



# COUNCIL OF EUROPE

## REPORT ON THE TRAINING AND CAREER STRUCTURES OF EDUCATIONAL RESEARCHERS

DOCUMENTATION CENTRE FOR EDUCATION IN EUROPE

THE INTRODUCTION OF EDUCATIONAL RESEARCH INTO THE  
TRAINING OF TEACHERS

by

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## I. INTRODUCTION

### Definitions

Before considering the part which research can play in teacher training, it may be useful to dwell for a moment on the nature of the processes which constitute the two key terms.

Broadly speaking, teaching means creating or encouraging situations favourable to learning; it means mediating between the learner and his environment

Teaching is at one and the same time a craft, an art and a science.

As a craft, it consists in applying rules and remedies inherited or discovered by feeling out the way, by trial and error. To deny the importance of this heritage would be unwise. For apart from its traditions and values surviving from earlier social conditions - which we are a little too inclined to decry - this craftsmanship conserves the lessons of sometimes a thousand years of experience, the harvest of man's long progress down the ages.

The art of teaching is also very real. It arises from a sense of "caring", from the empathy and intuition of the person exercising it. If not unlucky, we have all had a teacher during our schooling who, more than any other, left his intellectual and personal imprint upon us.

There are teachers who are endowed with a kind of mediumistic power, just as there are exceptional diagnosticians.

Great artists are unfortunately rare, and the limitations of the craftsman's empiricism are obvious. It is for the scientific approach to produce objective results, to test procedures, methods and techniques and to seek better ones by experiment and observation.

How can educational research be defined in this context? Three authors are not too many to help us do so. According to A. Lalande, science is an aggregate of knowledge and research of a sufficiently uniform and generalised nature leading to concordant conclusions and based not on arbitrary conventions, or the common personal tastes or interests of those concerned, but on objective relationships gradually discovered and subsequently confirmed by specific methods of verification (1). Primarily the essential points in this definition are its rejection of all ambiguity in the formulation and communication of theories and its insistence on strict verification.

And what about research? A.S. Barr proposes a definition which seems to me clear and creative. He conceives it as a systematic effort to understand, set in motion by a need or difficulty of which we have become aware and connected with the study of a complex phenomenon whose importance exceeds immediate personal concerns, the problem being stated in the form of a hypothesis (2). Here, the rational process, illustrated in How we think by John Dewey, is the principal factor.

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(1) A. Lalande: Vocabulaire de la Philosophie. Paris, PUF, 1956.

(2) C.W. Harris (ed): Encyclopaedia of Educational Research. New York, Macmillan, 1960, p. 1166.

It remains to define our object, for we are concerned not with any kind of research but with educational research. The recent study by E. Malmquist and H. Grundin shows how difficult it is to delimit our field but finally proposes a constructive solution. "Educational research should have the aim of contributing to the formation of a basis for decisions as regards practice in clearly identified educational situations." It must be "systematic in its approach to the problems studied" and "objective in its collection, analysis and evaluation of data" (1). The practical aspect is of particular importance here. Educational research is primarily the concern of educators and teachers, and therefore becomes a component of their training. This leads us to the heart of the problem.

One last remark is called for in concluding this introduction. The decision-oriented approach and the emphasis placed by E. Malmquist and H. Grundin on the practical aspect do not conflict with the need for generalisation implicit in A.S. Barr and explicit in Lalande. Nor is conclusion-oriented research excluded. On the contrary, it constitutes the best foundation for formulating decisions or, at the least, confers on them a subsequent ratification.

#### Many teachers are unaware of the findings of research

Introduced more or less at the same time as experimental psychology at the end of the 19th century, scientific pedagogy established itself gradually. Over the past twenty years the movement has gained in breadth and depth, and in the last decade it has suddenly accelerated.

As in other disciplines, we are thus witnessing a knowledge explosion and, after a phase of non-co-ordination and even incoherence, there is no doubt that discoveries are becoming integrated and are beginning to foreshadow the main lines of tomorrow's education. This education will certainly be based on a dialectic, both subtle and strict, between group-work and individualised learning, aided by an ever more powerful and refined technology.

Unfortunately, this progress in educational science has been achieved in most cases over the heads of teachers, who have been neither truly informed about it, nor involved in its development, nor even able to comprehend this scientific knowledge in those areas where it has been available.

In many Western countries, only a minority of teachers have sufficient training to understand the research reports that directly concern them.

These are the serious consequences of too narrow a type of teacher training in which the craftsman's approach is dominant. While scientific studies at university level - best illustrated by those of the doctor and the engineer - train students for the direct consumption of research findings, the same cannot be said of teachers. As things are, most pre-primary, primary, secondary and higher education teachers should commence scientific teacher retraining the very day they obtain their teacher's diploma.

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(1) E. Malmquist and H. Grundin: Educational Research in Europe, Today and Tomorrow European Cultural Foundation, Europe Plan 2000, 1973, Vol. I, p.23

## II. THE RELATIONSHIP BETWEEN TEACHING AND RESEARCH

### Teaching itself constitutes research

The desire to avoid transmitting canned knowledge implies that teaching must be based on the real problems facing the pupil. Early on the teacher must learn to state these problems unambiguously, to propose hypothetic solutions, to test them by collecting and analysing pertinent data and to draw logical conclusions.

This rationalised approach of scientific research must little by little become anchored in a way of life of which it constitutes one of the essential cognitive skills.

A teacher cannot encourage pupils to adopt this method of learning unless he himself constantly sets the example. This is a primary reason why research should be integrated into teacher training. It is a question of a way of life and of personal attitudes which, as we know, are more important than any techniques. The old adage "We teach not what we know but what we are" remains as true as ever.

But it is not only a question of one's attitude to work, one's "Einstellung". The teaching process and its corrective role must also be rationalised. In both cases, an empirical approach is also required.

It matters little what form formal education takes in the future - whether the traditional school survives or a new type is invented - the technological model (definition of objectives - input - treatment - output) seems the most appropriate for assessing the value of education and, what is more, the most fruitful source of general progress.

Strictness in the pursuit of the objectives, the keys of the whole system, will more and more imply a search for operational definitions and a constant check on the congruence of objectives, treatment and assessment. The components of the system will themselves be assessed for adequacy or efficiency, as we try to optimise the process. It is clear that only disciplined scientific training will permit such a method of procedure.

Moreover, action research seems to be the best link between laboratory research and the practice of teaching.

Although I am dealing only with the diagnostic and corrective aspects here, the method lends itself to general application.

As we know, action research in education means the systematic application of scientific methods and techniques to the study of the problems of practical teaching. "Its purpose is to provide a quantitative illustration of the essential components of a given operation and the factors influencing the result, and thus to provide a sound basis for decision-making" (1).

Let us take a pupil or group with educational difficulties. The least enlightened reaction consists in making the pupil repeat the exercise which he had difficulty in understanding or the year of study during which the failures occurred. In many cases, this amounts to doubling the dose of an ineffective medicine. A better reaction may already be expected

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(1) J.E. Magee and A.D. Little: Inter-Operation Research, NACA Bulletin, June 1954, p.1252.

from a careful observation of the case bringing into play all the teacher's finesse. But this global approach too has its failures. In such a case, rational analysis and quantification provide the best hope: define the problem, assess its degree of acuteness and evaluate the starting level; formulate hypothetical solutions, test them and adopt the best; initiate treatment, assess its efficacy both during application and on completion.

In short, one is again faced with the classical process of research, its methodological and instrumental requirements.

#### The art of teaching must build on research

In a noteworthy article, B.S. Bloom recently wrote on "innocence in education" (1). In the article, he meditates on the following theme: as soon as objective knowledge invalidates certain beliefs or customs, there is nothing to prevent a man who knows better from continuing to act wrongly: except that from this moment he becomes culpable in his error.

It is inconceivable that teacher training should not constantly build on acquired scientific knowledge, whether it be a question of developing a curriculum or of methods and techniques for teaching or assessment. To train teachers therefore also means to rob them of their "innocence".

It would obviously be futile to stuff student teachers with the whole encyclopaedia of research; it overwhelms the most advanced specialists and is always going out of date. Only crucial information and major trends should be broached. All the rest is once again a question of attitudes and skills. Teachers must become permanently interested in research and be able to read the reports themselves. But which reports? In their original form, with their full statistical analyses, or in a condensed, simplified form? The orientation and level of teacher training depend largely on the answer to this question.

In my view, there can only be one choice. As soon as possible, teachers should be given access to all the scientific literature of concern to them. This naturally does not mean that henceforth they should only read complete detailed reports, far from it. There is such an abundance of information that no one can read it all. However, they must be able to do it, for if they cannot, they are allowing others to choose, judge and criticise in their place.

Admittedly, there will always be a moment when the experiments or statistics become so technical that they are a matter for specialists only. But if the majority of practitioners in a given field ceases to be able to control the basis on which decisions are made, we have reached the era of technocracy with all the dangers that entails.

The course which we have deliberately chosen calls for a full university education; I will refer to the various possible modes in my conclusions.

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(1) B.S. Bloom: L'innocence en pédagogie. Education, May 1972

### The teacher as collaborator in scientific research

Any educational research which has no outlet on to educational reality has no *raison d'être* (1). Admittedly, the path towards decisions is sometimes long and winding and, as education is primarily a political and social matter, many decisions cannot await a scientific basis. Even if such a basis does exist, contingencies do not always allow it to be taken into account.

Whatever the position, a moment comes when the findings of research result in innovations and prove themselves in daily life. Except in cases where he is too much implicated in the problem to form an objective judgement, the teacher should be a privileged collaborator and equal partner of the researcher.

His co-operation should, moreover, begin much earlier ideally at the point when the problem is being formulated. But to generalise in this field is not without danger.

A real dialogue between research workers and practitioners is possible only where a common language and common frames of reference exist. But how can they do so without the necessary training?

### The teacher as research worker

Lastly, teachers can themselves be research workers and solve their problems by themselves or in association with colleagues who share their concern. At the present time, these are nearly always exceptional men, who overcome by their worth and courage the tremendous disadvantages inherent in investigations, which cannot be based on a solid scientific and logistical infrastructure.

In many cases, it is nevertheless to be deplored that through lack of adequate initial training, badly collected data are unusable, experimental models are inappropriate, and existing effective techniques are left unused.

Since in most countries of the world, there is a drastic shortage of educational research workers, a great potential is thus being neglected.

Better initial and continued training accompanied by some facilities and the assistance of professional research teams would very probably engender considerable scientific creativity in a number of teachers.

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(1) The hiatus, so often decried, between fundamental educational research and the school is a normal phenomenon. There is a similar disparity between sociological research and social action. Merton gave an excellent definition of the problem. An industrialist does not expect a laboratory researcher to provide him with a commercial proposition but it is the laboratory which provides more and more the elements and the discoveries which, suitably integrated and utilised by industry, create the present dynamism. And on the subject of research Merton concludes: "This requires the renouncement of immediate practical solutions, and the willingness to follow unexpected leads. But it is the only way in which social science can ever become really useful."

R.K. Merton: The Sociology of Science. University of Chicago Press, 1973, 559 pp.

### III. RESEARCH IN TEACHER TRAINING

Consideration of the necessary or desirable relations between teaching and research has always revealed the need to give teachers a sound experimental training.

What form should it take ?

#### Initial training

There is no doubt that in the near future, teachers of all countries will be trained in post-secondary establishments. Two trends appear clearly where pre-primary, primary and in many countries also lower-secondary school teachers are concerned: short training (often two years) in non-university higher colleges or long training (four years or more) at a university.

These two forms of training should, from a certain point on, be treated separately in the interests of balanced curricula. The fundamental principles remain, however, the same.

May I therefore recall that the general objectives of an induction to research are:

1. To create or strengthen an attitude or a turn of mind which induces teachers to think about and organise their teaching along research lines;
2. To enable teachers to understand and criticise research publications which concern them;
3. To make teachers conversant with the main research methods and techniques;
4. To acquaint teachers with the main sources of information on research;
5. To enable teachers to optimise teaching and learning processes conceived as technological systems;
6. To induce teachers to resolve serious educational problems by means of action research;
7. To prepare teachers to collaborate at all levels with specialised research workers;
8. To train teachers how to verify scientifically the effect of innovations in their classes;
9. To enable teachers to engage in personal research;
10. To provide an experimental basis enabling student teachers to follow a career in research rather than in teaching, or practising teachers to be usefully seconded to research teams;
11. To give teachers a practical introduction to data processing.

To these eleven objectives, which involve some overlapping, may be added a twelfth which concerns teacher training methodology as such:

To integrate and put into practice by the use of research the theoretical concepts derived from courses in psychology and education.



Were it only to serve this last objective, the place of research in the curriculum would be amply justified. Indeed, if one deals with somewhat complex education problems, one has to apply such different disciplines as educational philosophy, (a key to the definition of objectives), statistics, educational sociology, educational psychology, etc.

Experience shows that a student having to carry out research sometimes becomes aware, for the first time, of the vagueness of much of his knowledge, his inability to apply it to real situations and the lack of practical value of educational theories which appear attractive but do not stand the test of being put into practice.

Generally speaking, in all these cases it is a question of applying one's training to precise and, by definition, new situations, new at least for the individual concerned. But we know that the ability to apply knowledge remains the surest criterion of the value of learning.

Data processing deserves separate consideration. There is no doubt that it will have to be included in the curriculum of tomorrow's teacher training if one considers, firstly, the part which it will play in all intellectual life and, secondly, the role of initiator which the teachers themselves will in due course be called on to play.

A simple piece of research is enough to establish a functional contact with data processing. Even if this first contact is limited to preparing data, transferring it to punched cards, taking the cards to a processing centre and reading the output, a considerable step will have been taken since the simplicity of this most powerful tool will have been revealed. Learning how to use a programme library takes one still further.

Experience shows that the discovery of automatic processing of research data is always fruitful; it engenders new methods of thought and action and arouses among many students and teachers undergoing retraining a will to extend their knowledge of data processing.

#### Long initial training

In this case, there is practically no problem; often the essential knowledge is already there.

On the theoretical plane, research training normally comprises:

- A general introduction to methods and techniques (it should consist of three parts: principal concepts, universal instruments, specific methods and instruments)
- The construction of standardised tests and tests geared to objectives and assessment
- Descriptive statistics and inferential statistics and the study of the principal experimental models. As computers become more and more readily accessible, the calculation problem disappears. The important thing is to make the concepts and the reasoning understood.
- The principles of data processing - hardware, software.

In all cases, theory should be reduced to a minimum; one either limits oneself to merely arousing awareness (e.g. with regard to specific methods), or the concepts must be given life by the analysis and discussion of research reports, and above all by direct application. Here too, learning by doing, is the golden rule.

This need for practical application produces another, namely that for genuine research work in teacher training colleges, since what is true for the pupil is also true for the teacher. Only direct and continuous contact with research makes it possible to follow the rapid development of methods and techniques and promotes an awareness of the essentials.

There is no question of turning all student teachers into high-grade research workers; the aim is to produce sound practitioners and especially consumers of research findings.

This is why the direct and complete treatment (1) of a few simple problems is preferable to any attempt at an exhaustive study (which would in any case be purposeless). Nevertheless, participation, even if only brief, by students in complex research work will reveal to them a reality which they would otherwise be unlikely to perceive.

Initial training, which is inevitably fragmentary, will continue during professional life. We shall see how in a moment.

#### Short initial training

I have termed "short training" that which covers one or two years, often in non-university establishments (e.g. former teacher training colleges). The professional training of upper secondary school teachers also falls into this category. It follows a long period of specialised university studies and in certain countries is very short, if not virtually non-existent. This is still the case in Belgium.

One is here faced with a considerable difficulty to which no immediate satisfactory solution seems possible. Short-term training, reserved for primary and lower secondary school teachers, more often than not only attracts average if not weaker students; the candidate level will only improve when they become full members of the university (2).

As to the training which in some cases future upper secondary school teachers acquire in a few dozen hours, it does not amount to much. In such cases, reliance must be placed almost entirely on "continued" training.

Be that as it may, the broadlines of the research curriculum remains the same, as does the training methodology, although the units and examples become smaller and smaller.

As a number of countries have understood, the training of teachers for the upper secondary level calls for an extension of university studies. The length of this period will depend on the place already given to educational psychology during the specialised studies. It is impossible to go into this question in detail in this report.

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(1) Definition of the problem, hypotheses, experimental model, data collection, processing and analysis, conclusion, report.

(2) I do not attribute magical powers to the universities. The quality of recruitment depends on socio-economic status and the prestige attached to higher education.

### Continued training

Without reopening the discussion on nomenclature, I include under this heading continued training proper and the introduction of practising teachers to educational research.

### Introduction to educational research

As a rule, teachers take the time needed for continued training from their off-duty hours. Sometimes they attend residential seminars which vary in length from a weekend to a week or even two.

Such teachers are often about 30 or 40 years of age, and thus not so very ready to go through lengthy theoretical studies.

One should therefore resolutely opt in favour of practical training from the outset and only introduce theoretical and statistical knowledge when necessary or when asked for by the teachers.

Among the various strategies which we have tried out at Liège the following three proved efficacious.

Programmed learning seminars (1): During the first year an introductory seminar is arranged for some 30 teachers of the same subject. The initial objective is the establishment of a linear programme. Introductory theory is reduced to a minimum, and further concepts are only added when incidentally required. This objective is then rapidly expanded and leads to a real retraining.

As a first step, the teachers choose some aspect of the subject they teach for programming. A discussion then ensues on the definition of the objectives to be translated into behavioural terms and classified according to psychological or logical criteria.

It is at this moment that teachers generally receive a healthy shock which determines their future attitude. They realise that ideas and concepts which they handle every day and with which they considered themselves thoroughly familiar, in fact conceal vast unexplored areas, and that this explains certain educational failures or weaknesses in performance. The teachers are also struck by the exactness it is possible to achieve by analysis. Then follow the identification of the prerequisites, the preparation of the programme, the pre-test and the post-test, the selection of experimental samples, etc. The results are always processed by computer.

Teachers often undergo a profound change in attitude and develop enthusiasm for an aspect of their job of which they were unaware or believed inaccessible to them.

After the first year, programming teams are formed and continue to work in conjunction with the research centre from which they received their introductory training. Instances of such collaboration have now been proceeding for a number of years, and the demand for them has never diminished.

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(1) Organised in consultation with the Study Organisation Section of the Ministry of Education in Brussels.

Pupil assessment seminars: The principle is the same as for the programming seminars, but in this case the pivot of the activity is the drawing up of descriptive rating scales, of standardised or criterion referenced tests.

The initial shock is given either by a simple experiment revealing the unreliability or lack of validity of traditional marking systems, or by the definition of the objectives to which the measurement instruments will have to be geared.

In this case too, teachers are usually surprised to discover accessible techniques which prove very useful in their daily work.

A simple test: We have occasionally used an even simpler procedure. To a group of lower secondary school teachers who happened to ask to try their hand at research, we suggested Roller's Test-dictionnaire No. 5 (1) which they had never even heard of. For several members of the group this led to great discoveries and work which has continued for several years.

We recently recommenced a similar experiment with the aid of the cloze test (2).

In all these cases, two conditions seem essential to success; the fact that the teachers must deal with problems directly connected with their daily work and the presence of highly qualified research workers who are unreservedly accepted as members of the group. The research worker must never dispense instruction; he is there to provide information or help when it is required.

#### Continued training proper

This problem is simpler, and the methodology differs only in the starting level being higher.

Again, the main requirement is to associate teachers in work of direct concern to them and to provide them with the help they ask for.

One of the roles of research workers consists in this case in selecting such research literature as is likely to interest teachers and passing it on to them, often in its original form, since thanks to their basic training they are in a position to understand it.

In general, teachers have a feeling of security if they remain in contact with the establishment which trained them and with science in the making. The greatest difficulty resides in reconciling their often heavy professional burdens with the equally heavy demands of relatively high level research.

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(1) S. Roller: Test-dictionnaire No. 5. Geneva, Laboratoire de Pédagogie Experimentale, 1957

(2) G. De Landsheere: Le test de closure, mesure de la compréhension et de la lisibilité. Paris, Nathan; Brussels, Labor, 1973

#### IV. A NETWORK OF RESEARCH CENTRES

Continued training is too often discussed without sufficient importance being attached to the quantitative aspect. To enable a handful of teachers to undergo such training is already something gained particularly since they, in their turn, can become agents of dissemination and pressure. However, it is doubtful whether the effects of refresher training make themselves felt at the level of the school population if the number of teachers undergoing such training is below a certain level.

For example, in a small country like Belgium, approximately 100,000 pre-school, primary and secondary education teachers below the age of 45 are waiting for periodic refresher training.

A long-term national policy alone will permit effective action to be taken. This need coincides with the pressing need for a research network which should be gradually extended to serve the whole education system both for research proper and for action research.

I would propose that a pyramidal structure be set up, the summit of which would be a national or federal body to co-ordinate research. It could comprise mainly representatives of administrators responsible for organisation matters, of non-teaching personnel, of teachers and research workers.

The research and development policy decided on at this level would first be diffused to a primary network of research centres, built up where possible on the basis of existing university departments. This would ensure a solid scientific basis, a powerful research infrastructure (which there is no sense in paying for twice) and high-grade research workers, who in the educational field will probably remain very rare in Europe for a number of years to come. One would thus at the same time ensure the continuance of fundamental research without which a research service runs the risk of losing its vigour and working on a merely routine level.

To the university research centres would be attached practical teacher training centres which would also be developed as centres for research, documentation and refresher courses. It is from these secondary centres in particular that action research would spread to cover, after a certain time, most of the schools of a country. Where child psychology centres exist, they would naturally be integrated in the overall system.

For such a structure, with its regional contacts, to remain alive, there must be permanent communication and movement from the base to the summit. In particular, research workers would work sometimes in the primary centres and sometimes in the secondary centres. Moreover, teachers who show a special aptitude for research would be seconded from their usual functions for relatively long periods (at least one year if possible) and participate actively in the work of the centres. They would either become researchers themselves or return to co-ordinate and stimulate the activities of their schools.

## V. CONCLUSION

My intention has been to go beyond a general description and formulate precise proposals based on practical experiments in initial and continued training.

My first concern was to avoid utopianism. The educational forms of the forthcoming decades are becoming fairly clear. Following the recent example of medicine, educational science will speedily gain in rigour and efficacy. In fact, our theoretical and experimental knowledge is already in a position to introduce considerable improvements in the education system. One essential condition (though there are others) is to ensure permanent communication between practice and research. Most countries are still far from having reached this stage.

As I said at the outset, education (like medicine) cannot be a dry science and even less a technocratic one. Man's infinite complexity precludes an exhaustive knowledge of his nature and behaviour; his extreme sensitivity makes any mechanisation of human relations unbearable.

Perhaps, however, we are entitled, for the moment at least, to grant a certain preponderance to scientific pedagogy, because it is entering on its first great period of expansion after thousands of years during which the art and the craft of teaching reigned supreme.

Introducing teachers to practical research seems an excellent method of scientific training. But I certainly would not give it exclusive importance in teacher training. I believe equally in the gradual development of a sense of "caring" in a Hippocratic, practitioner-patient sense.