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Title: Ten years of the Australasian Computing Education Conference

Year: 2009

Version: Final published version

Please cite the original version:

Ten Years of the Australasian Computing Education Conference

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Abstract

The Australasian Computing Education Conference is now in its eleventh year. This paper charts the ups and downs of the conference from its origin in 1996, through its troubled years, to its recent apparently steady state. All 328 papers from the ten conferences are classified according to Simon's system for classifying computing education papers, and features of interest are pointed out. Only one clear trend over time is observed, and that is a steady and distinct increase in the proportion of research papers. The analysis then moves from the papers to their 496 distinct authors, exploring where the authors come from, how many papers each has contributed to the conference, and which authors appear to have made this conference their home. A final look at the number of papers presented each year suggests that the conference might once more be experiencing difficulty, and speculates on its future.

Keywords: classifying publications, computing education.

1 Introduction

The Australasian Computing Education Conference, formerly known as the Australasian Computer Science Education Conference, has been held ten times over the 13 years from 1996 to 2008. This paper gives an overview of the ten offerings, then goes on to briefly analyse the papers that have been presented at the conference and the authors of those papers.

2 Ten offerings in 13 years

Table 1 summarises the ten offerings of the conference. The remainder of this section describes the main points of interest during that time.

The first Australasian Computer Science Education Conference was held in Sydney in 1996. Chaired by John Rosenberg and Alan Fekete of Sydney University, it provided a regional forum for the presentation of work that might otherwise have been submitted to the SIGCSE Technical Symposium or ITiCSE. (SIGCSE is the Special Interest Group on Computer Science Education, a SIG of the premier computing professional group the ACM; the Technical Symposium is its annual conference in the US, and ITiCSE (Innovation and Technology in Computer Science Education) is its annual conference in Europe.)

Australian academics appear to have leapt at the opportunity to submit their work closer to home than had previously been possible, but there were also papers from overseas, their authors perhaps taking advantage of a funded trip to a desirable destination. Of the 51 accepted papers, the authors of just over 70% were from Australia, with the remainder coming from the USA (6 papers), New Zealand (4 papers), the UK (4 papers), and Japan (1 paper).

At the end of the conference an interested group met to decide whether to continue. It was assumed that the first offering had attracted a backlog of papers that had built up over some years, and it wasn't clear whether the steady state would provide enough papers to warrant running the conference on an annual basis. Even so, it was agreed to try the following year and see what would happen.

The second conference did indeed attract rather fewer submissions, but still enough for the conference to run. At this point it was agreed that there did appear to be sufficient interest to support an annual conference.

Plans at this stage were somewhat ad hoc: towards the end of each conference a group of willing parties would meet and somebody would volunteer to host and chair the next conference. This arrangement failed in 1999, when the volunteers didn't manage to bring things together. This meant not only that there was no conference in 1999, but that there was no meeting to decide on chairs and a venue for the subsequent conference. Realising this, Judy Sheard and Dianne Hagan of Monash University in Melbourne took the initiative and ran the conference in 2000.

Two matters that had often been discussed at the meetings of interested parties were the conference name and the conference logistics. Some felt that the 'computer science' in the conference name was unnecessarily restrictive, effectively denying legitimacy to other areas of computing such as information systems. This feeling was acted on in 2000, when the name was changed to the Australasian Computing Education Conference.

The question with regard to logistics was whether ACSE (now ACE) should collocate with the Australasian Computer Science Conference. The latter conference, which had been running for more than 20 years, was making economies of scale by gathering a number of smaller conferences together. The potential benefit to ACE was that organisational matters such as registration, venue, catering, and proceedings would be taken care of by the organisers of Australasian Computer Science Week (ACSW) as the combined conference was known. The main potential cost was the move from mid-year to January, which was seen for various reasons as a less convenient time. The temptation to join ACSW was strong, but it was resisted.

Table 1: summary of the ten offerings

Conference	Location	Chairs	Submitted	Accepted	Accept rate
ACSE 1996	Sydney	John Rosenberg, Alan Fekete	114	51	45%
ACSE 1997	Melbourne	John Hurst, Harald Søndergaard	46	31	67%
ACSE 1998	Brisbane	Paul Strooper, David Carrington	59	27	46%
ACE 2000	Melbourne	Judy Sheard, Dianne Hagan	79	39	49%
ACE 2003	Adelaide	Tony Greening, Raymond Lister	47	34	72%
ACE 2004	Dunedin	Raymond Lister, Alison Young	87	48	55%
ACE 2005	Newcastle	Alison Young, Denise Tolhurst	67	32	48%
ACE 2006	Hobart	Denise Tolhurst, Samuel Mann	60	29	48%
ACE 2007	Ballarat	Samuel Mann, Simon	43	20	47%
ACE 2008	Wollongong	Simon, Margaret Hamilton	39	18	46%

After ACE 2000 there was another lost year, when ACE 2001 failed to eventuate. This time the rescue was performed by Tony Greening and Raymond Lister, who, believing that the logistical problems were part of the reason for the failures, decided unilaterally to combine with ACSW. This explains the other apparent missing year, as the next conference was held not in June or July 2002 but in January 2003.

Another important decision made at this time was to provide for continuity of chairs, so that each year there would be one chair who had already run an ACE. Raymond Lister began the process by chairing ACE 2004 as well as ACE 2003, and each subsequent chair has spent two years in the job, first as a junior chair learning what was involved, then as a senior chair showing the ropes to the new junior.

The high paper acceptance rates of ACSE 1997 and ACE 2003 can perhaps be ascribed in part to a desire to accept a reasonable number of papers despite the lower numbers of submissions in those years. Submission numbers fell again for ACE 2007 and ACE 2008, but by this time the chairs felt constrained to keep the acceptance rate below 50% for reasons of quality assurance, even though this meant a serious reduction in the number of papers presented.

3 The papers

In all, 328 papers have been accepted and presented at the ten offerings of the conference. In this section the papers are analysed, first according to Simon's system for classifying computing education papers (Simon 2007, Simon et al 2008), and subsequently with some additional facts and figures that might be of interest.

Simon's system classifies a computing education paper according to four dimensions: the context in which the work presented is set; the theme of the paper, what it is about; the scope of the work, which indicates the breadth of the context; and the nature of the paper, an indication of whether it is a research paper, an experience report, or a position paper or proposal. The dimensions will be explained further in the following subsections, illustrated with examples from ACE.

3.1 Context

A paper's context is typically the subject matter of the course or subject in which it is taught. Therefore we would expect to see papers with contexts such as

Table 2: contexts of the 328 papers

Context	Papers	Context	Papers
artificial intelligence	1%	intro to IT	2%
broad-based	23%	literature	1%
capstone project	5%	logic	1%
compilers	<1%	management	<1%
computer forensics	<1%	networks	4%
data structures	2%	operating systems	1%
database	2%	postgraduate / research	1%
design	<1%	programming languages	1%
eBusiness/eCommerce	<1%	programming	32%
ethics/professionalism	1%	school outreach	1%
formal methods	1%	software engineering	5%
graphics	<1%	system modelling	<1%
group work	2%	systems analysis	2%
hardware/architecture	4%	web use	1%
human-computer interface	2%	webpage development	1%
image processing	<1%	work experience	1%
information systems	3%		

programming (*"Uni cheats racket": a case study in plagiarism investigation* (Zobel 2004)), information systems (*Authentication strategies for online assessments* (Summons & Simon 1998)), compilers (*Jocula - an instructive compiler* (Buckley & Hext 1996)), and so on. In addition, the system recognises three contexts that do not represent curricular subjects. The *group work* context is used for papers that, regardless of the subject matter, concentrate on aspects of group management, dynamics, or assessment (*Developing the software engineering team* (Hogan & Thomas 2005)). The *literature* context is for papers, typically surveys, whose data comes from the literature rather than the classroom (*A citation analysis of the ACE2005 - 2007 proceedings, with reference to the June 2007 CORE conference and journal rankings* (Lister & Box 2008)). And *broad-based* is used for papers that have no identifiable context (*Building a rigorous research agenda into changes to teaching* (Daniels et al 1998)) and for papers that range across multiple contexts (*Attracting and retaining females in information technology courses* (Clayton et al 1996)).

The 328 papers together cover 33 contexts, as shown in table 2. Programming accounts for 32% of the papers, a further 23% are broad-based, and the remainder make up a broad and shallow spread over the remaining 31 contexts. The spread is reasonably uniform across the ten offerings, with no noticeable trends over time.

3.2 Theme

The theme of a paper is what the paper is actually about, and at first consideration might be confused with its context. *Language tug-of-war: industry demand and academic choice* (de Raadt et al 2003) might appear to be about programming, but that is in fact its context. The paper is about the teaching technique of which programming language to use, and so it fits into the theme of teaching/learning techniques. In a similar vein, *The case for more digital logic in computer architecture* (Hoffman 2004) has a context of hardware/architecture but a theme of curriculum, and *Self and peer assessment in software engineering projects* (Clark et al 2005) has a context of capstone projects but a theme of assessment tools, as it presents a tool developed by the authors to assist with the assessment process.

While the set of possible contexts is limited only by the set of papers being examined, the set of themes remains fairly fixed. The themes of the 10 years of ACE papers are shown in figure 1.
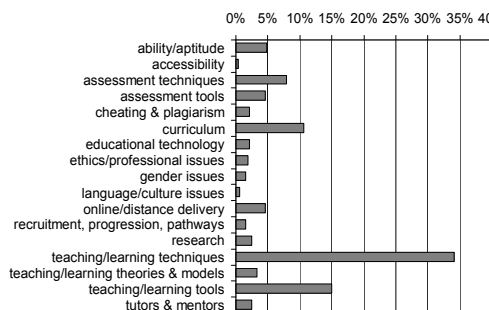
By far the bulk of the papers are about teaching/learning techniques (how we teach), teaching/learning tools (tools to help us teach), and curriculum (what we teach). Assessment techniques and tools together make up some 13% of the papers; students' ability and aptitude makes up about 5%, as does online and/or distance delivery; and the remaining contexts each account for less than 3% of the papers.

3.3 Scope

The scope of a paper is an attempt to specify the extent of collaboration with the (computing) education community that the work entailed. The narrowest recognised scope is the single subject (or course). A paper set in a single subject might possibly have been written with no collaboration at all (*Teaching software testing* (Carrington 1997)), although the many multi-author single-subject papers attest that this need not be the case (*Transforming learning of programming: a mentoring project* (D'Souza et al 2008)).

The program/department scope indicates a paper that is set in several distinct subjects across a degree program or a department. Such papers generally entail collaboration within the department (*Performance and progression of first year ICT students* (Sheard et al 2008)), although there are a handful of single-author program/department papers (*Peer mentoring female computing students - does it make a difference?* (Craig 1998)).

The scope of institution, recognising collaboration with colleagues in other departments at the same institution, tends to be quite rare. It is not always easy to break the silo mentality, but it can be rewarding to do so (*Peer assessment using Aropä* (Hamer et al 2007)).

It is generally easier to collaborate with computing education colleagues at other institutions, so there are many papers whose scope is many institutions (*eScience curricula at two Australian universities* (Gardner et al 2005)), especially since the advent of papers arising from working parties or workshops (*Differing ways that computing academics understand teaching* (Lister et al 2007)).

Some papers do not have an identifiable scope, typically because they have no explicit context (*Multiple choice questions not considered harmful* (Woodford & Bancroft 2005)) or because their context is the literature (*Qualitative research projects in computing education research: an overview* (Berglund et al 2006)). These papers are assigned a scope of not applicable.

There is no systematic variation in the pattern of scopes over time, so figure 2 shows the combined scopes of the papers from the last ten years.

3.4 Nature

The nature dimension was designed to acknowledge and chart the distinction between papers that are clearly reporting on research and papers that report their authors'
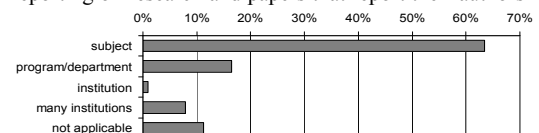
Figure 1: themes of the 328 papers

Figure 2: scopes of the 328 papers

experiences when implementing particular concepts in their classrooms. The intent is not to value individual research papers more highly than individual practice papers, but to recognise and applaud any overall increase in the amount of unequivocal research being reported in a body of papers.

An experiment paper (*The neglected battle fields of syntax errors* (Kummerfeld & Kay 2003)) reports on a scientific-style experiment, at the very least entailing a control group and an experimental group. It is logistically and ethically challenging to carry out such experiments in the classroom, with different groups being taught in different ways, so experiment papers tend to be rare in education.

A study paper reports on the implementation of a study designed to address a particular research question. The study will be carried out, data will be gathered and analysed, and conclusions will be drawn (*Mental models, consistency and programming aptitude* (Bornat et al 2008)).

An analysis paper is just as rigorous as an experiment or study paper, but addresses its research question by analysing existing data rather than first generating it. Analysis papers might be based on collected student results (*The impact on student performance of a change of language in successive introductory computer programming subjects* (Doube 2000)), on published literature (*A citation analysis of the ACE2005 - 2007 proceedings, with reference to the June 2007 CORE conference and journal rankings* (Lister & Box 2008)), or anywhere else where interesting data might already exist (*Decoding doodles: novice programmers and their annotations* (Whalley et al 2007)).

Report papers, the staple of computing education conferences, are the means by which academics exchange their experiences with (generally) new tools and techniques in the classroom. Valentine (2004) called publications of this type Marco Polo papers: 'I went there and I did that'. Perhaps the term Genesis papers would be more fitting: 'and he saw what he had done, and it was good'. Even where such a paper concludes by presenting the results of a student survey showing approval of the change, the survey result is incidental to the experience report, and does not shift the paper into the study or analysis categories.

Position/proposal papers outline work that is to yet be done, new ideas that are yet to be put into practice, or their authors' thoughts on a particular question (*The case for more digital logic in computer architecture* (Hoffman 2004)).

With the five categories described above, it seems reasonable to classify experiment, study, and analysis papers as unequivocally research. They propose a
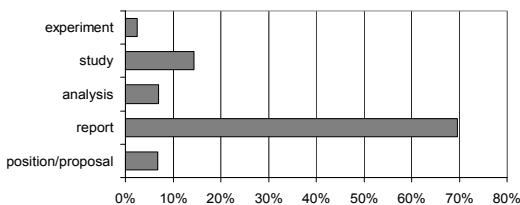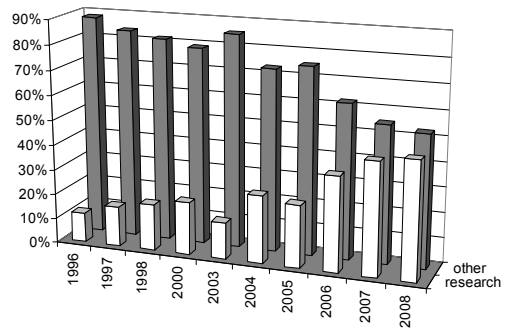
Figure 4: proportions over time of research papers (experiment, study, and analysis) and other papers (report, position/proposal)

research question, they gather the data to answer that question, they analyse the data, and infer the result. While some people would argue that reports, position papers, and proposals are also research, this is generally a lot less clear cut. There might indeed be some papers in those groups with a legitimate claim to be called research, but most of them are probably not.

Figure 3 shows the natures of the 328 papers from the ten offerings of ACE. This time, though, there is a clear trend over time. Simplifying the scale to research papers (experiment, study, and analysis) and other (report and position/proposal), figure 4 shows a steady growth in the proportion of research papers over the lifetime of the conference. This is a pleasing observation.

3.5 Titles

One cannot examine so many papers without noticing aspects of their titles. Some titles appear to be deliberately amusing or baffling; others are short and to the point; others appear to be trying to tell the whole story and save readers the effort of reading the paper.

Figure 5 shows the title lengths of the papers, from the single two-word title (*Why Ada?* (Millar & Mohammadian 1996)) to the single 25-word title (*One small step toward a culture of peer review and multi-institutional sharing of educational resources: a multiple choice exam for first semester programming students* (Lister 2005)). On examining figure 5, one wonders whether the chairs of ACE 2009 might look kindly on papers with 8-word titles, to help bring the overall distribution closer to normal.
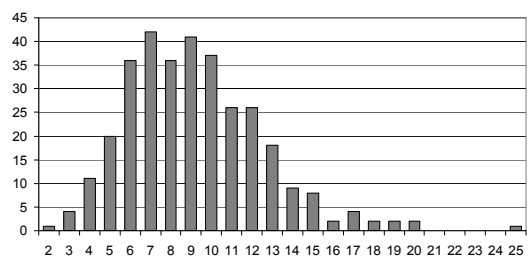
Figure 3: natures of the 328 papers

Figure 5: lengths of titles of the 328 papers

4 The authors

Over the ten years there have been 496 distinct authors of ACE papers. Many of those authors have only ever (co-)authored a single paper at the conference, while others have come back many times.

Table 3 shows the number of authors who have authored given numbers of papers, putting names to those who have contributed most. These repeat contributors are obviously the people one would expect to see at any ACE. All have their stories, of which a few are mentioned here.

Raymond Lister, the most prolific ACE author, is one of the two chairs who revived the conference in 2003, ran it in conjunction with ACSW, and brought in the two-year terms for junior and then senior chair.

Simon is the only author who has had a paper at every ACE since time began. Mats Daniels has had had papers in 8, Raymond Lister and Angela Carbone in 7, and Ilona Box, Anders Berglund, and Judy Sheard in 6.

John Hamer is the highest-contributing author from New Zealand.

Mats Daniels is the highest-contributing author from outside Australasia, closely followed by Anders Berglund. Both are from Sweden.

Michael de Raadt is the highest-contributing author all of whose papers are in the research grouping of experiment, study, and analysis. He is closely followed by Anthony Robins.

Peter Bancroft is the highest-contributing author none of whose papers are in the research grouping.

Nicole Herbert/Clark is the highest-contributing author who is known to have changed her name during the lifetime of ACE. Tracking authors through a change of name requires inside knowledge, so there might be others beyond the three recognised in this analysis.

The average number of authors to a paper is 2.4. For most of the life of the conference it sat close to 2, but then a surge in multi-author papers drove it up to nearly 4 in 2006, after which it fell to 3.4 in 2007 and 3 in 2008.

The highest number of authors for a single paper was 21 (*Differing ways that computing academics understand teaching* (Lister et al 2007)), while the previous year saw three 15-author papers from a single project (Simon, Cutts et al 2006, Simon, Fincher et al 2006, Tolhurst et al 2006).

4.1 Where they're from

Analysis of where the papers come from will use the simplification that a paper comes from where its first author comes from. Figure 6 shows the proportions of papers from Australia, New Zealand, and other countries over the ten years.

For the first three offerings about 70% of the papers were from Australia, with reasonable proportions from New Zealand and other countries (Germany, Japan, Taiwan, Sweden, UK, and USA).

In the troubled years, 2000 and 2003, nearly all of the papers were from Australia, with just three from New Zealand, two each from UK and USA, and one each from Denmark, Germany, and Sweden. It would seem reasonable to conclude that the uncertainty surrounding the conference might have made overseas academics reluctant to submit papers to it, or perhaps even unaware that it was still running.

Once the conference was back on track the proportion of papers from New Zealand increased to a fairly steady 30%, and the proportion from other countries (Finland, Ireland, Norway, South Africa, Sweden, UK, and USA) has sat around 15%-20%. The 'Australasian' tag seems to be warranted, and the conference draws a good number of papers from a broad range of countries outside the region.

5 The future

Another look at table 1 shows that, while the numbers of accepted papers have been up and down over the years, the past two years have been among the lowest. Submissions are down, and the conference chairs no longer have the luxury of boosting numbers by accepting a greater proportion of the submitted papers – to do so would almost certainly result in a drop in the quality ranking of the conference within Australia and perhaps elsewhere.

There has been some speculation as to whether the non-metropolitan locations of ACSW 2007 and ACSW 2008 led to this downturn, in which case ACE 2009, in Wellington, New Zealand, should see numbers pick up again. Unfortunately, the recently announced figures for ACE 2009 show that there were exactly the same number of submissions and the same number of acceptances as for ACE 2008. One must wonder why the number of

Table 3: authors contributing given numbers of papers

| Number of papers	Achieved by number of authors
14	1 (Raymond Lister)
13	1 (Simon)
9	3 (Ilona Box, John Hamer, Margaret Hamilton)
8	1 (Judy Sheard)
7	7 (Angela Carbone, Mats Daniels, Michael de Raadt, Tony Greening, Patricia Haden, Judy Kay, Jodi Tutty)
6	4 (Peter Bancroft, Anders Berglund, Anthony Robins, Errol Thompson)
5	4 (Alan Fekete, Nicole Herbert/Clark, Marian Petre, Denise Tolhurst)
4	11
3	30
2	72
1	362
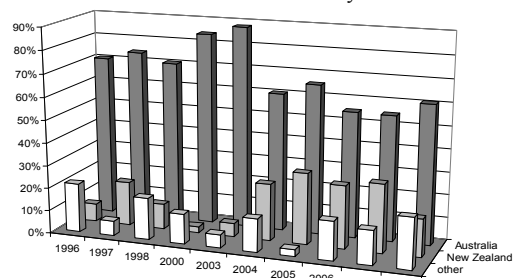
Figure 6: proportions of papers each year from Australia, New Zealand, and other countries

submissions has been so low since 2007.

Many universities and polytechnics in both Australia and New Zealand have recently made dramatic cuts to their academic staff numbers. This affects research in two ways: first, there are fewer people to conduct it; and second, those who do remain in academic work are expected to do more teaching, and thus have less time for research. This will clearly have a lasting impact on the overall output of research, and therefore on the number of papers submitted and accepted to conferences.

Another possible factor is the push in many countries for 'quality assurance', one consequence of which is that people are expected to publish more in high-ranking journals and high-ranking conferences. It seems all but impossible to have ACE recognised as a high-ranking conference, so institutions might increasingly be seen as discouraging their staff from submitting papers to it.

Finally, it is possible that the higher costs of travel and conference attendance are ruling it out as options for an increasing number of academics.

It would be nice to believe that the current drop in submissions and acceptances is short-lived, but we must accept the possibility that it is the beginning of the end for the conference.

6 Conclusion

The Australasian Computing Education Conference has been run ten times over the 13 years of its existence, surviving some difficult times in the process.

The 328 papers presented at the conference have been based predominantly in the context of programming or in no particular context, with a further 31 contexts each accounting for no more than 5% of the papers. The bulk of the papers deal with the themes of teaching/learning techniques, teaching/learning tools, and curriculum; a reasonable number deal with assessment techniques, ability/aptitude, assessment tools, and online/distance delivery; and the remainder are spread among ten further themes. More than 60% of the papers are set in single subjects, with about 10% in multiple subjects within the same department or degree program and about 10% set across two or more institutions. Nearly 70% of the papers are experience reports or 'Genesis papers', but the proportion of papers that are unequivocally research shows a steady increase from just over 10% in 1996 to nearly 50% in 2008.

The conference has seen papers by 496 distinct authors, of whom 362, nearly three-quarters, have had only one paper at ACE. At the other end of the scale, 21 authors have had five or more ACE papers, and the two most prolific have had 14 and 13 papers.

The bulk of the papers have always been from Australia, but recent years have seen respectable proportions of papers from New Zealand (about 30%) and nearly a dozen other countries (10%-15%).

Until recently the conference appeared to have good prospects for a long future. However, it does seem to have suffered a recent downturn in the numbers of papers submitted and accepted, for reasons that are not entirely clear, and it remains to be seen whether ACE can survive this difficult time as it has survived others in the past.

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