A Citation Analysis of the ACE2005 - 2007 Proceedings, with Reference to the June 2007 CORE Conference and Journal Rankings

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Abstract

This paper compares the CORE rankings of computing education conferences and journals to the frequency of citation of those journals and conferences in the ACE2005, 2006 and 2007 proceedings. The assumption underlying this study is that citation rates are a measure of esteem, and so there should be a positive relationship between citation rates and rankings. The CORE conference rankings appear to broadly reflect the ACE citations, but there are some inconsistencies between citation rates and the journal rankings. The paper also identifies the most commonly cited books in these ACE proceedings. Finally, in the spirit of "*Quis custodiet ipsos custodes*?" the paper discusses some ways in which the CORE rankings process itself might in future be made more transparent and open to scholarly discourse.

Keywords: Citation Analysis, Research Quality Framework

1 Introduction

The Australian Federal Government is undertaking a review of the quality and impact of publicly funded Australian research, known as the Research Quality Framework, or simply RQF (DEST, 2007). As part of the RQF, the Computing Research and Education Association of Australasia, (CORE) has developed a ranking scheme for computing related conferences and journals (CORE, 2007).

Developing such a set of rankings is by no means straightforward. Most ranking systems include citations as a prominent factor. While there are indexes that record the number of citations for individual papers and for journals, only a small percentage of all computing papers are thus indexed. Since there was not an existing robust method for ranking conferences and journals, CORE formed committees that developed their own processes for ranking conferences and journals.

An appropriate rankings process is particularly difficult for computing education, given that the sub-discipline is not well understood by computing academics outside computing education research, and that many of the places where a computing education researcher might publish are conferences and journals with a trans-disciplinary perspective on education.

This paper evaluates the June 2007 CORE rankings from the perspective of the Australian Computing Education community. Specifically, the paper poses the following research question: *do the conferences and journals cited most frequently in recent ACE proceedings figure prominently in the CORE rankings*? The assumption underlying this question is that there should be a positive relationship between citation rates and rankings.

The ACE2005, 2006 and 2007 conferences contain 32, 32 and 21 papers respectively, for a total of 85 papers. To answer the above research question, all 1475 citations in those 85 papers were examined, to see what conferences and journals were most frequently cited. Of the 1475 citations, 427 (29%) were to journal papers and 467 (32%) were to conference papers. Table 1 shows a complete breakdown of the different types of citation in those ACE proceedings. (All tables appear at the end of the paper.)

2 Conference Citations and CORE Rankings

2.1 The CORE Conference Ranking System

At the time of writing this paper (October, 2007), the CORE web site did not provide details on the conference rankings process. Only the broad structure was described – that a panel of academics made a preliminary ranking, which was released for broader consultation and feedback, before the panel determined a final ranking.

The CORE conference rankings of June 2007 are based upon four tiers, enumerated as A+, A, B and C. There are two indications on the CORE website as to the significance of the various tiers. One of these is data from DEST (the Australian Government Department of Education, Science, and Training) indicating approximate publication rates of Australian authors in each of the CORE ranks:

A+	6%
A	14%
B	44%
C	36%

The other indication is the following:

> *… it should be stressed that many Australian conferences (automatically) ranked B are important in terms of networking, developing the local community, and for PhDs and Early Career Researchers.*

2.2 ACE Conference Citations ─ Results

In the three ACE proceedings surveyed, authors cited papers from 121 different conferences. Table 2 shows the number of citations to conferences within the four CORE tiers, and also to conferences not listed by CORE.

A striking feature of Table 2 is that over half the conferences cited by ACE authors are not listed by CORE. However, as shown in Table 3, of the 121 different conferences cited, 82 of those conferences (68%) received exactly one citation from ACE authors. It would be unreasonable to expect CORE to rank all conferences that were cited by only one author.

Of the 121 conferences cited, 90% received 6 or fewer citations. Furthermore, some conferences cited more than once were cited in only one paper, and the citation rate for a particular conference can also be distorted by a high rate of self-citation. Table 4 allows for these distortions, by counting not the actual citations, but the number of different papers that cite a particular conference. Furthermore, Table 4 excludes self-citations. Of the 114 conferences that were cited other than by self-citations, 90 of those conferences (almost 80%) were cited in only one paper.

Table 5 lists all conferences cited by more than one paper, excluding self-citations. The columns show the CORE tier (blank where CORE have not assigned a tier), total number of citations to the conference (column "Cites"), total number of citations to the conference, excluding self-citations (column "CitesXSelf"), total number of papers that cited that conference (column "Papers"), and total number of papers that cited that conference, excluding self-citations (column "CitesXSelf"). The list is ordered (descending) on the last column.

The four most cited conferences listed in Table 5 are SIGCSE, ACE, ITiCSE and FIE. However, allowance should be made for the differing sizes of these conferences – a large conference might have more papers cited than a small conference, not because the larger conference is a better conference, but simply because the larger conference has more papers. In the three years of 2003, 2004 and 2005, the SIGCSE conference published 279 papers, ITiCSE published 158 papers, and ACE published 115 papers – an average of 93, 53 and 38 papers per year respectively. (We omit FIE from this analysis because it is a general engineering education conference, so it is unclear how many papers in FIE each year are of interest to computing educators.) Table 6 shows the same data as for Table 5, but only for SIGCSE, ACE, ITiCSE, with the data normalized to the average number of papers in each conference in the three years 2003-2005. With the data in this normalized form, it would appear that the three conferences are roughly equally popular with ACE authors, especially if one only examines the figures that exclude self-citations (as one would expect a reasonably high self-citation rate for ACE papers among ACE authors).

3 Discussion of Conference Rankings

Even after considering the data in Tables 3 to 6, the final row of Table 2 warrants further discussion. Among the conferences that are both cited by ACE authors and also listed by CORE, almost half (45%) of the conferences are from the B tier, and only 24% and 11% are respectively from the A and A+ tiers. If the A and A+ tiers contain the better conferences, would we not expect to see more citations to these tiers? Even if an ACE author does not have a publication worthy of a conference in tier A or tier A+, there is nothing to stop the ACE author from citing (in their B conference paper) papers from conferences in the A and A+ tiers. It is therefore plausible (but not proven) to make at least one of the following two claims:

- That computing education conferences are under-represented in the A and A+ tiers, and/or
- That the B computing education conferences are more than merely vehicles (as CORE characterized B conferences) for "*networking, developing the local community, and for PhDs and Early Career Researchers*".

On the other hand, one might equally argue that the citation rates given in the final row of Table 2 are consistent with the DEST data given earlier in the paper, for publication rates by Australian authors in the tiers:

- Tier A+ conferences have a 6% publication rate and an 11% citation rate.
- Tier A conferences have a 14% publication rate and a 24% citation rate.
- Tier B conferences have a 44% publication rate and a 45% citation rate.
- Tier C conferences have a 36% publication rate and a 20% citation rate.

On scanning down Table 5, it is difficult to see an A+ conference to which most computing education authors could aspire – not necessarily because their work is not worthy, but because those A+ conferences are not really venues where computing education papers are published. Neither CHI nor SIGMOD is a realistic venue for computing education papers. ICSE is a realistic venue, but only for those computing educators who work on the teaching and learning of software engineering.

Any committee-based ranking process will have a bias toward longer running conferences. It is therefore not surprising that the International Computing Education Research Workshop (ICER) ─ the only conference in the world dedicated to computing education research ─ has been assigned to the B tier, given that at June 2007 the conference had only run twice. Using only the citation data presented in this paper, it would be hard to mount a credible case for the immediate elevation of ICER to a higher rank, but few academics familiar with computing education conferences would rank it lower than SIGCSE and ITiCSE.

4 Journal Citations and CORE Rankings

4.1 The CORE Journal Ranking System

According to the CORE web site (CORE, 2007), the CORE journal rankings are split into three tiers – A+, A,

and B – plus a fourth tier (U) for journals that are listed but unranked. However, at June 2007, the PDF files containing the actual rankings included 3 journals ranked as C. Also, for the purposes of this paper, there is a sixth tier, which are journals that are not listed in the CORE rankings.

According to the CORE web site (CORE, 2007), approximately 10% of the ranked journals are A+, 10% are A, 30% are B and 50% are U. The CORE web site (2007) offers the following description of each tier:

- *A+ and A are journals to which we all aspire. They have high impact factors, high quality expert editorial boards, sound refereeing policies and low acceptance rates.*
- *B are good journals which are not quite at the level of A or A+. Some of them are new and would be expected to reach a higher rank in a year or two as their reputation builds.*
- *U encompasses two classes of journals.*
  - (i) *Those not quite at the level of B*
  - (ii) *The many journals for which there was no impact information available, nor any input from the community. Hence we had no reliable method of giving these journals a rank.*

The CORE web site also describes, in very broad terms, how the ranking was performed, using a combination of data from the ANU-based Research Evaluation and Policy Project (REPP), ISI factors for 2004 and "*other more recent international rankings from various sources*". The CORE ranking committee also used feedback from sections of the Australian ICT community.

4.2 ACE Journal Citations – Results

In the three ACE proceedings surveyed, authors cited papers from 190 different journals. Table 7 shows the number of citations to journals within the four CORE tiers, and also to journals not listed by CORE.

Like the analogous data for conferences, an immediately striking feature of Table 7 is that over 80% of the journals cited by ACE authors are not even listed (let alone ranked) by CORE. However, Table 8 indicates that over 60% of journals cited in the three ACE proceedings were cited only once, and it would be unrealistic to expect CORE to rank all journals cited only once. Also, among the journals cited are some that – while the citation may be germane to the paper in which the citation is made – one would not realistically expect to be ranked by the CORE committee (e.g. Journal of Dental Education, Journal of Physical Education and Dance).

Table 8 also shows that almost 90% of the journals cited were cited three times or fewer. In some of those cases, the multiple citations all occurred in a single paper. And of course some of those were self-citations. Table 9 shows the number of journals cited by different papers excluding self-citations. Over two thirds of journals cited were cited in only one paper (excluding self citations) and over 90% of the journals were cited in three or fewer papers (i.e. over 90% of journals were cited, on average, in one or fewer papers per year over the three years of ACE proceedings analysed). It would be unrealistic to expect CORE to rank many of these journals.

Table 10 lists all journals cited by three or more papers, excluding self-citations. The columns show the CORE tier (blank where CORE have not listed the journal, let alone ranked it), total number of citations to the journal (column "Cites"), total number of citations to the journal, excluding self-citations (column "CitesXSelf"), total number of papers that cited that journal (column "Papers"), and total number of papers that cited that journal, excluding self-citations (column "CitesXSelf"). The list is ordered (descending) on the last column.

The two most cited journals listed in Table 10 are *SIGCSE Bulletin* and *Computer Science Education*. The latter journal is ranked as A+, whereas the unlisted *SIGCSE Bulletin* is in fact the more frequently cited journal in the ACE proceedings. However, allowance should be made for the larger number of papers published in the *SIGCSE Bulletin* – it might be cited more frequently in the ACE proceedings simply because it publishes more papers. In the three years of 2003, 2004 and 2005, *Computer Science Education* published an average of 15 papers per year. The *SIGCSE Bulletin* appears four times a year, but two of those issues contain the SIGCSE and ITiCSE conference proceedings. We ignored those two conference proceedings issues in this analysis. Determining the average number of papers published in the remaining two yearly issues of the *SIGCSE Bulletin* is still not straightforward, as it publishes a mix of refereed papers, formally reviewed papers and small invited columns. Therefore, for *SIGCSE Bulletin* we have calculated two yearly publishing averages. One is for all papers published. That yearly average is 69. The other excludes opinion pieces and other columns (and includes the working group papers, which are refereed). That average is 43.

Table 11 shows the same data as for Table 10, but only for *SIGCSE Bulletin* and *Computer Science Education*, with the data normalized to the average number of papers in each journal in the three years 2003-2005. With the data in this normalized form, it would appear that – ignoring the opinion pieces in *SIGCSE Bulletin* – the two journals are roughly equally popular with ACE authors.

5 Discussion of Journal Rankings

5.1.1 Unlisted Journals & Australian Authors

An obvious feature of Table 10 is that very few of the journals cited by ACE authors are even listed in the CORE rankings, let alone ranked. However, given the RQF-related purpose of the rankings, CORE has only listed journals in which Australian-based computing academics have published in the last ten years. That is reasonable, and it is likely that a number of the journals listed in Table 10 do not meet that criterion.

5.1.2 Definition of Refereed Journal

Apparently (private communication), the SIGCSE Bulletin was not ranked by CORE as it contains articles of highly variable standard (on that issue we concur) which are "reviewed" and "formally reviewed" but not "refereed" (Impagliazzo, 2007). According to the ACM Policy (ACM, 2007), both refereed and formally

reviewed articles are "*subjected to a structured evaluation and critique procedure following a defined process uniformly applied*", but unlike refereed articles, formally reviewed articles are not required to pass a test of "*scholarly originality, novelty and importance* … [and generally include] … *papers submitted to conferences, where time constraints and the ad hoc nature of the evaluation group makes the designation "refereed" inappropriate*". The third category, "reviewed", is for material "*subjected to a more informal and not necessarily uniform process of volunteer review* … [and] … *there need not be written reports and statements for record, although of course there may be. This category includes opinion pieces* …"

Table 11 shows that, when reviewed articles from the SIGCSE Bulletin are ignored (such as the regular opinion piece written by the first author of this paper), SIGCSE Bulletin enjoys a citation profile in ACE proceedings similar to that of Computer Science Education ─ to our mind, a better and more objective measure of the "*scholarly originality, novelty and importance*" of SIGCSE Bulletin articles than the subjective assessment of the CORE panel.

5.1.3 Disciplinary Purity

Three of the unlisted journals in Table 10 have a strong focus on computing education ─ *SIGCSE Bulletin, Journal of Information Technology Education, Journal of Computing Science in Colleges* ─ and at least three are journals where a computing education researcher might realistically aspire to publish an article on computing education ─ *Journal of Educational Computing Research, Journal of Computers in Mathematics and Science Teaching,* and *Educational Technology*.

Among the remainder of the unlisted journals in Table 10 there are journals that have not been ranked by CORE because they were regarded as journals better ranked by panels in other disciplines (private communication). The CORE web site contains the following statement:

> *We took a fairly pure view of ICT, discarding about half of the initial list of nearly 900 journals, derived from the national DEST (National Australian Department Education Science and Training) reported list of journal publications by Australian academics from ICT departments over a ten year period. It was felt that the discarded journals would be assessed more accurately by other disciplines.*

On that argument of purity, it is not clear why some trans- or multi-disciplinary education journals should be omitted by CORE when some non-education trans- or multi-disciplinary journals were ranked ─ such as *Cognition, Quantum Information and Computation* (both ranked A+), *Corpus Linguistics and Linguistic Theory, Scientometrics, Speech Communication* (all ranked A), *Journal of Applied Non-Classical Logics, Journal of Logic and Algebraic Programming, Journal of the American Medical Informatics Association* (all ranked B).

6 Books

This paper is concerned primarily with the CORE rankings, and thus concentrates on conferences and journals. However, given that (as shown in Table 1) 17% of all citations are to books, a brief examination of these citations is in order.

Table 12 shows the most commonly cited books in the ACE2005, ACE2006 and ACE2007 proceedings. Each book cited was classified into one of eight categories:

- **Education ─** books that discuss teaching and learning issues in a non-disciplinary-specific fashion. Table 12 lists several books from this category.
- **Social ─ a**pproximately one third of these books concerned gender issues, but not specific to computing.
- **Computing Content ─ f**or example, reference books. Some of these books might have been cited because they were being used as textbooks.
- **Text Book ─ b**ooks that we recognized as textbooks.
- **Computing Education ─** books specific to education issues within the computing discipline.
- **Research Methods ─ f**or example, books on statistics or qualitative research.
- **Psychology ─** usually educational psychology.
- **Other**

Table 13 shows the frequency of each of these types of book. Over half of all book citations are to education books, and less than one third are to books that are either textbooks or concerned with computing content. However, some caution is required in generalizing from the bulk statistics in Table 13. As Table 14 indicates, the number of books cited within papers varies considerably. Just over a third of all papers cited no more than one book, but a small number of papers cited many books – one paper cited 34 books! We report anecdotally the impression that papers citing a small number of books tended to cite textbooks and computing content, while the papers that cited many books tended to cite 'social' and 'education' books.

7 Discussion: Scholarship and Discourse

The schedule for developing the CORE rankings has been driven largely by the federal government's timetable for the RQF, which was faster than many of us would have liked. Under such unfavourable circumstances, it was almost inevitable that the ranking would be an opaque executive process.

While the rankings themselves may change, the concept of a conference and journal ranking is probably here to stay. Now that the initial rush is over, it is appropriate to consider the long-term strategy for continuing the rankings. It is not in the best long-term interests of scholarship that the ranking remains an opaque executive process. Scholarship would be better served by a transparency that allows for the ranking process itself to be open to scholarly debate and peer review ("*Quis custodiet ipsos custodes?"* – Who will guard these guardians?). CORE should approach the ranking process as a research project. Indeed, CORE should seek to document its process to a standard that sees the process eventually published in a (top tier!) bibliometric journal.

As a first move toward developing an open, scholarly process for routinely revising the rankings, we suggest a three-step process, described below.

7.1 All Policy and Data Should be Public

The criteria to be used for determining rankings should be defined – with the same attention to detail that we might bring to a software specification document – and the actual data collected for each conference and each journal (e.g. acceptance rates) should be made public, so that the computing community can check that the data is correct. By using Web 2 technologies, CORE could both make such data public, and push much of the responsibility for data cleaning back onto the broader computing community.

7.2 Formal Models

Whether the models should be developed *a priori*, or be derived empirically from the given rankings, some form of formal model – a points system perhaps – should be adopted for assigning preliminary rankings. Such a model would make the ranking process far more transparent.

A formal model would also offer a mechanism for providing a preliminary ranking for new conferences and journals. Irrespective of what CORE intended, it appears that some computing departments are revising policies (such as travel funding) in such a way that unlisted conferences and journals are treated as if they form the bottom-most rank. Such policies could stifle Australian research in emerging areas.

7.3 A Documented Manual Review

Formal models are not likely to capture the complexities of ranking, at least not for some years to come. It is therefore appropriate that CORE continue to appoint committees that review the outputs of a formal model. When such a committee elects to manually alter the ranking of the formal model, its reasons should be publicly gazetted.

8 Conclusion

From our analysis of the CORE conference rankings, we conclude that the existing rankings are broadly appropriate, but that some fine tuning might be required: it is pleasing and appropriate that SIGCSE and ITiCSE have been recognized as tier A conferences, thus providing computing educators with two high ranking conferences in which they can aspire to publish. At this time, however, there is not an A+ conference to which most computing educators can aspire.

It is also pleasing and appropriate that *Computer Science Education* has been ranked as an A+ journal. However, as that journal publishes only around 15 papers a year, it is unlikely that all the very best computing education research – not just Australian research but work from all around the world – can appear in that one journal. Apart from *Computer Science Education*, very few of the journals to which a computing educator might aspire are even listed in the CORE rankings. The non-listing of the *SIGCSE Bulletin* is most problematic, as its popularity in ACE citations puts it on a par with *Computer Science Education*.

The CORE rankings process implicitly adopts an objectivist, transmission model of knowledge creation. In contrast, most computing education researchers have a high regard for social constructivism, which has led to their willingness to publish research papers in conferences and journals that also accept 'Marco Polo' papers (Valentine, 2004). However, to survive in a post-RQF environment, Australian computing education researchers may need to reconsider that policy.

The process of ranking conferences and journals is as complex as it is vexing. This paper aims merely to begin a scholarly discourse on the CORE rankings of computing education conferences and journals, certainly not to be the final word. Meanwhile, careers will rise and fall on the decisions made by the CORE ranking committees. It is therefore vital that the CORE ranking processes be open to informed discussion and peer review – why should we settle for a ranking process that is less rigorous than what we demand from research projects?

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Types of Citation	ACE2005		ACE2006		ACE2007		Total	
	No. Citations	%age Citations	No. Citations	%age Citations	No. Citations	%age Citations	No. Citations	%age Citations
Journal	134	28%	212	31%	81	27%	427	29%
Conference	168	35%	176	25%	123	40%	467	32%
Book	43	9%	163	24%	47	15%	253	17%
Web Page	74	15%	66	10%	35	12%	175	12%
Book chapter	28	6%	48	7%	6	2%	82	6%
Unpublished report	26	5%	17	2%	7	2%	50	3%
Unpublished thesis	3	1%	9	1%	1	<1%	13	1%
Personal Communication	3	1%	1	<1%	0		4	<1%
Newspaper articles	0		0		4	1%	4	<1%
Total	479		692		304		1475	

Table 1: Number of different types of citation in the ACE2005, ACE2006 and ACE2007 proceedings.

	Tier				
	A+	A	B	C	Not Listed
Number of conferences	6	13	25	11	66
Percentage of conferences	5%	11%	21%	9%	55%
Percentage of listed conferences	11%	24%	45%	20%	—

Table 2: Number of citations to conferences in each CORE tier, and to conferences not listed by CORE

	Number of Citations															
	1	2	3	4	5	6	7	8	9	10	16	29	35	79	92	**Total**
Number of Conferences	82	17	5	2	2	1	2	1	1	3	1	1	1	1	1	121
Cumulative Percentage	68	82	86	88	89	90	92	93	93	96	97	98	98	99	100	

Table 3: Number of conferences receiving various numbers of citations from the ACE2005, ACE2006 and ACE2007 proceedings

	Number of Papers													
	1	2	3	4	5	6	7	15	17	27	30	**Total**	0	**Total**
Number of Conferences	90	9	3	2	2	1	3	1	1	1	1	114	7	121
Cumulative Percentage	79	87	89	91	93	94	96	97	98	99	100			

Table 4: Number of conferences receiving citations, excluding self-citations, from various numbers of papers in the ACE2005, ACE2006 and ACE2007 proceedings

Conference	Tier	Cites	CitesXSelf	Papers	PapersXself
SIGCSE: ACM Special Interest Group on Computer Science Education Conference	A	79	74	32	30
ACE: Australasian Computing Education Conference	B	92	48	41	27
ITiCSE: Annual Conference on Integrating Technology into Computer Science Education	A	35	28	20	17
FIE: Frontiers in Education	B	29	28	16	15
CHI: International Conference on Human Factors in Computing Systems	A+	10	10	7	7
ICSE: International Conference on Software Engineering	A+	10	10	7	7
ASCILITE: Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education	C	10	8	9	7
SEET: Software Engineering Education and Training Conference	C	9	7	7	6
HERDSA: Higher Education Research and Development Society of Australasia		8	5	8	5
ASEE: American Society for Engineering Education		6	6	5	5
NACCQ: Conference of the National Advisory Committee on Computing Qualifications	C	16	5	9	4
ED-MEDIA: World Conference on Educational Multimedia Hypermedia and Telecommunications	B	5	5	4	4
AIED: International Conference on Artificial Intelligence in Education	A	7	6	3	3
PPIG: Psychology of Programming Interest Group Workshop		4	4	3	3
InSITE: Informing Science and IT Education Conference	B	3	3	3	3
Koli: Koli Calling – the Baltic Sea Conference on Computing Education Research	B	5	4	3	2
ICER: International Computing Education Research Workshop	B	3	3	2	2
CPR: Computer Personnel Research Conference		3	2	2	2
CogSci: Annual Conference of the Cognitive Science Society	A	2	2	2	2
ICALT: IEEE International Conference on Advanced Learning Technologies	A	2	2	2	2
SIGMOD: ACM Special Interest Group on Management of Data Conference	A+	2	2	2	2
ITS: International Conference on Intelligent Tutoring Systems	C	2	2	2	2
IWPC: International Workshop on Program Comprehension (now Conference)		2	2	2	2

Table 5: All conference proceedings cited by more than one paper (excluding self-citations) in the ACE2005, 2006 and 2007 proceedings. The columns show the CORE tier ("Tier", blank where CORE have not assigned a tier), total number of citations to the conference ("Cites"), total number of citations to the conference, excluding self-citations ("CitesXSelf"), total number of papers that cited that conference (column "Papers"), and total number of papers that cited that conference, excluding self-citations ("CitesXSelf"). The list is ordered (descending) on the last column.

Conference	Tier	Average Papers, 2003-05	Cites	CitesXSelf	Papers	PapersXself
SIGCSE	A	93	0.9	0.8	0.3	0.3
ACE	B	38	1.7	0.9	0.8	0.5
ITiCSE	A	53	0.9	0.7	0.5	0.4

Table 6: The same data as for Table 5, for the three most cited conferences, with the data normalized to the average number of papers in each conference in the three years 2003-2005

	Tier					
	A+	**A**	**B**	**C**	**U**	**Not Listed**
Number of journals cited	9	7	9	1	7	157
Percentage of journals	5%	4%	5%	1%	4%	83%
Percentage of listed journals	27%	21%	27%	3%	21%	—
Percentage of ranked journals	35%	27%	35%	4%	—	—

Table 7: Number of citations to journals in each CORE tier, and to journals not listed by CORE

	Number of Citations												
	1	2	3	4	5	6	7	8	9	16	21	63	**Total**
Number of Journals	116	41	13	8	4	2	0	1	2	1	1	1	190
Cumulative Percentage	61	83	89	94	96	97	97	97	98	99	99	100	

Table 8: Number of journals receiving various numbers of citations from the ACE2005, ACE2006 and ACE2007 proceedings

	Number of Papers												
	1	2	3	4	5	6	7	10	11	26	Total	0	Total
Number of Journals	131	33	10	8	1	2	1	1	1	1	189	1	190
Cumulative Percentage	69	87	92	96	97	98	98	99	99	100			

Table 9: Number of journals receiving citations, excluding self-citations, from various numbers of papers in the ACE2005, ACE2006 and ACE2007 proceedings

Journal	Tier	Cites	CitesXSelf	papers	papersXself
SIGCSE Bulletin		63	54	29	26
Computer Science Education	A+	21	20	12	11
Communications of the ACM		16	16	10	10
Journal of Computing in Small Colleges / Journal of Computing Science in Colleges		15	15	9	9
Higher Education Research and Development		9	9	7	7
Assessment and Evaluation in Higher Education		8	8	6	6
IEEE Computer		6	6	6	6
Higher Education		5	5	4	4
Journal of Educational Computing Research		5	5	4	4
Journal of Computers in Mathematics and Science Teaching		5	5	4	4
British Journal of Educational Psychology		4	4	4	4
Studies in Higher Education		4	4	4	4
Review of Educational Research		4	4	4	4
Psychological Review		4	4	4	4
Computing Surveys (ACM)		4	4	3	3
Journal of Systems and Software	B	4	3	4	3
Small Group Research		4	4	3	3
Educational Researcher		3	3	3	3
Journal of Information Technology Education	U	3	3	3	3
Computers and Education	A	3	3	3	3
Change (Magazine)		3	3	3	3
International Journal of Man-Machine Studies		3	3	3	3
Educational Technology and Society		3	3	3	3
Journal of Distance Education		3	3	3	3

Table 10: All journals cited by more three or more papers (excluding self-citations) in the ACE2005, 2006 and 2007 proceedings. The columns show the CORE tier (blank where CORE have not listed the journal), total number of citations to the journal ("Cites"), total number of citations to the journal, excluding self-citations ("CitesXSelf"), total number of papers that cited that journal (column "Papers"), and total number of papers that cited that journal, excluding self-citations ("CitesXSelf"). The list is ordered (descending) on the last column.

Conference	Tier	Average Papers, 2003-05	Cites	CitesXSelf	Papers	PapersXself
SIGCSE Bulletin (all)		69	0.9	0.8	0.4	0.4
SIGCSE Bulletin (refereed or formally reviewed)		43	1.5	1.3	0.7	0.6
Computer Science Education	A+	15	1.4	1.3	0.8	0.7

Table 11: The same data as for Table 10, for the two most cited journals, with the data normalized to the average number of papers in each journal in the three years 2003-2005

Sum	Type	Book
11	education	Biggs, J. (1999) *Teaching for Quality Learning at University*. Buckingham: Open University Press.
10	education	Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H. & Krathwohl, D. R. (1956) *Taxonomy of educational objectives Handbook 1: cognitive domain*, London, Longman Group Ltd.
8	education	Ramsden, P. (1992 & 2003) *Learning to Teach in Higher Education*. London, U.K.: Routledge (count includes 2003 second edition)
6	education	Biggs, J. B. & Collis, K. F. (1982) *Evaluating the quality of learning: The SOLO taxonomy* (*Structure of the Observed Learning Outcome*), New York, Academic Press.
5	education	Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., Raths, J. & Wittrock, M. C. (Eds.) (2001) *A taxonomy for learning and teaching and assessing: A revision of Bloom's taxonomy of educational objectives*, Addison Wesley Longman.
5	content	Humphrey, W. S. (1997) *Introduction to the personal software process* (tm), Reading, MA, Addison Wesley Longman.
4	content	Humphrey, W. S. (1995) *A discipline for software engineering*, Reading, MA, Addison Wesley Longman.
4	education	Laurillard, D. (1993): *Rethinking University Teaching: A Framework for the Effective Use of Educational Technology*. London, Routledge.
3	content	Beck, K., & Andres, C. (2004). *Extreme Programming Explained - Embrace Change* (2nd ed.). Upper Saddle River: Pearson Education, Inc.
3	education	Bowden, J & Marton, F 1998, *University of learning*, Routledge Falmer, London.
3	education	Kolb, D. A. 1984, *Experiential Learning: Experience as The Source of Learning and Development.* Englewood Cliffs, New Jersey, Prentice-Hall.

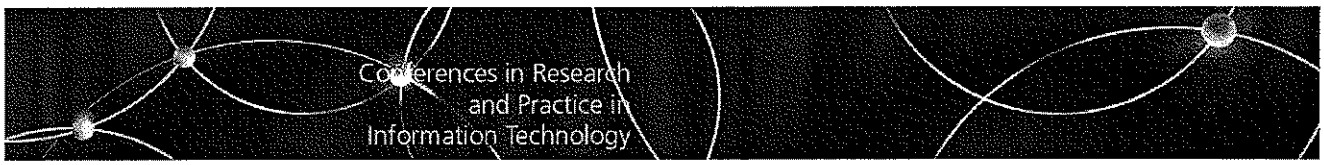
Table 12: Most commonly cited books in the ACE2005, ACE2006 and ACE2007 proceedings

Number Citations (305 total)	Different Books (229 total)	Type
155 (51%)	98 (43%)	Education
22 (7%)	22 (10%)	Social
60 (20%)	45 (20%)	Computing Content
27 (9%)	27 (12%)	Text Book
9 (3%)	7 (3%)	Computing Education
12 (4%)	10 (4%)	Research Methods
17 (6%)	16 (7%)	Psychology
4 (1%)	4 (2%)	Other

Table 13: Number of different types of book cited in the ACE2005, ACE2006 and ACE2007 proceedings

	Number of Books Cited												
	0	1	2	3	4	5	6	7	8	10	11	16	34
Cumulative Percentage	22	37	46	62	77	83	88	90	91	92	94	96	97

Table 14: Number of papers citing a given number of books in the ACE2005-07 proceedings



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Volume 78 - Computing Education 2008

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