

AARE / NZARE 1992 CONFERENCE
DEAKIN UNIVERSITY
GEELONG
22-26 NOVEMBER 1992

METHODOLOGY OF POLICY STUDIES
AND EDUCATIONAL RESEARCH
SYMPOSIUM

META-ANALYSIS AND POLICY RESEARCH

RALPH CATTIS

UNIVERSITY OF SYDNEY

META-ANALYSIS AND POLICY RESEARCH

RALPH CATTIS
UNIVERSITY OF SYDNEY

The potential of meta-analysis in policy development was anticipated by its originator (Glass, 1976) and subsequent methodological developments have enhanced the potential of the technique. The procedure can be used to identify the extent to which results from quantitative research can be relied upon for system or school level policy and for classroom application. Meta-analysis also can be used to illuminate the effects of policy once implemented, and the method can be used to identify the effects of variables not often amenable to investigation in an individual quantitative study.

My advocacy of the utility of meta-analysis assumes that in substantive fields of enquiry there are research programs which are identifiable by the underlying theoretical assumptions on which they are based. Inherent in my approach to meta-analysis is the requirement that there be a comprehensive coherent theoretical model on which the analysis of these differences can be identified and tested against the cumulative research record. Not all published meta-analyses have included adequate evidence that they are based on a coherent theoretical model, and therefore this exposition is not advocacy for the uncritical use of published meta-analyses. Examples in the literature can, nonetheless, demonstrate how the procedure could be used effectively for theory elaboration, explanation, and limited prediction. For studies that are conducted using quantitative methods, research integration can allow for social, historical, and policy differences to be compared in a manner which permits explanation and limited prediction.

For quantitative educational research to be used more effectively to inform policy and teaching practice, it is important to recognise the distinction between the fundamental nature of social science and physical science. The most significant epistemological feature of the social sciences is that the phenomena which are studied occur in open systems (Bhaskar 1989, 77). In the physical sciences it is possible to observe phenomena in closed systems and to draw conclusions or rules that will

invariably apply, subject to interaction with other invariant rules of nature.

Bhaskar's transformational model of social activity, which encapsulates the changing social science environment, is reproduced in Figure 1. He argues that in contrast to the physical sciences, theory elaboration in the social sciences is necessarily incomplete for ontological reasons, and

"in particular the ... progressive or degenerative nature of research programs in the social sciences cannot ... (be judged) society, conditioning work in particular programmes." (Bhaskar, p85)

FIGURE 1 ABOUT HERE

An issue in the debate about quantitative and qualitative

research is the capacity to assess the cultural, social, and political boundaries within which research results can be applied to explain and to make predictions. Broader social forces act to encourage research into one program area rather than another. Then, to the extent that the results are disseminated, research findings may influence those who come into contact with the results, and may result in changes in individual and community behaviour as a consequence of the new knowledge.

As a consequence, Bhaskar concludes that,

"Causal laws are not the constant conjunctions of events that, when generated under artificially produced and deliberately controlled conditions, comprise their empirical grounds, but the tendencies of mechanisms ontologically irreducible to them." The "category mistake (as per Marxist analysis) in philosophy is the confusion of powers or tendencies and their realization" (Bhaskar, 1989, 9)

Many teachers and at least some researchers (eg Cronbach, 1975) have long held this view of the nature of the findings of quantitative research. The concept that potentially conflicting quantitative research findings can be integrated relies on the assumption that the results are indicative of tendencies, rather than absolute laws. The methodology also explicitly seeks to

explain variations in findings in terms of differences including the time, place, and persons involved in the research. Because meta-analysis is based on these assumptions, it can be used to can extend the utility of quantitative research.

Perhaps of most immediate importance in educational contexts is the potential for a direct impact of research on practice. For research to inform practice at the classroom level, and to inform policy making at the school and the system level, findings need to be conveyed in a clear manner, and those using the findings need to have confidence to interpret the results in the context of their own school systems and classrooms. They need to understand that the findings identify tendencies for them to explore in their own context.

Meta-analysis has potential to serve these needs. The effect size concept provides a vehicle for summarising the practical significance of results. When applied to subsets of findings and clustered in terms of research design and treatment characteristics, effect size estimates can indicate the adequacy of theory on which policy is based. It should be noted that this use of meta-analysis rejects the reliance on a grand average estimate of effect across all available studies.

The Effect Size Concept

The effect size is used in meta-analysis as the unit of measurement when comparing findings from different quantitative studies. Effect size is the difference between the treatment and the control group means, divided by the standard deviation of the population from whence the data are drawn. Thus results for studies using different scales to measure the same construct can be compared in terms of the difference in the means as proportions of the respective standard deviations.

In mathematical terms,

$$d_i = (\bar{X}_t - \bar{X}_c) / s_i$$

where, for the i th research study,

d_i is the effect size,

\bar{X}_t is the mean for the treatment group,

\bar{X}_c is the mean for the control group, and

s_i is the standard deviation.

Use of the effect size places importance on the meaning of differences between treatment and control groups, rather than on the statistical significance of any difference. While meta-analysis relies on quantitative research for its sources of data, the procedure provides results of more immediate relevance to policy makers by reporting on differences whose practical import can be directly understood. For instance, if a new procedure with an effect size of 0.2 meant an average increase in life expectancy of two years (Gallo, 1978), but the cost of the intervention were, say, \$1 billion per person, then other less expensive options might be considered for public policy. Thus the value for mass policy of a treatment, depends on both the size of the effect and on the cost per individual.

Theory and Praxis

The applicability of theoretical findings to policy issues can be explored using meta-analysis. In laboratory studies, a theoretical model is constructed and tested using empirical methods. If this model provides a demonstration of tendencies in the open social systems in which learning occurs, a test of its utility is the comparison of the results of laboratory studies with those undertaken with intact class groups in normal school situations. Often "field" studies can, at best, use statistical procedures to control for individual differences, whereas laboratory studies with high internal validity involve the random assignment of subjects to groups.

There have been to date only a few meta-analyses that have specifically applied this conceptualisation. One that has successfully employed the distinction between field and laboratory settings concerned a review of the contingency theory of leadership, which proposes that leadership effectiveness is an interaction between characteristics of the leader and aspects of the social and institutional situation. Eight contingency categories were identified by Peters et. al. (1985) and the contingency theory was found to be supported for seven out of the eight categories, when tested in laboratory settings. This result indicated that the theory, as operationally defined in this study, was a useful approximation to the simplified but still complex social systems in "controlled" laboratory situations. Meta-analysis of the research findings in the far more complex field situations, confirmed four out of the same eight categories for tightly controlled studies, and only three when all available field results were included. The authors concluded that further theoretical construction was needed to adequately account for the observations in the "open" field situation. Thus differences in results were found between field and laboratory settings which

are of importance to both practitioners and those concerned with theory elaboration.

A further example is provided in a meta-analysis by Lundeberg and Fox (1991) who examined test expectancy effects in laboratory and classroom settings. They found that in classroom settings students gained higher achievement test scores when they prepared for the type of test which they received. For example, when they prepared for and received a multiple choice test, they tended to

do better than when they had expected an essay test, but were confronted with a multiple choice test. These results ran counter to the interpretation of findings from laboratory studies. It had been widely held that students expecting an essay test would perform better than those expecting a multiple choice test, irrespective of which type of test they received. This conclusion had been drawn from laboratory studies which compared performance on recall tests and recognition tests. Some had assumed that recognition tests provided a parallel to the situation with multiple choice tests, while recall tests could be equated with essay tests. The results question the logic of these assumptions, thus advancing understanding about theoretical models of testing, and confirming that informing students about the nature of assessment tasks is good practice.

Differences between laboratory findings and field studies have been recognised as a potentially constructive tool for informing theory elaboration (eg Cronbach, 1975), and for guiding practice. The examples above indicate that meta-analysis has the potential to enhance the utility of the conclusions that can be drawn by enabling inter-related variables to be examined across studies.

Social Contexts

It can be agreed that instructional content, social, and political contexts are important factors in determining educational policy and the effectiveness of its implementation. Some would argue that this precludes the use of empirical research in policy analysis because individual studies largely ignore these factors, but meta-analysis allows quantitative research findings to be interpreted in these contexts. For instance, the potential for interaction between gender and the effects of policy, differential effects related to the content domain of learning, and the impact at different grade levels can be explored.

Since the publication of *Girls, School and Society* (1975) many reports in Australia have identified differential outcomes in terms of employment and income as being in part a consequence of

different outcomes of schooling. Meta-analyses of schooling outcomes have demonstrated that gender is related to outcomes, with males having a relative advantage in the key areas of mathematics and the sciences. These studies also report a marked decline in gender differences in recent years. Freedman (1989) found that among high school students, the median effect size in favour of males in mathematical tasks, for studies undertaken up until 1974, was 0.43. For studies in the period from 1974 until 1987 it was 0.22. Thus the advantage of high school males in mathematics attainment was reduced in the more recent studies. Freedman interprets these findings as indicating that environmental variables are important in determining gender differences, and that intervention can reduce inequalities. In other words, society is transforming over time in a manner that impacts on gender differences in school achievement.

Freedman also found that four Australian studies conducted since 1974 were not consistent with her results for studies in United States schools. Despite the issue being raised in Australia in 1975 in the report, *Girls, School and Society*, system wide intervention to establish non-sexist education policies in Australia, did not occur until the late eighties. Freedman's results should at least provide policy makers in Australia with a basis for expecting substantial change for the next generation of school students, provided recent reforms are implemented in classrooms.

While improvements have been observed in relation to gender equity in mathematics achievement, Linn and Hyde (1989) concluded that broader social, economic and cultural influences must continue to be addressed in order for gender differences in mathematics attainment to be eliminated. They, like Freedman, found that recent studies in the USA show smaller differences in mathematics performance associated with gender, but concluded that differences that remain may be specific to cultural and situational contexts. They reported results that support their conclusions for many variables thought to relate to mathematics attainment. For instance, the average effect size for gender differences in spatial visualisation obtained from studies conducted before 1974 was 0.30 in favour of males, while for studies conducted since 1974, the difference was 0.13.

For some aspects of mathematics, including the area of problem solving, differences were found to remain for students in post-compulsory education. This relationship between gender and problem solving has been confirmed in a meta-analysis by Hembree (1992) who reported a zero difference in grades 1 to 8, a small effect (0.21) for senior high school grades, and a difference of

0.34 favouring males at undergraduate level. Linn and Hyde attributed these differences in part to the slowness of change in community expectations, but other factors were also identified. For instance, they also analysed standardised tests, and observed that differences favouring males could still be attributed to cultural bias in the instruments. Males were found to excel at questions related to sports and science, while females outperformed males on the few questions that related to aesthetics, interpersonal relations, and work tasks such as sewing which are stereotyped female roles.

A question of real importance is whether the changes represent social pressures dominate in post-compulsory schooling, as Linn and Hyde conclude, or a cohort effect with only students who have had the benefit of non-sexist policies throughout their schooling gaining the benefits. It may be that social and cultural forces continue to overwhelm educational initiatives, and prior achievement for female students. However, if findings about gender differences in the interaction between teachers and students are leading to the emergence of new teaching and learning strategies that are effective in combating the effects, then gender differences will not be reproduced in future in classrooms where the new strategies are adopted. Meta-analysis can provide a tool for charting such changes in effects over time. If the available research were separated into studies of students who have had their whole schooling under non-sexist strategies, and those who have not, then the competing theories of cohort effects versus social forces could be explored. Gender is but one of the social variables that have been addressed in meta-analyses. Interactions between ethnicity and schooling is another area potentially amenable to review. In one of the few examples to report on ethnicity in meta-analyses in the education research domain, Hansford and Hattie (1982) found that there were substantial differences in the relationship between self-concept and achievement among different ethnic groups. More recently, Hembree (1992) has reported that for USA school populations, differences in problem solving performance associated with major ethnic groupings are substantial and far greater than gender related differences.

In considering interactions between variables of interest and the treatment, potential relationships that are extraneous need to be investigated. Publication policies of journals is an example of a factor that needs to be explored. An early example of how meta-analysis can be used routinely to identify such factors is

provided by Smith (1980), who showed in a meta-analysis of sex bias in psychotherapy, that in published research the effect sizes favoured male subjects, while in the unpublished

dissertation literature, the effect size favoured the female subjects.

Political Contexts

The impact of party political policy changes on research findings, is represented in the meta-analysis literature mainly by examples of missed opportunities. An example was the attempt by the National Institute for Education (NIE) to use meta-analysis to investigate the effects of desegregation on student achievement (Wortman, 1983). In all, 157 studies of desegregation were identified, but a two phase procedure was applied to reduce this set to just 19 studies deemed acceptable by a panel of experts. By limiting the analysis to just twelve per cent of the total sample, the panel lost the opportunity to use the variability in the data set to consider political issues. For instance, it could have compared the effects of desegregation in school districts that had opposed the federal laws, with the effects in those districts that had initiated desegregation. Likewise the analysis could have considered social issues such as the relationship between the proportion of "minority" students in the designated schools and achievement. Given the sensitive nature of desegregation as a public issue, it is understandable why a government study would evade such issues.

Another missed opportunity occurred in the area of bilingual education. President Carter introduced significant changes to policy in the USA in 1976 which were overturned in 1980, with the advent of President Reagan. In a meta-analysis of bilingual education by Willig (1985), there was an opportunity to compare the effects of bilingual education under the Carter regime with those observed in earlier studies, and with those undertaken since the Reagan administration regulations had been introduced. As Secada (1987) pointed out in a critique of the Willig meta-analysis, the failure to examine the data for such a relationship missed the most significant aspect of a then very current policy debate.

Applications at the Institutional Level

Policy at the institutional and faculty level can also be assisted by application of meta-analysis. For instance, the effectiveness of various teaching interventions for students at different stages of their schooling is difficult to investigate using qualitative methods, and virtually impossible using a single quantitative study. Using meta-analysis, Catts (1992) considered the effects of prior knowledge of objectives on achievement, and found an interaction between the type of objectives presented to students, and the stage of schooling.

Secondary students benefited from the presentation of behavioural objectives, but not from the presentation of non-behavioural objectives, while for post-secondary students the most effective form of objectives were general and non-behavioural. This study also concluded that the prior knowledge of objectives was of substantial benefit to students in heterogeneous groupings, whereas for students in homogeneous groups, there was a small benefit.

Meta-analyses lend support to the view that some aspects of instructional methods may be content specific. A study by Luiten, Ames, and Ackerson (1980) on the effects of advance organisers on achievement, found that the average immediate post-test effect

for social sciences was 0.34, but was 0.10 for mathematics, 0.11 for biological sciences, and 0.15 for physical sciences. In comparing the effect of knowledge of objectives on achievement, Catts (1992) reported an average effect size of 0.46 for social sciences and 0.08 for sciences and mathematics. These results suggest that mathemagenic operators may be more effective in the social sciences. On the other hand, Cohen, Kulik and Kulik (1982), in a study of peer tutoring, found an effect of 0.60 for mathematics and an effect of about 0.30 for reading and for other subjects. Thus there may be a tendency for peer tutoring to be a preferred instructional initiative in mathematics classes.

These findings are interpreted as tendencies, not rules, and should lead teachers to consider what factors might lead to these tendencies being realised. A staunch critic of quantitative research, Eisner (1992) has argued that if one accepts that "nothing can replace the teachers judgement, including a decision to change the aims of the lesson", then it follows that one must necessarily reject a positivist approach to research which presumes to determine "best practice" for classroom settings. In many secondary school classrooms however, opportunities to make judgements are limited by the pressures of the curriculum, and the basic demands of maintaining an environment in which it is possible for students to learn. Any information that can make a difference to the efficiency with which students learn within the limits of available resources will be most welcome, and teachers will quickly make a judgement as to whether a particular process will work in their classrooms. A challenge for those who practice quantitative research, or who use its findings to inform policy and practice, is to describe the boundaries for predictions derived from the research. Meta-analysis of quantitative research can inform teachers about contexts in which there is a tendency for particular instructional enhancements to be effective, and that therefore warrant their consideration and their judgement

about applicability in particular classrooms.

Limitations to the Use of Meta-analysis in Policy Research

The potential for meta-analysis to provide insights into theory and practice, into social aspects of policy, and into the impact of political policy is limited by the outlook of many who undertake meta-analysis. The method has the potential to allow the findings of quantitative research to be applied to issues that have been the preserve of qualitative researchers, but few published studies have realised this potential.

The information provided in published research is another constraint upon the application of meta-analysis to policy making. In examining the relationship between self-concept and achievement, Hansford and Hattie (1982) reported that for the important variables of ethnicity and socio-economic status, data for each variable were available for less than half of the comparisons. Likewise, in order to examine the relationship between gender and the effects of prior knowledge of objectives on achievement, Catts (1992) had to use indirect evidence of the gender mix of subjects for seventy per cent of the cases. These estimates were made by constructing a variable based on the known gender distributions across subject areas in a major post-secondary education system. For the thirty per cent of cases where data was available, a correlation of 0.87 was obtained between the estimated and actual gender composition.

Conclusions

Appropriate use of meta-analysis as a tool for exploring the relationships among empirical research findings is one element in interpreting the meaning for policy of empirical research. Meta-analysis relies upon data from quantitative research, and thus excludes qualitative research from the data analysis phase. It may, however, offer a link between the two approaches by examining the effects of social, cultural, and political factors identified in qualitative research, across a body of quantitative literature. To explore social and political differences between studies, the meta-analyst must first establish a theoretical frame which draws on qualitative and quantitative research to identify relevant variables.

"As an object of study, (society) cannot be read straight off the empirical world ... but neither can it be reconstructed from our subjective experiences." (Bhaskar, 1989, p 87)

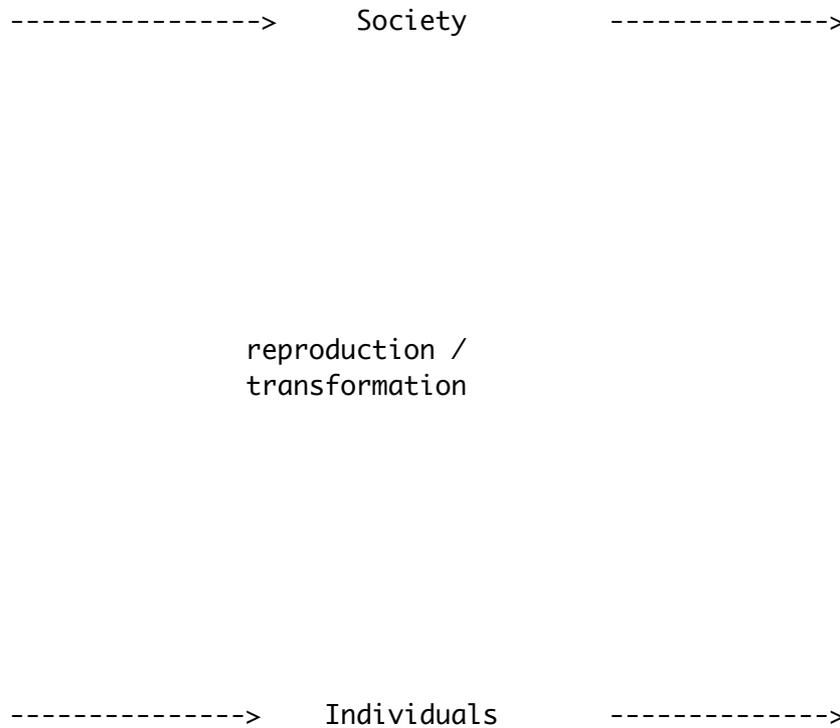
BIBLIOGRAPHY

- Bhaskar, R. *Reclaiming Reality*. Verso, London, 1989.
- Catts, R. *The Integration of Research Findings*. Unpublished PhD Thesis, University of Sydney, 1992.
- Cohen, P.A., Kulik, J.A. and Kulik C-L. C. Educational Outcomes of Tutoring: A Meta-analysis of Findings. *American Educational Research Journal*, 1982, 19(2), 237-248.
- Cronbach, L.J. Beyond the Two Disciplines of Scientific Psychology. *American Psychologist*, 1975, 30(2), 116-127.
- Eisner, E. W. Are all Causal Claims Positivistic? *Educational Researcher*, 1992, 21(5), 8-9.
- Freedman, L. Mathematics and the Gender Gap: A Meta-Analysis of Recent Studies on Sex Differences in Mathematical Tasks. *Review of Educational Research*, 1989, 59(2), 185-213.
- Gallo, P.S. Meta-Analysis - A Mixed Meta-Phor? *American Psychologist*, 33, 515-517.
- Glass, G.V. Primary, Secondary, Meta-Analysis. *Educational Researcher*, 1976, 5(10), 3-8.
- Girls, School and Society. Schools Commission, Woden, ACT, 1975.
- Hansford, B.C. & Hattie, J.A. The Relationship Between Self and Achievement/Performance Measures. *Review of Educational Research*, 1982, 52(1), 123-142.
- Hembree, R. Experiments and Relational Studies in Problem Solving: A Meta-analysis. *Journal for Research in Mathematics Education*, 1992, 23(3), 242-273.
- House, E. Response to Notes on Pragmatism and Scientific Realism. *Educational Researcher*, 1992, 21(6), 18,19.
- Hunter, M. Teacher Competency: Problem, Theory and Practice. *Theory into Practice*, 1976, 15(2), 162-171
- Linn, M.C. & Hyde, J.S. Gender, Mathematics, and Science. *Educational Researcher*, 1989, 18(8), 17-27.
- Luiten, J., Ames, W. & Ackerson, G. A Meta-Analysis of the Effects of Advance Organisers on Learning and Retention. *American Educational Research Journal*, 1980, 17(2), 211-218.
- Lundeberg, M.A. & Fox, P.W. Do Laboratory Findings on Test Expectancy Generalize to Classroom Outcomes? *Review of Educational Research*, 1991, 61(1), 1-52.
- Peters, L.H., Hartke, D.D. & Pohlmann, J.J. Fielder's Contingency Theory of Leadership: An application of Meta-Analysis Procedures of Schmidt and Hunter. *Psychological Bulletin*, 1985, 97(2), 274-285.
- Secada, W.G. This is 1987, not 1980: A Comment on a Comment. *Review of Educational Research*, 1987, 57(3), 337-384.
- Smith, M.L. Sex Bias in Counselling and Psychotherapy. *Psychological Bulletin*, 1980, 87, 392-407.
- Willig, A.C. A Meta-analysis of Selected Studies on the

Effectiveness of Bilingual Education. Review of Educational Research, 1985, 55(3), 269-317.

Wortman, P.M. School Desegregation and Black Achievement: An integrative Review. N.I.E. (ed)., Washington, DC, 1983. (ERIC Document Reproduction Service No. ED 239 003).

FIGURE 1
TRANSFORMATIONAL MODEL OF SOCIAL ACTIVITY (1)



1. (Bhaskar, 1989 p77)
POSTSCRIPT

House (1992) has argued "that progress in the social sciences is possible only when we achieve a better conception of science, and only when we reduce the heavy ideological orientation that now inhibits better explanations. Some rely upon quantitative research to draw prescriptive conclusions about effective teaching practices (e.g. Hunter, 1976). In reaction, some critics reject the use of quantitative methods. For instance, Eisner (1992) argues that if one accepts that "nothing can replace the teachers judgement, including a decision to change the aims of

the lesson", then it follows that one must necessarily reject a positivist approach to research which presumes to determine "best practice" for classroom settings. If prescriptive lists of teacher competencies are applied in an inflexible manner, there are grounds for this concern. In many secondary school classrooms however, opportunities to make judgements are limited by the pressures of the curriculum, and the basic demands of maintaining an environment in which it is possible for students to learn. Any information that can make a difference to the efficiency with which students learn within the limits of available resources will be most welcome, and teachers will quickly make a judgement as to whether it will work in their classrooms.

Debate on research methods for education is, in my view, poorly served by those who argue in an absolutest manner for or against the use of quantitative research. The problem for those who want to practice quantitative research, and to use its findings to

inform policy and practice, is to describe the boundaries for predictions derived from research.

Another writer who is a staunch critic of empirical methods is Bhaskar. Bhaskar's view of what he terms empiricism is best summed up in his own words;

"underpinning and necessary for the reified facts and fetishized systems of empiricism are ... dehumanised beings in desocialized relationships" ... "the fact form [of empiricism] thus acts as an ideology of what Kuhn has called normal science obscuring from scientists and non-scientists alike the historically specific structures and relations generating sense-experience in science" (p 8)

It may appear to be heresy to some, for an advocate of a quantitative methodology such as meta-analysis to invoke the philosophical perspectives of critical realism, however Bhaskar's representation of empiricism is different to my construction of 'normal science'. His denunciation is of an approach to social science and policy research which is NOT the model to which I subscribe, when I undertake meta-analysis to seek to explain events and to make limited predictions. In contrast, I adopt some of the basic assumptions that underlie critical reality in order to establish a methodology which employs the findings of empirical research to explain and predict. As Bhaskar has put it,

"because social systems are intrinsically open and cannot be artificially closed, our criteria for the empirical testing of social theories cannot be predictive and so must be explanatory. conditional predictions"

'Normal science' is an attempt to construct simplified models of complex events in nature. With successful theory building, it is possible to devise robust models that can explain observed events and make limited predictions about future outcomes. Under these conditions, when the critical circumstances that result in an observed phenomenon remain substantially unchanged, there can be some confidence in the prediction of future outcomes from normal scientific endeavours, and hence an application of 'normal science' to policy development.

I have quoted Bhaskar directly to make it clear where I draw support from his description of critical reality, and to ensure that it is understood where I depart from his analysis. I accept that the definition of empiricism adopted by Bhaskar is not productive to a science that seeks to explain 'reality', but equally I do not accept that the use of scientific models, and the categorisation and quantification of data necessarily impose upon the user, recourse to dehumanising people or relationships.

Bhaskar, on the other hand, concludes that

"orthodox philosophy of science, and the methodological directives they secrete presuppose closed systems. Because of this, they are totally inapplicable to the social sciences - ... (and) the attempt ... to apply them ... (has) disastrous results. inductivist theories of scientific development and criteria of confirmation, and Popperian theories of scientific development and criteria of falsification ... must all be totally discarded" (p 182).

This constitutes a rejection of the substantial usable information derived from research that has informed the practice of teacher educators and practitioners. In contrast I argue that we must interpret the knowledge derived from empirical research

in the context of the open systems which Baskar has demonstrated govern social science research and policy. Re-interpretation of the context in which the findings of research can be used for policy will enable us to generate explanations and limited predictions, to identify the significant elements in the open social system for which policy is to be determined, and the transformations that are likely to result in enhanced social policy in particular contexts.

Dr. Ray Debus, Faculty of Education, University of Sydney, provided helpful comments on an earlier draft of this paper.

Kay Owens, University of Western Sydney, drew my attention to this paper, and to and to Hembree cited below.

Catts, R. Meta-Analysis and Policy Research
page1

Catts, R. Meta-Analysis and Policy Research
page1

àÇ@

uà~ÄÇ@riptive conclusions about effective teaching practices
(e.g. Hunter, 1976). In reaction, some critics reject the use of
quantitative methods. For instance, Eisner (1992) argues that if
one accepts that "nothing can replace the teachers judgement,
including a decision to change thÄϕ.#5XÎÓΔ