ACTION RESEARCH

The Place of Scientific Experimentation into Human Problems

by

D. S. NIGAM,
Science Department, Central Institute of Education,
University of Delhi.

I. Scientific Method

This is an inductive-deductive mode of thinking, used in arriving at generalizations and explaining uniformation. It has the following characteristics and steps :

A. Characteristics

1. It is based on observed facts.

2. It employs analysis of a phenomenon into its components with a study of their inter-relationship, in order to comprehend the phenomenon.

3. It uses an hypothesis to guide the thinking, leading to collection of more data, designing a scheme of analysis and interpretation.

4. Its findings are not influenced by emotional bias.

5. Its facts depend upon objective determination and measurement.

6. Its treatment is quantitative.

B. Steps

1. Location and definition of a problem.

2. Survey of already available data.

3. Formation of hypothesis.

4. Logical development of the hypothesis leading to the design of an experiment.

5. Collection of new data.

6. Analysis, classification and summarization of data.

7. Generalization.

II. Controlled experimentation, however, is the chief scientific investigational tool in natural sciences.

There, a phenomenon is analysed into the number of variable factors, which comprise it. All but two of these are controlled, *i.e.*, are not allowed to vary during experimentation. While, of the two varying factors, one called the 'independent variable' is allowed to assume some of its representative values, one by one, so that the second variable, called the 'dependent variable', is watched for the values which it assumes because of the values which the first one has assumed. It is in this way that the relationship between any two varying factors is studied.

Attempts have been made to use this principle for investigating human problems. In this attempt a few special procedures have been developed, which are indicated as follows.

A. The One Group Method

In this one subject is subjected to various values, by turn, of the independent variable, and their corresponding effect on the dependent variable is noted. The procedure, however, suffers from the defect of the carry-over effect of the first value on the second value.

Shri D.S. Nigam teaches the methodology and techniques of research to Master of Education and Master of Nursing students at the Central Institute of Education of Delhi University. He is a science man himself and further is in charge of the Extension Services of C.I.E. to teachers all over India, keeping them in touch with new work and research at the University.

B. Parallel Group Method

In this there are as many groups as there are values which the independent variable is planned to assume. One group is studied only for the effect of one value of the independent variable. It is thus possible to avoid the carry-over effect of one value on the process of the other value. But the tremendous problem of equating all the other groups in their values of controlled factors arises.

C. Rotation Group Method

This is a combination of the above two designs, illustrated by the following diagram for Xa, Xb, Xc, Xd, Xe, values of the independent variable.

Groups

I	II	III	IV	V
Xa	Xb	Xc	Xd	Xe
Xe	Xa	Xb	Xc	Xd
Xd	Xe	Xa	Xb	Xc
Xc	Xd	Xe	Xa	Xb
Xb	Xc	Xd	Xe	Xa

All the corresponding values of dependent variable (say Ya, b, c, d, e) for the groups I to V are then pooled or averaged, and thus the relationship between 'X' and 'Y' is studied.

The carry-over effect is, however, not completely eliminated.

(*Contd. on page 59*)