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# Student-Organised Research Conferences as a Medium for Research Capacity Building\*

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In the article, the authors present evidence that student-led research conferences have perceived benefits. In the short-term, they provide a forum for students to network, exchange ideas, critique and reflect on others' and their own work, as well as facilitate growth personally and academically. Students also leave the conferences motivated to reconsider their own work in the light of feedback and as a result of the work of others. They appear to expand their domain of possibility regarding the nature, form, content and style of research. Networks are established that, under normal circumstances, would not otherwise occur. This tends to break the isolation that is often experienced by postgraduate students. Student-led conferences serve to strengthen inter-institutional collaboration, increase publication records, and develop processes to ensure equity and career path enhancement, especially for women. In order to achieve this development even further, it is suggested that consideration be given to three key factors, namely: sustainability, institutional financial commitment and inter-institutional student coordination.

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## INTRODUCTION AND BACKGROUND

Stenhouse stated that *Research is systematic enquiry made public* [1]. One of the functions of technikons and universities is to train individuals to a high level in the professions – for example as teachers, doctors, lawyers, entrepreneurs, engineers, and so on. Thus, just as commerce and businesses invest in higher education, so too might the practitioners of these professions. While the government is empathetic to the cause and, in principle, agrees with the sentiment of investing in higher education, it is also obliged to lay its emphases in other areas of society, such as roads and transportation, housing and schools.

In the last Century, the World Bank was persuaded to invest in primary and secondary education. Currently, it is revising this decision and is now focusing

on higher education where knowledge can be applied to social development [2].

In order to become more knowledge-developed, South Africa must also invest in technology and scientific discovery. This raises two questions, namely:

- Where will knowledge be produced?
- Where will human capital be developed?

One obvious context is institutions of higher education, where at least 85% of produced knowledge emanates. Research is the key vehicle by which this output is reached and maintained.

In considering research output and research capacity building, South Africa is succeeding adequately neither qualitatively nor quantitatively. During 1990, for example, people over the age of 50 years produced 18% of South Africa's new knowledge. By 1998, this figure had increased to 45% [3]. However, the profile of these researchers is instructive because, when these figures were disaggregated according to race and gender, what emerged was a picture that was very heavily skewed in favour of white males,

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who produced 80% of all South African publications. Women produced only 10% of publications and, within this small margin, a mere 8% were black women. So, while there may have been an emphasis on knowledge production, there has not been a systematic plan to develop research capacity, both at the level of faculty (especially female) and student.

In earlier years, it was the universities, not the technikons, that conducted research. This was because, it was assumed, the production of knowledge was a core responsibility of universities. In the production of new knowledge, universities generally operated within a Mode 1 epistemology of learning, ie learning that is factual, systematic, explicit, objective, codified, fragmenting into more specialisations, reductionist, orderly, empirical, establishment-minded, context-independent, theory-bound, authoritarian, impersonal, universal and trans-cultural. More recently though, universities have moved to Mode 2 epistemological approaches in which learning is conceived and assumed to be holistic, context-driven, mission-oriented, multi-authored, heterogeneous, divergent, reflexive, personalised, insecure, entrepreneurial and workable [4]. Within the latter epistemological approach, independent systematic inquiry is fore-grounded and privileged, an approach that provides the natural ground for research capacity building and a levelling of the playing fields.

In order to facilitate research capacity building, research students have to move beyond the confines of the lecture room in order to actively *engage* in conducting, analysing and writing up research. Developing research is about *creativity* coupled with *capabilities and limitations of research*. Often, the social relevance of research is not easily recognised, yet students must learn how to do it because, while it may not have an immediate impact, it may be used to change social practices in the future. By implication, this means *learning to play the game* and doing so by *obeying* the rules. Within the research arena, this means conforming (and this is debatable) to some extent to *rules* that will make one's work understandable and comparable. However, this does not mean that one cannot be creative, controversial, conflictual and/or contradictory in making the rules work. It means presenting (orally and in writing) one's work in a public domain for scrutiny and interrogation within a local, national and international community of scholars who understand the discourse.

It is important, too, that research carried out is comparable in terms of the quality of the output, especially when it is funded. Major research funders, such as the National Research Foundation, use public money and, therefore, have to be accountable for how

it is spent. Such accountability may be measured, among other ways, by the quality of the research conducted and reported. Quality is relative to the context of the research and its purpose, yet there are key performance indicators for evaluating both research quality and research quantity. An example of a quality product is a thesis that, when completed, is externally examined, thereby ensuring some measure of public accountability. An Education Students' Regional Research Conference is another valuable vehicle, whereby novice researchers (students writing dissertations at various levels and various stages) can share their research work in a supportive environment.

It is in this context, and against this background, that education research students at the University of Cape Town assumed the initiative in 2001.

## THE CONTEXT

One of the policies of the University of Cape Town, Cape Town, South Africa, is that Masters students should have opportunities to speak about their research findings and what they have learned through the process of carrying out a research investigation. In the BEd (honours) degree, it is also a requirement of the Research Methods course that students' substantial research investigations be presented in public as reported papers and in other open fora. Such a public forum, in the form of a day conference, had been provided for BEd (honours) and Masters students within the School of Education at the University of Cape Town since 1999. During the initial two years, this process was largely institutional (Department of Education) and staff-driven, with two faculty members taking the leadership in planning, coordinating and organising the day.

However, from 2001, it was decided to extend the invitation to the other four institutions in the Western Cape. This expansion meant an increase in administrative and organisational responsibilities. Since no funds were designated for such tasks, the two members of staff invited students to participate in the planning, organisation and coordination of what has now become an annual two-day inter-institutional conference. Students from across these institutions were invited to facilitate coordination. The result has been three successful and efficiently coordinated annual conferences completely planned and managed by students with their lecturers and supervisors being allocated mostly to the back rows of lecture theatres and seminar rooms, or as assistants to the organising students [5].

Students usually present papers on a wide range

of original educational, scientific and technological investigations, examples of which are listed in Appendix A. The reported work ranges across completed theses, PhD work in progress, Masters dissertation investigations and completed honours research projects.

This article reports on the results of data collected from students on the benefits of student-led conferences in terms of both attendance and organisation from 2001 to 2003.

## AIMS AND OBJECTIVES OF THE CONFERENCE

The aims of the conference were five-fold and sought to provide opportunities for the following:

- Inter-institutional *collaboration, networking* and *information sharing* among students;
- *Presentation* of empirical research work (in progress or complete) by novice and more experienced research students, and learning from each other;
- The beginning or expanding of a *publishing profile* as part of a research publication trajectory;
- *Presentation* of research work succinctly and articulately in a systematic manner, and within a limited time-frame;
- *Entry* into the public educational research arena.

The objectives were as follows:

- Enable enthusiastic education students to present sections of their research investigations publicly and systematically in a supportive, sympathetic, helpful and encouraging environment.
- Provide opportunities for these students to publish their ongoing research findings rapidly in one of three forms, either as an abstract or as a full paper – or even as an entire successful dissertation – as a formal part of acknowledged conference proceedings, *while their research results were still novel*.
- Enable novice education research students to start compiling their own personal CV records of publications and successful conference presentations, and to enable brief details of their published work to appear in the official 2001 and 2002 Annual Research Reports of their respective tertiary institutions.
- Encourage more experienced Doctoral and Masters students to share their research expertise and advice with their younger, eager, honours-level research peers.
- Enable education research students from five

different tertiary institutions to meet each other, establish research linkages, and form life-long friendships as professional educators in the new Century.

- Support the universal notion that a student's research training is not complete until tangible, visible outcomes of publications and public presentations have been attained by the student.
- Enable education research students with scholarships or bursaries to produce visible evidence to their sponsors that they are indeed proceeding positively, with visible and acknowledged accomplishments and outcomes, in their ongoing research studies [6].

## THE NATURE AND ORGANISATION OF THE CONFERENCES

As part of the initial preparation, a first call for abstracts and papers was sent to participating institutions. All participants were requested to send their work electronically. Abstracts, full papers and whole dissertations that were received from students (with supervisors' approval) prior to the conference, were edited by students and published in the conference proceedings. The proceedings were compiled and published just ahead of the conference. Upon registration on the first day of the conference, each student received a hardbound copy of the abstracts. Full papers and whole dissertations were reproduced on diskettes for each student, and these were inserted into the bound copies of the proceedings. This arrangement saved paper and kept the volume of proceedings portable, easily accessible and slim.

Each conference was held over two days and included a keynote address on the evening of the first day, a number of parallel sessions and a closing address at the end of the conference. On each occasion, the keynote address was presented by a prominent researcher based within the host institution. The parallel sessions were planned around cognate topics or disciplinary driven content or concepts. Included in each group were Masters, PhD and BEd (honours) students who were at various levels in the research process. A panel of conference rapporteurs, consisting mainly of faculty from the four visiting institutions, provided an assessment at the end of the conference. Their closing comments included commentary on the quality of presentations (content and form), quality of the organisation of the conference, the challenging issues and current trends and debates within education that emerged during the presentations as well as plans for the way forward. At this point, students were requested to complete evaluation

forms regarding issues outlined in the next section.

Details of the organisation and schedules of the conferences are set out in the published Abstracts and Proceedings of the conferences [6][7].

In 2002, more than 50 education research students from six universities and technikons, representing four continents, published their work as part of the conference proceedings. For most of the participants, this was their first formal publication and conference presentation. A similar-sized pioneering student-led conference had occurred successfully in 2001 in the same venue, and the third education student's regional research conference occurred in 2003. Conference fees for student participants were as follows: in 2001: admission free; in 2002: admission \$4; in 2003: admission \$8.

## METHODOLOGY

It should be noted firstly that a qualitative approach has been used in this article as a methodological framework for generating and analysing post-conference data. Qualitative approaches locate the researcher firmly within the research process and acknowledge the role of researcher subjectivity. Fundamentally, such approaches seek to gain a deep understanding of a phenomenon from an insider perspective and propose to describe and understand rather than explain and predict human behaviour [8]. Key within such approaches is gaining an understanding of individual perspectives and experiences and in understanding the phenomena in natural settings [9][10]. This implies an all-embracing approach that includes a sensitivity to context and process, an inductive approach to analysis, flexibility in research design and a commitment to understand, rather than prove or promote [11].

Secondly, pre-conference and post-conference quantitative data – generated from selected cohorts of UCT honours and Masters students using Likert-type self-rating scales – have been analysed. At specified times during the progress of their research project, students monitored and recorded their self-perceived levels of progress, confidence and support; then released their data voluntarily.

### Site and Samples

At the conclusion of the conferences in 2001 and 2002, post-conference qualitative data was obtained from a total 83 participant students from five different universities and technikons who had presented research papers. Students completed the conference evaluation forms voluntarily. The sample over two years consisted of 47 BEd (honours) degree students

and 36 Masters and Doctoral education students from the five tertiary institutions in the Western Cape. They represented 15 different countries, including Turkey, Japan, Austria, United Kingdom, Canada, Germany and neighbouring regions of southern and equatorial Africa. All were registered students, and were at several postgraduate levels, and at various stages (beginning, fieldwork, writing up, etc) of their research process.

Using 10 Likert scale items, pre-conference quantitative data was also obtained over the two-year period from a total sample of 93 honours and Masters students who were members of preliminary classroom courses in research methods. Of these, a total of 59 students responded to the same Likert items again at the end of their participation in the conference. The remaining 34 students elected not to prepare and present their ongoing research work at the education students' regional research conference that year. All 93 students comprising the 2001/2002 pre-conference sample were registered in different classes at the same university. Hence, the combined pre-conference convenience sample cannot be considered as necessarily representative of education research students from all five tertiary institutions in the Western Cape who arrived subsequently to be active presenters in the September conferences.

At the time of the conference, the honours students had almost completed their yearlong course, and shortly thereafter, they were required to submit their major research project for examination. In September 2001, 27 monitored honours students presented their research papers at the first regional student conference; and a second intake of 20 honours students presented in the following September 2002. The Masters and Doctoral students who presented papers in 2001 and 2002 were at various stages in the completion of their dissertations, and their research investigations ranged from being early in their development to far advanced.

### Data Collection Tools

Two forms of data generation occurred. Qualitative information was gained by asking questions on an open-ended conference programme evaluation form. The participant student presenters were invited to describe and record three benefits that they had derived from actively reporting their investigations at their own regional research conference; they were also asked to offer suggestions for the following year's student-led conference.

The quantitative Likert self-rating scales focused on the following:

- How well students felt their research investigation was releasing and developing their research potential;
- How confident students were about their research investigation;
- How keen students were to seek assistance with their research from other people;
- How much personal encouragement students felt that they needed;
- Students' self-perceived chances of succeeding in research;
- How lucky students felt in doing research;
- Students' willingness to take advantage of opportunities;
- How much students felt they were benefiting from their attempts to conduct a research investigation;
- How happy students felt while undertaking their research project;
- How helpful students' friends had been with their research study.

These criteria were selected and adopted from the findings of several recently reported studies in science and engineering education [12-14].

The presented scales invited students to respond with a self-assessment rating that ranged from 0 (*not at all*) to 5 (*very much*) on the 10 variables. A copy of this data-generating instrument is appended as Appendix B.

Using complete pre-conference data supplied intact by 75 responding students, the Cronbach alpha reliability coefficient of the Likert instrument yielded a value of 0.83.

Using post-conference data supplied intact by 52 out of 59 responding students at the immediate conclusion of the student-led research conferences in 2001 and 2002, the Cronbach alpha reliability coefficient of the Likert instrument was 0.74.

### Data Analysis Technique

Each qualitative evaluation form was numbered and read in order to ascertain what common trends and patterns were emerging. Broad themes were identified and categories were developed as a way of analysing the data. The quantitative data yielded mean scores that were tested for statistically significant differences.

### ANALYSIS OF THE QUALITATIVE FINDINGS

In developing an understanding of the benefits of student-led conferences for this cohort of respondents,

students reported benefits that were analysed in three broad themes. These include personal and individual growth, enhanced group psychosocial dynamics, and research as a public endeavour.

### PERSONAL AND INDIVIDUAL GROWTH

Within this theme, students reported the extent to which participation and sharing across institutions, levels and stages facilitated a deeper understanding of the nature and potential of research, increased inter-institutional personal networking, offered opportunities for emerging reflexive practices, and increased personal growth and development. These were all processes that led to a broadening of their individual horizons and perspectives (academically and personally).

### Widening of Personal Horizons

Students seemed acutely aware of the way in which such a forum created an opportunity for *enhanced networking* and how *meeting new peers* from different universities served as a catalyst to broaden perspectives on the nature, form, style and presentation of research. The following quotations illustrate this:

- *Networking with students and lecturers with similar interests from other universities – as well as contact with differing orientations – broadened my areas of interest, and enabled me to gather literature references.*
- *I found sharing people's struggles with their research helped me to focus and reflect on my own research: getting to meet different people from different disciplines, and talking to them about what they do, and sharing the knowledge of other people's research experiences.*
- *I had a rich learning experience. It opened my sight on how to structure for presentation and assignment purposes. It helped me to acquire and build more information on my research topic.*
- *I developed a new awareness of the interesting work being conducted in and around education.*
- *I gained conceptual enrichment from co-presenters.*

The opportunity also enabled students to gain some perspectives on the potential pitfalls and challenges that can be encountered during the research process, as one student suggests: *I benefited from the*

*contacts and networking with other researchers in regard to methodologies, concerns, pitfalls, etc.*

Students experienced affirmation and an acknowledgement of their personal voice, as the following student's comment indicated:

*Experiencing the different styles of presentation, and areas of interest of the students, reaffirmed that each individual's unique voice can be heard through the medium of research and dissemination.*

Comments were made on how, during presentations, students were exposed to *alternative styles of presentation and different, unfamiliar research methods*, thus creating opportunity to expand notions of what is possible and doable in research (in terms of process, product, form and content).

In this regard students stated that they learned a lot from the presentations attended [1], particularly the different angles of looking at research projects. Comments in this regard include *I valued getting an insight into which kinds of research are being done in the Western Cape and It has been a wonderful experience for me. The academic and human benefits gained are enormous.*

### **Towards Reflexive Practice**

Students seemed to reconsider their own research in the light of the presentations, a process that led them to reflect on their limited understanding of research as an academic endeavour. What emerged from some of the responses, then, was a shift towards some level of reflexivity – albeit surface and elementary. This, students reported, was as a result of two processes, namely that of participating in presenting as well as listening to other presentations. The following comments illustrate students' observations of how, firstly, the presentation process enhanced their thinking and, secondly, how being questioned about their own research made them critical and reflective of their own research:

- *I found sharing people's struggles with their research helped me to focus and reflect on my own research: getting to meet different people from different disciplines, and talking to them about what they do, and sharing the knowledge of other people's research experience.*
- *The questions asked on my presentation helped me to sharpen my research report.*
- *My capacity to critique research, including my own, increased as a result of exposure to*

*different research designs.*

- *This programme actually forced me to look back at the conclusions of my research topic.*
- *Comments and questions on other people's topics gave me more light on how to present research.*
- *The positive feedback and discussion after my presentation will assist me in my analysis of my data. As an MEd student, I feel that if only I had been exposed to this at an earlier stage of my research, it would have enriched my work BIG time.*
- *I benefited by being forced to think very carefully about what I want to achieve in my research, by responding to questions.*

Secondly, as this comment suggests - *I was able to see how other people went about their research, and therefore could review mine and find where some information was lacking* - participation and networking provided opportunity for a range of research to be presented. This generated a process that facilitated students' thinking, reflection and a reconsideration of their own work, because, in a way, they seemed to realise their own limitations and limited understanding.

### **Personal Growth and Development**

By far the most commonly reported benefit was personal growth and development. In this regard, students reported increased self-confidence, inspiration and motivation. They also perceived enrichment of their presentation skills. Illustrative comments are listed below.

Regarding self-confidence, motivation and inspiration, some students stated the following:

- *The conference provided me with inspiration and motivation;*
- *I was thrilled. It was the experience of a lifetime. I will never forget it;*
- *I am still very excited about the conference, especially given the fact that I had the nerves to participate. I gave it my best and I GOT AN AWARD!!!! OH!!! ... I worked so hard ... Thank you for making my studies alive and meaningful.*

Students made comments, too, on the extent to which fellow-students served as an inspiration. *The conference energises you, a buzz carries through you;* and *The enthusiasm of the students was very inspiring* are comments that support students' views

of the benefits of the conference regarding its capacity for peer-inspiration.

Widening the realm of possibilities with regard to career opportunities and potential seemed an additional benefit for conference participants. One student affirmed: *The thought of presenting my work for the very first time made me feel great. In fact, I have made up my mind to make research part of my career.* While this may have been only one student's experience, it does raise issues about the possibility of such fora as platforms for career path development, an issue that will be discussed in detail in the next section.

Presentation skills were improved, as these students suggest:

- *My research skills (were) enhanced;*
- *It was the first time I presented research and I learned a lot!!! Instead of theoretical knowledge, I had first-hand experience of presentation.*

One student commented on the extent to which the deadlines of the conference served:

*... to galvanise me into action in terms of articulating preliminary findings and using the audience and subsequent discussion as a yardstick to gauge the relevance and direction of my research.*

### ENHANCED GROUP PSYCHOSOCIAL DYNAMICS

It seemed that respondents experienced the conference as a safe, collegial and supportive environment in which they could *emerge* as novice researchers, as the following responses suggest:

- *I feel more confident since I have enhanced my presentation skills;*
- *A space to voice your own research, a safe space!*
- *I appreciated a word of encouragement from the experienced researchers.*

More importantly though, it seemed to create a medium in which students could *break isolation*, as one student put it: *The conference contact and conversation broke in a small way the feeling of isolation associated with a lengthy postgraduate research project.*

The experience of collegiality, new friendships, as well as a sense of being *mentored by a more*

*knowledgeable other* was a benefit students reported on, as these comments state:

- *I was able to give directions to younger, less experienced researchers;*
- *I got to hear how other students also struggle with some of the social process theories and models (Luke & Freebody, etc)!*
- *Great conversation, constructive collegiality;*
- *I benefited from broadening of friendships in research, and learning from fellow researchers about their work.*

### RESEARCH AS A PUBLIC ENDEAVOUR

For research to enter and be critiqued in the public domain, it has to follow the *rules*, one of which is conforming and adhering to a code of ethics regarding data collection in social contexts, especially when human beings are the subject and object of study. During one of the keynote addresses, students were challenged to consider the ethics of conducting social research in various contexts, a topic from which they benefited. This student suggests how this made her reconsider her own context of research: *The address on research ethics gave good guidelines for my data collecting.* They were also intensely aware that research required a systematic and rigorous approach. As one student aptly put it, *It's all about rigour, rigour, rigour.*

Another consideration in regard to accountability is making research public through publications and presentations. Firstly, having their work included in the book of abstracts (and having some complete reports and theses published) was a great perceived benefit, as these student comments indicate:

- *My work will also make a contribution in the educational field;*
- *Of most benefit were the published Abstracts and Proceedings;*
- *The possibility of publishing my work was the greatest benefit.*

Students suggested that they gained awareness of the correct structure, learning to present in public and being accountable before an unfamiliar audience. This comment is illustrative: *The conference gave the additional experience of accounting for my work in public.*

### QUANTITATIVE FINDINGS

The following lists the responses of the pre-conference sample ( $n_1 = 93$ ) and the participant conference

sample at the end of their conference ( $n_2 = 59$ ) to the 10 Likert scale items. It was found that the two samples were statistically *similar* in respect to the extent to which the students said:

- They were keen to seek assistance with their research from many people;
- They needed encouragement;
- They were willing to take advantage of opportunities in their research;
- They felt that they were benefiting from their attempts to conduct a research investigation.

Using, where applicable, t-tests, sign tests and Wilcoxon tests, it was found that the 59 conference paper presenters recorded significantly *higher scores* than the 93 respondents in the pre-conference sample in regard to the extent to which they said:

- Their research project was releasing and developing their research potential ( $m_1 = 3.74$ ;  $m_2 = 4.39$ ;  $p < 0.01$ );
- They felt confident about their research investigation ( $m_1 = 3.46$ ;  $m_2 = 4.20$ ;  $p < 0.01$ );
- They felt their chances of succeeding in research were high ( $m_1 = 3.99$ ;  $m_2 = 4.43$ ;  $p < 0.05$ );
- They felt lucky in their research ( $m_1 = 3.40$ ;  $m_2 = 3.96$ ;  $p < 0.05$ );
- They felt they were benefiting from their attempts to conduct a research investigation ( $m_1 = 4.29$ ;  $m_2 = 4.58$ ;  $p < 0.05$ );
- Doing a research project made them happy ( $m_1 = 3.87$ ;  $m_2 = 4.27$ ;  $p < 0.05$ );
- Their friends had been helpful to them with their research project ( $m_1 = 3.66$ ;  $m_2 = 3.95$ ;  $p < 0.05$ ).

## DISCUSSION

The evidence suggests that student-led conferences have perceived benefits and, indeed, do provide a forum for students to network, exchange ideas, critique and reflect on others' and their own work, as well as facilitate growth personally and academically. While the long-term outcomes cannot be gauged from student responses, what the data does suggest is the immediate benefits such conferences have.

The most obvious is that students leave the conference more confident and motivated to reconsider their own work in the light of both written and oral feedback, and as a result of the work of others. Secondly, they appear to enlarge their domain of possibility regarding the nature, form, content and style of investigation. Thirdly, working networks are established that, under normal circumstances, would not

otherwise form. One student aptly commented that this breaks the isolation that is often experienced by postgraduate students in particular.

As a result of this evidence, four challenges emerge regarding student-led conferences.

The first relates to the annual sustainability of such endeavours within diminishing higher education budgetary constraints. Each annual conference was conducted with an internal budget of less than AUD1,000, monies for basic university running costs being obtained from a University block grant. Such money is neither guaranteed, nor specifically designated for this purpose, which is a challenge when universities are financially constrained to fund *more important* projects.

At present, the profile of student research publications tends to be low, both nationally and locally. This raises the second issue, namely the advantage that such a conference can have in serving as a catalyst and clearinghouse for completed work subsequently to be submitted to peer-reviewed journals.

A third concern relates to the tension between wider educational research imperatives and students' own particular interests. Data collected in 2001-2002 regarding the status of educational research in South Africa has suggested, firstly, that appreciable numbers of students and supervisors appeared to be out of synchronisation with each other regarding what each considered as research. Secondly, in some respects, educational institutions of higher learning themselves seemed to be out of harmony with educational challenges as experienced and formulated by national and provincial Departments of Education. What this suggests is a discontinuity between what is researched by education faculty in universities and what is perceived as worth researching *in the field*, so to speak. What this raises is the issue of relevance, particularly what practising teachers might want to choose to investigate in relation to the restricted capacity available within schools of education at both the universities and technikons.

The fourth issue, the most crucial, centres on the importance of equity and the extent to which such a forum can actively develop educational mechanisms that encourage not only novice researchers, but those who may not necessarily have access to funding for further studies. This means proactively seeking out other students who have been identified as possible candidates for further studies, yet who might not otherwise have had the opportunity. In this instance, the disadvantaged minority might be women researchers, since the evidence points overwhelmingly to their neglect in the field, especially in South Africa.

## CONCLUSION

Challenging as it might seem, conferences of this nature may serve to strengthen inter-institutional collaboration and increase publication records. They may also foster the development of processes to ensure equity and career path enhancement, especially for women, if consideration is given to three key factors, namely: sustainability, institutional financial commitment and inter-institutional student coordination.

## RECOMMENDATIONS

The following recommendations are suggested:

- Consideration should be given to each participant institution committing some financial assistance to make the conference sustainable;
- A student conference organising committee be established, comprising students from each institution in the region;
- Mechanisms should be adopted to begin processes for the conference to serve as a formal clearinghouse for publications.

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University of Cape Town, in 1984.

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He has received more than 20 academic awards and medals, including the Australasian Association for Engineering Education's Medal (International) for Distinguished Contributions to Engineering Education (1996); a *Silver Badge of Honour* for distinguished contributions to engineering education from the UNESCO International Centre for Engineering Education (UICEE) (1997); the Distinguished Visitors Lecture Award, Monash University (1996); the Kwa-Zulu Natal Association of Science and Technology Educators Plenary Guest Speaker's Award (1998); a visiting lecturer's award, University of Bogazici, Istanbul, Turkey (2000); a Mannheim University of Applied Sciences Visiting Lecturer's Award to Germany (2001); the Excellence in Classroom Teaching Award (Biology) of the South African Association of Teachers of Physical Science, Mathematics and Biology (1993); the University of Sydney's Norman I. Price Visiting Researcher's Scholarship in Electrical Engineering Education (1991); the University of Natal's Visiting Lecturer's Award (1989); the UCT's Class Medal in Astronomy (1975); and the George Amos Award for Science Teaching, of the Victorian Council of Schools Organisation, Australia (1967).

Most of his more than 170 publications have been in science, technology and engineering education. These include 75 conference publications, four chapters in books, two books as research editor, 20 articles in cited, refereed journals, 35 articles in professional journals or university publications, three sets of conference proceedings as editor, ten articles in popular magazines and 25 newspaper articles. He has made more than 60 presentations at national or international conferences, and his research students have produced more than 200 publications.

He is an active member of the Editorial Advisory Boards of the *Global Journal of Engineering Education*, the *World Transactions on Engineering and Technology Education*, the *South African Journal of Higher Education* and the *South African Journal of Education*. He has also refereed for the *Australasian Journal of Engineering Education*, the *International Journal of Applied Engineering Education*, the *Journal of the Science Teachers' Association of Nigeria*, *Perspectives in Education*, the *Journal of the Southern African Association for Research in Mathematics and Science Education*, the *African Journal of Research in Mathematics, Science and Technology Education* and the *South African Journal of Science*.

He is a 1989 foundation member of the International Liaison Group for Engineering Education (ILG-EE), and is an active member of the UICEE, the South African Association for Research and Development

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Jean Baxen is a senior lecturer in the School of Education at the University of Cape Town. She joined the School of Education in 1996 as a primary education specialist after graduating from the University of Leeds with a Masters in Education in 1990. Her teaching interests include research methodology with a key focus on qualitative forms of research; contemporary policies in the context of HIV/AIDS; and identity. She is currently completing her PhD in education. Her research interests include HIV/AIDS, teachers and education; diversity; inclusive education and social justice in education.



Aydin Inal is a teacher of physics, science and technology, and is the Headmaster of Star International School in Cape Town. He completed his MPhil degree in science education research (with distinction) in 2002, simultaneously authoring (or co-authoring) more than 20 research publications. He

has previously published in the *Global Journal of Engineering Education*, the *South African Journal of Higher Education* and the *Australasian Journal of Engineering Education*, as well as publishing eight full conference and seminar papers, and editing two volumes of conference proceedings. He has also performed duties in the organisation of local and international conferences. His special field of interest is the attainment of performance and practical process skills by students in different classroom learning contexts.

## APPENDICES

### Appendix A: Examples of titles of students' presented conference papers (2001-2003)

- Second year technikon students' comprehension of basic scientific and technical terms;
- Students' conceptual understanding of force, energy, work and power;

- Students' insights into processes involved in the retention and drainage of water in soils;
- The assessment of students' knowledge of Galvanic electrochemical cells using different types of grouping arrangements for instruction and evaluation;
- Criteria for the development of textile technology qualifications;
- Internet addiction;
- Teachers' perceptions of the introduction of computers into their learning environments;
- African students' conceptions of the nature of science;
- Outcomes-based technical education;
- The impact of business needs on curriculum development;
- Practical work effectiveness with microchemistry kits;
- Priorities for the teaching and learning of science/mathematics/technology education in developing countries;
- Teaching non-western science and technology;
- Gender and achievement in mathematics;
- Language barriers to learning science and technology;
- Technikon students' notions of electricity at tertiary level;
- The assessment of students' process skills in physics and technology;
- The role of language in the teaching and learning of science;
- Continuous assessment and multiple assessment strategies in Uganda;
- Real-life mathematics teaching;
- Motivating students to learn;
- Students' proficiency in estimating angles and diameters;
- Labelling museum specimens;
- Successful women in positions of educational management and leadership;
- Assessing physics practical work experiments;
- The effect of different assessment formats on mathematics achievement scores;
- A comparative analysis of students' drawings of a river;
- Science achievement in rural and urban schools in Lesotho;
- Topics in mathematics perceived by students to be easy or difficult;
- Evaluation of the drawings in a modern textbook for science and technology;
- Students' conceptual understandings of heat and temperature.

### **Appendix B: Likert self-rating scales used by research students to record and monitor their state of progress, confidence and support at regular intervals through the year**

*You may circle any or all of the following, or leave them blank.*

On a scale of 0 to 5, circle your impression of your own state of progress as at 16 July 2001 [or 15 April 2002, etc.]:-

*As a research student:*

1. My research project is releasing and developing my creative potential:

very much 5 4 3 2 1 0 not at all

2. I feel confident about my research investigation:

very much 5 4 3 2 1 0 not at all

3. I am keen to seek assistance with my research from many people:

very much 5 4 3 2 1 0 not at all

4. I need encouragement:

very much 5 4 3 2 1 0 not at all

5. I feel that my chances of succeeding in research are:

very high 5 4 3 2 1 0 very low

6. In research, I feel that I am:

very lucky 5 4 3 2 1 0 very unlucky

7. In my research, I am willing to take advantage of opportunities:

very often 5 4 3 2 1 0 never

8. I feel that I am benefiting from my attempts to conduct a research investigation:

very much 5 4 3 2 1 0 not at all

9. Doing a research project makes me happy:

very much 5 4 3 2 1 0 not at all

10. My friends have been helpful to me with my research project:

very much 5 4 3 2 1 0 not at all

## ***4<sup>th</sup> Global Congress on Engineering Education: Congress Proceedings***

edited by Zenon J. Pudlowski

This volume of Congress Proceedings comprises papers submitted to the *4<sup>th</sup> Global Congress on Engineering Education*, which was held at Menam Riverside Hotel, Bangkok, Thailand, between 5 and 9 July 2004, with King Mongkut's University of Technology Thonburi (KMUTT), Bangkok, as the principal co-sponsor and co-organiser. The chief objective of this Congress was to bring together educators, professional organisations and industry leaders from around the world so as to continue discussions tackling important and contemporary issues, problems and challenges in engineering and technology education.

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The 4<sup>th</sup> Global Congress can be characterised as a strong academic event; most papers in these Proceedings were found to be of a very high academic standard. Furthermore, all papers have gone through a strict refereeing process to ensure their future relevance for engineering educators, academics and students.

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