



---

---

## Contents

Editorial .....	iii-vi
Can multimedia meet tertiary educational needs better than the conventional lecture? A case study .....	1-20
<i>Geoff Andrewartha and Simon Wilmot</i>	
A multivariate analysis of students' experience of web based learning .....	21-36
<i>Uschi Felix</i>	
Managing change: The use of mixed delivery modes to increase learning opportunities .....	37-49
<i>Sue Franklin and Mary Peat</i>	
Developing science students' metacognitive problem solving skills online .....	50-63
<i>Rowan W. Hollingworth and Catherine McLoughlin</i>	
Constructivism as a referent in the design and development of a computer program using interactive digital video to enhance learning in physics .....	64-79
<i>Matthew Kearney and David F. Treagust</i>	
Building the Web Interactive Study Environment: Mainstreaming online teaching and learning at the University of Western Sydney .....	80-95
<i>Stephen Sheely, Deborah Veness and Lynnae Rankine</i>	
The use of a QTVR image database for teaching veterinary radiology and diagnostic ultrasound to distance education students .....	96-114
<i>Rob Phillips, Romana Pospisil and Jennifer L Richardson</i>	

---

---

© 2001 All rights reserved. No part of this journal may be reprinted or reproduced  
without permission from the publishers.

The *Australian Journal of Educational Technology* is a refereed research journal  
published three times per year jointly by the Australian Society for Educational

Technology and the Australasian Society for Computers in Learning in Tertiary Education. For details on submission of manuscripts, subscriptions and access to the AJET online archives, please see:

<http://cleo.murdoch.edu.au/ajet/>

or for manuscript submission contact the Editor, Dr Ron Oliver, Mt Lawley Campus, Edith Cowan University, Mt Lawley Western Australia 6050, [r.oliver@cowan.edu.au](mailto:r.oliver@cowan.edu.au), or for subscriptions contact the Production Editor, Dr Roger Atkinson, Teaching and Learning Centre, Murdoch University, Murdoch Western Australia 6150, [atkinson@cleo.murdoch.edu.au](mailto:atkinson@cleo.murdoch.edu.au). Members of ASET, ASCILITE and ISPI (Vic) receive AJET as a part of their membership benefits.

AJET's 2001 Editorial Board, nominated by ASCILITE and ASET is:

Ron Oliver (Editor), Edith Cowan University  
 Roger Atkinson (Production Editor), Murdoch University  
 Cathy Gunn, University of Auckland  
 Barry Harper, University of Wollongong  
 Mary Jane Mahony, University of Sydney  
 Clare McBeath, Curtin University of Technology  
 Sue McNamara, Monash University  
 Rod Sims, Southern Cross University

Australasian Society for Computers  
 in Learning in Tertiary Education  
<http://www.ascilite.org.au/>

Australian Society for  
 Educational Technology  
<http://cleo.murdoch.edu.au/aset/>

Copyright in individual articles contained in AJET is vested in each of the authors in respect of his or her contributions. Copyright in AJET is vested in ASET (1985-86), AJET Publications (1987-1996), and ASET and ASCILITE (from 1997). Desktop publishing and HTML by Roger Atkinson. Printed and bound by Deadline Printing, Applecross WA 6153, Australia.

### *Supporting Societies*

Supporting societies obtain bulk supplies of printed copies of AJET at the same cost as applicable for ASCILITE and ASET members, and access to AJET online articles during the period of restricted access for each issue. Inquiries about supporting society status may be directed to the Production Editor.



**INTERNATIONAL  
 SOCIETY FOR  
 PERFORMANCE  
 IMPROVEMENT**

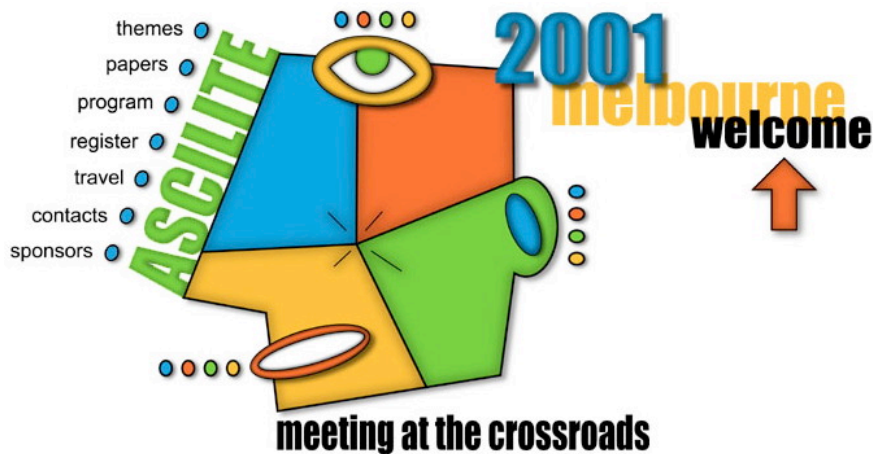
ISPI Melbourne Chapter  
<http://www.ispi.org/>

## Editorial

---

Six of the seven articles in AJET's first issue for 2001 have been drawn from ASCILITE's 2000 Conference at Coffs Harbour (ASCILITE 2000). Continuing a policy adopted in 1999 (Oliver, 1999), AJET received nominations of the most distinguished articles from the Conference's editorial and review processes. As with the 1999 selection, these articles are excellent examples of a vigorous research and development effort concerning the use of educational technologies in higher education.

The first article in this issue is Geoff Andrewartha and Simon Wilmot's examination of multimedia program and face to face lecture deliveries (Andrewartha and Wilmot, 2001). Their article was not drawn from ASCILITE's December 2000 Conference, but was accepted into production on 10 November 2000, just one day after we filled AJET 16(3) and four weeks before the ASCILITE Conference. The delay in publication until April 2001, whilst waiting for the full complement of articles to fill AJET 17(1), is a concern. As Production Editor, I'm preparing a proposal for AJET's Board to consider, to enable a limited form of web release for individual articles, immediately after completion of peer review and prior to appearance in a print issue. I'm mindful that over three years have passed since offering to explore "the pros and cons of moving to primary publication on the AJET web site, with print issues following at a later date, when a sufficient number of articles, typically 4 to 7, are accumulated to warrant a 'print, package and post' job." (Atkinson, 1997)



ASCILITE 2001, 9-12 December, hosted by the  
University of Melbourne and the Biomedical Multimedia Unit  
<http://www.medfac.unimelb.edu.au/ascilite2001/>

---

Ironically, a delay in publication may not be a disadvantage in all cases, as the following anecdote indicates. During March-April, researchers in Australian universities have become acquainted, or re-acquainted, with DETYA's Higher Education Research Data Collection process (DETYA, 2001). Nowadays this exercise is taken very seriously, because the data enables one component of the Federal Government's procedures for "... determining allocations to universities under performance based funding schemes." (DETYA, 2001) In brief, universities submit to DETYA a count of their research publications for Year 2000 and will obtain a related increase (or decrease) in future annual allocations of Federal funding. Details vary between universities, but to give an indicative example, a *research* article by Murdoch University staff in a *refereed* journal is expected to "earn" about \$3000 to \$3600 in the Year 2000 count for Murdoch University. A *seriously* rewarding amount, compared with about \$900 per article in the Year 1999 count (Murdoch University, 2001). Authors who just missed out on a 1999 publication date and had to take a Year 2000 date probably will not complain to the Editors about delays in the publishing process!

Naturally enough, DETYA has an extensive set of rules and procedures for verifying and auditing the counts of research publications made by Australian universities (DETYA, 2001b). Authors, editors, conference organisers and publishers now take great care to ensure eligibility as a *research* article in a *refereed* journal (DETYA category C1) or in a *refereed* conference proceedings (DETYA category E1). Articles which are not refereed, or are not research, or are deemed ineligible on other criteria (DETYA, 2001b) do not attract a research funding reward for the author's university. Authors submitting to AJET may be re-assured that the status of accepted articles is "DETYA C1 compliant" (however, only authors working in an Australian university are able to obtain a practical benefit from that status, as the scheme is applicable only for DETYA funded universities).

#### Online references

AJET's editorial policy to "promote and facilitate the citation and use of online references" (Atkinson, 2000) has been applied comprehensively to three issues (Table 1). Records of editorial action show that about 20% of the URLs (Uniform Resource Locators, or web page addresses) cited by authors require correction or are annotated as "broken" (refer Table 1, column "Corrected or broken"). Editorial addition of URLs (refer column "URLs added") increases the percentage of URL based citations from about 19% (column "URLs cited") to about 31% (column "URLs %").

Table 1: Citations of URLs in AJET articles

AJET Vol (issue)	Number of articles	Total citations	URLs cited	Corrected or broken	URLs added	URLs %
17(1)	7	227	24	11	38	27.3
16(3)	6	129	45	4	8	41.1
16(2)	6	113	20	3	10	26.5
Total	19	469	89	18	56	30.9

The proportion of errors and broken URLs is similar to proportions noted in other studies, for example Germain (2000) and Davis and Cohen (2001).

Editorial work on verifying, correcting and adding URLs is essential, and seems to be well worthwhile. Whilst the main purpose is to facilitate the reader's access to references cited in AJET articles, extensive use of valid URLs helps to demonstrate and promote the increasing importance of the research journals, conference proceedings and monographs which have espoused Internet based delivery of *freely accessible* literature.

### Access statistics

Page access counts ("hits") for AJET's home and contents pages (Table 2) continue on the strong growth path noted in a 1999 editorial (Atkinson, 1999). The growth rate is satisfying, although the counts are relatively small compared with some other journals. For example, the library and information services journal *Ariadne* records a total of over 100,000 page views per month (Hunter, 2000), and its usage "...doubled between May 1998 and October 1999" (Hunter, 1999). AJET usage, assessed by home page hits for the month of March, increased 47% between March 1999 and March 2000 (from 1277 to 1879) and coincidentally, also by 47% between March 2000 and March 2001 (from 1879 to 2768).

Table 2: Selected page access counts for AJET 1999-2001

Date	Home	Vol 16	Vol 15	Vol 14	Vol 13	Search
2 Dec 99	23150	-	4252	6408	4874	2099
3 Oct 00	38931	1599	9932	9132	7091	5534
4 Dec 00	42607	2470	10742	9628	7539	6372
5 Feb 01	45434	3242	11404	9946	7845	6844
5 Apr 01	50059	4313	12237	10401	8268	7807

Unfortunately, it is difficult to obtain statistical data enabling extensive comparisons between journals. We encounter several problems, including some problems in comparability of data, and a major problem in 'coyness' about data relating to circulation and numbers of readers. Very few publishers, whether commercial or non-profit, provide publicly accessible information about the numbers of subscribers to print versions, or about accesses to online articles. Perhaps this is understandable, because librarians may cancel subscriptions, and authors may be reluctant to submit articles, if a journal is known to have a small number of subscribers (or low hit counts) (Luther, 2001).

Commencing with AJET 15, we have placed hit counters on the web pages for all articles. Access rates show a marked peak after new articles are released from the period of password restricted access (currently 3 months) before entering a "decay curve" (Anderson et al, 2001). AJET 16(3) articles currently show access counts in the range 62-120 hits per week (average 78; sampling period 22 Mar-5 Apr 2001), compared with counts in the range 8-34 per week for articles in AJET 16(1) and (2) (average 15.1), and 5-130 for articles in AJET 15 (sampling periods 6 Feb-5 Apr 2001). Omitting the remarkably high count of 130 per week for McLoughlin (1999), the average count for AJET 15 articles is 13.8 per week. There is bad news for writers of AJET's editorials. The hit count average for AJET 15, 16(1) and 16(2) editorials is a mere 3.1 per week. And editorials don't earn DETYA research funds :-)

Roger Atkinson

## References

- Anderson, K., Sack, J., Krauss, L. and O'Keefe, L. (2001). Publishing online-only peer-reviewed biomedical literature: Three years of citation, author perception, and usage experience. *Journal of Electronic Publishing*, 6(3).  
<http://www.press.umich.edu/jep/06-03/anderson.html>
- Andrewartha, G. and Wilmot, S. (2001). Can multimedia meet tertiary educational needs better than the conventional lecture? A case study. *Australian Journal of Educational Technology*, 17(1), 1-20.  
<http://cleo.murdoch.edu.au/ajet/ajet17/andrewartha.html>
- ASCILITE 2000, 17th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education, hosted by Southern Cross University at Coffs Harbour NSW, 9-14 December 2000. <http://multimedia.scu.edu.au/ascilite2000/>
- Atkinson, R. J. (1997). Editorial. *Australian Journal of Educational Technology*, 13(2), iii-iv. <http://cleo.murdoch.edu.au/ajet/ajet13/su97pi.html>
- Atkinson, R. J. (1999). Editorial. *Australian Journal of Educational Technology*, 15(3), iii-vi. <http://cleo.murdoch.edu.au/ajet/ajet15/editorial3.html>
- Atkinson, R. J. (2000). Editorial. *Australian Journal of Educational Technology*, 16(2), iii-iv. <http://cleo.murdoch.edu.au/ajet/ajet16/editorial16-2.html>
- Davis, P. M. and Cohen, S. A. (2001). The effect of the Web on undergraduate citation behavior 1996-1999. *Journal of the American Society for Information Science and Technology*, 52(4), 309-314.  
<http://www.asis.org/Publications/JASIS/vol52n4.html>
- DETYA (Commonwealth Department of Education, Training and Youth Affairs) (2001a). Higher Education Research Data Collection.  
<http://www.detya.gov.au/highered/research/herdc.htm>
- DETYA (2001b). 2001 Higher Education Research Data Collection: Specifications for preparing returns. [verified 6 Mar 2001]  
<http://www.detya.edu.au/highered/research/documents/spcs01rt.rtf>
- Germain, C. A. (2000). URLs: Uniform Resource Locators or Unreliable Resource Locators. *College and Research Libraries*, 61(4), 399-365.
- Hunter, P. (1999). Ariadne's thread. *Ariadne*, 22.  
<http://www.ariadne.ac.uk/issue22/editorial/>
- Hunter, P. (2000). Plumbing the Digital Library. *Ariadne*, 24.  
<http://www.ariadne.ac.uk/issue24/editorial/>
- Luther, J. L. (2001). White Paper on Electronic Journal Usage Statistics. *Journal of Electronic Publishing*, 6(3). <http://www.press.umich.edu/jep/06-03/luther.html>
- McLoughlin, C. (1999). The implications of the research literature on learning styles for the design of instructional material. *Australian Journal of Educational Technology*, 15(3), 222-241. <http://cleo.murdoch.edu.au/ajet/ajet15/mcloughlin.html>
- Murdoch University Division of Research and Development (2001). Internal seminar, 8 March.
- Oliver, R. (2000). Editorial. *Australian Journal of Educational Technology*, 16(1), iii-vi.  
<http://cleo.murdoch.edu.au/ajet/ajet16/editorial16-1.html>