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# Epistemologies in Use in Information Systems Research: Divergence or Change?

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## Abstract

*Researchers have referred to the dangers of widely diverse approaches for the future of Information Systems (IS) research and argued for 'controlled diversity', where some degree of consensus exists. The aim of this study was to test the degree of epistemological diversity found in a national IS research community and through this, to provide a verification and update of the results of a similar analysis in a North American context. The paper reports on an empirical study of the epistemology of Australian academic mainstream IS papers published in ten outlets between 1980 and 1996. Although increasing epistemological diversity was found it started from a homogeneous base and there were indications that it was controlled. The study tracked part of a longitudinal change process that may lead to consensus.*

## Introduction

It has been argued that the degree of diversity in IS research is a problem (Benbasat & Weber 1996), and that scientific progress requires consensus (Pfeffer 1993). In an attempt to legitimise IS research, theoretical foundations and methodologies were borrowed from reference disciplines and applied to IS (Benbasat & Weber 1996). The last authors argued that diversity needs to be managed and controlled. This paper reports on an analysis of the epistemology of Australian mainstream IS academic papers published between 1980 and 1996 in order to determine the degree of diversity or consensus displayed. The work also responds to calls for the articulation of international IS research traditions (for example, King 1993). An awareness of the nature and trends of the epistemology of IS research must be a starting point for consensus. Furthermore, as it has been argued that there is a link between the philosophical assumptions of research, the methods employed and the phenomena investigated (Benbasat & Weber 1996), then shifts in the epistemology may reflect more general changes to the nature of research.

## Background

Although there is a body of largely North American literature that has investigated the nature of published IS research, it has focused mainly on the research topics and/or methods used (for example, Alavi, Carlson & Brooke 1989; Alavi & Carlson 1992; Cheon, Grover & Sabherwal 1993) rather than on epistemology. In 1991 Orlikowski and Baroudi used Chua's (1986) epistemological classification scheme to analyse the epistemology of empirical papers published between 1983 and 1988 in four leading IS publication outlets. The scheme categorised the papers as positivist, interpretive or critical studies. Positivist papers were further classified as theoretical or descriptive. In the study of mainly North American papers, 96.8% were found to be positivist, of which 23.9% were descriptive and 72.9% theoretical, while 3.2% were interpretive. No critical science papers were found.

Positivist papers 'are premised on the existence of a priori fixed relationships within phenomena which are typically investigated with structured instrumentation...[serving] primarily to test theory in an attempt to increase predictive understanding of phenomena' (Orlikowski & Baroudi 1991). Theoretical papers were evidenced by formal propositions while descriptive papers provided an account of events.

In contrast, interpretive papers had an assumption that meaning was dependent on the subjective perspective of people as they interacted with others and the world.

Critical studies attempt to critique current approaches by exposing fundamental contradictions in social systems in an effort to transform social practices (Orlikowski & Baroudi 1991) and bring about a transformation of social conditions that limit people.

## Methodology

A descriptive, positivist approach was used for this study (Orlikowski & Baroudi 1991). An analysis was conducted of all refereed empirical papers with at least one Australian author published between 1980 and 1996 in *MIS Quarterly*, *IS Research*, *Management Science*, *Academy of Management Review*, *Communications of the ACM*, *ACM Computing Surveys*, *European Journal of IS* and *The Australian Journal of IS* and in proceedings of the International Conference on IS and the Australasian Conference on IS (ACIS). Not all the outlets published over the entire period. The publication outlets were chosen following

surveys of Australian IS researchers (Ridley 1997). Three IS researchers classified the papers, first determining which were empirical and then coding them as positivist (theoretical or descriptive), interpretive or critical studies. Intercoder reliability was calculated to be 77% which was considered acceptable.

## Results and Discussion

The epistemologies of the 173 empirical papers that were found are displayed in Table 1. It can be seen that positivism was overwhelmingly the epistemology in use with 88% of the total empirical papers. There were 4% more theoretical than descriptive positivist papers. About 9% of the papers were interpretive while just on 3% were classified as critical.

**Table 1. Epistemologies Used in Refereed IS Empirical Papers by Australian Authors, 1980-1996**

| Epistemology             | No. of Empirical Papers | % of Total Empirical Papers |
|--------------------------|-------------------------|-----------------------------|
| Positivist total         | 153                     | 88.44                       |
| Positivist (theoretical) | 80                      | 46.24                       |
| Positivist (descriptive) | 73                      | 42.20                       |
| Interpretive             | 15                      | 8.67                        |
| Critical studies         | 5                       | 2.89                        |
| <b>Totals</b>            | <b>173</b>              | <b>100%</b>                 |

Although the totals are of interest, they do not permit examination of trends or a comparison with the North American study. Consequently, the yearly totals of empirical papers were determined for each epistemology over the period 1990-1996 and are presented below in Table 2. The double-bordered figures for the period 1983 to 1988 allowed a comparison to be made with the North American results. Although only ten Australian papers were found, comparisons were considered valid as the papers represented the total population from this period and not a sample. All ten papers were theoretical positivist in nature. In general the findings from the two regions were very similar with 96.8% of the North American and 100% of the Australian papers being positivist. However, about a quarter of the North American papers and none of the Australian papers were descriptive. No interpretive Australian papers were found, while just 3.2% of the North American papers were classified as interpretive.

**Table 2. Breakdown of Epistemology of Australian Mainstream IS Empirical Research, 1980-1996**

| Epistemology           | '80      | '81      | '82      | '83      | '84      | '85      | '86      | '87      | '88      | '89      | '90      | '91      | '92       | '93       | '94       | '95       | '96       | totals     |
|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|------------|
| Positivist             | 1        | 0        | 0        | 3        | 0        | 2        | 1        | 1        | 3        | 1        | 7        | 7        | 17        | 18        | 20        | 32        | 40        | 153        |
| Pos. (theor.)          | 1        |          |          | 3        |          | 2        | 1        | 1        | 3        |          | 4        | 2        | 6         | 11        | 13        | 12        | 21        | 80         |
| Pos. (desc.)           |          |          |          |          |          |          |          |          |          | 1        | 3        | 5        | 11        | 7         | 7         | 20        | 19        | 73         |
| Interpretive           |          |          |          |          |          |          |          |          |          |          |          |          | 1         | 2         | 3         | 4         | 5         | 15         |
| Critical studies       |          |          |          |          |          |          |          |          |          |          |          |          | 1         |           | 1         | 1         | 2         | 5          |
| <b>Empirical total</b> | <b>1</b> | <b>0</b> | <b>0</b> | <b>3</b> | <b>0</b> | <b>2</b> | <b>1</b> | <b>1</b> | <b>3</b> | <b>1</b> | <b>7</b> | <b>7</b> | <b>19</b> | <b>20</b> | <b>24</b> | <b>37</b> | <b>47</b> | <b>173</b> |

Although the trends can be followed in Table 2, graphical representation makes it easier. Accordingly, three graphs were prepared, but due to space limitations they could not be included. However their online availability is detailed at the end of this paper. To determine whether changes stemmed from use of the epistemology rather than from variations to the proportion of empirical and non-empirical papers, the number of papers in each epistemology was presented as a percentage of the annual total of empirical papers.

Figure 1 examines the use of positivist and non-positivist (interpretive and critical studies) epistemologies in Australian mainstream IS research as a percentage of the total number of empirical papers. Positivism was the only epistemology in use until 1992, and it continued to overwhelm Australian IS research until 1996. Non-positivist papers first appeared in 1992 and remained a relatively important minority group until 1996. In general there was a small decline in the proportional use of positivist epistemologies from 1992, and a corresponding increase in use of non-positivist epistemologies. Despite the end of the monopoly by positivism in Australian IS research in 1991, the epistemology appears as though it will remain influential.

Figure 2 compares the proportions of theoretical and descriptive positivism in Australian mainstream IS empirical research. Theoretical positivism dominated the positivist papers until 1989, after which there were considerably reduced levels with some cyclic resurgence. Although theoretical positivism remained important in 1996 it was no longer the sole approach of Australian IS research. From the first appearance of descriptive positivist papers in 1989 they assumed an important to dominant role, with a cyclic influence. In general however, there was a downward trend in the use of descriptive positivism after its emergence, a pattern that extrapolation suggests will continue.

Figure 3 displays changes in the use of non-positivism as a percentage of the total empirical papers published by Australian mainstream IS academics. Before 1992 no non-positivist papers were published. In general thereafter a reasonably steady increase in the proportional use of interpretivism was seen. From extrapolation the growth is expected to continue. Few critical studies papers were found from 1992, the year they first appeared. Although critical studies papers have had only a minor impact on the nature of mainstream Australian research, from extrapolation the trend is expected to continue but may not increase.

### Conclusions

This study has been limited to an analysis of mainstream academic refereed empirical IS papers with at least one Australian author. Future research includes analysis of the topics and methods in use in Australian IS mainstream research.

Analysis of Australian IS mainstream papers published between 1980 and 1996 revealed epistemological diversity from the early 1990s. The epistemology employed over the entire period was overwhelmingly positivist and the divergence arose from a homogenous beginning. Such homogeneity is to be expected given the original approaches of most leading international IS publication outlets and the positivist research education of many Australian IS researchers early in the period under investigation. The major trends in the epistemology of Australian IS research over the analysis period were the emergence then gradual decline of descriptive positivism and the introduction and then increased use of interpretivism. When the Australian results were compared with the North American results for the period 1983-1988 only, the findings were similar. However, unlike the North American study no descriptive and interpretivist papers were found in the Australian study. The earlier developmental stage of Australian IS research may account for the discrepancies found between the two studies.

In general the changes seen extended over some years and were progressive in their direction. Such trends are not suggestive of random change but are indicative of being driven by a mechanism of control. Possible driving mechanisms include the introduction and formalisation of Australian IS-specific PhD programs, increased pressure on academics to gain a research degree and publish, the growing international influence of interpretive-style research, a shift in the editorial policies of leading IS journals and increased diversity in publication outlets. Such mechanisms are likely to lead to a consensus regarding appropriate epistemologies for IS research rather than the perpetuation of inherited approaches from the reference disciplines.

The study examined a small section of a long-term change process to develop appropriate research approaches for IS. It is possible that the epistemological divergence observed is the beginning of a shift away from the positivist origins of IS and towards IS-specific non-positivist approaches. A longer-term historical analysis will be needed to test this conjecture.

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Figures 1 to 3 are available on the www at URL: [http://www.infosys.utas.edu.au/publications/1998/ais98\\_GR\\_CDK/](http://www.infosys.utas.edu.au/publications/1998/ais98_GR_CDK/)