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**IMPROVING EDUCATIONAL QUALITY (IEQ) PROJECT  
SOUTH AFRICA**

**Monitoring and Evaluation Handbook**

*Prepared for:*

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**Institute for International Research  
in collaboration with  
Juarez and Associates, Inc.  
and  
The University of Pittsburgh**

*Prepared by:*

**R. Chavez  
R. Chesterfield  
T. Dlamini  
R. Ebrahim  
R. Ntshingila-Khosa**

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## Preface

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The Improving Educational Quality (IEQ) Project was funded by the United States Agency for International Development (USAID) to provide technical assistance to non-governmental organisations (NGOs) in the areas of research, evaluation and monitoring. These NGOs, funded under the South African Basic Education and Reconstruction (SABER) and Education Support and Training (ESAT) programmes, provide inservice education for teachers in primary education (INSET) and Early Childhood Development (ECD). The following goals were articulated for the IEQ Project in South Africa:

### Goals of the IEQ Project

The following goals have been articulated for the IEQ Project in South Africa:

- Conduct impact assessments of grantees' products and services that influence instruction and learning at the school and classroom level
- Strengthen grantees' capacity to establish and maintain monitoring and evaluation systems of individual projects;
- Strengthen grantees' expertise in educational research and evaluation methodology; and
- Facilitate professional linkages between grantees and the educational research and development community within and outside of South Africa.

### IEQ's Collaborative Approach to Evaluation

During April 1995 and July 1996, the IEQ project conducted impact assessment studies of six Inservice Education for Teachers (INSET) NGO grantees. IEQ's approach to working with grantees to introduce and implement evaluation methodologies differs from most grantees' previous experiences. Requests for measuring programme outcomes typically come from donors or potential donors and require "outsiders" to conduct the evaluations. The presence of the evaluator often interferes with service delivery and imposes on staff time. IEQ, therefore, develops **collaborative relationships** with grantees that include:

- identifying grantee information needs which may be gathered during the assessment;
- working together to construct a design that fulfils grantee information needs;

- forming teams of IEQ and grantee staff to develop data collection instruments that remain with the grantees for project use;
- building capacity to sustain monitoring and evaluation activities;
- conducting site visits together; and
- developing strategies for utilisation of the data to influence policy and improve practice.

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# Introduction

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During 1994-1996, the IEQ Project worked collaboratively with a number of non-governmental organisations (NGOs) to conduct programme evaluations of their teacher training programmes. Participating NGOs are grantees of USAID under the South African Basic Education and Reconstruction (SABER) and Education Support and Training (ESAT) programmes and provide inservice training for teachers at the Educare and primary school levels in disadvantaged communities. Based on their participation in collaborative impact assessment studies, grantees requested more training in monitoring and evaluation in order to consolidate and extend the skills they have learnt. Such a workshop would also help NGO staff in setting up their own monitoring and evaluation systems. Setting up monitoring structures and carrying out consistent monitoring and evaluation activities is important for NGOs for two reasons. First, using the staff within the NGOs to collect and analyse classroom data would provide tools for the continuous improvement of their training programmes. Second, as NGOs enter into partnerships with government structures, they would need to demonstrate that their programmes have sound monitoring and evaluation systems, and that their work in classrooms has been monitored and evaluated over time.

In August 1996, IEQ project held a series of four to five day Working Groups for NGOs on programme monitoring and evaluation in Western Cape, KwaZulu-Natal Natal and Gauteng. Two United States consultants, Ray Chesterfield and Regino Chavez, collaborated with the IEQ/Durban team in the planning and implementation of the Working Groups. The goals of the Working Groups were as follows:

- to provide a framework of various monitoring and evaluation approaches;
- to demystify evaluation as a practice for a few experts, and bring it to the level of practitioners; and
- to provide hands-on experience in instrument development, data collection, data analysis and report writing.

A total of 40 participants who hold positions of programme co-ordinators, researchers, and implementors in their organisations attended the Working Groups. The Working Groups provided a number of monitoring and evaluation activities including an orientation to various methodologies of evaluation and hands-on experience in instrument development; data collection, reduction, retrieval and analysis; and report writing.

This Handbook is a product of the Working Groups on Monitoring and Evaluation and a synthesis of activities from the three Working Groups. It is hoped that the Handbook will serve as a resource and a guide for staff of NGOs in their monitoring and evaluation activities.

# An Overview of Programme Monitoring and Evaluation

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Those who engage in the monitoring or evaluation of education programmes find that they are often asked “to evaluate your programme according to whether the programme’s objectives have been achieved.” Such seemingly straightforward advice will be offered by a variety of individuals, all of whom wish to help a programme’s staff carry out a defensible monitoring or evaluation study.

Yet, because there are several different sorts of objectives that can be employed during an education programme’s existence, a clear potential for confusion exists among programme personnel regarding the role of objectives in programme evaluation. In the remainder of this section, different forms of evaluations are described and their functions delineated.

## **Formative Evaluation**

Formative evaluation, or monitoring, encompasses the thousand-and-one jobs connected with providing information to the staff to get the programme running smoothly. Certainly it will involve some attention to looking at programme implementation and achievement of goals. To improve a programme, it will be necessary to understand how well a programme is moving toward its objectives so that changes can be made in the programme’s components. Monitoring is time-consuming because it requires becoming familiar with multiple aspects of a programme and providing programme personnel with information and insights to help them improve it. Before launching into monitoring, make sure that there actually is a chance of making changes for improvement; if no such possibility exists, monitoring is not useful.

## **Decisions and Actions Likely to Follow Formative (Monitoring) Evaluations**

Objectives of the monitoring process deal with the intended procedures that are to be implemented in a programme. For example, in a typical school situation, a teacher who wishes to improve classroom discussions might establish an objective such as to call on each student at least twice during classroom discussions. As a result of monitoring, revisions are made in the staffing, activities, organization, and other materials of the programme. These adjustments may be made throughout the monitoring process.

## **Questions for a Monitoring or Formative Evaluation**

Sponsors or Gatekeepers:

How can the programme be improved?

How can it become more efficient and effective?

Evaluators/Staff:

What are the programme's goals and objectives?

What are the programme's most important characteristics--materials, staffing, activities, administrative arrangements?

How are the programme activities supposed to lead to the attainment of its objectives?

Are the programme's important characteristics being implemented?

Are the programme components contributing to achievement of the objectives?

Which activities or combination best accomplish each objective?

What adjustments in programme management and support (staff development, incentives, etc.) are needed?

Is the programme or some aspects of it better suited to certain types of participants?

What problems are there and how can they be solved?

What measures and designs could be recommended for use in an impact evaluation of the programme?

## **Impact Evaluation**

The goal of impact evaluation is to collect and to present information needed for summary statements and judgments about the programme or certain programme components and their value. The evaluator should try to provide a basis against which to compare the programme's accomplishments. One might contrast the programme's effects with costs with those produced by an alternative programme with the same goals. In situations where such a comparison is not possible, participants' performance might be compared to a group receiving no such programme at all. The standard for comparison might come from the comparison of programme results with the goals identified by the programme designers or the community at large.

In some instances, impact evaluation is not appropriate. A summary statement should not be written, for instance, about a programme that has not been in existence long enough to be fully developed. The more a programme has clear and measurable goals and objectives as well as

consistent replicable materials, organization, and activities, the more suited it is for an impact evaluation.

### **Decisions and Actions Likely to Follow an Impact Evaluation**

Objectives of an impact evaluation focus on the intended changes that are sought in the programme's participants as a consequence of having participated in the programme. Decision makers may use information from impact evaluations to help them decide whether to continue or to discontinue a programme or certain programme components as well as whether and/or how to expand or reduce it.

### **Questions for an Impact Evaluation**

Sponsors or Gatekeepers:

What does Programme X look like and accomplish?

How effective is it?

What conclusions can be made about the effects of Programme X or its various components?

Is Programme X worth continuing or expanding?

Evaluators:

What are the goals and objectives of Programme X?

What are Programme X's most important characteristics, activities, services, staffing, and administrative arrangements?

Why should these particular activities meet Programme X goals?

Did the planned programme occur?

Does the programme lead to goal achievement?

What programmes are available as alternatives to Programme X?

How effective is Programme X? In comparison with alternative programmes?

Is the programme differentially effective with particular types of participants and/or in particular locales?

How costly is the programme?

## Qualitative and Quantitative Methodology

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Some of the individuals engaged in certain academic disciplines in universities may argue that qualitative and quantitative research and evaluation methods cannot be used in conjunction. They feel that the assumptions involved in each type of methodology make the two almost mutually exclusive. There is, however, a growing amount of evidence which shows that the two types of methodologies can be successfully combined. This is especially true in the work of practitioners in education and health who are involved in resolving practical problems and must choose the best possible ways to find answers to their questions. The methodologies used in any evaluation and monitoring efforts will depend on programme needs and objectives. One instrument or methodological approach is seldom sufficient to meet all of the objectives of a particular programme.

There are some general features that characterise qualitative and quantitative evaluation approaches. These characteristics are summarized below to help readers in making choices about appropriate methodologies for evaluating their programmes.

### Qualitative

- Depth
- Words
- Researcher is main instrument
- Individual/school/community
- Process (How? Why?)

### Quantitative

- Breadth
- Numbers
- Standardised instruments
- Representative sample or population
- Impact (Who? What?)

Qualitative methodology seeks to study a particular phenomenon in depth. The methodology is generally characterised by the use of words and often creates volumes of descriptive data. The focus is on single cases such as an individual, a school, or a community that typifies the event or activities of interest. The researcher is considered an instrument in the data collection process and his/her interaction in the day-to-day activities and events that make up the naturally-occurring context of a school or community is important to understanding a particular educational process. Questions are related to processes such as: How do teachers promote creative thinking? Or, why do girls perform more poorly than boys in primary school?

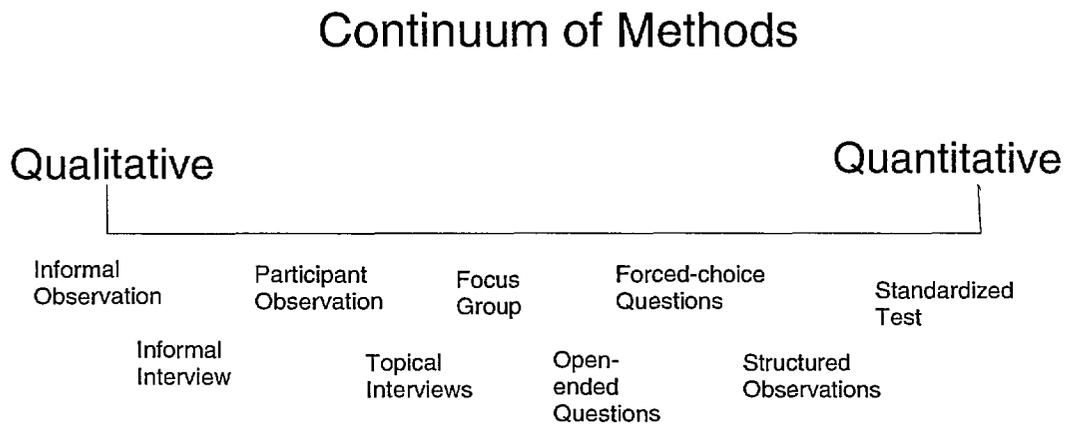
Quantitative methodologies focus on generalizing to all cases of a certain type, such as all South African primary school teachers, and the results of quantitative investigations are usually expressed in numbers. Perhaps the most familiar type of quantitative research is an opinion poll, used to determine voter preferences. Such polls use a representative sample of voters to generalize about how all voters are likely to vote. In quantitative methodologies, instruments are

standardized and all researchers are expected to use the instruments in exactly the same way. Thus, a study is made “researcher-free” by controlling for any differences in the interaction patterns that individual researchers might have with actors in the research setting. The types of questions asked are related to programme impact on the population as a whole. Examples of such questions are: Do teachers with more training provide more individualized instruction to their learners? Or, what is the achievement of boys in a given programme compared to girls?

These characteristics should be viewed as ways to typify the two methodological approaches rather than absolute differences. For example, words can often be expressed as numbers and numerical results can often be expressed in words. It is perhaps most useful to think of the two methodologies as on a continuum, from which educational researchers and evaluators can pick individual methods or several methods that best meet their needs.

Figure 1 presents the two methodologies as part of a continuum. In the more qualitative approaches, the social situation under study and the interpretation of that situation by the actors have a greater importance than in the more quantitative approaches. In these examples, the categories of response are largely determined by the researcher.

**Figure 1: A Continuum of Qualitative and Quantitative Methodologies**



## Data Collection Instruments

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The following are various instruments used for collecting information, listed in order from the most quantitative to the most qualitative:

Standardized tests are a good example of a very quantitative approach. Tests are created by specialists in academic subjects, generally with little participation by teachers. They are often administered in a testing context that is removed from the normal activities of the classroom. They allow examination of the performance of classes and individual students in relation to entire populations of similar students who have taken the same test under similar conditions.

Structured observations take place in the context of the classroom. They generally deal with a fixed set of categories of behaviours that have been determined outside the classroom context and rely on researchers who have been trained to consistently observe in the same way. They generally don't require interaction with teachers or students nor their interpretation of the classroom activities under study. They are used to generalize about what teachers do in their interactions with students.

Fixed-choice questionnaires or interviews collect data on teachers' or students' interpretation of events. The questions and the range of responses are, however, limited by the researchers or evaluators and often require only a Yes or No response. Again, the results are used to generalize about the way teachers or students as a group think about issues of importance to the researchers.

Open-ended questions provide greater opportunity for teachers or students to provide their interpretation of the situations or events under study. Although the questions are determined by the researcher, respondents are not limited in their responses. They can provide explanations or elaborations of their answers in their own words. This approach may also be used to generalize to a population of teachers but requires the researchers to determine common categories of response from the information provided by the respondents.

Focus groups are interviews conducted with a homogeneous group of 8 to 10 individuals. A moderator uses a general guide of research topics to encourage group participation and synergy. It is felt that the spontaneous interaction among individuals with similar experiences will lead to responses beyond those produced by one person in a single interview. Thus, the interpretation of contexts such as classroom lessons is interpreted by the group. Focus groups are used to determine language for other types of data collection instruments and to pilot-test instruments when developed.

Topical interviews do not have fixed questions but rather allow respondents to discuss a number of general topics in their own words. Thus, they encourage respondents to contextualize

their responses based on their own experience. They are used to collect in-depth information such as the process of change over time in a school.

Participant observation is a strategy in which the researcher or evaluator has a particular role within a social situation and observes from that perspective. The sample is generally limited and the objective is to determine how teachers or students with particular characteristics interpret the reality of their interactions and activities.

An informal interview is generally an open conversation without pre-established topics or questions. The respondent freely discusses whatever arises in the course of the conversation. This technique is used to help the researcher gain a better understanding of the respondent and the way that person sees the world.

Informal observation is a technique commonly used by anthropologists when doing ethnographic research. The researcher enters the social situation as an apprentice and attempts to learn about that situation from the perspective of the participants in the situation. Such a technique is generally limited to one researcher per school for an extended period of time. It provides a great deal of information about a particular school, but is not generalizable beyond that school.

## **Observational Instruments**

Most observational instruments are forms of some type which are designed to assist a researcher to collect systematic observational information about research questions. Whatever the purpose of the form, it should contain certain basic information, including the name of the school and identification of the classroom and teacher. In the case of observations of individual students, they should also be identified by name or identification number. The context of the observation (e.g. language class, math class, recess) should also be recorded on the form, as well as the time that the observation took place. Although the format of an observation form will depend principally on the objectives of the investigation, it is always a good idea to leave space on the form to add codes or additional notes and comments. What follows is a discussion of some of the types of observational forms used in the IEQ Working Groups.

### **Maps**

Drawing maps of a school and especially of classrooms can provide a very useful tool to a classroom observer. A school map sets the context of the study by giving a point of reference as to where elements of the school (roads, classrooms, offices, storerooms, kitchens, recreation areas) are located in relation to one another and the relative size of each. It also shows what facilities (potable water, latrines, electricity) are available. Developing a school map can also be a good way for an observer to begin to understand the school, as the school director can be used

as a resource to give the researcher a tour of the school. Such a tour will identify the elements of the school that the school personnel think are important and provide the researcher with the terms that staff use to refer to these elements. Using this vocabulary helps to build rapport and mutual understanding with school staff. In longitudinal studies, initial maps serve as a baseline for measuring infra-structure change in the school.

Classroom maps provide a visual description of the spatial arrangement among students, teachers, and materials. They show the relationship of gender and other child characteristics such as age and ethnicity to the spatial organization of the classroom. Classroom maps are generally drawn during a researcher's first visit to a classroom. They include the position of desks, instructional aids such as blackboards, posters or learning corners, and textbooks, as well as structural features of the room like doors, windows and cupboards. Researchers making classroom maps generally sketch these aspects of the classroom, then identify the students by assigning a number to each with an "F" or "M" subscript to show the student's gender. Student age and ethnicity is determined through reviewing the map with the teacher during a break in classroom work.

The researcher then uses the map as a reference in systematic observations. For example, in an observation of teacher-initiated interactions with students, the observer writes down the number of each student with whom the teacher interacts in a given period of time. These interactions can be examined for patterns of interaction by students' gender, ethnicity, or age.

In data analysis, the information contained in maps can be used to form classification variables such as "well equipped" schools and "poorly equipped" schools or "interactive" and "traditional" classrooms. Such variables can be used to compare programmes in terms of absolute or relative frequencies or in conjunction with other variables (e.g. to measure the relationship between "interactive" classrooms and materials use). Maps can also be analysed to identify different spatial patterns such as the location of girls in the classroom. Again, such patterns can be related to other information such as the frequency of teachers' interactions with children of different genders. In using such data, however, care must be taken to assure that seating patterns are stable.

### **Inventories**

Inventories are counts of certain types of objects or conditions present in a classroom or school. Generally inventories are concerned with whether instructional materials of a certain type are available in a classroom. The number of materials, such as textbooks, that are present in a classroom can also be investigated through an inventory. Inventories may also be concerned with physical conditions or the numbers of children or teachers in a school or classroom. Inventories are used to answer questions about availability of supplies or facilities such as: Are latrines or bathrooms available? What is the ratio of books to children? or What is the ratio of pencils to children?

The Educare Observation Protocol, developed as part of IEQ efforts to study preschool child development programmes in South Africa, has elements of an inventory. As can be seen from the example that follows, researchers used an inventory to identify the existence of certain conditions or elements normally associated with effective preschool programmes.

Example: Section 1 of Educare Observation Protocol

#### THE CENTRE

Please make a tick in front of each thing the centre has:

- A clean classroom
- A schedule/plan for the activities that the children do during the day
- Child-sized tables and chairs
- A place for children to lie down
- Clean bedding for them to use to lie down
- A safe place to play outdoors
- A clean bathroom
- Colourful decorations on the walls
- Books for the children: About how many books are there?....
- How many books are there? \_\_\_\_\_
- Toys/games for the children: please list some of the toys/games
- Educational materials
- Learning areas

This inventory includes both noting presence and absence of certain things and counting the number of items, as in the case of books. It also requires the observer to make some judgments, as it asks about the quality of elements such as the classroom, bathroom, bedding ("clean") and a place to play outdoors ("safe"). In order to achieve consistency among researchers in making these judgments, operational definitions are developed and agreed upon during training. For example, clean bedding operationally defined will be bedding that is not stained or torn. These are observable criteria that all researchers can agree upon and practice identifying during training.

#### Checklists

Presence and Absence Checklists are the most commonly used type of classroom observation instrument. There are a number of different types of checklists, which are often used together. The simplest type of checklist is that which is used for measuring presence or absence of an event or action. The focus on aspects of a classroom that must "happen" and are therefore not always present, is what distinguishes this type of checklist from an inventory. As mentioned, inventories focus on inanimate aspects which are continually part of the classroom environment.

Checklists that focus on presence or absence of certain phenomena are used to provide a general profile of what happens in classrooms. The types of questions for which this form of checklist can be used include: Do small groups occur? Do teachers use praise? Are girls called on?

In South Africa, where the study focused on the child development programmes for preschool children, one of the research interests was in determining if the programmes offered a nurturing environment for the children. At the classroom level, this was operationalized in terms of discipline and praise, as shown by the following checklist components:

How does the teacher discipline the children (tick all that apply)?

- 1. No discipline observed
- 2. Yells at the child
- 3. Hits the child
- 4. Punishes the child
- 5. Quietly reminds the misbehaving child of the rules
- 6. Separates the misbehaving child from other children
- 7. Other (Specify) \_\_\_\_\_

How does the teacher praise the children? (Tick all that apply.)

- 1. No praise observed
- 2. Compliments the child
- 3. Hugs/touches the child
- 4. Gives the child a reward (i.e., more food, sweets, etc.)
- 5. Other (Specify) \_\_\_\_\_

There are several observational strategies that can be used to collect present/absent data. One of the most common is a series of "spot checks" in which the researcher makes periodic visual sweeps of the classroom and checks any observed occurrences of the actions or events under study. Each sweep takes only a few minutes to complete. When the interest is in characterising the instructional day, such sweeps are repeated several times during each hour of instruction, so that a total of 8-10 data points are available for analysis.

In each of the Working Groups, checklists were developed for examining the classroom environment in terms of presence and absence of certain types of materials, space, furniture and the like. The following example is the Gauteng Classroom Checklist. It includes both presence and absence of certain elements and if those elements were observed in use. The list is used

three times in different activities during a visit to a particular classroom, as the degree to which the elements are present and/or in use can vary by activity.

### Gauteng Classroom Checklist

School: \_\_\_\_\_

Teacher: \_\_\_\_\_

Date: \_\_\_\_\_

Observer: \_\_\_\_\_

Classroom period: \_\_\_\_\_

Use this instrument in three different activities which occur during the visit to the classroom. Indicate **PRESENCE**, **ABSENCE**, or **USE** of each of the following in the classroom:

Classroom Organization	TIME 1		TIME 2		TIME 3	
	Present	In Use	Present	In Use	Present	In Use
Flexible work space for children						
Learning centers/corners are present						
Children move among desks, materials and learning centers						
Child current work is displayed						
Safe learning materials						

Yes = Present

No = Absent

Comments:

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Frequency Counts are a second type of commonly used observation checklist. Frequency counts differ from observation of presence/absence in that the number of occurrences of a phenomenon under study are recorded, rather than simply if the phenomenon was ever observed or not.

Frequency counts are used in situations where the objective of the research is to make comparisons among individuals or schools in terms of certain types of behaviours. For example, questions such as, "Are there differences in the predominant instructional methodology used in schools implementing an educational reform and schools not implementing the reform?" and "Are there differences in teachers' interaction patterns with boys and girls?" can be answered through frequency counts.

The teacher is often the focus of observation for frequency counts, as it has generally been assumed that it is the teacher who orchestrates classroom interaction. With greater emphasis on child-centered approaches to learning, more attention is being paid to child-initiated interactions and the different experiences of individual children in the classroom. Thus, a sample of children that is representative of the class in general (e.g. two boys and two girls making normal progress and one boy and one girl repeater) will be selected for observation.

Strategies are similar to those used for other types of observational checklists. A researcher uses a "snapshot" strategy of focusing on the target teacher or children for a period of five or ten minutes and indicates any interaction with the proper symbol. Such snapshots would take place a number of times over the school day to characterise the instructional day at a school. Again, when the interest is in characterising specific periods of instruction or lessons, a strategy of continuous observation of the teacher or several students during the period of the lesson can be used. As mentioned, the repeated observations assure the stability of the observation and the characterisation of what normally happens in the school, whereas a single "snapshot" may reflect an anomaly such as the teacher dealing only with one student or being called from the room. While such events are important, they should be recorded in the broader context of an instructional period or a school day.

As the participants in the workshops came largely from teacher training organisations, there was a special interest in the observation of teacher behaviour in the classroom. The general concern was with the degree to which teachers built on the experience of the children and encouraged their active participation in their own learning. Thus, checklists that examined the degree to which students initiated interactions, the contexts used to promote learning (such as collaborative learning in small groups), the use of the child's experience, and the teacher's efforts to encourage elaboration and to provide feedback were important elements of the checklists. The following example is teacher observation checklist developed by the Durban Working Group.

### Durban Teacher Observation Form

School: \_\_\_\_\_

Teacher: \_\_\_\_\_

Date: \_\_\_\_\_

Age Range: \_\_\_\_\_

Observer: \_\_\_\_\_

Classroom period: \_\_\_\_\_

Location:  Rural  Urban  Peri-urban  Informal settlement

Interactions	Initiator		Context				Teacher Behaviour				Receiver Response		Teacher Feedback	
	T	Student	In	P	SmG	WhC	Asks about Home	Uses Loc/Fam mat	Asks O-End Q's	Uses Probes	Student	Teacher	V	NV
		B									G	V		

Comments: \_\_\_\_\_

## Rating Forms

Rating forms are used to summarize the relative occurrences of different events or actions in a classroom. They are filled in by an observer after a period of observation (e.g. school day, lesson). Rating forms are generally used to compare classes or schools where the behaviour of an entire class of children or the general pattern of interactions of teachers are of interest. They build on the observer's experience by allowing her/him to make judgements about what she/he has observed over a period of time.

The general observation strategy with rating forms is for the researcher to observe over a designated period of time. Often during this period, the researcher will collect other types of observational data through inventories or checklists. This experience will then be employed to make judgements about the overall nature of the classroom. The South Africa primary school impact studies carried out by IEQ used one of the most common formats for rating forms. As shown in the example of the instrument, Likert-type scales were developed for researchers to use in making judgements about what learners and teachers are generally doing during an observation period.

### Learners Involved in Active Learning Tasks

4	3	2	1
All Learners manipulate materials.	Most learners manipulate materials.	Some learners manipulate materials. Others watch.	Learners are not involved in active learning tasks. Most watch.
Description _____			

### Learner Independence

4	3	2	1
Learners find information independently.	Learners make use of info. sources when directed by teacher.	Learners follow teacher's instruction working independently.	Unquestioning transcribing of text from board and text books.
Description _____			

A second similar type of rating form is one which requires the observer to make judgements about fractions or percentages of individuals, time, events or interactions that best characterise the classroom. The following example from the Uganda classroom observation instruments illustrates this type of format. As can be seen, although the item is in a checklist

format, it also has a vertical six-point scale, similar to the four-point scale used on the rating form in South Africa.

How many pupils are clean and dressed in clean clothes that are not torn?

- 5.    \_\_\_ All
- 4.    \_\_\_ More than 3/4
- 3.    \_\_\_ More than half, but less than 3/4
- 2.    \_\_\_ More than 1/4, but less than 1/2
- 1.    \_\_\_ Less than 1/4
- 0.    \_\_\_ None

IEQ Ghana also used rating forms to estimate the percentage of English used in different contexts. Researchers made judgements about the overall use of language by both teachers and students. After a period of observation, researchers filled in items on the classroom observation form such as the following:

Language Usage: What percentage (approximately) of what the children say is in English, in Ghanaian, or a mix of Ghanaian and English?

Children:	English	Ghanaian	Mix
A. During English class	_____	_____	_____
B. During change-over times	_____	_____	_____
C. During other subjects	_____	_____	_____
D. Outside of class at school	_____	_____	_____

Repeated "snapshot" observations can also be used as a strategy for completing rating forms. One case where this observation strategy is appropriate is if the objective is to determine what "most" children are generally doing in certain contexts. The South Africa Educare study examined what children were doing when engaged in learning activities in different preschool contexts. Researchers were asked to judge what a "majority" and "minority" of children are doing in different contexts over a five minute observation period.

Rating forms can also be in an open-ended format. In this case, the observer is required to judge the degree to which something happened and then explain why such a judgement was made. As shown in the first example, researchers in Uganda made judgements about the degree to which teachers provided feedback to students during a lesson, then explain why the judgement was made. The item, however, allows only for explanation of a "Yes" judgement. More complete information might have been gained if researchers also provided an explanation of their reasons for choosing the category of "Somewhat."

Does the teacher tell pupils how well they are doing in their work during the lesson? Yes\_\_\_\_  
No\_\_\_\_ Somewhat\_\_\_\_

If yes, please describe how the teacher does that.

The second example taken from the South Africa Educare research, asks researchers to make overall judgements about materials, the learning environment and classroom interaction. Thus, although the questions appear similar to the presence/absence checklist, they differ in that they are not direct observations of presence or absence, but rather judgements made by the researcher of predominate characteristics of the classroom. The Yes/No format could have easily included "somewhat" as in the previous example, thereby creating a three-point rating scale.

Did materials and equipment provide a wide range of experience? Yes\_\_\_\_ No\_\_\_\_ Why?

Was the interaction between teacher and children appropriate? Yes\_\_\_\_ No\_\_\_\_ Why?

Care should be taken both in the use and analysis of rating forms. In instances where it is easy for researchers to count the frequency of occurrence of some phenomenon (for example, children with stained and torn clothing), the actual frequency is better information than the researchers' judgement. Also, assigning numbers to a scale is a heuristic device to aid the researcher in making judgements. The numbers are not scores, but rather categories. They should therefore be analysed as categorical data not as numerical data.

### **Running Logs**

Running logs are narrative descriptions of ongoing events or actions in the classroom. They are most commonly used for intensive observations of individual children but can also be used for observations of teachers or of lessons. Running logs are used to answer questions about the nature and quality of the experience of individual children in the naturally occurring events of the classroom and the relationship of this experience school success.

Given the intensive nature of this observational approach, a sub-sample of children, representative of particular types of students or of the class as a whole, are generally selected for study. Data collection often combines the strategies of time and event sampling where specific events (e.g. language or math lessons) are randomly sampled and children are observed for specified amounts of time (e.g. five or ten minutes). As with other types of classroom observations, children are generally observed over several days to assure the stability of the observation. Often observations are conducted until the total time for an observation period is equal to that of a normal lesson, for example, one hour. Where the interest is in examining change over time, the same procedures will be used at two or three different times in the school year.

Running logs were used as part of the IEQ classroom research in Guatemala. The research was concerned with the implementation of a curriculum reform that promoted collaborative learning among children in multi-grade schools. Thus, the research has focused not

only on programme implementation, but on the experience of individual children over the three years of implementation to date. A sample of 12 children, six first graders and six second graders, with equal representation of both boys and girls, were chosen at random. These children have been observed several times during each school year in academic lessons. A similar sample of children in schools not participating in the reform were chosen and observed in the same way to serve as a comparison group. All children were observed over several days until a total of one hour of observations for each child had been collected at each observation period. Observers rewrote their rough narratives, and the data were coded along a number of dimensions of concern in the reform effort. The following is an example of a single observation in a running log of a child in the indigenous region of Guatemala, that has been rewritten and coded.

The codes represent each interaction involving the child under observation. The first code is the context, in this case small group without a teacher present. The second code is the subject matter-- Spanish. The third code is the initiator of the interaction, in this case IO = initiated by the observed child and Pm = with a male peer. The fourth code is whether the interaction was verbal, as in this case and the language, nl = native language. Subsequent codes show that there was a response in the native language (Rnl), which made the interaction a communication sequence (S), that the interaction involved reading vocabulary practice (readvoc), and also involved self esteem in terms of turn-taking (esturn).

Date: 03/14/94 Observer: Hugo A. Cuc Quim  
Child: Eduardo Cañales School: Samilaha  
Grade: Third Subject: Spanish Language Arts  
Time: 10:05-10:10

### Description of Behaviour

**Context:** There are 40 students in the classroom, including students from preschool to fifth grade. All of them are working in the same room, grouped by grade and named with animal names to identify them with their classmates in the room. The observed child is in the "cows" group with three other male classmates. They are working with two dictionaries. The teacher is working with the "snakes" group.

10:05 a.m. Eduardo and a classmate are looking up the definition of "tomato." They begin to copy the definition of the word "tomato." Eduardo listens as Ricardo reads the definition and begins to write it down, "Tomato: a red, edible fruit..." (*Tomate: una fruta comestible de color rojo..*) Eduardo finishes copying the definition and says to his classmate in Q'eqchi', "What's the next one?" (*Ahora qué toca, vos?*) Ricardo answers, "Wheat, Eduardo" (*Trigo, vos, Eduardo*). Eduardo and his classmate begin searching for the word. They are heard saying "tra, tre, tri" as they spend a while looking for the word. After a minute, his classmate finds the word and says, "Here it is" (*Aquí está, vos*). Eduardo says, "Where? Oh, yes" (*Dónde? Aaa, sí pues*), and he underlines the word. Eduardo begins to read the definition out loud as he and Ricardo copy it. 10:10 a.m.

The advantage of running logs is that they provide a rich corpus of data that can be examined as necessary during an investigation to interpret trends emerging from other data sources. They also provide actual examples of classroom interaction and behaviour that can be used as a basis for discussions among practitioners and policy-makers on how an educational reform affects children with different characteristics. The disadvantage is that such in-depth data collection is time consuming and very labor intensive, requiring extended visits to schools.

## **Interview Instruments**

Interviews permit the researcher to enter the respondent's world and thereby examine outward behaviour from that person's perspective. Basically, interviews are conducted for two primary reasons:

1. To learn about things we cannot observe (feelings, thoughts, intentions, attitudes); and
2. To learn about behaviour that we did not observe because it might have taken place at some previous time.

### **Types of Interview Questions**

Interviews allow the researcher to collect information on a number of aspects of a respondent's behaviour or outlook on the world. Among the different aspects of behaviour subject to interviews are the following:

Experience/Behaviour: To elicit descriptions of experience, behaviour, actions and/or activities that could have been observed:

*"If I had been in the programme with you, what would I have seen?"*

Opinion/Belief: What people think about a specific setting, goals, intentions, desires, values:

*"Would you 'Strongly Agree', 'Agree', 'Disagree' or 'Strongly Disagree' with the following statement: Every South African child should learn a second language."*

Feelings: To understand emotional responses of people to their experience and thoughts; whether people are feeling anxious, happy, afraid, intimidated, etc.:

*"When you last visited your child's school, how did the teachers make you feel?"*

Knowledge: Finding out factual information:

*"What training services are available through your programme?"*

*“Who is eligible to be trained under your programme?”*

*“What are the characteristics of the teachers trained in your programme?”*

Sensory: What is seen, heard, touched, etc.:

*“What types of materials do you use for your lessons?”*

*“What equipment is available in the classroom?”*

Background/Demographic: Identifying characteristics to help locate the respondent in relation to others:

*“What languages do you speak?”*

*“What is your age, within the following age ranges:*

18 to 20     36 to 40

21 to 25     41 to 45

26 to 30     46 to 50

31 to 35     Over 50

Interviews range from conversational-type discussions to highly structured, formal interviews with clearly specified questions. The nature of the interview is determined by the level of detail of the interview instrument. Each type has its advantages and disadvantages. Three basic types are as follows:

### **Unstructured Informal Discussions**

In this type of interview, information is freely exchanged between the researcher and the respondent. There is a spontaneous generation of questions that flow from the immediate conversation between the interviewer and interviewee. The interview instrument may consist solely of the main issue to be explored.

**Advantage:** This type of interview is highly responsive to individual differences and situational changes. Questions can be individualized to suit the context and the language of the interviewee.

**Disadvantage:** The interview requires a significant amount of time to get systematic information, and it may take several conversations before a similar set of questions has been asked of several respondents. As the interviewer does not ask the questions in the same way to all respondents, this strategy is more open to interviewer effects; that is, the interviewer plays a larger role in the nature and quality of the data obtained. Additionally, the data is more difficult to analyse. In asking questions in different ways, the researcher cannot be sure that the responses from all respondents are applicable to the same measure.

## **Guided or Thematic Interview**

This interview strategy has an instrument that consists of a list of topics or issues to be explored during the course of the interview. Again, questions may not be formulated beforehand and the order of the questions may be altered to fit the flow of the discussion.

**Advantage:** This technique uses a interviewing process that is focused in that the same information is obtained from a number of respondents. Again, the interviewer has more leeway in deciding how best to use the available time. The strategy is more systematic than an unstructured, informal discussion.

**Disadvantage:** The strategy is also open to interviewer effect or bias in that there is no order to the questions. Also, as no working questions are specified, the researcher may introduce bias in how he or she phrases the questions.

## **Formally Structured Interview**

This interview strategy consists of a set of pre-constructed questions. The interview instrument specifies questions that are carefully worded and grouped by categories. The instrument may even specify transition statements to assist the respondent in making mind shifts from one category to the next. The interview instrument takes all respondents through the same procedures in the same way by having the researcher ask the same questions in the same order for all respondents.

**Advantage:** The formal, highly structured interview format reduces bias introduced by having different interviewers conducting the interviews, by reducing the variation among interviews. In assuring that all questions are asked in the same way, the technique makes for easier data analysis.

**Disadvantage:** A limitation of this strategy is that it restricts the pursuit of topics into issues that may be important and relevant to the objectives of the study. Also, by specifying the questions in a specific format, the researcher has restrictions in placing the questions in a context that assures that the questions can be understood by all respondents.

## **Avoiding Bias in Interviews**

Interview questions can be framed in a number of ways to obtain the information needed from the respondent. In constructing questions, however, the researcher must take care not to frame them in a way that suggests a response on the part of the interviewee. For example, in seeking to identify whether the teacher works with students in selecting leaders for the classroom, questions could easily be framed to lead the interviewee toward a certain type of answer. Consider the following two questions:

*Do students participate in selecting peer leaders in your classroom?*

*Are there peer leaders in your classroom? IF YES, who selects them?*

Each of the questions above asks about peer leadership. The first, “Do students participate in selecting peer leaders in your classroom?” is leading, as the teacher is alerted to the main issue (peer leaders) and the selection process (student participation in selection). The second question, “Are there peer leaders in your classroom? IF YES, who selects them?” is free of bias in both regards.

Another issue important in question construction is the type of question to be used in the guide. One can use open-ended questions with no specified responses; questions that ask for responses within a set range; or questions that limit the response that can be provided by the interviewee. Open-ended questions permit the respondent to answer in his or her own language and do not restrict the answers in any way. Closed-ended questions specify responses for the respondent from a category or range of categories.

### **Interviewing Tips**

Regardless of the interview method or questioning format, interviewing involves asking questions, listening to and recording the answers, and following up with additional relevant questions. Some issues to consider in constructing interview protocols and interviewing are as follows:

- Begin the interview with non-controversial questions.
- Start with questions that are straightforward descriptions and easy to answer.
- Follow with questions about interpretations, opinions, feelings about behaviours/actions.
- Knowledge questions can be threatening as a person may feel like he or she is being tested; place them in the context of programme activities and experiences.
- Background and demographic questions can be boring and are usually asked last.
- Arrange a time prior to arriving at the scene for an interview time, if possible.
- Have nothing with you except the materials needed for the interview.
- Establish rapport as quickly as possible with the interviewee.
  - Explain your research goals.
  - Explain your role.
  - Explain about the confidentiality of the information.
  - Ask permission to tape the interview prior to doing so.

- Think about the interview from your informant's point of view.
  - Make him/her comfortable.
  - Make the interview as pleasant an experience as possible.
  - Show interest in your informant. You are asking for help and information.
- Do not interview when you feel you are becoming stale (tired, bored, frustrated, irritated). Avoid getting into a debate with the person.
- Allow the person time to think, then listen carefully. Be objective.
  - Do not answer for the respondent.
  - Do not rush into the next question.
  - Note other concerns raised by the person.
- Use content neutral probes to explore issues in-depth, e.g., *"Tell me more about that"*. Keep the purpose of the interview in mind.
- End the interview by asking if there are any other relevant and important issues that were not covered in the interview or if there is anything that they want to ask you.
- Be sure to write the date, place, time, and respondent's identity on the first page of your interview notes. Number the pages.
- Review your notes.
  - Make sure they are legible
  - Make sure that every question that should be answered has a response.
- Do not share previously collected data with the interviewee.

### **Identifying the Best Instrument to Measure an Indicator**

As can be seen from the discussion of each of the data collecting strategies and the different types of instruments, each instrument has its strengths and limitations. What one instrument can achieve may not be achieved with the use of another instrument. The result is that sometimes more than one instrument may have to be used to supplement information that cannot be gathered with the use of one particular instrument.

To obtain the type of data required, the researcher will need to answer the following questions:

- What are the objectives of the study?
- Can I get the needed information by looking/observing? Is it something I can find from documents? Is it something I cannot see, and therefore I need to speak to someone?

- How best can I catch all the supplied information?
- Will it be possible to analyse the data efficiently?

In most cases the use of a combination of instruments provides the required data.

# Sampling

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## Sampling in Quantitative Research

Most of the time, educational researchers focus on large groups of interest. Usually, one cannot study an entire population, or every member of the group of interest, as it is impractical in terms of time and costs. Thus, a sample of the population is drawn and studied, and researchers then make inferences that what is true of the sample is probably true of the population. Important terms in sampling are as follows:

Population: Every member of the group of interest  
Census: Study of every member in the population  
Sample: A portion of the population

In selecting a sample for one's study, two primary issues to address are adequate sample size and ensuring that the sample is representative or like the population of interest. A number of complex formulas are available to researchers to determine an adequate sample size for one's study. Additionally, the representativeness of the sample ensures that the findings are not influenced by the nature of the sample selected. When bias exists in a selecting a sample, the findings are influenced by the particular type of persons who participated in the study. Also, one is unsure of the direction in which the bias effects the results. Issues central to sample size and representativeness are as follows:

### Is the sample size adequate?

The following factors should be considered in determining the sample size:

Time and cost: Expensive & time-consuming procedures may limit the size of the sample

Document something rare: If the group of interest is small, study the entire population.

Variability in population: The more differences exist in the population of interest, the larger the sample (e.g., studying the experience with inservice training among teachers would require a larger sample than studying standard one teachers who have master's degrees.)

Magnitude of differences expected: If looking for small differences in the findings, then a large sample is very important, as a small sample might mask the differences due to random errors.

## **Is the sample biased?**

The following factors should be considered to obtain an unbiased sample:

Random selection: All in the population have an equal chance of being chosen for the study.

Identify all members of population: To give everyone a chance of being selected, one needs to identify the members of the population. For example, if our population is Standard 1 teachers in South Africa but one only identifies those of one province, the sample will be biased in favor of solely those teachers.

Convenient selection: If researchers only talk with teachers in one's neighborhood, the sample is biased against all others.

Volunteers: Usually volunteers are different in some way from the general population.

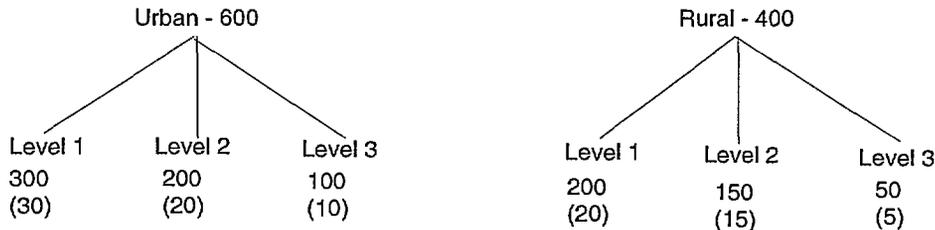
## **Stratified Samples**

In drawing samples for the educational evaluations to be undertaken for NGOs in South Africa, issues of importance may revolve around dividing the population into strata of importance to the evaluation objectives. For example, programmes that have different levels of teacher training or that serve both rural and urban schools may want to assure that the heterogeneity of the programme is captured in any study sample. To do this, the population is divided into strata, then the sample is drawn separately at random from each category at each stratum. The following example is provided for illustrative purposes.

### **EXAMPLE:**

An NGO seeks to evaluate the effectiveness of a teacher training module on parental participation and wants to draw a sample of 10 percent of its population of teachers with this module. The programme has trained 1000 teachers, of whom 600 are in urban areas and 400 are in rural areas. Additionally, the trained teachers are at different levels of training. The researchers might proceed along the following manner to draw a 10 percent sample:

## Drawing a Stratified Sample Based on Region and Level of Training



For the total sample of 100 teachers, researchers would select 30 teachers from Level 1, Urban schools; 20 teachers from Level 2, Urban schools; 10 teachers from Level 3, Urban schools; 20 teachers from Level 1, Rural schools; 15 from Level 2, Rural schools; and 5 from Level 3, Rural schools.

## Sampling in Qualitative Research

Sampling is also important in qualitative research. Even in a limited context such as a single school it is impossible to look at everything that happens to everyone within that context. For example, the observable elements in a social situation that one can study include:

Space:	the physical organization of a site or sites
Actors:	the individuals involved in a social situation
Activities:	a set of related behaviours carried out by a group
Objects:	the things or materials present in a situation
Actions:	the individual behaviour of the actors
Event:	a set of related activities
Time:	the sequence in which behaviours, activities, or events occur
Objective:	the ends that the actors wish to achieve
Sentiments:	the emotions felt or expressed by the actors

All of these elements can be studied but they cannot all be studied at the same time. Thus, choices must be made in order to best respond the specific questions that the researcher or evaluator wants to answer. The case is generally the focus in qualitative research. Cases are chosen because they have some characteristic that is important to the goals of the research/evaluation (e.g., successful schools, egalitarian teachers, overage students). Thus, the interest is not to represent a population but rather to examine in depth a particular phenomenon

(e.g., "success", "egalitarianism", "overage". Often, however, multiple cases are chosen in order to determine if a phenomenon takes place in similar ways across different settings. Cases that do not have a given characteristic may also be chosen to verify the presence or absence of key elements associated with the sample cases.

**Considerations:**

Small numbers	Study a case, but within its social setting so one examines phenomena (event, activity, social process)
Purposive sampling	Want to look at specific events, activities or social processes
Theory-bound	Choose phenomena on the basis of a conceptual question
Sample across and within cases	Select activities, processes, events, locations, etc. across cases (e.g., cases of schools that are successful or not successful, learners who are female or male, teachers who are nurturing or stern) as well as within cases (e.g., overage girls students vs. appropriate-age girl students)

Care must also be taken to collect an adequate sample of the phenomenon under study. This is especially important in studying teachers and learners in schools, as the context and type of interactions may change rapidly or be influenced by the number of students present, administrative duties of the teachers, and the like. If, for example, the interest is in examining teachers' interactions with learners throughout the school day, a sample of the activities that occur in a school day will be observed. This may consist of 10-minute observations of each of the day's activities such as opening activities, language, math, recess, science, and cleanup. Similarly, if one wants to know how learners with different characteristics behave during lessons, a sample of lessons would be studied.

Always conduct more than a single observation to reach findings about a phenomenon. For example, one observation of a teacher may show that she only interacted with one child and spent the entire observation period drilling that child on three English verbs. However, additional observations would be needed to determine if this was the instructional strategy that the teacher used with all children and if so, was it only used in English class and not in other subject matter lessons. Similarly, in determining how school success, such as an increase completion rates, occurred, a researcher would obtain perspectives from teachers, administrators, students and parents to identify those elements seen by all as important to the positive change.

## Role of Evaluator

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It is important to remember that teachers, parents, and, possibly, children themselves will have questions and certainly preconceptions about the researcher's role. Researchers will be "on the spot" since their role management is critical particularly during the initial contact with the school. The following are several role management strategies that have proven effective for Learner Involvement Study researchers:

Obtain permission and set up school visits prior to arriving at the school. When necessary, contact "gatekeepers" such as inspectors or subject advisors to inform them of the study and obtain their permission. Arrange the school visit through the principal and meet with that individual to explain the research upon arriving at the school.

Have a clear picture ahead of time of how you are going to explain your role as a field researcher. This should be discussed, agreed upon and piloted during preparation for data collection. Emphasis should be placed on having been trained in studying programmatic aspects and that this is the principle concern.

Emphasise the role of school staff and students as experts in what happens at the school. Since much of the success of the research depends on the quality of information provided by school personnel, it is important to involve them in the study by emphasising their role in describing what they consider important about the educational reform and the school.

Be sensitive, polite, considerate, and helpful. Teachers are always busy and preoccupied during the school day. It is best during the first contact, to ask general questions and to try to make positive comments, whenever possible, about the school. When in the classroom, choose an unobtrusive place from which to observe.

Assure participants of confidentiality. Assure participants that the confidentiality of all individuals will be protected, and therefore no names will be used in any reports of the research results. Share your instruments with the teacher if asked to do so.

Keep a diary to record personal feelings and impressions. Pay special attention to changes in the field researcher role, particularly rapport: interpersonal relations between school staff, programme developers, and yourself as observer.

Indicate how the information you collect will be used. Offer and provide copies of the results to the teachers when requested.

# Quality Control: Ensuring Quality in Data Collection

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Data analysis and interpretation can only be meaningful if the information obtained is valid and reliable. Standard procedures can be implemented to ensure that there is some degree of control over the quality of the data. High quality of data refers to the gathering of information that accurately describes the phenomenon under examination. Among the important procedures for ensuring quality control of the data collected are (1) training and re-training of field workers and (2) establishing an administrative system for managing the data collection process.

## **Training of Field Researchers**

The probability of obtaining higher quality data increases with training. All field workers must be trained in the use of the instruments and practice using the instruments in true-life situations. That is, if the project involves data collection through observations of classrooms and interviews of teachers, parents and others, then the field workers will practice using the instruments in schools and conduct practice interviews with teachers and parents in those “pilot” sites.

## **Establishment of an Administrative System for Project Management**

A supervisor or project director ensures that data collection, editing and processing procedures are implemented in the same way by each member of the team of field workers. Additionally, project supervisors can undertake periodic audits to measure the quality of data collection. The audits can include computerized checks on data responses outside of expected range or random checks of data for accuracy and completeness. Data audits of this type, when carried out during evaluation, permit redirecting field researchers to appropriate topics in line with the evaluation goals and purposes. The audits can be followed up with regularly scheduled phone calls to provide data collectors with feedback on problems and to correct data collection errors.

## **Documentation of Data Collection Visits**

Another strategy for ensuring quality control of data is to have appropriate authorities sign forms stating that the researcher was at that site. Having appropriate personnel, e.g. school directors, sign the documents, ensures that field researchers visit the site and collect data.

## **Supervision of Data Collectors**

Supervision of the team in the field is of utmost importance for ensuring quality control of the data. A number of strategies for providing adequate supervision in the field are available including the following:

- Appoint a supervisor and make sure that local team knows who is in charge.

- Have the field team turn in the instruments at the end of the day to the supervisor.
- Check each instrument for omissions and discuss problems in field work.
- Make spot checks in the field, re-interviewing certain respondents.
- Secure local field supervisors to provide close supervision.
- Implement ways to have cross site communication to ensure consistency in data collection and to provide emotional and logistical support for members of the evaluation team.

### **Other Quality Control Strategies**

- Initial training periods in observation techniques including simulation of data collection using the instruments with videos and in local school classrooms;
- Additional training sessions prior to each phase of fieldwork;
- Use of standardized formats for data recording;
- Development of a field manual to supplement training sessions by providing operational definitions of the phenomena under study, delineating role relationships, and specifying ethical and confidentiality considerations; and
- Conducting parallel observations among the researchers.

# Data Analysis

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Data analysis is the process of bringing order to the information collected in the field. The process consists of organizing the information into patterns and categories. The process is fluid to the extent that analysis begins with the posing of the evaluation question(s) and flows back and forth during the remainder of the project.

Data interpretation involves giving meaning to the analysis. The interpretation process consists of explaining the descriptive patterns that emerge and identifying the significance of the associations or linkages among the various categories or variables.

## Data Analysis Strategies for Qualitative Data

The researcher in the field plays a critical part in the analysis of qualitative data. As the “instrument” for data collection, the researcher not only gathers data but is also the one immersed in the context from which it flows. The following are strategies the researcher can use to analyse qualitative data:

### Descriptions

The task of describing incorporates descriptions of beliefs and values of the participants, descriptions of their behaviours, and descriptions of the physical setting. The setting includes as much the community, as the school and the classroom. The focus of description is to ascertain what happened in the classrooms.

### Counting

Another task involved in data analysis is simply counting the incidences of a behaviour, value, belief or other phenomena of importance to the objectives of the evaluation. One can simply count the frequency of occurrence of a phenomena. If one is to compare the incidence across categories, it is important to convert the instances of observed or recorded behaviour into relative frequencies or percentages. For example, one can count the types of teaching strategies used or the instances of child-initiated interactions.

### Comparison/Contrast

Most times, it is not sufficient to simply count the number of times a phenomena occurs. It is important to examine whether there are specific conditions under which it occurs. Two strategies for elucidating conditions are comparing and contrasting the phenomena observed. In comparing behaviour, the analyst is interested in how are things similar. For example, a good comparison type question is, “What types of strategies are used by all teachers?” In examining contrasts, the researcher is interested in how are things different. For example, s/he might ask, “Do some types of teachers rely on some type of strategy?”

## **Identify Patterns**

Through comparison and contrasts the analyst begins to identify patterns or structures in the data. For example, the analyst may begin to look for patterns of behaviour organised by relationships within the classroom, e.g., Are some teachers doing some things more than others? Do boys interact differently with the teacher than girls? Does the teacher with more experience use different strategies than one with less experience? What categories emerge? Is there some order to how these appear? Additionally, one may begin to find the exceptional case that does not fit into the pattern found. For example, it may be the one teacher who uses many strategies, the one classroom where interaction is mainly initiated by children, or the one teacher who relies mainly on small groups in classroom organization.

## **Examples/Steps in Data Analysis**

The following examples are used to illustrate the various strategies available for analysing qualitative data. The examples are taken from the data collected during the training exercises conducted in South Africa for the Working Groups. Examples are provided for data display, data reduction, and for the linking of two data sets. For purposes of data linking, the illustrative examples used are from one site only.

## Step 1: Data Display

Data display is important in that it is the first step in organising and managing the information collected from respondents. In this first step, responses to a question are placed in some order that permits description and analysis. The researcher, then, labels, codes, indexes, classifies or otherwise names the units of data. Data displays permit the researcher to initiate the cataloguing of responses to allow the identification of themes, patterns or other conceptual contents. The following table displays data from the responses to the question on the Teacher Interview in Gauteng asking whether peer leaders are used in the classroom and who selects them. The first column identifies the school from which the response came; the second column classifies or labels the response. The display below is in the form of a table. However, displays may consist of lists, matrices, diagrams, outlines or textual displays. In the example below, global statements about findings would be difficult to discern quickly. By reducing the response categories, the researcher is able to key in on the issues central to the evaluation objectives.

**Data Display for Information from Teacher Interview**

<b>School</b>	<b>Have Peer Leaders and Who Selects Them</b>
1	No
2	Yes, with teacher
3	Yes, rotation
4	Yes, rotation
5	Yes, with teacher
6	Yes, with teacher
7	No
8	No
9	Yes, with students
10	Yes, with students

## Step 2: Data Reduction

Data reduction permits the researcher to manage the information in a more efficient manner and to initiate the process of identifying relevant categories, an important aspect of qualitative data analysis. Data reduction strategies are closely linked to the evaluation objectives. In the question above, the evaluation objective focused on whether learner-centered instruction occurred in the classroom. As part of the objectives, children were to select their own peer leaders in the classroom. As is evident above, four categories of responses can be easily identified. The researcher would need to keep separate those categories that are important to the evaluation objectives. Thus, one could reduce even further and have three basic categories: "Yes, with others"; "Yes, by students", and "No". In the example below, the four basic categories were not reduced.

In this example, the categories emerged from the data. At other times, the researcher may have categories that have been identified as important through the conceptual questions posed and the review of literature undertaken to examine how others have approached similar studies.

### Data Reduction

Schools	Original Response	New Response Category
2, 5, 6	Yes with teacher	1, Yes, with teacher
3, 4	Yes, rotation	2, Yes, rotation
9, 10	Yes, students	3. Yes, students
1, 7, 8	No	4, No

### Step 3: Data Linking

Data linking occurs when information from two or more sources is brought together and analysed to identify associations among the variables. During the various Working Groups, several instruments were developed to permit collection of data using the most appropriate means. Thus, workshop participants developed observation forms, teacher interview guides and classroom checklists. In one group, participants practiced with a running log. Linking data from several sources permits the testing of hunches or hypotheses that the researcher may have gleaned during the data collection phase. The following table links information from the teacher interview and from the observation form from the Durban study. The Durban Working Group examined learner involvement in the classroom. The example below links the question on years of teaching experience collected from the teacher interview and an item on the observation form related to the use of small groups by teachers.

**Linking of Information from Interviews and Observation Form**

School	Years Teaching - Teacher Interview	Use of Small Groups - Observation Form
1	8	Yes
2	15	No
3	5	Yes
4	1	Yes
5	20	Yes
6	10	No
7	2	Yes
8	20	No
9	5	Yes
10	15	No

The researcher now can identify patterns related to years of teaching experience and the use of small groups in the classroom. From the exhibit above, it is readily apparent that 80 percent of teachers with more than 10 years of teaching experience do not use small groups in their classrooms.

Data display, reduction and linking processes all permit the researcher to order and manage the information collected for the evaluation. The display and other processes of data analysis are then used to produce a narrative description of the evaluation findings.

### **Frequency Count Data Reduction and Analysis**

As might be expected with an instrument designed to determine the frequency with which certain behaviours occur, tabulation or counting is a common data reduction technique for frequency count instruments. The following two examples are the observations of teacher interaction from two three-minute observations of classrooms of Teacher #3 by a researcher in the Durban Working Group.

Several trends are clear for this teacher. She always initiated interactions with students, and the predominant classroom context in which interactions took place was that of "Whole Class". The contexts of children working individually at their desks and working in pairs did not occur during the observations. The teacher did not incorporate the children's experience into interactions by asking about their home life. She did, however, use local materials in several instances. An open-ended question was used once; probes to elicit responses or additional information from the learners were not used. In addition, students generally made responses to the teacher. Feedback by the teacher was never given to these responses.

In order to examine trends across all classrooms observed, the behaviour for each teacher for each item in the instrument was totaled. A summary table provides the summary of the behaviours for each of the 10 teachers observed during the working group. As can be seen, teacher #3 was similar to that of the other teachers in the group. All of the teachers initiated all of their interactions with students. Whole class context predominated in all classrooms, although a majority of the teachers also used small group contexts. Individual work by children at their desks was almost never observed, and work in pairs did not occur during the observation. Teachers seldom asked children about their home experience or used open-ended questions or probes to encourage elaborated responses. A majority of teachers used local or familiar materials as teaching aids, but they did not do this in all interactions. Student responses were common, occurring in nearly half of the interactions of each teacher. Perhaps where Teacher #3 differs most from her colleagues is that she is among a minority of three teachers who never supplied verbal feedback to their students.

One of the trends that differentiates teachers is that four of the 10 teachers were not observed to use small groups. These teachers also were the only ones who did not use local or familiar teaching materials. This suggests that small group contexts may facilitate to use of such materials. This hypothesis can be tested by examining the individual case of each teacher. Returning to the case of Teacher #3, it can be observed that use of local materials only occurs in the small group context. If this holds true for all six of the teachers who use small groups, a conclusion can be reached about the relationship between small groups and the use of local materials.

### Durban Teacher Observation Form

School: 3

Teacher: 3

Date: 14/8/96

Age Range: \_\_\_\_\_

Observer: xxx

Classroom period: 2:30pm-2:33pm

Location:  Rural  Urban  Peri-urban  Informal settlement

Interactions	Initiator		Context				Teacher Behaviour				Receiver Response			Teacher Feedback					
	T	Student		In	P	SmG	WhC	Asks about Home	Uses Loc/Fam mat	Asks O-End Q's	Uses Probes	Student			Teacher			V	NV
		B	G									V	N	N	V	N	N		
1	√					√						√							
2	√					√						√							
3	√					√													
4	√					√		√				√							
5	√					√		√	√			√							
6	√					√						√							
7	√					√		√				√							
8	√					√													
9	√					√						√							
10.																			

Comments: \_\_\_\_\_

### Durban Teacher Observation Form

School: 3

Teacher: 3

Date: 14/8/96

Age Range: \_\_\_\_\_

Observer: xxx

Classroom period: 2:36pm-2:39pm

Location:  Rural  Urban  Peri-urban  Informal settlement

Interactions	Initiator		Context				Teacher Behaviour				Receiver Response			Teacher Feedback			
	T	Student		In	P	SmG	WhC	Asks about Home	Uses Loc/Fam mat	Asks O-End Q's	Uses Probes	Student		Teacher		V	NV
		B	G									V	N	V	N		
1	√					√						√	√				
2	√					√											
3	√					√											
4	√					√						√					
5	√					√						√					
6	√					√											
7	√					√							√				
8																	
9																	
10																	

Comments: \_\_\_\_\_

### Durban Teacher Observation Form

School: \_\_\_\_\_

Teacher: \_\_\_\_\_

Date: \_\_\_\_\_

Age Range: \_\_\_\_\_

Observer: \_\_\_\_\_

Classroom period: \_\_\_\_\_

Location:  Rural  Urban  Peri-urban  Informal settlement

Interactions	Initiator			Context				Teacher Behaviour				Receiver Response			Teacher Feedback				
	T	Student		In	P	SmG	WhC	Asks about Home	Uses Loc/Fam mat	Asks O-End Q's	Uses Probes	Student			Teacher			V	NV
		B	G									V	N	N	V	N	N		
	V			R	V	R	R												
T1 = 13	13	0	0	0	0	4	9	0	2	0	0	5	1	0	0	0	0	0	0
T2 = 8	8	0	0	1	0	0	8	0	0	0	0	6	2	0	0	0	0	1	0
T3 = 16	16	0	0	0	0	4	12	0	3	1	0	9	3	0	0	0	0	0	0
T4 = 16	16	0	0	0	0	2	14	0	2	0	0	8	1	1	0	0	0	1	0
T5 = 11	11	0	0	0	0	4	7	0	1	0	0	7	3	1	0	0	0	2	0
T6 = 10	10	0	0	0	0	0	10	0	0	0	0	6	2	2	0	0	0	2	0
T7 = 24	24	0	0	0	0	10	14	0	3	0	0	9	0	0	0	0	0	2	0
T8 = 19	19	0	0	0	0	0	19	0	0	1	0	9	0	0	0	0	0	2	0
T9 = 21	21	0	0	0	0	9	12	1	2	1	1	9	0	0	0	0	0	0	0
T10 = 11	11	0	0	0	0	0	11	0	0	0	0	8	2	1	0	0	0	2	1

Comments: \_\_\_\_\_

## Data Reduction and Analysis for Running Logs

As has been discussed, running logs provide a rich corpus of data on the behaviour of individuals in the classroom. They are often used for examining the experiences that children with different characteristics (e.g. language proficiency, gender, ethnicity, age) have in the classroom. A common way of reducing and analysing this information is through coding. In the Gauteng Working Group, the group was interested in the degree to which teachers created a classroom that encouraged learners to share in developing their own learning experiences. In terms of behaviour this meant students working together in small groups, initiating interactions with peers and the teacher, having the opportunity to respond to others and to learn from others through imitation and elaboration, using materials, directing activities, working with others by taking turns and the like. Each of these behaviours could be turned into a code which is intuitive (such as IOC = Initiated by Observed Child, or IPm = Initiated by Male Peer). The coding sheet contains six super-ordinate categories, each with specific codes. In the first three categories the codes are mutually exclusive. That is, a single interaction can only occur in one context; the observed child cannot both initiate and be the receiver of the same interaction. The final three categories are not exclusive, and all applicable codes should be used. For example, a response can be both verbal and nonverbal, and a child can express an opinion or use materials while directing another child. The complete coding sheet is as follows:

### Gauteng Learner-Centered Teaching Evaluation Coding System

#### 1) CONTEXT

- A = Small group of 3 to 8 students directed by teacher
- B = Small group directed by one or more students
- C = Whole class/all students in the class directed by teacher
- D = Individual assignment done at student's desk

#### 2) INITIATOR

- IOC = Initiated by observed child
- IPm = Initiated by male peer
- IPf = Initiated by female peer
- IT = Initiated by teacher
- IG = Initiated by group

#### 3) RECEIVER

- ROC = Received by observed child
- RPm = Receive by male peer
- RPf = Received by female peer
- RT = Received by teacher
- RG = Received by group

4) TYPE OF INTERACTION

V = Verbal  
NV = Non-verbal

5) RESPONSE

ResV = Verbal Response  
ResNV = Non-verbal Response  
ResNR = No Response

6) QUALITY OF INTERACTION

Peer Interaction

Direct = child directs learning activity  
Turn = child takes turns  
Share = child shares learning materials

Communication and Self Expression

Opinion = child opinion to adult or another child  
Imitate = child imitates language of other children  
Elaborate = child elaborates ideas

Materials

MATuse = child uses materials to carry out task  
MATrefer = child refers to materials during activity

Using the operational definition of an interaction as, “A verbal or nonverbal exchange involving two or more individuals without a change in person or subject”, each interaction of the target child in a running log can be coded. The following examples of three five-minute running logs of first a boy, John, then a girl, Mary, show how observations of individual children can be coded using the codes developed in the Gauteng Working Group.

<p>A/IPm/ROC/V/ResV</p> <p>.A/IPm/ROC/V/ResV/imitate</p>	<p><b>9:42am</b> John, a third grader, is in mathematics class sitting with two other boys in a small group. They are copying mathematics problems that the teacher puts on the blackboard. As John works alone, Alan, the boy sitting next to him, interrupts him and says, "I've already got six." John responds "I've got five" and continues copying. Alan finishes copying and says "Okay". John, finishes and says "Okay" to Alan.</p> <p><b>9:47am</b></p>
<p>D/IOC/RPm/V/ResV/MATuse</p> <p>D/IPm/ROC/V/ResV</p>	<p><b>10:15am</b> John is working individually at his desk, copying a social studies lesson from the book. After two minutes John finishes copying and says to the boy next to him, "I already copied it". The boy next to him says "I only have two more". John says "Hurry up". The boy replies "Hold on". John doesn't reply but closes his notebook and watches his companion. Two minutes later, the boy tells John "I'm done". John replies "Already?" Then opens his notebook and resumes copying. <b>10:20am</b></p>
<p>D/IOC/RPm/V/ResV-NV</p> <p>D/IPm/ROC/V/ResNV</p>	<p><b>11:05am</b> John is in English class copying sentences the teacher has put in his notebook. He says to his brother who is sitting next to him "If you want, I'll help you with the sentences." His brother answers "Okay", handing him the notebook. John takes the notebook and writes a few sentences, but another student who is sitting behind them realizes that John is helping his brother . He tells John, "I'm going to tell the teacher that you're doing your brother's work". John stops helping his brother and neither of them speak.</p> <p><b>11:10am</b></p>

<p>B/IPf/ROC/V/ResV/Turn-Share/MATuse</p> <p>B/IOC/RPf/NV/ResV/Turn-Share/MATuse</p> <p>B/IOC/RPf/V/ResV</p>	<p><b>8:12am</b> Mary, a third grader is sitting with two other girls in English class reading a lesson on "Well chosen words, well communicated ideas". Mary listens attentively as a classmate reads. As soon as Carmen finishes she says to Mary, "Now it's your turn to read." Mary takes the book and reads very quietly so that she almost can't be heard. Her classmates are distracted and don't listen well. After about one minute, she finishes and hands the book to Terri. Terri begins to read but can't find the place where Mary stopped. Mary says "No, you're not reading the right part." Terri asks where she should read and Mary points to the right place. Terri begins reading. <b>8:17am</b></p>
<p>D/IPm/ROC/V/ResV/Turn</p>	<p><b>9:30am</b> Mary is in mathematics class studying at her seat near the other third graders. After finishing copying the multiplication tables for 5, she begins to study it. Then Julia says "Mary why don't you ask me then I'll ask you?" Mary responds "Okay" and says "5 x 1?" Julia responds "5." "Five times ten?" asks Mary. The other girls answers "Fifty." Then she says, "Okay now I'll ask you - five times two?" and Mary says "Ten". <b>9:35am</b></p>
<p>B/IOC/RPf/V/ResV</p> <p>B/IOC/RG/V/ResNV/direct</p> <p>B/IOC/RPf/V/ResNV/direct</p>	<p><b>11:05am</b> Mary is working with a small group in natural sciences. She asks a classmate how many questions she has left to answer. Jane responds, "I haven't copied any yet." Mary says "I'll dictate to you then." She begins to read out loud and her classmates listen. "What would happen if these creatures were taken to live in another place?" Mary observes Terri write and says "No, creatures is like cream." Terri who had written "Kr" erases and writes again. <b>11:10am</b></p>

Gauteng Analysis of Learner Behaviour Spreadsheet

Student	Context				Initiator					Receiver					Type		Response			Quality							
	A	B	C	D	OC	Pm	Pf	T	G	OC	Pm	Pf	T	G	V	Nv	V	Nv	Nr	Dir	Turn	Share	Op	Im	El	Ma Use	Ma Ref
John		2		4	2	4				4	2				6		5	2						1		1	
Mary		6		1	5		2			2		4		1	6	1	5	2		2	3	2				2	

The codes can be tabulated in a spreadsheet similar to that used for frequency counts of teachers discussed earlier. The spreadsheet information can be analysed by hand or transformed into a statistical programme file, such as SPSS, for computer analysis. Each individual interaction is ticked for all of the codes present. Then these ticks are added up for a profile of the interactions an individual child is involved in. The examples above use only three observations of each child, which obviously is not sufficient to characterise a child's behaviour. Ideally at least a full hour of observations should be conducted, perhaps 20 minutes in classes of English, Mathematics and Science collected over several days.

We will use the observations and codes presented in these two examples to illustrate the process of data analysis. The spreadsheet below presents the tabulated codes for John and Mary. While the data are insufficient to reach conclusive findings, they do suggest some definite trends in terms of gender differences that would need to be confirmed through additional observations of these two children and the analysis of observations of additional boys and girls.

#### Trends:

- In terms of context, girls are more likely to work together in small groups whereas boys tend to work individually.
- In small group and individual contexts, both boys and girls interact only with classmates of the same sex.
- Verbal exchanges predominate in the interactions of children of both sexes.
- Girls, possibly because of working in a small group context, tend to work collaboratively by taking turns, sharing materials and directing learning activities, behaviours that were not observed among boys.

The running logs also permit returning to the data themselves to try to explain the findings. For example, it is of interest to see why, when both boys and girls have a similar number of interactions with their peers, very little of the desired behaviour occurs among boys. By examining the observations it is apparent that the boys' interactions are of a different nature than those of the girls. Rather than sharing, the boys "pace" one another. That is, they check with peers to see how far along they are on the assignment, which suggests competition rather than the collaborative behaviour found among girls. Similarly, Mary, when directing a learning activity, assists her companion without providing the answer directly and builds on previous learning. John, on the other hand, actually takes his brother's assignment and does it, rather than involving the boy in learning how to do it correctly.

## Reporting Results

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Formats for reporting study results will depend to a great deal on the audience to be reached with the results. Formal reports include an introduction; a discussion of the methodology, including the sample selection and instrumentation; a findings section; and a conclusion, implications and recommendations section. They also often include an executive summary which presents the major findings and recommendations in a format that can be quickly scanned.

### **Findings: What the Data Say**

A finding presents what the data tell us about the evaluation question. A finding from a teacher observation instrument, for example, might be “Sample teachers initiate all interactions that occur between teachers and students in the classroom.” In presenting the finding, supporting data are generally used. For instance: “In observations of 1000 teachers over a period of two hours, the 7000 observed teacher-student interaction were initiated by the teacher”.

### **Conclusions: What the Findings Mean**

Conclusions are what the findings mean in terms of a particular set of programme objectives. For instance, if our finding above is related to a teacher training programme designed to encourage student classroom participation, a conclusion might be “training has not been sufficient for teachers to incorporate the strategies for student participation presented in workshops”. Recommendations, in turn, stem from the conclusions. In this case, “the programme must develop additional modules focusing on strategies promoting students’ initiation of interactions with the teacher”.

### **Implications: What the Findings Suggest**

Implications are often used rather than conclusions when the research is not tied to a particular programme or not enough is known about the situation, as in a baseline study, to make solid conclusions and recommendations. They are often stated in terms of what the findings suggest. In the case of the finding above, when not tied to specific programme objectives, an implication might be “the complete lack of child-initiated interactions suggests that a large investment in training teachers in participatory techniques will have to be made if greater student participation is an objective”.

## **Recommendations/Utilisation: What the Research Team Suggests**

The recommendations section consists of suggestions of what could be done to ensure that the programme meets its objectives. This section is also known as a Utilisation section. Using the findings and conclusions of the study, what could be done to improve the programme or influence policy?

## **Presentation of Results**

The audience for the evaluation results will determine the way in which results are presented. In many cases evaluation reports are useful to a wide range of audiences. However, these audiences differ in their concerns, needs, areas of focus and specialty. In all cases, the evaluator should think about what the members of the intended audience will understand best, what are their concerns, and how they can make use of the results. If there is need to address more than one audience, then the research team may have to produce more than one report. Multiple reports on a single evaluation study ensure that each audience's concerns are fully addressed.

Paying attention to the presentation of results has numerous benefits. Findings can be presented by narratives. However, narratives may not always be the most appropriate form of communicating findings to your targeted audience. For example, in presenting results to rural parents, who are illiterate, graphics or drawings may be appropriate. Similarly, photos may help government bureaucrats to understand the context from which certain results emerge, when they have not visited isolated areas. The use of graphs or any other visual presentations is attractive to a reader who gets bored with reading text. Also, a variety of presentation strategies such as the use of graphs, bold, italics, box, and tables might catch the eye of a reader who is scanning the report in order to decide whether he needs to read the whole report.