TRENDS, FADS AND FUTURES: COMPUTERS IN LEARNING IN TERTIARY EDUCATION, 1983-2002

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Abstract

ASCILITE, the Australasian Society for Computers in Learning in Tertiary Education, is a professional society focusing on computers in learning in tertiary education that has been sponsoring conferences for its membership since 1986. Prior to this, three earlier conferences formed the genesis of ASCILITE. Over that period there have been significant changes in pedagogy and technology but few attempts, if any, have been made to analyse the ways in which conference proceedings have reflected these changes and shifts. The purpose of this research paper is to review the ASCILITE proceedings and provide an analysis of "trends, fads and futures" to reflect on past initiatives, propose potential directions and assist the society identify strategic directions. In addition, the analysis will provide a basis from which further research can be justified in terms of better understanding "computers in learning in tertiary education".

Keywords

Pedagogical trends, Technological trends, Computers in learning, Computers in teaching, Educational technology research, Historical review

Introduction

The year 2002 sees ASCILITE, the Australasian Society for Computers in Learning in Tertiary Education, celebrating the publishing of its 20th set of conference proceedings. This paper documents an analysis of each of those proceedings, in terms of both the demographics of the contributing authors and the major themes and outcomes that have arisen from two decades of research and analysis. Note that within this paper, citations for specific conferences are made to the conference name and its year of operation, and this identifier can therefore be used to locate publication details for each of the proceedings. For convenience, these citations are listed under a separate category: Proceedings - by year of publication.

By way of background, the genesis of ASCILITE can be traced to 1983 when the University of Queensland hosted a conference on Computers in Learning in Tertiary Education (CALITE, 1983) that attracted approximately 200 delegates. By 1985 interest had swelled and at CALITE (1985) John Bowden led the foundation of the Australian Society for Computers in Learning in Tertiary Education (ASCILITE). Since then ASCILITE has hosted annual conferences each December, apart from a collaborative venture with the World Conference on Computers in Education in 1990 when it was host to a special Computer Based Training session (see WCCE, 1990; Sims, 1990) and a second collaboration with the TAFE and Schools sectors at the 1994 APITITE (Asia Pacific Information Technology in Training and Education) conference (APITITE, 1994). Including each of these conventions, there have been nineteen national conferences and associated conference proceedings since CALITE (1983). The hosting of the 2002 conference in Auckland, New Zealand not only marks the twentieth conference but also the first time that ASCILITE has been hosted outside Australia.

A precursor to this study was an analysis conducted by Geoff Isaacs (Isaacs, 1993), who focused on the scholarship of papers accepted for publishing by ASCILITE (and its predecessor conferences) between 1983 and 1992. One of the factors Isaacs (1993) considered was the number of papers which had referred to other papers; as shown in Figure 1, the two periods that Isaacs (1993) considered (1983-1984 and 1991-1992) revealed that approximately 20% of papers did not make reference to other sources. In comparison, all papers now published in the ASCILITE proceedings make reference to other sources (as shown in the right-hand bar in Figure 1). Not only does this acknowledge a shift in scholarship but also that papers submitted to ASCILITE must conform to a standard of double-blind peer review.
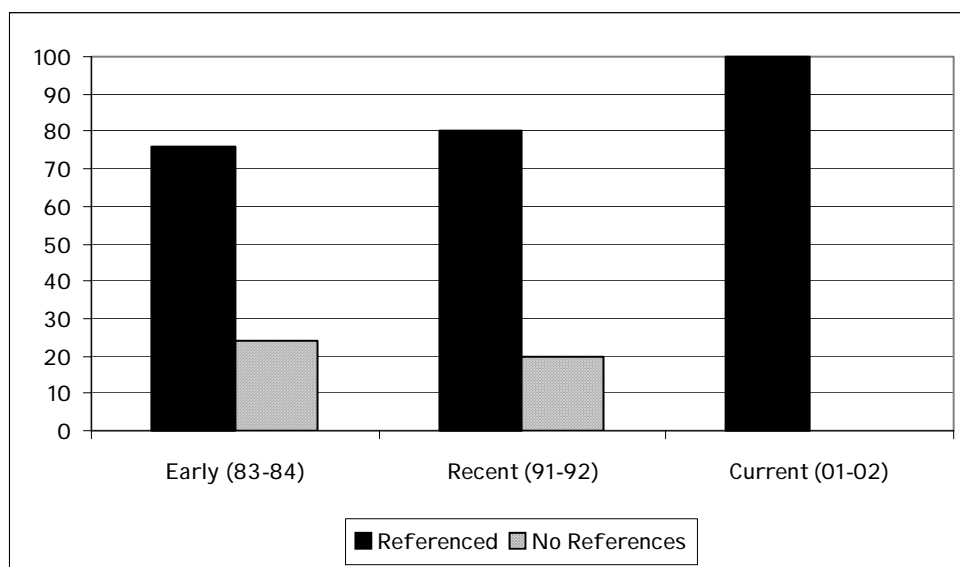

Figure 1: Comparison of Papers with References (after Isaacs, 1993)

While noting that there is always the opportunity to learn from the past as well as learn from experience, Isaacs (1993) concluded that the important task is to strike a balance between reflective analysis and proactive research. Interestingly, this reflection on the history of educational computing is now becoming somewhat commonplace, and would suggest that bringing the extensive knowledge and understanding of computers in teaching and learning that has been gained over the past twenty years is critical to providing a strong foundation for the next two decades of research and endeavour.

Interestingly, over the last twelve months three different analyses of "computers in learning" have been presented at Australian and international conferences. Koschmann (2001), presenting at ASCILITE, described the implementation of a Kuhnian analysis of instructional technology research and identified the emergence of four paradigms over the past four decades - computer assisted instruction, intelligent tutoring systems, Logo-as-Latin and computer-supported collaborative learning. While these paradigms can be aligned to different theoretical and technological developments, it was emphasized that "further examinations of research practice are needed as is an illumination of the theories that guide our work" (Koschmann, 2001 p. 20).

A second study by Williamson, Nodder & Baker (2001), also presenting at ASCILITE, focused on research output in New Zealand in terms of research methods, pedagogical framework, educational environment and technology. Their conclusions focused on the need to better align government policy and funding with the benefits that can be achieved from the implementation of educational technology. Earlier this year, Maurer (2002), presenting at EdMedia in Colorado, detailed a subjective reflection on the past fifteen years of instructional technology from an international perspective, with the main theme to emerge being that as new technologies and new practitioners emerge, so do skills and knowledge from the previous "generation" become lost or unrecognised. This point is consistent with the conclusions of Isaacs (1993). In addition, Maurer (2002) argued that the technology we currently have, or will have,

access to will change the practice of teaching and learning, as we will no longer need to teach what is now considered important to learn.

Within this environment, this project was initiated to focus specifically on the Australian context through an analysis of nearly two decades of conference papers published by the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE, 1986-2001) as well as papers from three predecessor conferences - Computers in Learning in Tertiary Education (CALITE, 1983-1985). By building on the outcomes of the other studies noted, the aim of our research was to focus on three discrete factors associated with the conference publications:

1. a demographic analysis of delegates, keynote presenters, papers presented, state of origin, country of origin and place of conference;
2. an analysis by theme (technology, pedagogy, application, discipline) and trend in terms of the focus of the individual papers; and
3. a reflection of these trends in terms of future directions for "computers in learning in tertiary education".

Methodology

The methodology for the project is qualitative, adopting a grounded approach and multiple perspectives to provide measures of reliability and validity. The undertaking was extensive, examining each paper presented at CALITE (1983-1985) and ASCILITE (1986-2002) to identify the essential demographics, the major category to which it could best be assigned, the technology being considered, the pedagogy informing the writing and the major outcomes derived from the publication. To achieve this, the following process was adopted.

First, an initial pilot review of three sets of proceedings (CALITE, 1983 and ASCILITE, 2001) was conducted to confirm the process by which papers would be identified with a pedagogy (for example instructivist, constructivist, collaborative, experiential, problem-based), technology (for example mainframe, personal computer, network, internet) and category. Based on this, the following set of categories were adopted:

- RESEARCH and EVALUATION: A paper that reports specifically on a research and/or evaluation project with accompanying data analysis and results, with answers/outcomes to the research question critical.
- CASE STUDY: A paper that focuses on a description of an application with no evaluation component; these papers may also focus on the various elements that constitute a computer-based teaching and learning environment.
- PROGRAM DEVELOPMENT: A paper that describes the design and development of a complete program of study associated with the use of computers in education.
- PROFESSIONAL DEVELOPMENT: A paper that emphasises the provision of skills to academic staff and students to enable them to better utilise computers in learning.
- INSTITUTIONAL: A paper that focuses on issues relating to institutional decisions for Computers in Learning in Tertiary Education as well as implications for policy and practice.
- INSTRUCTIONAL DESIGN: A paper that considers the educational design processes associated with creating computer-based teaching and learning resources.
- INTERFACE DESIGN: A paper that focuses on the creation of effective displays to maximise learning activities.
- THEORY A paper focused on the theoretical aspects of the field.
- TECHNICAL: A paper that focuses on the hardware and/or software aspects of creating computer-based learning resources

Having completed the pilot phase, the papers in each set of proceedings were classified by pedagogy, technology and category as well as demographic details of author institution, and the data collected used to define the results reported in this paper. The following phase of the project will be to undertake a thematic analysis of the outcomes and collaborate with independent experts to establish consistency and

reliability, and establish a basis to clarify the trends, fads and futures of computers in learning in tertiary education.

Results

Distribution of Authors

The distribution shown in Figure 2 represents the percentage of first authors from universities in each state, grouped by four five-year periods (1983-1987, 1988-1992, 1993-1997 and 1998-2002). As would be expected given that 28 of the 37 universities are from New South Wales (10), Victoria (10) and Queensland (8), these three states represent the majority of papers presented over the past twenty years. However, while the representation from Queensland is decreasing (from the its dominant position in the 1983-1985 period), New South Wales and Victoria are maintaining a relatively constant contribution and Western Australia is showing a large increase, especially over the past five years.
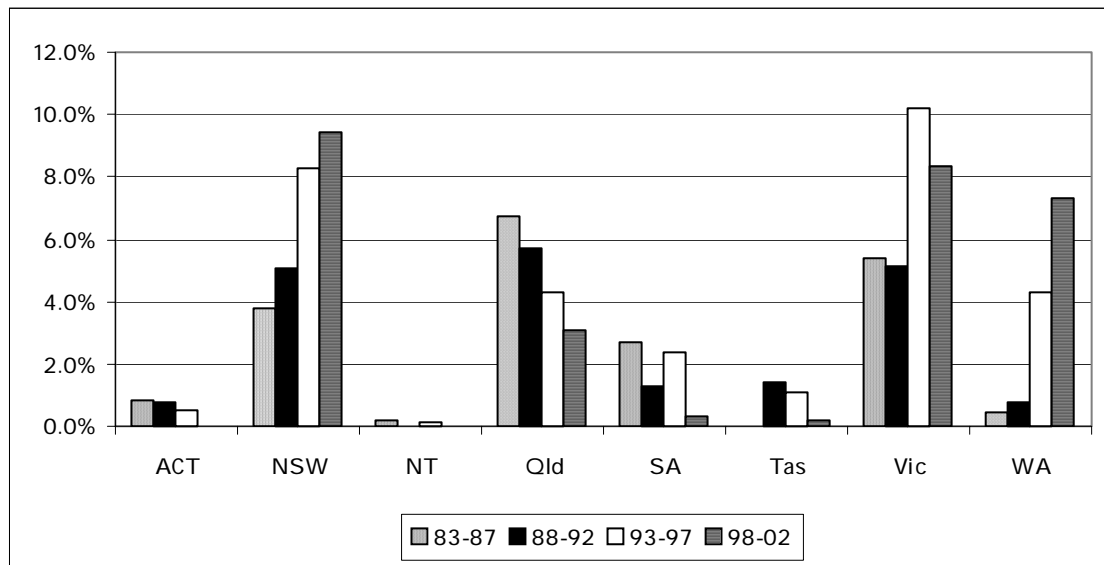

Figure 2: Distribution of University First Authors by State

A second analysis of the authors is shown in Figure 3(a) and Figure 3(b), representing contributions from international delegates as well as those from other sectors of the Australian educational community. With respect to international contributions, ASCILITE appears to be attracting a range of overseas contributors especially from the UK and New Zealand, which attests to the work of the executive in developing the Society as Australasian as well as the linkages established with the Association for Learning Technologies (ALT) and the Journal of Computer-Assisted Learning. The rise in contributions from New Zealand is not a result of the conference being held in Auckland in 2002, but rather a reflection of the close linkages being forged across the Tasman. This change may also be attributed to the emergence of international communities of practice in our field, and the subsequent decision by individuals to meet with their "virtual" peers in a physical context.

Over the past twenty years, ASCILITE has also managed to attract a regular stream of contributions from the corporate sector, government and technical education. However, detailed analysis of the raw data shows that compared to the early years of ASCILITE, the last five years have seen a significant reduction in contributions from these sectors, with none at all from TAFE between 1997 and 2002. Overall however, ASCILITE does not consistently attract papers from sectors outside the Australasian university sector which may be an area to focus on if the organization wishes to enhance its international profile.
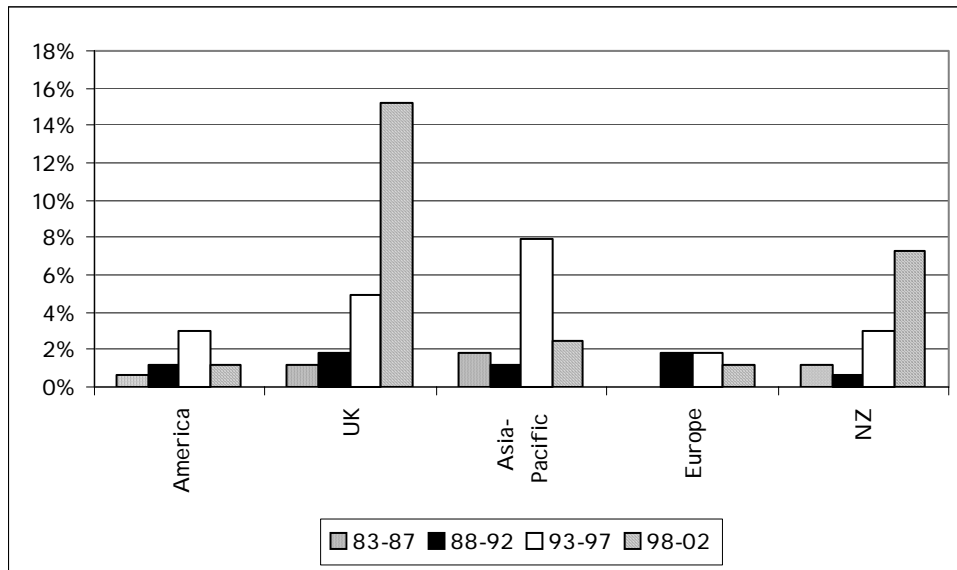
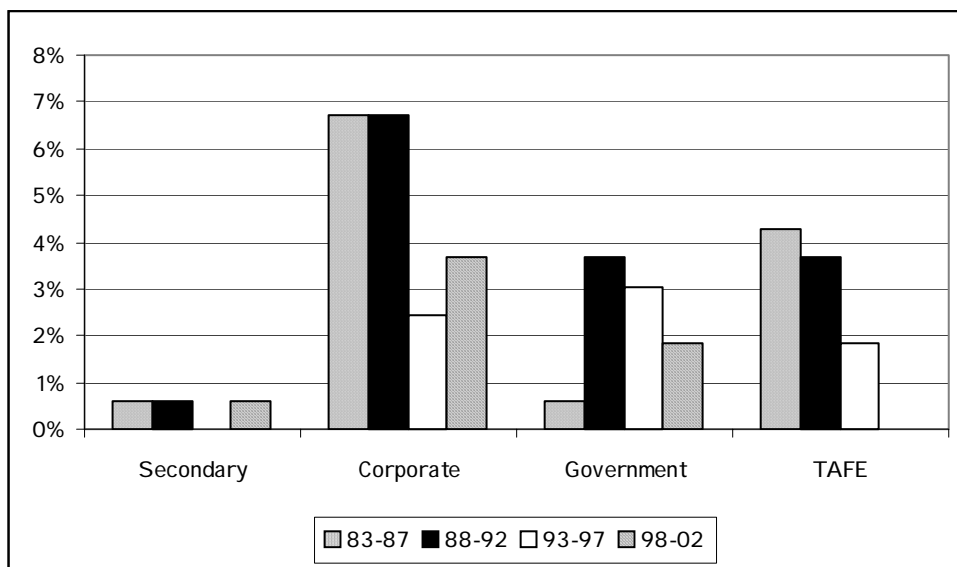*Figure 3(a): Distribution of First Authors by Overseas Universities*

Figure 3(b): Distribution of First Authors by Other Australian Sectors

An interesting trend also emerging is the marked increase in collaboration between authors as illustrated in Figure 4. From a very small percentage evidenced from CALITE (1983) the trend has been from collaboration within organizations to those within a geographical proximity to national and international contributions. While this can partly be attributed to the development of electronic communications it is also evidence of a growing and maturing community of practice (Wenger, 1998). Extracting individual data from this summary reveals that in 1983, 87% (n=41) of papers were written by a single author whereas by 2002 the percentage of single-author papers had dropped to 34% (n=23). From a review of the papers, it would appear that the most of this collaboration is between authors from the same department or university, however this data has yet to be fully analysed.
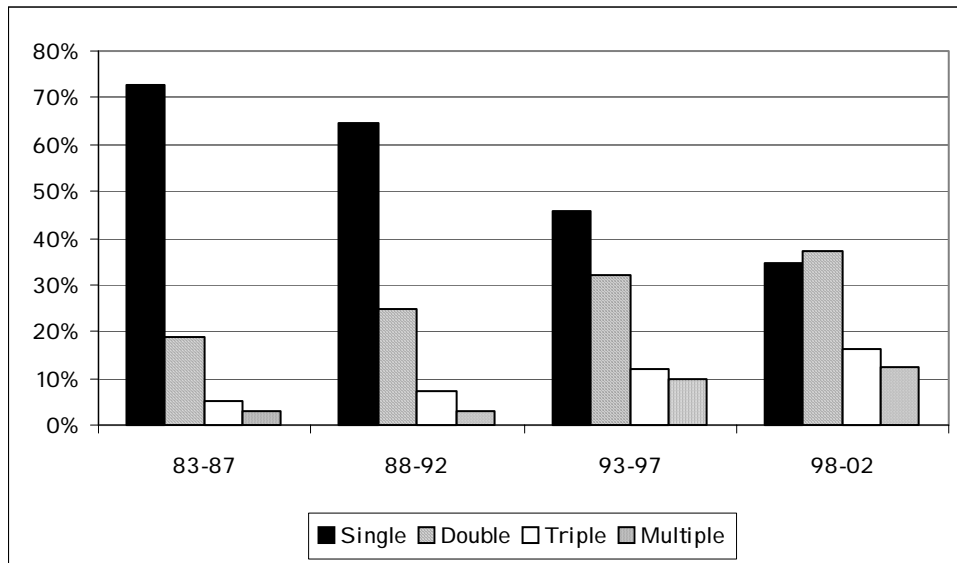
Figure 4: Evidence of Increased Collaboration Between Authors

The value of this data for ASCILITE as a professional organisation is to align this profile with that identified within its strategic plan for further conferences, locations and target delegates. In addition, the following summary of the category distribution of the papers provides a context by which the focus of activity within the research and development of computers and learning should be directed.

Distribution by Category

In addition to the profile of authors, the themes or category that the various papers focused on reflect a particular stage in the way we have perceived and reported the condition of computers in learning in tertiary education. The following analysis is based on representative data analysed from seven sets of the proceedings (1983, 1986, 1989, 1992, 1995, 1999 and 2001) and is reported in terms of four five-year periods, as illustrated in Figure 5. While the data is as yet incomplete, the trends are sufficient to identify areas in which further study and research can be directed.
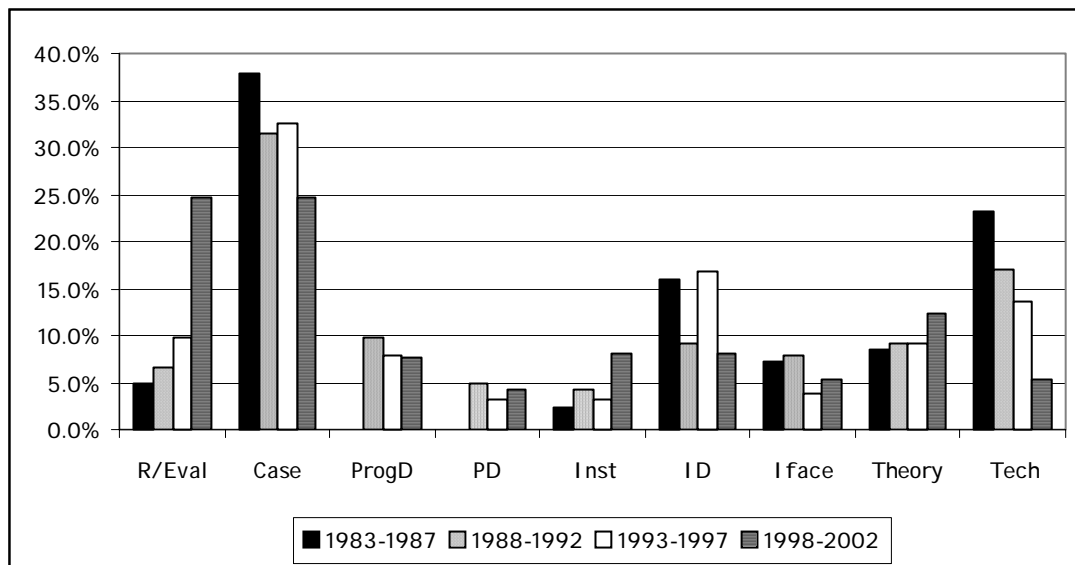

Figure 5: Comparison of Category between (CALITE, 1983) and (ASCILITE, 2001)

With respect to Research & Evaluation, there has been a marked shift in the focus of individual papers on this aspect of the field over the past five years, from 4.9% in the 1983-1997 period to 24.6% on the past five years. Conversely, the focus on technology demonstrates a negative correlation to that of Research & Evaluation, slipping from a high of 23.2% to 5.2% in the same period. We believe this is a positive outcome, suggesting a recognition that more is needed to be understood of the computer-learner dynamic rather than the technology itself. Interestingly, data discussed in the following section indicates there remains a gap between the technology and the pedagogy of using that technology.

Another important trend in the data is that papers focusing on a Case Study (reporting what was achieved in terms of development and implementation compared to research and/or evaluation of that implementation) has remained at a level of at least 25%, suggesting that authors are continuing to report on what they are doing with technology compared to analyzing the effectiveness of that intervention. However, as can be seen from Figure 5, there is also a gradual increase in those papers focusing on Theoretical aspects of the field, suggesting that the field of computers in learning is becoming more formalized with specific theoretical underpinnings.

A third aspect emerging from the data shown in Figure 5 is the emergence of studies focusing on the Program Development of whole courses using computer-based resources, the ways in which Professional Development support should be provided and the implications of technology on Institutional operations. Over the same period, papers addressing areas such as Instructional Design and Interface Design have diminished. Overall, this latter set of data reinforces the observation that the field is establishing itself and is beginning to focus on broader issues.

Computers and Learning

A final set of data to consider is the extent to which the papers analysed have focused on technology (computers) and pedagogy (learning) the core elements of ASCILITE. As shown in Figure 6, data from seven of the conference proceedings show a relatively constant reference to the technology (as would be expected) as well as an increase on pedagogical strategies. While further analysis remains to be undertaken, the trends in technology factors show an expected shift from mainframe to personal to multimedia to online environments while the pedagogy has followed similar directions, with the current emphasis on community and collaboration.
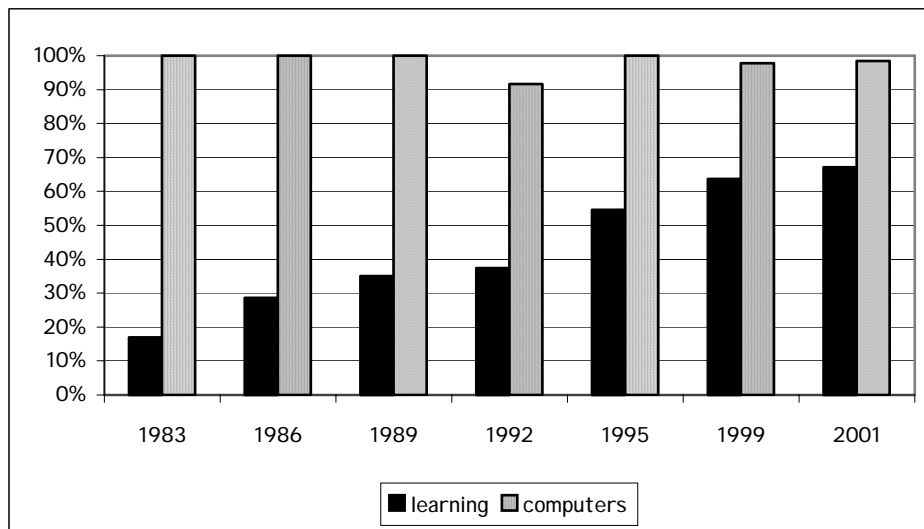

Figure 6: Shift in Focus from Technology (Computers) to Pedagogy (Learning)

Conclusion

This analysis of conference papers published over twenty years by the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE) has provided data relating not only to the demographics of authors submitting papers but also to the various themes being presented within those papers. One of the general trends emerging, as might have been expected, is that many of the papers reflect the changing state of the underpinning technology rather than their impact on teaching and learning practice, and it is this area that we feel continues to require focus within the broad field of computers in learning.

While we have yet to complete a comprehensive analysis of these trends, there is a consistency with the four paradigms identified by Koschmann (2001), and therefore we can predict that as a new technology emerges so the papers of ASCILITE will reflect those technologies. The extent to which the pedagogy is also the focus will be dependant both on the field of practice of the authors and the ways in which the conference organizers identify themes for their meeting.

More importantly however, there is the opportunity for ASCILITE participants to be aware of the array of writing and research that has been undertaken in the field, and to build on that knowledge as new economies, politics, policies, social structures and educational environments emerge. What we encourage is to embrace the technologies as they emerge, but to contextualise them in currently understood practice and not view them in themselves as a means to an end.

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Acknowledgements