in attending the Congress so far. This gives the potential involvement of over 350 persons from 40 countries. It should be mentioned that late abstracts are still coming in.

As with the excellent response to the call for papers for the 2nd Annual Convention and Conference of AAEE, the response of Australians to the call for papers for the Congress call may be regarded as excellent, with over 30 abstracts having been received. A few additional papers have been promised by members of the Program Committee. The deadline for paper proposals has passed, but the Program Committee operates in Australia and is prepared to consider interesting abstracts as they come in. Persons who contemplate attending the Congress and who still intend to submit their abstracts are advised to do so as soon as possible.

A special arrangement has been finalised to link the International Association for Engineering Education (IGIP) 1991 annual symposium, called *Engineering Education '91*, which will be held at the Dresden University of Technology (see details in the AAEE Newsletter, Vol.2, No.3) with the East-West Congress. Apart from mutual assistance in preparing both meetings, it is anticipated that the President of IGIP, Professor A. Melezinek of the University of Klagenfurt, Austria, and IGIP symposium Chairman, Prorektor of the Dresden University of Technology, Professor G. Lehmann, will address Congress participants in Cracow.

Interested parties are reminded that a special issue of the *Australasian Journal of Engineering Education* (AJEE), with selected papers, will appear before the Congress.

Authors are cordially invited to submit an expanded version of their Congress papers, to be considered for publication in this special issue. In preparing and submitting such an article authors must follow the ***Notes for Contributors*** which are included in the enclosed Journal brochure. It is the policy of the AJEE, while ensuring a high standard of articles, to give preference to those authors who are members of the Australasian Association for Engineering Education, or are Journal subscribers. Potential contributors may wish to consider joining the association or subscribing to the AJEE. Submit articles to the Journal Editor-in-Chief no later than by February 28, 1991.

Tourists enjoy the beauty of the Marketplace in the Centre of Cracow's Old Town. Cracow will host the 4th Meeting if the International Liaison Group on Engineering Education in September 1991.

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

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Association members and tertiary 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.