



## THEORETICAL BASE OF EDUCATIONAL RESEARCH QUESTIONS AND BASIC ELEMENTS OF RESEARCH DESIGN

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### Abstract:

*In an ideal world, educational research has a vital role to play in the improvement of education, whether this be in the development of theory to better explain why things occur the way they do in particular learning situations, or stimulating ideas for innovative practices, or developing new procedures and materials to enhance the efficiency and effectiveness of instruction. Educational research also has the role of providing attested information to improve the quality of decision-making for educational policy. This happens all too rarely, for reasons which will be explained in this paper. Policy decisions are often taken in the absence of good research, and sometimes in spite of the findings of available research. Furthermore, creating a well-researched policy does not mean taking any action on that policy. But at least it is a beginning. It is the objective of this paper to assist researchers to interact with policy makers in fruitful ways, so that gaps are bridged and research results made available in forms which are helpful to all.*

### INTRODUCTION:

Numerous definitions of policy research exist. A simple and useful one is 'research undertaken by qualified researchers in order to produce evidence on issues of importance to policy-makers'. The hope is that such evidence can then be used to help in formulation or revision of laws or educational policy guidelines. The intention always is that decision-oriented research should provide results which are useful for resolving current problems in education.

The distinction is sometimes made between 'basic' research and 'applied' (or mission-oriented or decision-oriented) research. The following definitions may be helpful here: (Wallen, 1974)

"The findings of a basic research study: should apply to educational institutions and should be related to many other studies and/or theories. It need not have obvious or immediate implications for practice. In contrast, the findings of an applied research study should be applicable to a specific situation (they may or may not apply elsewhere); and need not relate to a broader field of knowledge or other research; and also have immediate and obvious implications for practice".

The distinction is not a hard-and-fast one, of course, and both types of research have an important place. Both have their own standards of rigour and validity. But it is likely that research carried out to inform policy makers will lie towards the applied, decision-oriented or mission-oriented end of the research spectrum.

This paper concentrates on such decision-oriented research, and seeks to help researchers identify important issues needing attention, through a systematic 'mapping' of the educational territory. It then proceeds to find ways to establish priorities, using a consensus-building approach to select projects from

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the infinite number of problems which exist 'out there'. Finally it comes down to specifics, with a discussion of ways to develop specific aims from general aims, and operationalize these through the use of research questions and hypotheses.

### PREPARING THE GROUND

Since most policy research budgets are limited, it is desirable to have a sound procedure for identifying general issues needing research, to ensure that all important problem areas are considered and to allow for the setting of research priorities. For this to occur, it is helpful to know right at the beginning exactly who are the parties involved, and what their various expectations of the research may be.

Who are the policy makers? They are likely to be:

- Politicians, senior government officials, or Members of Parliament;
- Chief executives and senior administrators in ministries and government agencies;
- Influential people in national associations representing various interest groups, e.g., Employers Associations, Chambers of Commerce, Trade Unions.

Identification of educational policy research issues

Who are the researchers? They could be:

- Staff of research divisions which are part of government departments, ministries or agencies;
- Staff of universities or other tertiary institutions who carry out research, either as part of their own work or on contract;
- Consultants employed by international agencies;
- Staff of private research institutions or R&D establishments;
- individual, independent, self-employed research workers.

### Bringing people together

It is very necessary to bring the people involved in the research together at an early stage, and create a climate of dialogue. The different conditions under which policy makers and researchers work can often lead to tension between the two groups. This must not be allowed to occur, if the outcomes of the research are to be fruitful.

#### Policy makers:

Want research to deal with their own particular problems, and may not necessarily be interested in the relationship of these issues to the broader socio-political context, the 'fabric' of society. Are not usually trained as social science researchers, and are likely to be unfamiliar with the content, methods or jargon of educational research. This is one important reason for early consultation. Characteristically want results immediately. They tend to work on a different time scale, and are impatient of the slowness of the educational research process, when urgent decisions are needed. Need to realise that research cannot answer value questions.

#### Researchers, on the other hand

Are specialists, skilled in a relatively narrow range of paradigms, or ways of approaching research problems. Some prefer intensive qualitative methods, others are more comfortable with quantitative research techniques.

· May be somewhat remote from the 'real' world of social conflict, political pressure and financial constraint, and come up with recommendations offering solutions which are not feasible in practical terms. Or they may offer short-term solutions, addressing immediate problems, where alternate recommendations may be more appropriate to solve likely future problems.

· Often write in a particular research jargon, which means that they find difficulty in communicating to the policy makers who are interested in their findings. Training is needed in writing simply and clearly, and in presenting findings in such a way that they are not misinterpreted and distorted,

and yet at the same time, do bring out what the outcomes of the research are, however cautiously.

- May not be used to tight deadlines. They may come from an academic environment of scholarly research, and find they under-estimate the time needed to do a thorough job, and so require time extensions.

- Find their role unclear. For example: should they present their findings as objectively as possible, and leave others to interpret them, and do the necessary lobbying for any changes recommended? Or should they accept that true impartiality is impossible? Even in the choice of problem, selection of measures, methods of data analysis, and interpretation of findings, value judgements are being made.

#### **Anticipating difficulties**

If the ground is not properly prepared by a good dialogue between the policy maker and the researcher, major difficulties can arise. Suppression of research results can occur. Nothing will sour the relationship between a policy maker and a researcher more than the suppression of the findings of the research, because they did not demonstrate what the policy maker wanted to find, or proved an embarrassment to them and their cherished policies. The independence of the researcher needs to be made very clear at the beginning, and accepted by both parties. Delaying tactics are another way of avoiding potential embarrassment, if those in authority feel that there may be even a hint of criticism in the research report and recommendations. They deliberately 'drag their feet', there are substantial delays in the final editing, publication and acceptance of the report. It appears to have disappeared down a 'black hole', never to see the light of day. Attempted interference with the research process can also occur when it is suggested that certain recommendations should not be made. It is always good practice for the researcher to show an early draft of the recommendations to the policy makers commissioning the research. This avoids the suggestion of possibly naive and unworkable solutions. But a wholesale modification of a series of recommendations, under pressure from the commissioner of the research, is thoroughly undesirable. The above discussion indicates something of the different worlds from which the policy maker and researcher come, and highlights the question of 'ownership'. Who owns the data, the research, the outcomes, the final report? The policy maker doing the commissioning, the institution paying for it (these may not be the same) or the researcher doing the work? Who is allowed to publish and disseminate the results? In what form may the results be released? When can this occur? It is crucial to determine all these things at the outset, in a spirit of co-operation, so that mutual tension and distrust are avoided.

#### **Models of research utilization**

It is common to criticise policy makers for failing to take research findings sufficiently into account when formulating policy. Such criticisms often fail to acknowledge the complexity of the whole process. Policy makers are required to take into account social, political, economic, and educational realities, as well as the values and attitudes of interest groups and the manifestos of political parties. Research-based information is only one of the inputs into the policy-making process. It would be simplistic to believe that it was the major one. It may simply be one means of contributing to a general discourse on the nature of society, and its current and potential problems. To avoid the frustrations and weaknesses noted earlier and promote an effective contribution from policy-oriented research it is desirable that:

The subject of the research be relevant to the concerns of the policy makers. Dialogue between researchers and policy makers is a necessary, but not a sufficient, condition for effective policy-oriented research.

Policy makers should be prepared and able to identify the issues which they wish the researchers to address, and the types of information they seek; this will often relate to variables which can be manipulated by policy.

Information from the research should be provided in time, that is, before the policy decisions have to be made, in a form readily understandable by those who have to make the decisions, preferably in non-technical language and in summary form.

Multi-disciplinary approaches should be used, where appropriate, since social, political or economic considerations are likely to be important.

Policy researchers should be alert to the fact that their research may alter the balance in the 'power structure' between interested parties, and change their levels of influence. An awareness of political and administrative realities is therefore critically important.

In order for research to be utilised, it is therefore necessary to understand exactly how findings are presented and disseminated. This can conveniently be described in terms of 'models', idealised ways in which a complex process can be defined. There is a very large literature on the ways in which research

knowledge is disseminated and used (Husen and Kogan, 1984). Two very simple such models are discussed here. The first,

#### Linear model of research utilization

The linear model, may be useful in the physical sciences, but has not generally been found to be appropriate in the social sciences. One does not begin with a problem, devise a research strategy to solve it and obtain a solution. In the social sciences, the diffusion model is more appropriate, in which research knowledge is disseminated over a period of time, and gradually seeps into the consciousness of all the parties affected, perhaps in ways not fully appreciated or recognised. Researchers build on previous research, and action eventually follows a growing perception on the part of policy makers, driven by public pressure, that something should be done. This is often a matter of political expediency, and often in the face of economic constraint.

#### Diffusion model of research utilization

A much more complex series of seven models is given by Carol Weiss (1979). They can be summed up as follows:

1. The first model is the linear one referred to above, in which basic research will lead to applied research, which in turn will lead to development, and then application.
2. The second model is the problem solving one, in which missing knowledge is identified, and then social science research findings are gathered, either from existing knowledge or from specially commissioned research. The research findings are then interpreted in the context of various decision options which are possible, and the best policy chosen. Typically, this model leads to rather optimistic expectations about what research can actually do in solving real life problems.
3. The third model is the interactive one, which assumes that some sort of back-and-forth dialogue will take place between policy makers and researchers (often through intermediaries), and that this will result in a compromise acceptable to all parties, and allow sound policy directions to be determined.
4. The fourth model is the political one, in which researchers produce certain findings which are then used as political ammunition both by the ruling party in power and by the opposition (where such a political system exists). A less desirable variant of this model occurs when the politicians make up their minds about what policy they want, and then commission research to 'justify' their conclusions.
5. The fifth is the tactical one. Here the policy makers delay making a decision on a matter about which they are uncomfortable by commissioning a long research study, or maybe several research studies, on the issue. They thus 'bury the problem' under the guise of doing research, and say that they cannot act until research results are forthcoming.
6. The sixth is the enlightenment model, in which research findings slowly filter through to the public, and gradually shape the way people think about particular issues or problems. In many societies, particularly open, democratic ones in which the government is prepared to release research findings, even unpalatable ones, an informed public is a very powerful lobby group, and can influence policy decisions gradually over a period of time. The existence of scholarly journals and informed discussion of policy issues through the mass media are characteristic of the enlightenment model.
7. The seventh and last is the embedded model. Research is part of the whole intellectual enterprise of the society, embedded in its ways of thinking and behaving. It is only one of the many influences in policy development, and must take its due place alongside many other considerations, political, social and economic.

#### DEFINING THE ISSUES

Before any issues become the object of research, or any particular project is decided upon, there are some important matters to be taken into account.

A. The issue needs to be an important one, and not something trivial. Students seeking a post-graduate qualification at a university may have more scope here to choose something of particular interest to them (or perhaps the professor supervising their research dissertations). The topic they choose may push back the frontiers of knowledge a little, but not necessarily be a matter of national concern. But research designed for the consumption of policy makers commonly draws on public funds, and so needs to be seen to be of significance for the education system as a whole.

The following questions need to be asked: Does the research need to be done so that the system can be improved, either quantitatively, or qualitatively? Will it result in better classroom practice? Will it generate higher levels of achievement, greater equality of opportunity, or increased equity of outcomes? Will it provide a better-equipped work-force, or more socially aware and responsive citizens in the future? Will it highlight ways to bring about increased efficiency?

The issue needs to be researchable. Many problems which are not researchable exist in education systems. Some of these, such as whether or not a comprehensive secondary schooling system is 'best'. Others in this category would be questions of whether moral or religious instruction should be given in school, or what values should be incorporated in the curriculum, or whether class grouping or 'streaming' is desirable for instructional purposes. Issues such as these lie outside the province of empirical, 'testable', educational research.

The project needs to be manageable and workable. The financial and human resources need to be available, so that an outcome is possible within a reasonable time frame. Staff with an interest in the area, and possessing the appropriate methodologies, or consultants with the necessary expertise and sensitivity need to be available. Other questions which need to be answered are: Will it be possible to obtain access to a large enough sample to allow reliable and valid results? Are appropriate methodologies known and data analysis facilities available? Is there reason to believe that something useful will emerge from the research, an 'answer' to the problem.

Timeliness is another important criterion which is easily overlooked. Will results be obtained within a suitable time scale so that they will be of some practical value to the policy maker? Educational researchers characteristically want to carry out a large, long and thorough study, taking as many variables as possible into account, so as to 'milk' the research project of as much information as possible.

Policy makers, on the other hand, are usually under political pressures, and want the results immediately, if not sooner! The tough question, then, is: Will there be a payoff from this piece of research, and if so what will it be, and when will it occur?

Other considerations which are probably more relevant in a university setting, and less important for research directed at policy makers, are theoretical value, critical mass, and personal interest.

- Firstly, does the problem fill a gap in the literature, and contribute to the underlying theory in a particular area of education? Will it contribute to the advancement of knowledge in the field, and will others recognise its significance? Does it improve on the 'state-of-the-art'?
- Secondly, does it have a critical mass. In other words, is its size and scope sufficiently large to allow something really important to be said? Or is it rather insignificant, with only small sample sizes, few variables, and lack of potential results.
- Thirdly, is it the sort of project that will generate enthusiasm on the part of the researchers, so that they will be committed to it, and willing to work long hours on it? Will it excite their imagination and 'turn them on'? Will it provide them the opportunity to learn further useful skills, and extend their research competence?

#### **The content of policy research**

With these comments as a preliminary, it is useful to examine the types of research which policy makers are likely to be interested in. Out of the infinite number of possible research topics, it is necessary to decide which ones are most important, and should be pursued. This means the range of possible projects must be narrowed, and for this to be done systematically so that no possible area of concern is omitted, a classification system is desirable. Numerous such classification systems are possible, and that which follows is only one of many. It appears to be reasonably comprehensive, and allows projects to be classified in a logical way. It begins with the establishing of six broad categories:

1. Learning goals and curriculum.
2. Assessment, guidance and selection.
3. Demography, enrolment, structure.
4. Finance and administration.
5. Selection and training of educators.
6. Monitoring the education system.

#### **1. Learning goals and curriculum**

The goals of education can be considered at three main levels. At the first level, very general statements can be made, such as 'to produce democratic citizens', 'to produce literate and numerate

workers'. Such broad general goals are often seen in five-year plans. However, these goals need to be transformed into more detailed curriculum goals, for each year of schooling. These curricular goals are characteristically seen in subject syllabuses. This is the second level. Finally, at the third level we have detailed and specific goals, which might be related to what was intended should be covered in a unit or paper of work in a particular subject. The first and second level goals are the ones of interest to policy makers and planners, and are the ones with which researchers in education ministries are most likely to be concerned. Some examples of research topics which would fall into this area of learning goals and curriculum are:

a. Needs assessment surveys: If an education ministry is not alert to the needs of its society, and responsive to those needs, the school system may be producing learning which is irrelevant. Students may drop out of school early, and be unable to find suitable work; others who continue on to the upper classes in secondary school may be bored and disaffected, and become a disruptive influence. At the tertiary level, such surveys are vital in a rapidly changing world if industry is to obtain the skilled and up-to-date work force which is necessary for high national productivity.

b. Curriculum development: This follows on naturally from needs assessment surveys. Once the needs of society are known, including both the needs of citizens and the needs of employers, it is necessary to translate these requirements into actual curriculum statements of what shall be taught. A good feedback mechanism between employers and the education system can help to ensure that what is taught is appropriate, that the curriculum is up-to-date and relevant and not imported from some other, quite different society, or ten years behind the times. There is much research to be done here, and many different curriculum development models exist to guide the researcher. Furthermore, if a policy is made to bring in a curriculum innovation without careful trialing including sound on-going formative evaluation, the new curriculum may be poorly implemented and eventually unsuccessful in bringing about desired results.

c. Provision of resources: Again, following on naturally from curriculum development is the provision of appropriate curriculum resources to allow the curriculum to be implemented as intended. In many developing countries, a very large amount of time and energy has been spent on the production of textbooks, learning packages, and other curriculum materials, and on the setting up of libraries and resource centres. There are the obvious needs for school buildings - classrooms, laboratories, with all their necessary science equipment, and sports facilities and equipment for cultural activities.

d. Special needs students: Another possible topic for research which could be classified under this heading is that of provisions for special needs students; children whose first language is not that of the country in which they are living, disadvantaged ethnic minorities, displaced persons, the physically, intellectually and emotionally handicapped, and the highly gifted. For all of these types of students advanced education systems will attempt to make special provision, on the grounds of catering for the needs of the individual. The policy makers entrusted with the task will need research to guide them in the sorts of provisions they might make, and the likely costs of those provisions.

## 2. Assessment, guidance and selection

An integral part of curriculum development is assessment, because it is not possible to know whether the curriculum is appropriate without some form of feedback from the students and teachers. Assessment can be formative, occurring at intervals during the learning process and designed to assist and guide the learner, perhaps with some diagnostic elements. Or it may be summative, occurring at the end of a learning experience, and designed to provide feedback to the individual, educational institution or the community about what learning has been achieved (Livingstone, 1990).

a. Examinations : Virtually every country has written examinations in one form or another. Some have national examinations at several points in the education system, which determine the rate of promotion of students. Results on such examinations provide an indication of the level of education received by the student, and also an indication of attainment relative to other students at this level. But they also act as a filter, a form of selection, a mechanism for rationing of scarce resources, to control the entry of students to higher levels of education, and eventually their career paths into the occupational hierarchy in the world of work. Although examinations may take various forms (a single national examination, a number of regional examinations, teacher-based assessments, or a combination of these), virtually every country has them, at a higher or lower level. In many developing countries, the first such examination is that for selection for entry to secondary school.

b. Other forms of assessment: There are many other types of assessment which are worthy of research. For example, the development of forms of diagnostic assessment, perhaps using computer technology, the preparation of item banks, the development and use of standardised tests of achievement for guidance and placement in particular courses, competency testing for specialist vocational skills, objectives-referenced

or criterion-referenced approaches to assessment and their appropriate uses, and different ways of reporting and certification of levels of achievement. This is a vast field for research.

c. Guidance and selection : Guidance services for students are an important part of a well-developed education system, aiming to cater for the needs of the individual. Some of this will occur informally within an institution, without the need for specialist guidance personnel, simply on the basis of personal acquaintance, and information from tests, and other forms of assessment. For children with special needs, either those who are handicapped or highly gifted, special provisions will be needed, and specialist guidance will be required. The recent trend in some advanced systems to 'mainstream' children with special needs, removing handicapped children from 'special schools' back into regular classrooms, will doubtless lead to evaluation studies. Vocational or career guidance, the development of suitable instruments and methodologies, and methods of selection for higher education, are all likely to be areas for research.

### 3. Demography, enrolment and structure

Education systems are located in particular demographic settings, in countries with particular population distributions and patterns of enrolment. More especially in countries where universal primary education has yet to be attained, basic statistical information is necessary, and will form a very necessary part of the research information base for a ministry of education establishing primary schools. It is also vital information for those planning secondary and higher level educational institutions. Topics for investigation should include:

a. Basic demographic statistics : These should be prepared for the whole country, for each age group from birth onwards, with particular attention being given to accuracy, comprehensive coverage, geographic breakdown (rural/urban, by province), birth-rate and migration trends.

b. Educational enrolments : Once the population base is determined, political decisions are likely to determine the extent of provision for education. But politicians need guidance on what is possible (e.g., in providing a pre-school service, or expanding a system of secondary schools), and basic statistical research can provide that guidance. Information needs to be available (in relation to both the statutory school beginning and leaving age) on such matters as: the percentage of children who are not in school, or some other educational institution, at every level, the rural/urban and male/female balance, participation of ethnic minorities, special community requirements (e.g., for girls to care for children in the home, and for boys to work on the farm), and their impact on present and future enrolments.

c. Educational structures : Once the characteristics of the relevant population base have been ascertained, it is then possible to proceed to consider the educational structures necessary to cater for those who wish (and are able) to take advantage of them. This is likely to involve studies of the location of schools and other educational institutions (school 'mapping'), the provision of various alternative types of secondary and tertiary education (comprehensive secondary schools, vocational training institutions, teachers colleges, universities). It will be necessary to advise on the likely effects of automatic promotion or grade repetition policies, which are in turn linked to examination pass-rates. Investigations are needed on the prevalence of school truancy, 'stop-out' and 'drop-out' and the reasons for them. Studies should be undertaken on the retention rates of various institutions (including tertiary institutions such as teachers colleges and universities). All of these will have a major bearing on the quantity of education which must be provided.

The structure of a school system is always a matter of debate. There are many matters here which are subject to value judgements, of course. The value of intermediate schools, whether selective or comprehensive secondary schools are better for students, whether or not single sex schools or private schools should be encouraged, the effects on learning and student attitudes of large schools, or large class sizes, or 'streaming' into more homogeneous teaching groups, and so on. Some of the findings to date in these areas of research are equivocal, e.g., the class size issue (Glass, 1985). And yet even here, it is possible for specific, in-country research to be carried out, and for its results to provide an input into the decision-making process, over a period of time.

### 4. Finance and administration

In most countries, educational costs are growing rapidly. At the same time, there is a concern over educational standards, and a desire to increase levels of performance. This tension has given rise to a particular concern for both effectiveness and efficiency, and a desire to see 'lean' administrative structures in place which will contribute to these two very desirable goals in any education system. When curriculum innovations are being made, too, there are often implied, hidden costs, and trade-offs need to be made when budgets are limited. Research can therefore address issues such as the following:

a. Unit costs : Policy makers need to know the cost of particular forms and levels of education, and their various economic rates of return, both private and social. This is desirable if the demand is to be estimated accurately. At the same time, it should be appreciated that human beings do not always behave rationally, and traditional rate of return analysis makes strong assumptions. Its results should always be placed alongside other information which takes political and social realities into account before major financial decisions are made. It is also helpful if the actual costs of running institutions are known, to ascertain whether economies of scale are possible (e.g., with small rural schools), and whether the marginal costs of bringing in extra students are likely to be relatively small.

b. Resource allocation : In most countries, education is seen as a public good, to be provided for all its citizens as one of their rights, at least up to a certain level. But when times are tough, there is likely to be some pressure towards user-pays, particularly if it is believed that some students (e.g., those attending university) are receiving an undue share of the country's tax income to pay for their advanced education. In the long run, it is a value decision on whether education should be cross-subsidised, and will depend on a number of factors, including how much the country needs highly qualified people for its economic growth, and how much it will go out of its way to locate able students, encourage them by way of scholarships, living and boarding allowances, and subsidise their educational costs.

c. Administrative structures: Some education systems are highly centralised, others devolve a large amount of responsibility to the local level in administrative matters, and sometimes in curriculum as well. Most achieve a blend between the two. Research can be valuable in determining the best compromise, in determining the cost-effectiveness of various alternative patterns of administration, and ascertaining the effects of these upon teachers, principals, members of school governing bodies, and parents (Wylie, 1990). The reward and incentive structures for teachers also have a considerable bearing upon the quality of education, and the evenness of its spread across rural and urban areas in any country. Research is also needed on alternative teaching strategies and delivery systems (e.g., distance learning, small group, problem-based enquiry learning) and their impact on costs and the physical environments for learning.

##### 5. Selection and training of educators

A vast amount of research has been carried on into exactly what makes a good teacher, from the pre-school level right through to university. This is to be expected, because teaching and learning form the core of all education. A good teacher can make us happy and inspire us to continue learning, a bad teacher can make us miserable and 'turn us off' further learning altogether. And effective teaching behaviours vary widely, at different age levels, in different subject areas, and in different situations. Teaching also merits study because it uses up a lot of money, and an inefficient teaching service is a heavy drain on the country's educational budget.

a. Teacher selection : Every country must pay considerable attention to the way in which it selects its teaching force, because the lives of its future citizens and its own economic welfare are in their hands. Research is therefore highly desirable on the qualifications of the pool from which student teachers are traditionally drawn, the competencies and qualifications which are sought in prospective teachers, and in those who are eventually chosen for training. It is important to have good information on the incentives to teaching, the reputation of teaching as a career and the motives of those who select it, as well as the screening processes (overt and covert) which are used to select teachers and other educators.

b. Teacher education : The settings in which pre-service education of teachers is carried out, whether at a university, a teachers college or both, the level and length of training, and the balance between education theory and classroom practice are all legitimate topics for research. In-service education is another issue which is becoming of increasing importance, as new and updated curricula and teaching methods are introduced (e.g., in science) which make much heavier demands, both upon teachers' knowledge of their subjects, their ability to use new equipment and new approaches (e.g., discovery, problem-solving methods), and on their ability to cater for individual needs. They may be required to work in team teaching situations in open plan classrooms, and generally cope with a much more flexible and less-structured teaching environment, in which the traditional 'lock-step' rote learning is no longer acceptable.

c. Teacher effectiveness : All the matters mentioned above have a bearing on the general issue of teacher effectiveness. In spite of the vast amount of research into this area, we still do not know enough about what makes for effective teaching, in any global, international sense. This probably differs at different class levels, in different countries, under different teaching conditions, and with different community expectations. But it is important to have evidence about effective and ineffective teaching behaviours to plan the content of pre-service and in-service teacher education programmes, because there is no sense in



training teachers to adopt ineffective teaching strategies. If apparently successful teacher behaviours are so variable (as they seem to be) a search for general findings is probably unproductive. Specific, in-country research may be necessary to guide teacher educators in their very important task.

### 6. Monitoring and inspection

One form of assessment takes place at the student level. This has been considered under Topic 2. Another form of evaluation is as an accountability mechanism at the system level. It consists of gathering measures of performance so that policy makers know whether their expectations of the system outputs are being fulfilled, whether standards are being improved (or at least maintained), and (perhaps) how their own country's education system compares with other similar systems.

a. Monitoring achievement: It is not usual to undertake monitoring of achievement at every grade level, because of the sheer expense of the operation. Some countries do not even undertake formal monitoring at all, through the use of tests or other assessments, because they are not convinced that it is a cost-effective way to maintain standards. They may prefer to use informal methods of quality assurance by concentrating upon teacher in-service training, or by providing standardised tests of achievement to guide teachers in their curriculum and assessment decisions. But many countries do select important 'check-points' in the system at which to administer various assessment measures on a nation-wide basis, so that policy makers and the general community can obtain some idea of the standards that are being maintained throughout the education system (Livingstone, 1985). Tests of literacy and numeracy commonly form the basis of such assessments, but they can go much broader than this. A further argument is that without monitoring, the policy makers will not know how to improve the internal efficiency of the system, because they do not know how efficient or inefficient it is, nor exactly what are its outputs of well-qualified students.

b. Comparative evaluation: On a slightly broader front, system evaluation studies are desirable, to consider such topics as the following. Is my country investing more or less in the education of its population than other similar countries, seen as a proportion of its GDP? How does the country fare in relation to these other countries on a range of social indicators, such as school enrolment ratios, graduation rates, proportion of enrolment in higher level science and mathematics courses, etc.? Are we producing a sufficient supply of highly-qualified persons to compete with the output from other rapidly developing countries? And even, what proportion of the total educational budget should be devoted to educational research.

c. Inspection: Another traditional way in which educational systems maintain a quality check has been through regular inspection of its teachers, at least at the primary and secondary levels. The quality of education provided in any country is crucially affected by the quality of the teaching and lecturing force, and research studies of the ways in which such evaluations can best be carried on in a sensitive, ongoing way are called for. Such evaluations commonly go along with some inspection of the schools, or other educational institutions, themselves, to ensure that they are well-equipped and capable of delivering the high-quality education which is required.

### SETTING PRIORITIES FOR EDUCATIONAL POLICY RESEARCH ISSUES

When establishing a policy-oriented research programme, it is highly desirable to establish a mechanism to determine national priorities. Researchers are not good judges of what is important nationally. They tend to see research projects in terms of ideas, models or methodologies which are of interest to them. On the other hand, some administrators lack foresight, and are only able to identify projects when problems arise in Parliament or there is a national disagreement. It is usually then too late to initiate research which will deliver the desired results on time.

A good procedure is to poll major interest groups well ahead of time, so that the likely problem areas are identified in advance. This will give the necessary lead time to get the required research under way. It is also good to consult the Ministries of Education in other countries at a similar or slightly more advanced stage of development, to find out what problems they have experienced, locate any relevant research they may have done or commissioned, and generally pave the way for sound policies.

Clarifying priority educational policy research issues and developing specific research questions and research hypotheses

Once the general aims of the piece of research have been agreed upon, it is necessary to get down to more specific aims, and establish a suitable methodology for the research. The particular approach chosen will depend to some extent on the experience and preferences of the researcher, but very largely upon the type of problem faced.

To quote David J. Fox (1969) in *The Research Process in Education*.

In considering the research approach, we must consider two separate and underlying dynamics or dimensions, along which we can structure our research thinking. The first dimension is a kind of time line reflecting whether we believe the answer to the research question is in the past, present or future. The second dimension is an intent dimension reflecting what we intend to do with the completed research.

In the time dimension, if we believe the answer is in the past, we resort to what is called the historical approach, a research approach in which the effort is made to cast light on current conditions and problems through a deeper and fuller understanding of what has already been done. If we believe the answer exists somewhere in the present, we use the survey approach. In this approach we seek to cast light on current problems by a further description and understanding of current conditions. In other words, we seek more fully to understand the present through a data-gathering process which enables us to describe it more fully and adequately than is now possible.

If, on the other hand, our interest is in predicting what will happen in the future, that is, if we undertake something new and different, or make some changes in the present condition, we have the experimental approach, which is experimental in that it seeks to establish on a trial (or experimental) basis a new situation. Then, through a study of this new situation under controlled conditions, the researcher is able to make a more generalised prediction of what would happen if the condition were widely instituted.

### The research question

Usually the matters of concern to researchers in ministries of education are in the form of questions to be answered. This is part of the statement of the problem, which simply indicates what the researcher is trying to find out. A research question is not the same as a question which you could ask an individual who might be part of your investigation. A research question is a way of formulating a problem so that you are directed to the answers. If one person could give the answer to a research question there would be no need to set up a research project to establish the facts. Usually, the topics of concern to policy makers, or those selected by students for degree dissertations, are too vague to begin with. This does not mean that studying them is not worthwhile or even necessary. It simply means that the topic needs refining. Examine the following example of a discussion between a policy maker (P) and a researcher (R), limiting and clarifying the topic of concern, and making it more easily researchable.

- P. We need to do some research on why boys are not performing as well as girls in mathematics.  
 R. What exactly is the problem here?  
 P. Well, teachers I meet with keep telling me that girls do better.  
 R. Do you have any hard evidence to show this is so?  
 P. Only the examination results at the end of primary school. The girls score on average about 5% higher than boys.  
 R. Do all children take this examination?  
 P. Most of those who are still in school at that time take it.  
 R. What proportion of these are girls?  
 P. I'll have to check the figures. I would estimate two-thirds would be boys, one-third girls.  
 R. So there is a higher drop-out rate amongst girls in primary school?  
 P. Yes. There always has been.  
 R. Why do you think this is?  
 P. Social factors, largely, I would think. Many girls have to stay at home to help with the younger children; they don't see a career as to be as important as boys do.  
 R. Would it be the girls with a better home background who stay on longer?  
 P. Yes, I would think so.  
 R. Well perhaps that might be part of the reason. They might have more support and resources at home to do well at school and pursue their education. How could you check it out?  
 P. I think some schools administer standardised tests of achievement at Grade 4 level.  
 R. Have many girls dropped out by then?  
 P. No. Most of them are still in school.  
 R. Do you have universal primary education in your country?  
 P. Well, more or less, at least up to Grade 4 (that's about age 10 or so). The dropout starts after that.  
 R. So there should be a roughly equal number of boys and girls in primary school at Grade 4 level.  
 P. Yes.  
 R. Could you get the results from boys and girls separately from those schools which administer the tests in

mathematics at this level?

This procedure of clarifying the issue and making it researchable is a very important and necessary step before any research is embarked upon. In many circumstances, it can be made more systematic. Consider the research question below,

#### Research question

What is the need for a secondary school in particular village?

We will assume that the answer to this question is not already known, and that it could not be satisfactorily answered by just one person. The answer will depend on information from various sources, such as the dept. for Education, policy makers within the Ministry who are responsible for interpreting the Minister's policies and finding the financial and personnel resources, the views and opinions of people of the village, the views of the principals of the primary schools, population trends in the area, distance from secondary schools on neighbouring village, ease of transport in the village, and so on. When surveying opinion, the researcher will not simply want to repeat the research question above. Rather, it will be necessary to ask a series of more specific questions related to it. It may be possible to obtain answers to some of these questions from official records or government statistics. Perhaps some could be obtained from a postal questionnaire. But the most reliable way would usually be to interview key people likely to be affected by the decision. These are sometimes called the 'stake-holders', because they have an interest or 'stake' in the question.

To begin with, the following four questions might be asked by the interviewer:

Is there a need?

Where is the need?

Why is there a need?

What kind of need is there likely to be in the future?

Research questions	Examples of interview questions
<i>Is there a need?</i>	How many children attend primary school in the village of? How many of these are in their final year of primary school?
<i>Where is the need?</i>	Where are the primary schools in the village located?
<i>Why is there a need?</i>	What is the policy of the Minister of Education on the setting up of secondary schools?
<i>What about the future?</i>	What is the birth rate in the whole country? Is the birth rate in the village likely to be any different? Is there much internal migration to or from village?

#### The research hypothesis

Sometimes it is helpful to state the issue in the form of a hypothesis. Put simply, a hypothesis is a suggested answer to a problem, expressed in the form of a brief sentence.

#### It should satisfy at least four criteria:

It should be relational; that is, the hypothesis should state an expected relationship between two or more variables. The researcher will attempt to verify this relationship.

It should be non-trivial; the hypothesis should be sensible and worthy of testing, a likely possibility and not just an idea dreamed up for the sake of having a hypothesis.

It should be testable; that is, it should be possible to state it in an operational form which can be evaluated on the basis of data to be gathered.

It should be clear and concise; the hypothesis should be in the form of a brief, unambiguous sentence.

1. The hypothesis should be relational : In correlational studies, that is, those in which data on two or more variables are collected on the same individuals, a direct relationship is usually stated in the hypothesis. In experimental studies, where an experimental treatment is administered to one group of students but not to another group, differences between the treatments are usually hypothesised, based on means and standard deviations. In addition to stating a relationship, the hypothesis may also briefly identify the variables and the population from which the researcher intends to select the sample. As a rule, however, it is best not to include too much information of this type in the actual hypothesis, because it makes it too lengthy and less clear.

2. The hypothesis should be non-trivial : After completing the necessary review of the literature, you will have detailed knowledge of any previous work relating to your research investigation. In many cases you will find conflicting results, but they will at least give you some leads so that your hypotheses are sensible and reasonable. It is best to have some basis in theory, fact, or past experience for your hypotheses. A 'shot-gun' approach which gathers large amounts of information unsupported by any underlying rationale is not to be recommended.

3. The hypothesis should be testable : The relationship or difference under consideration should be such that the measurement of the underlying variables can be made reliably and validly, in order to see whether the hypothesis as stated is supported by the research. Do not state any hypothesis which you do not have good reason to believe can be tested by some objective means. The hypotheses of inexperienced researchers often fail to meet the criterion of testability, either because the required measures do not exist, because many other likely factors are at work, or because it would take far too long to obtain results. For example, a hypothesis that taking a particular course in moral education would lead to a reduction in adult crime statistics is unlikely to be easily testable.

4. The hypothesis should be clear and concise : In stating hypotheses, the simplest and most concise statement of the problem is probably the best. Brief, clear hypotheses are easier for the reader to understand, and also easier to test. It is better to have a larger number of simple hypotheses than a few complex ones. Care and precision in the use of language are necessary in order to define the variables and samples clearly. Each separate relationship drawn from the research question needs its own hypothesis, because usually some will be supported by the data and some will not.

In dealing with many education policy issues, researchers are likely to find it helpful to use questions rather than hypotheses for their problem statements. Questions may be more useful because they provide more less mechanistic, more holistic guidance in the framing of a research project. They are closer to real life enquiries, and allow a variety of broader approaches to gathering information, including qualitative methods. The advantage of the research hypothesis lies in the direction and precision which it gives to research. There is no room for sloppy thinking in framing research hypotheses.

Researchers commonly use two different kinds of hypotheses. A research hypothesis indicates what the researcher expects to find, and substantiate with evidence. It is framed in a positive way, but it is important to note that it is not what the researcher wants to find, but what he or she expects to find that is the basis of the statement. No researcher operates in a value-free environment. All of us have our own preconceptions about education; the frameworks in which we conceive the research and even the very questions which we ask will reflect that. But the important point here is that there is a 'procedural neutrality', and the researcher is as objective as possible in gathering the necessary data to see whether what he or she expects to find is indeed the case. Researchers sometimes use another type of hypothesis, the null hypothesis for reasons of ease in statistical testing. The null hypothesis states that no difference or relationship exists among the variables, regardless of whether or not the researcher believes this to be true. If, as a result of the research, the null hypothesis is rejected, the investigator concludes that differences do exist, and will then set out to identify those differences, and if possible, their causes. Two examples will make the difference clear.

#### Example 1

Topic: The relationship between age of entry to primary school and subsequent school success.

Research Question: How is performance in the English language affected by whether children enter primary school at age 6 or age 7?

Research Hypothesis: Children who enter primary school at age 6 will perform better on standardised tests of English reading comprehension at age 12 than children who enter at age 7.

Null Hypothesis: There are no differences in achievement on standardised tests of English reading comprehension at age 12 between children who enter primary school at age 6 and at age 7.

Note that the general topic has been made more specific by the research question, in that school success has

been defined in terms of the English language only. Clearly there are many other definitions of school success, and these would all need their own research questions. Note next that the research hypothesis has further narrowed the research question, in specifying that performance in English is defined in operational terms as written performance only (not spoken performance or listening skills) and that this performance is limited to what can be measured on a standardised test of reading comprehension (not vocabulary, for example). Other hypotheses would be needed to cover other aspects of English. Furthermore, the age of 12 years has been set as the point at which the measurement is to be done. If it was desired to see whether the advantage persisted to a later age, it may be necessary to test students again when they were 14 years or 16 years. These would require further hypotheses. The null hypothesis matches exactly the research hypothesis, and the same precision is called for in the framing of the statement. Here, however, no assumption is made as to whether beginning school earlier has a positive effect on learning or not. The hypothesis is entirely neutral.

### Example 2

Topic: The use of micro-computers in diagnosing errors in basic arithmetic.

Research Question: Can micro-computers be used effectively to diagnose errors in basic addition and subtraction with primary school pupils?

Research Hypothesis: The number of errors in addition and subtraction correctly located by a computer diagnostic arithmetic programme is more than the number located by a classroom teacher.

Null Hypothesis: The number of errors in addition and subtraction correctly located by a computer diagnostic arithmetic programme is no different from the number located by a classroom teacher.

Note that a number of other hypotheses would need to be tested here as well. It would be important to know how long it took the teacher to do the error diagnosis task, compared with the computer, whether or not the same errors were detected, how much extra information was obtained from the computer printout about the false starts made by the pupil before he or she got the right answer, and so on. (Livingstone, Eagle, Laurie, 1988).

Generating research hypotheses - Where do hypotheses come from?

There are three main sources:

Observation

Theory

Literature Review

Hypotheses are often derived as the end result of a series of observations. But they are not to be confused with observations. An observation refers to what is, and can be seen; a hypothesis refers to something that can be inferred, or expected, or assumed from what is seen. For example, some researchers could visit a primary school, and note that there is no library, there are very few bookshelves round the classroom walls, and there are hardly any books on them. Though they do not know the school achievement results are poor (that is, they have no data on examination success, at this stage), they expect that in general children from that school will not perform well. They could then make an explicit hypothesis, setting out an anticipated relationship between two variables, number of books found in school and success in examinations for entry to secondary school. This hypothesis could be tested by visiting a number of different schools, observing the number of books, and whether or not the school had a library, and relating these observations to the proportion of pupils who were successful in entering secondary school. A generalised hypothesis could be framed on the basis of the evidence.

But in visiting the various neighbourhoods, the researchers also observed that some of them showed obvious signs of poverty. There were many broken down old sheds, and the ground seemed not to be cultivated. They wondered whether this might have an even more significant effect on school achievement. Perhaps the majority of people living in these poor neighbourhoods could not afford a newspaper, or any books in their homes. There was no 'literate culture' in the homes, to reinforce what the school taught, and this was the main reason why the children did not do well at school. This idea would give rise to some alternative hypotheses, relating first, total home income, and secondly, the number of books, newspapers, magazines, etc. in the home, to the success of children in their examinations for entry to secondary school. More generalised hypotheses could now be framed and tested, provided that data on home income and home literacy could be obtained and put into an operational form to allow the necessary correlations to be calculated.

And so the process would continue, with more likely hypotheses being generated and proposed for testing, requiring new information to be collected in a form which allowed it to be evaluated with reasonable objectivity. A hypothesis, then, is an expectation about events, based on a generalisation of an assumed relationship between variables. Hypotheses are abstract and concerned with theories and concepts, whereas the observations used to test them are specific and based on facts.

Another way of generating a hypothesis is from an underlying theory, which has been built up over a large number of previous studies by researchers over a long period of time. The theory of mastery learning would be one such example. This states that if learners possess the necessary entry behaviours (prerequisite knowledge, skills and attitudes) for a new learning task, and if the quality of instruction is adequate, then they should all learn the task, given sufficient time.

A thorough literature review has another advantage as well; by learning from the work of others, you can avoid repeating their mistakes, if they are honest enough to report them. Finally, you may discover some studies which give clear and unequivocal answers to the very questions you are concerned about. You may not need to do the research you had planned at all, or you may only need to do a small-scale study to check that the results already found somewhere else hold equally true in your own country. One particular form of literature review is the relatively recent development of meta-analysis, which can provide a fruitful field for the generation of research hypotheses. Meta-analysis refers to a method that combines a large number of similar studies testing essentially the same hypothesis in different settings, and thus helps to reveal the overall size of the effect or relationship between the variables involved. In effect, meta-analysis is the analysis of analyses, a distillation of past research on an issue. Not only is this a good way to generate hypotheses, but it also provides an opportunity to pass judgement on the overall quality of the research on a particular issue. It also helps identify variables which ought to be included in future studies, because they have been found to be important in other studies in the past.

#### **A note on qualitative approaches**

Researchers and those who consult research information want trustworthy information, whether this is desired to guide educational practice or inform educational policy. In the past there has been a division of opinion over whether qualitative datasets are sound, trustworthy and generalizable. Today, it is generally accepted that quantitative and qualitative research are complementary. Each type of research data has its own authority and rules for establishing validity. Quantitative research relies upon measurement, using such techniques as questionnaires, interviews, and observational studies which involve the counting of scores, tallying frequencies, and estimating statistical differences and relationships between sets of variables. Qualitative research refers to a range of activities, but they do have some characteristics in common. Robert Burgess lists four:

"The researcher works in a natural setting ... and much of the investigation is devoted to obtaining some understanding of the social, cultural and historical setting".

In certain styles of research, "Studies may be designed and redesigned ... [and] researchers may modify concepts as the collection and analysis of data proceeds".

"The research is concerned with social processes and with meaning ... the kinds of studies that are conducted using this perspective involve focusing on how definitions are established by teachers and pupils, and how teacher and pupil perspectives have particular implications for patterns of schooling".

In some styles, "Data collection and data analysis occur simultaneously.... Hypotheses and categories and concepts are developed in the course of data collection. The theory is therefore not superimposed on the data, but emerges from the data that are collected". (Burgess, 1985)

In the latter, more qualitative approach, with its emphasis on 'context' and 'meaning', the researcher collects the data without a preconceived framework for analysis. Writing a running record of the behaviour of a child in a pre-school is an example. A researcher could start with a very general question, without formal hypotheses, collect as much information as possible, and let the data 'speak for themselves', as they gradually accumulate. In the former, more quantitative approach, the data are fairly well structured, as for example, with a structured observational schedule or an interview schedule. Researchers often start with the second approach, by recording conversations with people on the topic of study, before moving on a more structured analysis.

There are hazards with each method. The more qualitative approach works best if the researcher has the ability to see the underlying 'meaning' beneath the surface of events, but is very time-consuming. The quantitative method allows for standardised data-collection across subjects and samples, and more ready generalisation, but the choice of what to observe and measure can be a source of bias. Something important may be overlooked, or the kind of data collected may not be appropriate to important sub-groups within the population. However, it is likely that this approach will be most commonly used by researchers

working in Ministries of Education and providing information for policy makers, and it is assumed in what follows.

Moving from specific research questions and research hypotheses to the basic elements of research design

### **Putting it in to operation**

Let us suppose that you have now, after careful consideration of your research priorities, established your general aims for a research project. Following consultation with all the stake-holders, you have outlined your specific research aims and set out some basic research questions or hypotheses. How then do you proceed to put these research aims into practice, or 'operationalize' them?

The research questions or hypotheses are of crucial importance in the design of the research. They will determine every facet of the methodology.

1. Research questions determine the type of study which should be carried out: e.g., descriptive, relational or experimental. Is there likely to be some control over the research setting, so that random assignment of students to differing experimental 'treatments' is possible, or must the research simply describe the situation as it is, and attempt to draw conclusions? To what extent are the outcomes likely to be 'situation-specific', and how much generalisation to other settings is hoped for?

2. Research questions identify the target population from which any sample will be drawn. Only when it is known exactly about whom the policy decisions are to be made will it be possible to decide the subjects to consult and study. If you do not identify the people you are most interested in, those who are most able to provide the information required, you risk omitting important respondents from the project.

3. Research questions determine the level of aggregation of the data to be obtained. Are differences between pupils within classes, with their differing ages, abilities and home backgrounds, the important consideration? Or is it information gathered at the classroom level about levels of performance of groups of children under different instructional environments which is the major focus of the study? Or are you largely concerned with the schools themselves, their location within a particular urban or rural area, their organizational structure, and the effects this may have on attitudes or achievement? If this question is not considered carefully at the outset, there is a risk that there will not be enough data at the right level of aggregation to answer the research questions you want to answer.

4. Research questions identify the outcome variables. For example, precisely what definition of adult literacy is being used in a particular study? Does it only include written literacy, or is oral literacy included? Is it in the first spoken language or only in English, which may well be a second language for most people in your country? It is possible to determine appropriate outcomes only if you know exactly what you want to know. Otherwise, there is a danger that you fail to collect data on some significant outcomes.

5. Research questions identify the key predictor variables. Does performance in computer-based instruction differ by sex, or reading ability, or attitude to technology in the home? What other variables may be important? Thinking carefully about all the most likely things which may be associated with your outcomes will help to avoid missing vital predictor variables.

6. Research questions influence the measuring instruments which will be used in the study, the ways in which data is collected, whether by access to archival records, questionnaire, interview schedule, observational record, or other means. Do the official records exist in a form which allows for ready analysis? Are there published instruments or other existing measures which are suitable for the task, or will new ones have to be prepared, validated and used? Will a variety of approaches be necessary to gain the rich information necessary to describe this phenomenon?

7. Research questions determine the sample size, the number of people you must consult or study. Different questions require different modes of analysis, which in turn require different sample sizes to ensure adequate statistical power to detect effects. Low or biased response rates and clustering effects play havoc with sample sizes, and considerable care is needed to ensure that the research gives definitive and generalizable results, useful to the policy makers who will be interpreting its results (Light, Singer and Willett, 1990).

Below are two examples of how these procedures to 'operationalize' the specific research aims can be carried through systematically. Every research project is different, and different types of research require different approaches. But there is good value in being thoroughly systematic about the way in which the project is planned. A tabular approach can be helpful, and the two examples which follow illustrate how this can be done for two different research projects.

**Example 1- It is first necessary to decide:**

The type of research which would be most appropriate. (It could be a multi-faceted or 'triangulated' study, using several methodologies).

The target population, i.e. who are you going to consult, interview or survey. (This may be different for different sub-questions).

The sample size for the study (where this is appropriate).

The data sources, measuring instruments, etc. which will be required.

**Research question:**

What is the need for a secondary school in village ?

Sub-questions:

Is there a need?

Where is the need?

Why is there a need?

What kind of need is there likely to be in the future?

Type of study: Needs-based opinion survey, drawing on archives, official and local viewpoints.

**Table 1. Summary of data sources**

Code	Target population	Sample size	Data source
<b>A</b>	Official government record	-	Official records
<b>B</b>	Ministry of Education Officials	<b>5</b>	<b>Interview</b>
<b>C</b>	(a) national	<b>3</b>	<b>Interview</b>
<b>D</b>	(b) local	<b>6</b>	<b>Interview</b>
<b>E</b>	All principals of primary of neighborhood villages	<b>5 random from each of 6 schools = 30</b>	<b>Interview</b>
<b>F</b>	Sample of parents of primary school children and village head and other local dignitaries	<b>6</b>	<b>Interview</b>

It is helpful to set out your information in the form shown in Table 1 above, coding each of the data sources, and filling in the entries across the page. Once such a table is complete, you will have some idea of the size and scope of the project, the number of interviews and questionnaires which will be required, and a rough estimate of the amount of time and money which will be needed. The sample sizes can be modified at a later stage in the planning, of course, when the statistical treatment of the data is finally determined. But it is helpful to have some guide at this early stage. It is now possible to operationalize the process one stage further, by examining each of the individual questions which you intend to answer and deciding the best way of obtaining the information. In general, the best way is the most efficient way, the one which will provide the information at least cost, maximum accuracy, and least intrusion on the valuable time of other busy people.

For some research projects, particularly experimental studies, it is possible to go one stage further, and actually list the outcome variables and key predictor variables which are to be considered. This was less relevant for the question on the secondary school of neighboring village because the outcome was simply whether or not a school would be built, and many of the so-called 'predictor' variables were really background demographic information, political intentions by government, and central and local perceptions of need. It would be difficult to carry out an empirical, statistical analysis on such data. Most of the project arose from findings in other studies that children with high achievement levels invariably came



from schools with large libraries and/or homes with many books. Access to books seemed to be important for language learning, and it was hypothesised that a substantial increase in the supply of books available to children might improve their language learning. This was actually done by a 'book bank', the donation of a large number of books for use in school classrooms.

#### REFERANCES:

- Husén, Torsten and Maurice Kogan (eds) (1984). *Educational Research and Policy: How do they Relate?* Oxford, Pergamon Press.
- Light, Richard J., Judith D. Singer and John B. Willett (1990). *By Design: Planning Research on Higher Education*. Cambridge, Harvard University Press.
- Livingstone, Ian D. (1985). *Standards, National: Monitoring*. International Encyclopaedia of Education. Oxford, Pergamon Press.
- Livingstone, Ian D., Barry Eagle and John Laurie (1988). *The Computer as a Diagnostic Tool in Mathematics*. Study 13 of the Evaluation of Exploratory Studies in Educational Computing. Wellington, New Zealand Council for Educational Research.
- Livingstone, Ian D. (1990). *Assessment for What? The Director's Commentary in Fifty Fifth Annual Report*. Wellington, New Zealand Council for Educational Research.
- Nisbet, John and Patricia Broadfoot (1980). *The Impact of Research on Policy and Practice in Education*. Aberdeen, Aberdeen University Press.
- Nisbet, John and Stanley Nisbet (eds) (1985). *Research, Policy and Practice*. World Yearbook of Education 1985. London, Kogan Page.
- Postlethwaite, T.N. and K.N. Ross (1986). *Indonesia: Joint Assignment Report*. Office of Educational and Cultural Research and Development, Ministry of Education and Culture, Jakarta.
- Ross, Kenneth (1985). *The Measurement of Disadvantage*. set No.1, Item 3. Wellington, New Zealand Council for Educational Research.
- Ross, Kenneth N. and Lars Mählck (eds) (1990). *Planning the Quality of Education: The Collection and Use of Data for Informed Decision-Making*. Paris, UNESCO/International Institute for Educational Planning.
- Ross, Kenneth N. (1990). *The potential contribution of research to educational policies for the poor in Asia*. *Prospects*, Vol XX, No.4.
- Travers, Kenneth J. and Ian Westbury (eds) (1989). *The IE A Study of Mathematics I: Analysis of Mathematics Curricula*. Oxford, Pergamon Press, for the International Association for [the Evaluation of] Educational Achievement.
- Tuckman, Bruce W. (1988). *Conducting Educational Research*. Third edition. London, Harcourt, Brace Jovanovich.
- Wallen, N.E. (1974). *Educational Research: A Guide to the Process*. Belmont, California, Wadsworth, pp.1-2.
- Weiss, Carol (ed) (1977). *Using Social Research in Public Policy-Making*. Lexington Books, Lexington, Mass.
- Weiss, Carol (1979). *The many meanings of research utilization*. *Public Administration Review*, Sept/Oct, pp.426-431.
- Wylie, Cathy (1990). *The Impact of "Tomorrow's Schools" in Primary Schools and Intermediates: 1990 Survey Report*. Wellington, New Zealand Council for Educational Research.