WHOSE VALUES IN EDUCATIONAL RESEARCH?

Mr Harvey Goldstein
National Children's Bureau, London

Introduction

Much of the fascination in discussing issues in education
comes from the fact that we've all experienced it, that some
of us have children consuming it, and so many are paid to
manufacture it. The educational researcher, who is supposed
to make sense of it, finds himself in an especially diffi-
cult position. If, for example, he and his statistician
want to assess the 'outcomes' of an educational process and
to relate these to influential factors, they will have to
make various assumptions about which factors and 'results'
to use and how to measure them. The trouble is that these
are often highly contentious matters. For example, if we
wanted to set up and compare different compensatory
education programmes, we would be unlikely to get general
agreement on a set of quantifiable objectives - a problem
we normally wouldn't encounter if we were doing a medical
clinical trial. The controversy over IQ testing is another
fine example of an emotive issue with a bimodal distribu-
tion of experts over a range extending from belief in the
complete irrelevance of IQ tests to a belief that they
measure a fundamental and permanent mental attribute.

Assumptions - explicit and implicit

These examples illustrate the old dilemma of whether we

should measure what we believe in, or believe in what we measure. There is no easy universal answer, of course, and the applied statistician is faced with an important challenge. How does he make all the assumptions of his analysis explicit in such a way that someone with a different set of values, and hence different assumptions, can modify the conclusions?

Let me make it clear that I am not concerned here to discuss the usual kind of 'technical' assumptions statisticians are trained to consider, such as normality or homoscedasticity of variances. Rather, I am worried about the assumptions built into the construction of the measuring instruments and the scales on which the measurements are expressed. To be precise, I shall discuss an example of a particular and influential piece of educational research where fundamental, and to my mind highly questionable, assumptions were made. These assumptions were largely obscured amid technicalities which made them inaccessible to the non-statistical reader.

The Plowden Report

This report, published in 1967, has undoubtedly had a profound impact on both the principles and practice of primary education in this country. In particular, it gave a lot of attention to comparing the relative influences of home circumstances, parental attitudes and school factors on the attainment of primary schoolchildren. One of its conclusions, which may be paraphrased as "the Home is more important than the School", has become assimilated into

popular educational mythology.

The report based this conclusion mainly on the analysis of a
large survey described in its appendix 4, which spelled out
the following message: "The specific contributions made by
the variations in parental attitudes are greater than those
made by the variations in home circumstances while the
latter in turn are greater than those made by the variations
between schools and teachers that we have taken into account".
Thus "importance" is implicitly measured in terms of the
variations (actually variances) ascribed to different sets
of factors. The dependent variable in the analyses is a
test score, whose interpretation is of course debatable, but
which for the sake of the present argument I shall accept.
It so happens that there are other serious criticisms of the
analysis, based on the type of variables chosen, and the
relative numbers of variables in each set, as well as
certain 'technical' criticisms of the regression analysis
(Acland 1971; Goldstein, 1972).

My main purpose in the present article however, is to query
the assumptions in the above definition of 'importance',
which is equivalent to a utility function defined as the
regression sum of squares. The greater the sum of squares
attributed to a particular set of factors (for example
parental attitudes) the more 'importance' that set of
factors is said to possess.

Maybe it is because of its familiarity and easy computing

that regression analysis is often pushed beyond reasonable bounds. It is not unreasonable to apply such analysis to data of this kind for the purpose of carrying out significance tests and making estimates of coefficients and constants for variable categories. If, however, we then wish to make statements about the relative 'importance' of different factors we need to specify the utilities or costs to be attached to any given test score. What appendix 4 does is to assume implicitly that the utilities are proportional to sums of squared deviations from a mean value. Naturally, this is quite arbitrary and is without a particular educational justification. It would be more appropriate, for example, were we interested in allocating educational resources to children with low attainment levels, to give a large weighting or cost to scores a long way below the mean rather than treat positive and negative deviations in a symmetrical fashion.

A Hypothetical Example

The following artificial data illustrate how different utility functions can cause us to arrive at different and opposing conclusions. Suppose that we have two variables, one a measure of parental attitudes and one a measure of school circumstances, and suppose that there are three types of parental attitude and three types of school circumstance. The following table presents the average scores of 100 children divided between these categories.

School circumstance	Mean Score	Number of Children
1	90	20
2	100	60
3	110	20
Total	100	100

Parental Attitude	Mean Score	Number of Children
1	80	5
2	100	90
3	120	5
Total	100	100

Between circumstance sum of squares = 4,000
Between attitude sum of squares = 4,000

We see that, using a sum of squares criterion which is essentially that used in appendix 4 of the Plowden Report, we should attach equal importance to School circumstances and Parental attitudes. If instead, we used the sum of mean deviations as our criterion we obtain values of 400 and 200 units respectively, leading us presumably to regard school circumstances as being twice as important as parental attitudes. If we decided that only scores below 90 were of any importance at all, then we would attach zero importance to schools and a positive importance to parental attitudes.

While not necessarily denying, at least in some senses, the truth of the statement, "The Home is more important than the School", evidence in favour of it is not provided by the

Plowden analysis. Neither is it possible, with the way the data are presented in appendix 4 to rework the analysis using different assumptions.

What is to be done?

Ideally, it should be possible to present the results of a data analysis as an informative summary and in such a way that the effects of using different utility functions can be discovered. In doing this we may be able to persuade the educationalists and the policy-makers to consider explicitly their value systems, not only for each of them to inform themselves better, but also to inform each other and all the rest of us. All too often, I suspect, people try to tackle other problems in similar ways, and there is certainly no shortage of techniques with useful sounding names like AID and Causal Path Analysis, to help us do this.

This article has attempted to indicate a neglected aspect of educational research, and raised the question of the statistician's role in such research. It would be interesting to hear other viewpoints.

REFERENCES

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