

**Construction and Validation of Pupil
Socioeconomique Status Index
for SACMEQ Education Systems**

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ABSTRACT

*The results of the research projects conducted by the Southern Africa Consortium for Monitoring Educational Quality (SACMEQ) have revealed marked differences in the **quality** of the education offered by different schools in the SACMEQ education systems — manifest in varying levels of pupil performance — as well as problems of **equity** (Dolata, S.; Ikeda, M. and Murimba, 2004). These inequalities raise questions and their causes need to be thoroughly analyzed.*

*Of the different hypotheses put forward to explain the unequal performance of pupils, one of the most important has to do with the effect of the **family background**, the highly disparate nature of the populations studied being the prime cause of variations in pupil performance. These variations therefore need to be analyzed in terms of the family and environmental factors that produce them.*

The object of this paper is 1) to discuss the idea of a socioeconomic status (SES) index for pupils from SACMEQ education systems, 2) to identify the factors from which the SACMEQ SES is derived, 3) to examine the breakdown of pupils by home background across countries and over time, and 4) to examine any link between pupils' family background and school performance.

1. SACMEQ SOCIOECONOMIC STATUS INDEX: DEFINITION, DATA AND ASSESSMENT

1.1 The concept of socioeconomic status and educational science

The purpose of assessing family background

The Industrial Revolution — which was later to spread across the entire world — began in England in the second half of the eighteenth century. This was a time when society underwent radical transformation, with the advent of two new classes, the bourgeoisie and the industrial proletariat, and the development of urbanization as the rural population moved to towns and the towns grew to accommodate the larger population. In this context of fundamental social change, the new discipline of Sociology¹ was born. One area of active sociological research is **social stratification**, which distinguishes between social groups on the basis of three types of hierarchy: *status*, *class*, and *party* (Weber, 1948):

- *Status* has to do with the amount of prestige an individual enjoys in the community. Prestige depends on lifestyle, level of education, birth or a particular profession (lawyer, labourer, etc.).
- *Class* is what unites individuals whose economic condition is similar in that they have access to the same goods and services.
- *Party* refers to commitment to a cause and the desire to gain some degree of power in society (i.e. political power).

The most elementary social group is the **family**, the first group to which the individual belongs and the one in which he/she begins life in society. But what exactly is a family?

Family background is particularly difficult to pin down because of its multi-faceted nature. Any index of family background has to show that the individual's membership of a particular

¹ Term coined in 1840 by Auguste Comte

social group is due to specific characteristics, whether biological (age, sex, etc.) or environmental (income, location of family home, etc).

Of the environmental factors, the individual's **socioeconomic circumstances** are of special interest because, unlike biological characteristics, they can be altered. The differences between the linguistic abilities of children from privileged and deprived backgrounds, for example, are apparent from their first days at school (Leroy-Audouin, 1993). But if the school knows about their background, it can adapt its teaching policy to ensure equal acquisition of knowledge through specific pedagogical measures, such as remedial classes.

In accordance with prevailing ideas on the individual's position in the social hierarchy, which depends chiefly on prestige, financial situation and power, the operational measurement commonly applied is the professional status indicator. The first classification of professional status was *Social Class Based on Occupation* (Stevenson, 1911), published in The United Kingdom, which ranked the population on the basis of five professional and industrial categories: I Professional occupations, II Managerial and Technical occupations, III Skilled occupations, IV Partly-skilled occupations and V Unskilled occupations.

Since then, the mapping of the individual's socioeconomic environment has continued to progress. A range of terminologies (status, index, level, etc.) and approaches are used to pin down professional status, taking account of household income, for example.

At national level, the approach used to identify different social strata depends on the national context and a given criterion may be given more emphasis in one country than in another. In 1954, for example, France's National Institute for Statistics and Economic Studies established a set of Socioprofessional Categories (CSP), defined by four criteria (status, economic activity, level of education and qualifications), which identified eight social categories: 1) farmer, 2) craftsman, tradesman and head of company, 3) executive, professional, 4) intermediate non-manual worker, 5) office worker, 6) labourer, 7) retired person and 8) other non-active person. In 1982 the CSPs were replaced with Professions and Social Categories (PCS), which encompassed the first six CSP categories. A new version, PCS-2003, has been in force since 1 January 2003.

At international level, researchers needed standardized instruments if they were to compare processes in society. Their task proved difficult since, in order to establish a common international SES scale that could be used for purposes of comparison, they had to take account of the specific context of each country. Of the international SES scales, Treiman's International Standard Classification of Occupations² (1977) has often been used. Treiman collated the results of studies on prestige in 55 industrialized and developing countries and drew up a metric listing 509 professions. These professions were broken down into eight levels depending on their prestige, identified by a prestige rating of between 0 (zero prestige) and 100 (maximum prestige).

Traditionally, international classifications like Treiman's have been based solely on professional activity. This means that only working people can be classified and extrapolation to any other populations may be problematic. Studies therefore fail to address a significant part of the population: the unemployed, the retired, etc. Moreover, constantly changing economic conditions and needs bring about changes in the prestige and income derived from work and these classifications should therefore be regularly reviewed.

The family as a factor in educational science

The rapid pace of economic and scientific progress in the 19th century siècle made it necessary to raise the general level of education of the population. Once schooling became compulsory, education became a critical social issue.

Major studies, including the famous **Coleman** Inquiry in the United States (1966), highlighted the incontestable effects of socioeconomic and family background on educational achievement and showed that these effects are particularly marked *during the first years of schooling*.

² Treiman's Standard International Occupational Prestige Scale (SIOPS)

➔ **The parents, the child's first models**

Of all those who play a part in the life of children, parents have the greatest influence on their school performance, because they are their first models with primary responsibility for their upbringing (Duru-Bellat and Janrouse, 1993). Generally speaking, parents can affect children's motivation and school performance in three ways:

- by creating a positive atmosphere in the home (good interaction between parents and children, organization of cultural activities, etc.),
- by showing positive attitudes towards education and school and taking corresponding action (monitoring school performance, purchasing educational resources, etc.),
- by expecting their children to be particularly successful at school (choice of direction, choice of options, etc.).

➔ **No single measurement of the pupils' family background**

It has not been possible to establish a single operational measurement of pupils' family background. The family SES measurement varies from one study to another, since it is based on different variables, dictated *inter alia* by the object of the study, the country in question, and the target population. For example, the results of the study conducted in Nepal by Jamison and Lockheed (1987) revealed a positive relationship between the socioeconomic measurement of pupils' family background and the numbers enrolled in school. One of the variables used for the social measurement was related to the pupils' *caste*³. Although relevant to Nepal, this variable would not have been applicable in another country.

➔ **... but one basic composite measurement: socioeconomic status (SES)**

Variables, reflecting the values and resources upon which parents rely to establish the family setting, nevertheless turn up time and again in international inquiries designed to assess the effect of family factors on school outcomes (moving on to a higher level, passing performance tests, etc.). Buchmann's 2002 review of around sixty international studies conducted between 1973 and 2000, which dealt with the positive effects of the family

³ The caste system is a hierarchical system of social relations comprising economic, social and ideological elements.

background on educational outcomes, clearly showed that the basic operational measure of pupils' family background in educational measurement is that of socioeconomic status (SES), quantified according to three criteria:

- a) **parents' professional activity**
- b) **parents' income**
- c) **level of education**

Based on the existing international scales, such as Treiman's classification, the first studies in edumetry examined the effect of the SES of the family context in which the pupil developed, focusing on the father's profession. But the active participation of women in the labour market prompted researchers to consider the mother's profession as well and they noted that it had a significant influence on school performance (Dronkers, 1989). In European countries, for example, pupils whose mothers worked tended to be more successful at school (Duru-Bellat and Zanten, 1999). The importance parents attach to studying and acquiring the competencies needed in different professions may influence pupils and inspire them to develop their own competencies.

The family's financial situation is measured in terms of parental income. This is more difficult to grasp, as there is no direct measurement of the financial resources available to the household. Moreover, data on monetary income may fluctuate from one year to another. Another routine problem is the very high non-response rate, which prevents researchers from gaining useful data on income. This problem arises because the data is not derived directly from parents but from the responses of the pupils, who are rarely able to give accurate information, given their age and perception of family resources. Hampered in their attempts to measure parental income, researchers increasingly resort to proxy variables to ascertain the economic characteristics of the pupils' family background.

Proxies for the household income have the merit of being stable over time and better reflecting the families' buying power. Two proxies commonly used in surveys are the structural quality of the pupils' houses (Hansen and Haller, 1973; Fuller, Singer and Keily, 1995) and the consumer goods or equipment available in the pupils' home (Comber and Keeves, 1973).

Consequently, **the material dimension** of the pupils' family SES is assessed from data on the profession and income of the parents and **the cultural dimension** is derived from the parents' level of education. As with the parents' professional activity, the first operational measurements of the parents' level of education only took account of the father's education. But given that mothers normally spend more time with their children than fathers, researchers have been prompted to consider the mother's level of education as well and studies have confirmed that it is an important and positive factor in the schooling of the pupil.

It is easy to quantify the educational attainments of parents by establishing, for example, the highest level reached by one parent or both, or by counting the total number of years spent in a school or the number of years both parents have spent studying.

International classifications of pupils' family background: IEA, PISA and PEIC studies

→ IEA and the socioeconomic status of pupils

For more than forty years, data collected in international comparative studies carried out by the IEA (*International Association for the Evaluation of Educational Achievement*)⁴ has provided input for numerous research projects on the effects of family SES on pupils' performance in Mathematics or Science. Twelve countries participated in the first of these projects, the FISS (First International Mathematics Survey) between 1962 and 1965. The next one in 2007 will involve sixty-four industrialized and developing countries.

The IEA focused on measurement of the child's family setting and established a composite SES. As a result,

- all surveys include a measurement of the parents' level of education
- the first four surveys document the parents' professions in different ways (parents' professions, profession of father only, part-time/full-time profession of mother, etc.). The FISS was the first international study to address the professional status of the mother but the proportion of responses on these items was too low to permit of any analysis. From 1995 therefore the IEA no longer included questions on parents' professions.

⁴ <http://www.iea.nl>

- From 1995, a new financial situation parameter (derived from twelve goods available in the house) was included in the SES measurement.

In a highly informative article, Buchmann considers SES measures in more than 38 international studies and 21 studies based on IEA data. The point about SES is that it has a positive influence on school outcomes, (the pupil goes on to a higher level, performs well at school, etc.). Aspects related to schooling and to parents' professions appear individually or jointly in 80% of the works listed. As emphasized earlier, income may be referred to directly in determining SES (Niles, 1981; Stevenson and Baker, 1992) or indirectly in terms of proxies, such as ownership of the land where the family lives (Cochrane and Jamison, 1982) or of goods available in the family residence (Hansen and Haller, 1973).

→ PISA and pupils' socioeconomic status

The OECD Programme for International Pupil Assessment (PISA)⁵ is a comparative assessment, jointly developed by participating countries and administered to 15-year-olds in schools. PISA provides for the three-yearly collection of data on pupil performance in reading, mathematics, and science using standardized instruments. A first cycle in 2000 was implemented in 43 countries and focused on reading; a second in 2003 involved 41 countries and concentrated on mathematics.

PISA 2000 highlighted the immense importance of the pupils' socioeconomic environment for comprehension of the written word. On average, the pupils' background accounted for 20% of the variation in reading performance. This finding was confirmed in 2003, when it was noted that socioeconomic factors accounted for 17% of the variation in performance in mathematics. The family environment was synthesized using the Index of Economic, Social and Cultural Status (ESCS), a composite of the educational level and professional status of the father or the mother (whichever is highest) and the availability of books and educational resources in the home.

PISA 2003 produced three main findings on the influence of socioeconomic factors on school performance:

⁵ <http://www.pisa.oecd.org/>

- The professional status of parents significantly influences pupils' performance in mathematics.
- Pupils' performance in mathematics is significantly better if the mother has a secondary education or higher education diploma. This is true in all participating countries.
- The availability of cultural items (books of classic literature, poetry and art) has a positive impact on pupil performance.

Other factors have been studied, such as lone parenthood, pupils' country of origin and the language spoken at home, but it has not been possible to establish any clear connection between them and school performance.

The effect of social origin, however, varies from one country to another. It is shown to be very slight (accounting for less than 10% of variation in performance) in Iceland and Indonesia, for example, and very marked (accounting for more than 20% of variation in performance) in other countries, such as Hungary and Belgium.

→ PEIC and pupils' socioeconomic status

In 1997, the PEIC (First Comparative International Study) carried out an international assessment of the quality of education in 13 Latin American countries, in which around 50,000 pupils were tested in reading and mathematics. The results of the study reveal a link between the SES of the pupil's family and school performance (Willms and Somers, 2005). Moreover, the two most significant factors in the child's success were the parents' educational level (in some cases the pupils' scores increased for every extra year of parental education) and the presence of 10 or more books in the home. The parents' profession did not prove to be a particularly significant variable. However, the link was more pronounced in some countries than in others. The highest achievement results of PEIC, for example, were obtained in Cuba, where social inequalities are comparatively slight.

1.2 The SACMEQ index of the socioeconomic status of pupils (SACMEQ SES)

Industrialized countries and developing countries: the same SES?

The vast majority of available literature on family SES examines this subject in the context of industrialized countries. Standardized cross-border SES measures, such as the PISA ESCS Index, work very well but were devised for rich countries and OECD partner countries. They do not cover any African country or Asian country like India or China, all of which have a very high proportion of young people. It follows that very little work has been done on SES in developing countries and international comparative studies of SES measurements are particularly rare.

Family SES in the African context

Of the research examining the relationship between family SES and the school outcomes listed by Buchmann (2002), only about fifteen studies have addressed African countries. Moreover, the first bibliography of literature on the factors associated with school performance in developing countries was only drawn up in 1978 (Simmons and Alexander). Despite the rarity of studies of the phenomenon in poor countries, we can still identify two of the basic elements relating to parents — i.e. level of education and income — by using proxies. Information on the third element (parents' profession) is available to a lesser degree.

Once again, families' financial status was determined using proxy variables, about which pupils were better informed. Moreover, the proxies used for the studies on developing countries were different from those employed in industrialized countries. For example, in the Botswana study of 1995 the proxies used were the quality of the materials used to build the house and possession of certain household commodities. For Uganda, Zaire, Cameroon, Malawi and Zimbabwe only household commodities were used. Admittedly, the number of commodities varied from one country to another but two cropped up regularly: electricity and running water.

The use of basic resources like electricity and water as proxy variables is particularly relevant to the African context, where access to potable water and electricity is limited and a matter of major importance. In the industrialized countries, these basic resources are available to

everybody and are not a major issue. Conversely, PISA's ESCS index takes account of modern resources such as computers and Internet connexions, which are not relevant to SES in developing countries. These two examples illustrate the problems inherent in applying an international standardized index like the PISA ESCS, which was drawn up for one context (industrialized countries), in another context (developing countries), where requirements are not the same.

Which variables should be used to assess pupils' SES in Africa?

Whatever the national context, the parents' **level of education** is one of the essential components in the measurement of pupils' SES everywhere. Studies show that the number of books in the house, more precisely the possession of more than ten books, is a relevant factor in assessing the cultural dimension (see PEIC studies).

In approaching the material dimension, **basic resources** that are available in the home and in good working order should be used as proxies.

In addition to these basic elements, other supplementary measures may be used to determine a family's financial situation, such as **the quality of the materials used to build the pupil's house** (Hansen and Haller, 1973) or the amount of livestock owned (Ross and Postlethwaite, 1989). In Kenya, for example, the Masai are regarded as rich, not because of their goods, but because of their livestock.

Measurement of the parents' profession is problematic in that the IEA studies showed that pupils had difficulty quantifying it. Moreover, it did not influence school performance in poor Latin American countries.

1.3 The SACMEQ databases

The data on pupils used in this study were taken from educational policy research projects conducted by SACMEQ, whose research documents and databases have been in the public domain since January 2004⁶.

Under the consortium's auspices, two initial educational research projects — better known as SACMEQ I and SACMEQ II (2000) — examined schooling and quality of education at primary level. The projects involved the collection of convergent data on primary school pupils, teachers and head teachers. Questionnaires developed for SACMEQ I were used for SACMEQ II and supplemented with further items.

Seven countries took part in the first project: Kenya, Malawi, Mauritius, Namibia, Tanzania (Zanzibar), Zambia and Zimbabwe⁷. In 2000, ministries from eight more countries joined SACMEQ: South Africa, Botswana, Lesotho, Mozambique, the Seychelles, Swaziland, (Continental) Tanzania and Uganda.

Under the two SACMEQ projects, samples were taken from a defined target population of “*pupils at Grade 6 level during data collection (at the first week of the eighth month of the school year) who were attending registered mainstream primary schools*”. The data were collected in accordance with a clearly defined scientific sampling protocol. For further information, the methodology employed by SACMEQ is described in its technical report.⁸

⁶ Source: Ross, K; Saito, M.; Dolata, S.; Ikeda, M; Zuze, L. (2004). *Data Archive for the SACMEQ I and SACMEQ II projects*. Paris: IIEP

⁷ Zimbabwe only took part in SACMEQ I

⁸ www.sacmeq.org

2. ANALYSIS MODEL USED: THE RASCH MODEL

2.1 Item response theory (IRT)

Devised in the sixties (Lord, 1952; Rasch, 1960; Lord and Novick, 1968), item response theory covers a wide range of probabilistic models or item response models (IRM) intended to make predictions of the likelihood of observed item responses. They are based on the idea that the probability of a subject j giving a correct response to an item i (score for the item) depends on two factors: the item and the trait or characteristic of the individual, which is not directly observable. These two elements can be expressed in terms of various parameters.

The two main advantages of these models are that:

- the aptitudes of the subjects can be assessed independently of the sample of items used. It is thus possible to compare the scores of subjects who have not taken the same tests,
- the difficulty of the items and the aptitudes of the subjects are ranked on the same continuum.

2.2 One-parameter IRM — the Rasch model

The Rasch model, named after its inventor, Georg Rasch, was chosen to assess the socioeconomic level of pupils in the SACMEQ countries. This is the simplest form of item response model (IRM): the probability of success of a subject on an item depends on the level of latent trait of the subject and a parameter describing the level of difficulty of the item. Rasch's approach stipulates:

“...that a subject A having a latent trait at a higher level than a subject B will have a higher probability than subject B of giving a correct response for any item measuring the same phenomenon. Similarly, an item X having a higher level of difficulty than an item Y means that for any subject the probability of a correct response is higher for the second item.” (Rasch, 1960, p.117).

The item characteristic curve (ICC)

To express the probability of success on a particular item as a function of the latent trait of the subject, the Rasch model uses a logistic ogive, which transforms observations derived from binary or ordinal measures into interval scale measures, represented graphically by a curve referred to as the item characteristic curve (ICC).

For the remainder of the discussion, we will refer to dichotomous response items (0/1, true/false, yes/no). In other words, the scale for measuring socio-economic status will show, for example, the likelihood of having a radio in the pupil's home (0 for no radio in the home, 1 for having radio in the home). The general form of the ICC is shown in figure 1.

(Insérer ici la figure 1)

Figure 1 shows that for a subject with a higher level latent variable (\odot), the probability of success for a particular item (score of 1) is close to 1. For a subject with a low-level latent variable (\ominus), the probability of success for the same item is close to zero. For a subject with an average level (\odot), the probability of success is 0.5. The blue curve indicates the probability of a correct response for this item depending on the different latent variable levels. For each item there is a specific ICC whose the curve depends solely on the item parameter.

According to this model, the difficulty of the item is defined as the level at which the probability of a correct response to the item is equal to 0.5. In the example shown in Figure 1, the level (δ) of the latent variable of an average-level subject is defined as the difficulty of the item for this subject. In view of this, the difficulty of the item is linked to the level of the latent variable.

By showing the difficulty of the item on the scale of the latent variable, it is easy to interpret the scores of the subjects on the scale in terms of the characteristics of the item. An example of this is given in Figure 2. The left-hand scale (ranking the subjects) and the right-hand scale (showing the position of the items according to their difficulty) are linked using the probabilistic function. If a subject has a score θ , it is easy to

calculate the probability of success for items 1 to 6 from the difficulty of items δ_1 to δ_6 respectively. In the same way, it is possible to describe the level of the latent variable of a subject by referring to the subject's probable responses to each of these items.

(Insérer ici la figure 2)

Figure 2 also shows that, by observing a subject's responses to items, it is possible to estimate the subject's probable position on the latent variable scale, using the probabilistic functions linking the difficulty of the items to the steps on the scale. In this way, irrespective of the sub-set of items used (whether items 1, 3 and 5 or items 2, 4 and 6 in figure 2), the position of the subject on the scale will be identical (within margins of error due to the measurement). It follows that each subject will always be placed at the same position on the scale, whatever the instruments used.

Advantages of item response models (IRM)

IRMs are widely used in human sciences, as they enable us to ensure that measurement scales have good psychometric properties (reliability, validity, etc.). If data does not fit the Rasch model, using the model will not make for a better psychometric assessment of the data. In other words, unless the data really fit the Rasch model, there is no point in using it. ***It is therefore necessary to gauge the extent to which data are consistent with the Rasch model.*** When data fit the Rasch model, we have an indication that the items measure a single *construct*. This is a way of validating the construction.

3. CONSTRUCTING THE SACMEQ SES MEASUREMENT SCALE USING THE RASCH MODEL

With the aid of the CONQUEST⁹ software program, a procedure has been devised for the purpose of constructing a scale to measure the SES of pupils in Grade 6 of primary school. It comprises six stages:

- 1) Identification of items linked to the SACMEQ SES index,
- 2) Coding and recoding of selected items,
- 3) Creation of the data matrix required by CONQUEST,
- 4) Item analysis and calibration,
- 5) Final selection of items,
- 6) Construction of measurement scale.

3.1 Identification of items linked to SES in Africa

Five essential components of the pupils' SES emerged from the conceptual discussion. The cultural dimension of the family environment was measured by the parents' level of education and the number of books in the home, while the material dimension was measured by the basic resources available in the home, the structural quality of the home and the amount of livestock.

Variables in the SACMEQ archives used to measure SES?

SACMEQ II questionnaire consists of the items contained in SACMEQ I as well as four new items. In all, twenty-one closed items, relating to five components of the SES measurement, were included in the questionnaires (see table 1). The items taken from the questionnaire are shown in Appendix A.

(Insérer ici le tableau 1)

Seventeen items are common to both projects: the educational level of the father and mother, the number of books available and fourteen items relating to material

possessions (newspaper, magazine, radio, television, VCR, audio cassette player, telephone, refrigerator, car, motorcycle, bicycle, running water, electricity and table for writing on) in the pupil's home. The list of possessions was drawn up by the national research coordinators, who wanted to know whether the homes had these basic resources.

Four of the items were only included in SACMEQ II: there were three questions on the materials used to make the floor, the outside walls and the ceiling of the house and one on the main source of lighting in the home, enabling pupils to read. It was felt that the last item might provide further information on SES.

The questionnaire also contained eight open items on **livestock** (ox, goat, chicken, etc.). When the data were being analyzed, however, the responses given by the pupils turned out to be unusable. They were based on the children's perception of the number of animals at home and contained a great many instances of unrealistically high figures. Consequently, these items could not be incorporated into the SES index.

3.2 Coding and recoding of selected items

In order to carry out the item analysis using ConQuest, the items were recoded in such a way that the first response category was given the value 0, the second was given the value 1, etc.

Each item was checked twice to ensure that the SACMEQ I and SACMEQ II items were comparable and the response categories of the items were in **ascending order in terms of the underlying level of the latent variable SES**. Five items required specific recoding:

- (a) For the two items on the parents' highest level of educational attainment, there were eight response categories in SACMEQ I (1, 2, 3, 4, 5, 6, 7, 8) and nine in SACMEQ II (1, 2, 3, 4, 5, 6, 7, 8, 9). These items were recoded as (0, 1, 2, 3, 4, 5), with the

⁹ ConQuest is a computer program developed at the Australian Council for Educational Research (ACER) for fitting item response and latent regression models.

categories *I don't know* and *I have no mother or female guardian* being recoded as missing values¹⁰, and categories 6 and 7 of SACMEQ II merged into one (6).

(b) The response categories for item 5 of SACMEQ II on lighting enabling the child to read were changed from (1, 2, 3, 4, 5, 6) to (0, 0, 0, 1, 2, 0) where:

- 0 = absence of satisfactory lighting,
- 1 = gas lighting,
- 2 = electric lighting.

(c) The coding for item 14 on the materials used for the outside walls of the pupils house was changed from (1, 2, 3, 4, 5, 6) to (0, 0, 0, 1, 1, 2) where:

- 0 = outside walls not sealed (cardboard, straw, stones, etc.),
- 1 = outside walls sealed and made of average quality materials (metal, wooden planks),
- 2 = outside walls sealed and made of superior quality materials (stone, concrete or ceramic bricks

(d) The coding for item 15 on the principal material used for the roof of the child's home (1, 2, 3, 4, 5) was changed to (0, 0, 1, 2, 2), distinguishing three qualities of roof:

- 0 = roof not sealed (cardboard, straw, etc.),
- 1 = roof sealed and made of average quality materials (iron),
- 2 = roof sealed and made of superior quality materials (cement, concrete and tiles).

3.3 Creation of the data matrix required by CONQUEST

To run the CONQUEST program, it was necessary to prepare a data matrix (see figure 3). The pupil data (unit of analysis) were arranged in lines by project (SACMEQ I and II) and country, and the items were set out in columns.

(Insérer ici la figure 3)

¹⁰ SYSMIS in SPSS

Because the country databases vary in size — data base include 5,500 Namibian and 1,571 Seychellois pupils, for example — and the number of pupils may influence the parameters of the model, a sample of 800 from each country was randomly selected using SPSS to produce a data matrix of **16,800 pupils** (800 x 21 countries).

3.4 Item analysis and calibration

Item analysis provides information about each item in terms of how well it fits the measurement model, and identifies misfitting items (measuring a latent variable other than the one under examination) or items of mediocre quality (adding little information to the measurement scale). In other words, the analysis serves a twofold purpose, calibrating the difficulty of the items on the measurement scale and determining the degree of usefulness of each item as measurement tools.

Results of the item analysis of 21 items (appendix B1) provide information on the set of items collectively as a measuring instrument and also on the characteristics of individual items so that the best items for measuring the SACMEQ SES latent variable can be selected.

Reliability of the measuring instrument

The Alpha coefficient, a homogeneity index or measurement of the internal consistency of a scale, varies between 0 and 1 and estimates the extent to which the score accurately represents the pupils SES. Ideally, the reliability should be as close as possible to 1¹¹. For the SACMEQ SES scale comprising 21 items, the coefficient is 0.73, an acceptable level in edumetry.

Individual analysis of items used in the measurement scale

For the individual analysis of items, five statistical criteria are examined individually and also considered collectively for the final selection of the items:

¹¹ The Alpha coefficient is used to assess the reliability of a test.

- The discrimination index for an item A in Classical Test Theory expresses the correlation between a subject's score on this item and his/her total score on all items in the questionnaire. If item A were used to measure pupils' SES in the SACMEQ countries, one would expect a high positive correlation between the score for item A and the total score on the questionnaire. A discrimination value of 0 indicates that there is no relationship between the score on the item and the total score.
- The fit index of an item shows the degree to which the item responses on an item can be predicted by the IRM, and the degree to which an item is measuring the same underlying construct as other items in the questionnaire. Typically, an index close to or equal to 1 indicates that the item fits the IRM well. An index much higher than 1 shows that the item does not discriminate the subjects well in terms of the level of the latent variable and should be removed from the scale. An index less than 1 indicates that the item discriminates better than expected. The item may be selected for the scale provided that some improvements (e.g., recoding) can be made, and a check on its performance in a re-analysis of the items should be carried out.
- The point biserial correlations provide information on the relationship between the response category chosen by the subject and the level of the subject's latent trait. For example, one would expect a pupil with a high SACMEQ SES to choose a high category for his mother's level of education. The correlations should increase with increasing category score, and the correlation for the highest category for the item should be positive. If the differences between the correlations for adjacent response categories are small, this means that the categories for the item are close and could be merged.
- The scores assigned to each response category for an item must correspond to the level of pupils' SES measures. Moreover, scores for the response category and the pupils' measures should be set out in ascending order for each item.
- The item characteristic curve (ICC) also provides useful information about the behaviour of an item. Let us consider the ICC of item 2 on whether there are daily newspapers in the pupils' home (figure 4). Two curves can be distinguished: 1) the

dotted curve shows the **observed** measurements of the pupils SACMEQ SES; 2) the solid curve represents the **theoretical** ICC derived from the IRM.

(Insérer ici la figure 4)

The goodness-of-fit of the item to the model can be assessed visually. If the **observed** curve is very close to the **theoretical** curve, then the item fits the model well. If the observed curve were flat, that would indicate that there was very little relationship between the categories and the SES measure.

Results of the analysis of the 21 items

The reliability, estimated at 0.72, indicates that the selection of 21 items is coherent. Table 2 provides an evaluation of each item as an indicator variable for SES, in terms of the five statistical criteria described above, showing whether the requisite criteria are satisfied (✓), not fully satisfied (?), or not at all satisfied (???).

(Insérer ici le tableau 2)

- Fifteen items (2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 18, 19, 20, 21) satisfied the five criteria and were therefore chosen for the final SES scale. Three items (4, 18, 20) had low discrimination or fit indices, but other attributes were satisfactory for these items.
- Three other items were selected for the SES scale, subject to modification of the response categories:
 - While the fit indices showed that the items on parents' level of education do not fit the IRM model well, other statistical criteria were found to be adequate. To improve the fit, a recode was carried out, where (0, 1, 2, 3, 4, 5) were recoded into (0, 0, 1, 2, 2, 2), thereby distinguishing pupils whose parents had not completed primary level (0), those who had completed primary level (1) and those who had reached secondary level or higher (2).
 - For item 1, the point biserial values for categories 3, 4 and 5 were not in increasing order. Consequently, these three categories were collapsed through a recoding, from

(0, 1, 2, 3, 4, 5) to (0, 1, 2, 2, 2, 2). The recoded categories correspond to: *children with no books in the house* (0), *one to ten books* (1), and *more than ten books* (2).

- Three items (11, 12, 14) were not included for the SES scale. Scores on items 11 and 12 (motorcycle and bicycle respectively) had low correlations with SES measure, and item 14 on electricity, taken on its own, had considerable weight in the construction of the SES measure and was rendered redundant by other items (TV, VCR, etc.), which required a source of electricity to work.

3.5 Selection of final items

The selection of items is an iterative process. Every time a different set of items are chosen, the reliability of the questionnaire and the individual characteristics of the items need to be reanalyzed to ensure that the changes have brought about a general improvement in the quality of the questionnaire. Table 3 lists the items selected in section 3.4 for further analysis using CONQUEST.

(Insérer ici le tableau 3)

Appendix B2 shows the results of the analysis of the eighteen items. The reliability for the item set is adequate, estimated at 0.76 (higher than the result of the previous analysis). Moreover, the summary of the individual analysis of the eighteen items given in table 4 shows that the eighteen items adequately satisfy the five criteria discussed previously. These items were accordingly selected for the SACMEQ SES scale.

(Insérer ici le tableau 4)

The ICCs of the eighteen items are shown in appendix C2. In particular, Figure 5 shows the ICCs of the three items on the number of books (BOOK), the level of education of the mother (EDMO) and of the father (EDFA), before and after the adjustments were made (recoding of the categories and deletion of three items).

(Insérer ici la figure 5)

Before the recoding, the items had poor fit indices and the response categories could not be distinguished from the tangle of curves.

After the adjustment (right-hand column), the fit indices significantly improved (1.17 for BOOK, 1.18 for EDMO and 1.26 for EDFA). The ICC for BOOK confirms that item 1 in its original form did not sufficiently discriminate pupils with the response categories. In particular, categories 11-50, 51-100, 101-200, and 201+ failed to add any useful information about the pupils' SES level. In future surveys, the Consortium may consider dividing the 1-10 book category into a number of finer categories, such as 1-5 books and 6-10 books. Similarly, the ICCs for the parents' levels of education were no longer combined. The categories 0 (no schooling) and 2 (secondary or higher) were selected by around 80% of the pupils. Very few chose primary school. This is one example that shows the difficulty experienced by the pupils in responding to questions on their parents' level of education, which they tend to overestimate.

SACMEQ scale of pupils' socioeconomic status

ConQuest was used to estimate the item difficulties associated with the response categories of the eighteen items, and the SES level of each of the 16,800¹² pupils. The items and the pupils are placed on the same SACMEQ SES scale (figure 6). The scale is read vertically, with the SES scores ranging from the lowest (at the bottom) to the highest (at the top).

(insérer ici la figure 6)

The following are a few remarks in relation to the items/pupils chart shown in figure 6:

- The radio (4) is frequently found in the child's home whereas the VCR (10) is much rarer.

¹² Reminder: 800 pupils were chosen at random from each country for the calibration.

- The gap between the response categories — 1-10 books and 10+ books (in blue) is very wide and confirms the need to divide the 1-10 books category into finer categories in future surveys.
- The SES scores for the first three response categories (in pink) on the quality of the floor are very close. They are separated by a wide margin from the last category (tiles). In future studies, it may be advisable to include a category in-between these two categories.
- The categories for the item on lighting are very close and need to be re-examined in any future studies.
- On the parents' educational levels (primary or secondary), the categories for the mothers are “more difficult” than the one for the fathers, indicating that mothers' education levels are generally lower than fathers'.
- The items for electrical goods (VCR, telephone, refrigerator, television and electric light) are high on the scale, between 0.5 and 1.5, indicating that few pupils have these goods in their homes.

3.6 Construction of the scale — SACMEQ index of socioeconomic status

Once the calibration of the item difficulties for the 18 items was carried out based on a data set of 16,800 pupils, it is easy to calculate the scores for the SACMEQ¹³ SES index (in logarithms) for all 61,842 pupils (20,156 pupils in SACMEQ I and 41,686 in SACMEQ II), using a procedure where the calibrated item difficulties are anchored when computing the pupils' SES level.

The SES scores obtained were entered in the data archives using SPSS. For SACMEQ I, the general average SACMEQ SES index for pupils was -0.29 with a standard error of

¹³ The name of the variable produced is PSESLOG

1.32 (table 5). The statistics were similar for SACMEQ II (average of -0.19 and a standard error of 1.28).

(Insérer ici le tableau 5)

To facilitate the interpretation of the SES scores, the SACMEQ II scale was centred at 500 and scaled to have a standard deviation of 100 (an arbitrary convention, widely adopted in international studies such as PISA) as follows:

$$ZPSESSCR=100*((PSESLOG+0.1907212227335)/1.280391667583)+500.$$

where ZPSESSCR is the name of the new SES variable.

To compare pupils' SES level in the two different projects, the same transformation was applied to the SES index of SACMEQ I scale.

At present, the average national SES for SACMEQ I (492) is close to the one for SACMEQ II (500), with a standard error of 103.5 (table 5). Individual SES scores for the SACMEQ pupils' vary widely, between 196 and 818 for SACMEQ I and between 186 and 840 for SACMEQ II.

4. INTERPRETING THE SACMEQ SES SCALE

Once the SACMEQ SES scale has been established through appropriate indicator variables (the items in the questionnaire, in this case), it is possible to address the pupils' profile on the scale.

4.1 National scores for the SACMEQ SES

The table below shows the average scores of primary school Grade 6 pupils on the SACMEQ SES scale and the associated sampling errors (SE) for SACMEQ I and II.

(Insérer ici le tableau 6)

Are there differences from one country to another?

National mean SES scores are between 423 and 604 for SACMEQ I and between 440 and 643 for SACMEQ II. The difference between highest and lowest scores, around 200 points in both projects, is considerable.

If we take the average SES for SACMEQ II with more or less twice the SE for South Africa (the country with the greatest SE), three groups of countries can be distinguished: those with scores around the SACMEQ II average (average SES), those with scores below average (low SES) and those with scores well above average (high SES) - (see table 7).

(Insérer ici le tableau 7)

For both studies, a substantial majority of countries are in the low SES category; some are average and some are in the high SES category. Of the six countries that participated in both projects, Zambia and Kenya fell from the average SES category to the low category with losses of 14 and 29 points respectively. Are the differences in pupils' SES significant?

Is the difference over time significant?

The table below shows a comparison of SES levels for SACMEQ I and II for the six countries that participated in both SACMEQ projects. Differences between average SES scores ($M_2 - M_1$) and associated sampling errors ($ES_{M_2-M_1}$) are shown in the right-hand columns. With a 95% confidence level, the difference over time becomes significant when the absolute value of ($M_2 - M_1$) is equal to or greater than twice ($ES_{M_2-M_1}$)¹⁴. Significant differences are indicated by two asterisks (**).

(Insérer ici le tableau 8)

The only country exhibiting no significant difference is Malawi, where the SES remains unchanged at 443. The SES of pupils in Grade 6 of primary school in Mauritius and Zanzibar rose significantly (by more than thirty points) in five years, but it fell sharply in three other countries (Kenya, Namibia and Zambia). This fall is due to the high attendance at primary school since the nineties. In sub-Saharan Africa, enormous efforts have been made to enable children, particularly those from deprived backgrounds, to go to primary school.

4.2 Interpreting the SACMEQ SES scale

Let us consider the expected scores curve for item 15 on the quality of the floor of the child's home (figure 7). The SACMEQ SES is shown on the horizontal axis and the expected score for the item on the vertical axis.

For pupils with an SES score between E1 and E2, the expected scores for the item range from 1.5 to 2.5. For pupils with an SES score between E2 and E3, the expected scores for this item are between 2.5 and 3.5. Consequently, E1, E2 and E3 may be regarded as limits between response categories 1, 2 and 3 of item 15 on the SES scale.

(Insérer ici la figure 7)

¹⁴ $ES_{M_2-M_1}$ is calculated from the square root of the sums of variations for each average SES score.

Below the expected scores curve, a horizontal bar shows regions of response categories. The SES scale reads from left to right: the response of pupils with low SES will normally be the first category. As and when their SES increases, they will tend to give a response in higher categories.

The information has been represented in the same way for each of the 18 items in figure 8, where the SACMEQ SES scale varies from 0 to 1,000 with an average of 500 and a standard deviation of 100.

(Insérer ici la figure 8)

For a pupil at a particular level on the SES scale, the expected scores for the items can be clearly described. In figure 8, two pupils A and B with different SES are indicated by dotted lines. It can be seen from the table that the SES of pupil A is lower than that of pupil B.

How do we determine the SES profile of a pupil?

On the SACMEQ SES scale, pupil A scores 200 and pupil B scores 860. What do these scores mean? Does a particular score represent a high or low SES? How high or low?

In figure 8, the eighteen items are placed on the same scale. In this way one can easily refer to the expected responses for pupil A and pupil B by looking up and down the list of categories.

At pupil A's home, the following eleven items are not likely to be available: a radio, a book, a table for writing, an audio cassette player, a newspaper, a television, a magazine, a refrigerator, a telephone, a car and a VCR. Lighting is inadequate for reading and there is no running water. The floor, walls and the roof of the house are not sealed and the parents/guardians of the child have had little or no education.

Pupil B's home, on the other hand, is likely to have the eleven items referred to above and more than ten books. It also has electric lighting and running water. The floor, walls

and roof of the house, made of higher quality materials, are sealed and the parents have reached at least secondary school level.

It is clear from this description that pupil A lives in conditions of extreme poverty and that pupil B enjoys very good social and economic conditions. These two examples serve to illustrate the two extremes of SES, as established in SACMEQ I and II (see table 5).

What are the national SES profiles of SACMEQ pupils?

In figure 8, the average SES scores for the SACMEQ II countries, ranging from 420 to 643, have been placed on the SES scale. In order to provide a detailed picture of the average scores, special prominence has been given to the interval 430 to 660 on the SES scale (figure 9).

At national level, all pupils are likely to have access to a **radio** and a **table for writing** in their homes and their **parents have completed primary education**. On the other hand, there are differences with respect to the other items, depending on the country score. From the average SES profile for the pupils (i.e. the response categories for the 18 items on the SES scale), it is possible to distinguish six groups of countries according to the pupil profiles (figure 9).

(Insérer ici la figure 9)

- 1) Pupils in the 1st group of countries, Uganda, Malawi, Tanzania, Zanzibar and Mozambique, have very low SES (between 440 and 465). The average profile of these pupils is as follows:

At the pupils' homes, there are between one and ten books but there is no cassette player, running water, newspaper, television, magazine, refrigerator, telephone, car or VCR. As to the structure of the house, the floor is made of wooden planks, the walls are made of good quality material (metal, asbestos or wood) and are sealed, the roof is made of average quality materials (metal or

asbestos) and is sealed, and the main source of lighting is inadequate for reading. The parents have completed primary education.

- 2) Pupils in the 2nd group of countries (Kenya, Zambia, Lesotho and Namibia) have low SES (between 470 and 485) and differ from the first group only as regards the kind of lighting in their homes. Their homes have **gas lighting**, which enables them to read.
- 3) In Botswana and Swaziland, pupils have average SES (between 505 and 515). The average profile of this group of pupils differs from that of the previous group in that they have *cassette players* at home and their houses have *cement floors*.
- 4) The 4th group comprises a single country, South Africa, where pupils' SES is fairly high (555). The average profile of South African pupils differs from that of the previous group in that they have *running water, a newspaper and a television in the home, and the father has reached at least secondary education level*.
- 5) Seychellois pupils are also in a group of their own with a very high SES of 625 (70 points higher than the South Africans). Their average profile is different from that of the previous group in that there are *more than 10 books, a magazine, a refrigerator, a telephone, a car and a VCR at home. Their houses have electric lighting, the walls are sealed and made of average high quality, and their mothers have reached at least secondary school education*.
- 6) Mauritian pupils also form a separate group with a very high SES (645). Their average profile is distinguished from that of the Seychellois by *the superior quality of the materials used for the floors and roofs* of the pupils' houses.

Detailed definitions of the six profiles are given in Appendix D.

Profiles of pupils in the first three groups (eleven countries) are very similar and their SES is very low. There is a 50 point gap between each of these countries and South

Africa (average SES), where the pupils' homes have running water and television in the home and their fathers have enjoyed a higher level of education.

Seychellois and Mauritian pupils have similar, very high SES. The gap between pupils of these countries and the others is considerable. They live in a very "rich" environment and their mothers have received secondary level education.

4.3 Correlation between SACMEQ SES and pupils school achievement

Pupils test scores in reading and mathematics were constructed in accordance with the Rasch model, taking account of the curricula in each country (D.Andrich et al, 2005, in preparation). The test results were centred at 500 and scaled to have a standard deviation of 100 to facilitate comparison of achievement in reading and mathematics.

SACMEQ SES and achievement in reading and mathematics

For SACMEQ I and II, the correlation coefficients for the observed SES measurements and the pupils' reading scores are 0.38 and 0.42 respectively (table 9). These coefficients are positive and considerably higher than the minimum threshold required in education (0.2), which shows that there is a relationship between the two variables.

(Insérer ici le tableau 9)

In 1995, Zambia and Zanzibar had correlation coefficients slightly below 0.2. In contrast, the coefficients of the five remaining countries are higher than 0.2 and point to a relationship between the pupils SES and their school achievement. The values for Namibia and Mauritius are very high at more than 0.43.

In 2000, the correlations between SES and reading achievement were positive and equal to or greater than 0.2, varying between 0.2 and 0.64:

- The coefficients for Kenya and Zambia rose sharply between 1995 and 2000, from 0.27 to 0.41 and from 0.17 to 0.4 respectively. A less dramatic

rise was also observed for Namibia, Malawi and Zanzibar (around 0.05 points). Mauritius maintained a high correlation with 0.4.

- The correlations for South Africa and Namibia were particularly high (greater than 0.6).

SACMEQ SES and achievement in mathematics

For SACMEQ II, there was a high correlation coefficient of 0.37 for the observed SES scores in mathematics. National values, between 0.08 and 0.57, were nevertheless lower than those for the SES and the reading test.

This relationship was not apparent in the case of pupils in Uganda, Malawi, Zanzibar, Lesotho and Mozambique. Yet again, South Africa, Namibia and Mauritius were found to have the highest correlations.

5. SACMEQ SES SCALE: CONCLUSIONS

Unlike the international SES measures used for industrialized countries, the SACMEQ index of the socioeconomic status of pupils is derived from five elements that define the pupils' family environment:

- the level of education of the father and mother,
- the number of books in the home,
- the presence of eleven items in the home (a newspaper, a magazine, a radio, a television, a VCR, an audio cassette player, a telephone, a refrigerator, a car, running water and a table),
- the structural quality of the house (floor, outside walls and roof),
- the main source of light, determining whether or not pupils can read.

When the next study is conducted, researchers might improve the SES scale by

- revising the response categories for the item on the number of books in the home and the construction materials used,
- using an additional source of information on the parents' level of education and the amount of livestock at home to ensure that data are as accurate as possible,
- including further items on modern, basic amenities, such as toilets and mobile phones, to cater for pupils at the far end of the scale, identified in Figure 6.

The initial results on pupils' SES profiles have revealed serious disparities between pupils in the eleven "low SES" countries (Uganda, Malawi, Tanzania, Zanzibar, Mozambique, Kenya, Zambia, Lesotho, Namibia, Botswana and Swaziland), pupils in Swaziland with average SES, and pupils in the Seychelles and Mauritius with very high SES.

Recent work by Heyneman and Loxley (1983) maintains that the impact of pupils' SES is high in rich countries and low in poor countries and that the low impact of SES in the developing countries is due to poor school resources. A clear relationship between SES and pupils' reading achievement was nevertheless brought to light in all the SACMEQ

countries, where the overall correlation was 0.42, a value very close to the average correlation observed in the PISA survey.

A final finding of the study relates to variations in pupils' SES between schools and within the same school (figure 10). The left-hand column in figure 10 shows the national pupil SES scores. The bars show the variations in scores between schools and within schools and the length of each bar represents the sum of these variations (the value given in the right-hand column). The total variation for SACMEQ II was set at 100. Half the variation is between schools and the other half is within schools.

(Insérer la figure 10)

The only country with a variation higher than the SACMEQ value was South Africa (108), where much of the variation (71) was between schools. Namibia and Botswana also exhibited significant variations between schools — 54 and 45 respectively. In the case of these three countries, SES seems to play an important part in choice of school.

To understand such remarkable correlations and variations, more thorough investigations are needed (at national and regional level). These would show us why the Grade 6 pupils' SES influences school achievement. It would also be interesting to examine the pupils' SES scale in relation to the school resources scale (Saito, M (2005), in preparation).

References

- Bertrand, R ; Balis, J-G. (2004). *Modèles de Mesure. L'apport de la théorie des réponses aux items*. Presse de l'Université du Québec.
- Buchmann, C. (2002). *Measuring Family Background in International Studies of Education: Conceptual Issues and Methodological Challenges*. (Pp. 150-97). In *Methodological Advances in Cross-National Surveys of Educational Achievement*, National Research Council, Board on International Comparative Studies in Education. Andrew C. Porter and Adam Gamoran, editors. Washington, DC: National Academy Press.
- Cacouault, M.; Oeuvarard, F. (2003). *Sociologie de l'éducation*. Paris: La Découverte.
- Cochrane, S. H., & Jamison, D. T. (1982). *Educational attainment and achievement in rural Thailand*. In A. Summers (Ed.), *Productivity assessment in education* (pp. 41-60). San Francisco: Jossey-Bass.
- Coleman, J. S., C & al. (1966). *Equality of educational opportunity*. Washington, DC: U.S. Department of Health, Education, and Welfare.
- Comber, L. C., & Keeves, J. (1973). *Science education in nineteen countries*. Stockholm: International Association for the Evaluation of Educational Achievement.
- Dolata, S.; Ikeda, M.; & Murimba, S. (2004). *Different pathways to EFA for different school systems*. (pp.8-9). *IIIEP: Newsletter* .XXII(2).
- Dronkers, J. (1989). Working mothers and the educational achievements of their children. In K. Hurrelmann & U. Engel (Eds.), *The social world of adolescents* (pp. 185-198). Berlin, Germany: Walter de Gruyter.
- Duru-Bellat, & al. (1993). *Les scolarités de la maternelle au lycée*.pp.43-60. *Revue française de sociologie*. Vol.XXXIV, n°1
- Duru-Bellat, M. (2003). *Inégalités sociales à l'école et politiques éducatives.*: Paris: UNESCO-IIIEP.
- Duru-Bellat, M.; Van Zanten A. (1999). *Sociologie de l'école*. Paris: Armand Colin.
- Duru-Bellat, Marie (2002). *Les Inégalités sociales à l'école: genèse et mythes*. Paris: Presses universitaires de France.
- Fuller, B., Singer, J., & Keiley, M. (1995). *Why do daughters leave school in southern Africa? Family economy and mothers' commitments* . *Social Forces*, 74, 657-680.
- Hansen, D. O., & Haller, A. O. (1973). *Status attainment of Costa Rican males: A cross-cultural test of a model*. *Rural Sociology*, 38, 269-282.

- Heyneman, S; Loxley, W. (1983). *The effects of primary school quality on academic achievement across twenty-nine high-and-low-income countries*. In *American Journal of Sociology*, vol. 88, n°6, p.1162-1194.
- Husen, T. (1967). *International study of achievement in mathematics: A comparison of twelve countries*. Stockholm: Almqvist and Wiksell International.
- Husen, T. (1987). Policy impact of IEA research. *Comparative Education Review*, 31, 29-46.
- Jamison, D. T., & Lockheed, M. E. (1987). *Participation in schooling: Determinants and learning outcomes in Nepal*. *History of Political Economy*, 35, 279-306.
- Keeves, J. P., & Saha, L. J. (1992). *Home background factors and educational outcomes*. In J. P. Keeves (Ed.), *The IEA Study of Science III: Changes in science education and achievement: 1970-1984* (pp. 165-186). Oxford, England: Pergamon Press.
- Keeves, John P. and Shaha L.J.(1997). *Measurement of Social Background*. *Educational research methodology and measurement : an international handbook*, 930-937.
- Leroy-Audouin, C. (1993). *L'école maternelle, entre la diversité des élèves et la continuité éducative*. Thèse pour le Doctorat. Université de Bourgogne -IREDU.
- Lord, F.M. (1952). *A theory of test scores*. *Psychometric Monographs*, No. 7. Chicago IL: University of Chicago.
- Lord, RM. & Novick, M.R. (1968). *Statistical theories of mental test scores*. Reading: MA: Addison-Wesley.
- Niles, F. S. (1981). *Social class and academic achievement: A third world reinterpretation*. *Comparative Education Review*, 25, 419-430.
- OCDE. (2001). *Knowledge and skills for life: first results from PISA 2003*. Paris: Author.
- OCDE. (2004). *Apprendre aujourd'hui, réussir demain. Premiers résultats de PISA 2000*. Paris: Author.
- Rasch, G. (1980). *Some probabilistic models for the measurement of attainment and intelligence*. Chicago: MESA Press.
- Ross, K., & Postlethwaite, T. N. (1989). *Indonesia quality of basic education*. Djakarta, Indonesia: Ministry of Education and Culture.
- Ross, K; Saito, M.; Dolata, S.; Ikeda, M; Zuze, L. (2004). *Data Archive for the SACMEQ I and SACMEQ II projects*. Paris: IIEP-UNESCO.
- Simmons, J. and Alexander, L. (1978). *The Determinants of School Achievement: A Review of the Research*. *Economic Development and Cultural Change* (January).

- Stevenson, D. L., & Baker, D. P. (1992). *Shadow education and allocation in formal schooling: Transition to university in Japan*. *American Journal of Sociology*, 97, 1639-1657.
- Treiman, D. J. (1977). *Occupational prestige in comparative perspective*. New York: Academic.
- UNESCO (2002) *Education for All. Is the world on track? EFA global monitoring report*. Paris: Auteur.
- UNESCO (2005) *Education pour Tous. L'exigence de qualité. Rapport Mondial de suivi de l'EPT.*. Paris: Auteur.
- Weber, M. (1948). *Essays in Sociology*. Eds : H.H. Gerth et C.W. Mills, Londres, cap. VII.
- Willms, J.D et Somers, M-A. (2005). *Raising the Learning Bar in Latin America, Measuring Pupil Outcomes*. Canadian Research Institute for Social Policy: Policy Brief III.
- Wu, M., Adams, R. J., & Wilson, M. (1997). *ConQuest: generalised Item Response Modelling Software*. Melbourne: ACER

Table 1. List of the 21 initial Items for SACMEQ-SES Index

Question	SACMEQ I	SACMEQ II
1. How many books are in the place (home) where you stay during the school week ? Which of the following things can be found in the place (home) where you stay during the school week?	PQ6	PQ6
2. - Daily newspaper	PQ08.01	PQ07.01
3. - Weekly or monthly magazine	PQ08.02	PQ07.02
4. - Radio	PQ08.03	PQ07.03
5. - TV set	PQ08.04	PQ07.04
6. - Video cassette recorder (VCR)	PQ08.05	PQ07.05
7. - Cassette player	PQ08.06	PQ07.06
8. - Telephone	PQ08.07	PQ07.07
9. - Refrigerator/ freezer	PQ08.08	PQ07.08
10. - Car	PQ08.09	PQ07.09
11. - Motorcycle	PQ08.10	PQ07.10
12. - Bicycle	PQ08.11	PQ07.11
13. - Piped water	PQ08.12	PQ07.12
14. - Electricity	PQ08.13	PQ07.13
15. - Table to write on	PQ08.14	PQ07.14
16. What is the highest level of education that your mother (or female guardian) has completed ?	PQ9	PQ11
17. What is the highest level of education that your father (or male guardian) has completed ?	PQ10	PQ12
18. What is the surface (covering) of the floor of the place (home) where you stay during the school week mostly made from ?		PQ13
19. What is the roof of the place (home) where you stay during the school week mostly made of ?		PQ15
20. What are the outside walls of the place (home) where you stay during the school week mostly made of ?		PQ14
21. What is the main source of lighting by which you can read in the place (home) where you stay during the school week ?		PQ8

Table 2. Summary of Individual Analysis of the 21 Items

Item	Discrimination Index (> 0.40)	Fit Indices (<=1)	Point-biserial Correlation	Measure Order	ICC
1. Book(s) at home	✓	???	?	?	?
2. Newspaper	✓	✓	✓	✓	✓
3. Magazine	✓	✓	✓	✓	✓
4. Radio	?	✓	✓	✓	✓
5. TV set	✓	✓	✓	✓	✓
6. VCR	✓	✓	✓	✓	✓
7. Cassette player	✓	✓	✓	✓	✓
8. Telephone	✓	✓	✓	✓	✓
9. Refrigerator	✓	✓	✓	✓	✓
10. Car	✓	✓	✓	✓	✓
11. Motorcycle	???	?	✓	✓	???
12. Bicycle	???	???	✓	✓	???
13. Piped water	✓	✓	✓	✓	✓
14. Electricity	✓	???	✓	✓	✓
15. Table to write on	✓	✓	✓	✓	✓
16. Mother education	✓	???	✓	✓	?
17. Father education	✓	???	✓	✓	?
18. Floor (home)	✓	?	✓	✓	✓
19. Roof (home)	✓	✓	✓	✓	✓
20. Outside walls (home)	✓	?	✓	✓	✓
21. Lighting to read	✓	✓	✓	✓	✓

Indications : ✓ = criterion satisfied, ? = criterion not completely satisfied, ??? = criterion not satisfied

Table 3. List of the 18 Final Items for SACMEQ-SES index

ITEM	LABEL	RESPONSE MODALITIES			
Item 1	Book(s) at home	1.0=No	1.1=1 to 10 books	1.2 = + 10 books	
Item 2	Newspaper	2.0=No	2.1=Yes		
Item 3	Magazine	3.0=No	3.1= Yes		
Item 4	Radio	4.0=No	4.1= yes		
Item 5	TV set	5.0=No	5.1=yes		
Item 6	VCR	6.0=No	6.1=yes		
Item 7	Cassette player	7.0=No	7.1=yes		
Item 8	Telephone	8.0=No	8.1=yes		
Item 9	Refrigerator	9.0=No	9.1=yes		
Item 10	Car	10.0=No	10.1=yes		
Item 11	Piped water	11.0=No	11.1=yes		
Item 12	Table to write on	12.0=No	12.1=yes		
Item 13	Mother education	13.0=No school	13.1=completed primary	13.2 =Secondary or +	
Item 14	Father education	14.0=No school	14.1= completed primary	14.2 =Secondary or +	
Item 15	Floor (home)	15.0=Not sealed	15.1=toile	15.2 =Wooden planks	15.3=Cement 15.4=Tiles
Item 16	Roof (home)	16.0 = Not sealed	16.1= medium quality	16.2= high quality	
Item 17	Outside walls (home)	17.0= Not sealed	17.1= medium quality	17.2 = high quality	
Item 18	Lighting to read	18.0= No lighting	18.1= gaz lamp	18.2= electric lighting	

Table 4. Summary of Individual Analysis for the 18 Items

Item	Discrimination Index (> 0.40)	Fit Indices (<=1)	Point-biserial Correlation	Measure Order	ICC
1. Book(s) at home	✓	?	✓	✓	✓
2. Newspaper	✓	✓	✓	✓	✓
3. Magazine	✓	✓	✓	✓	✓
4. Radio	?	✓	✓	✓	✓
5. TV set	✓	✓	✓	✓	✓
6. VCR	✓	✓	✓	✓	✓
7. Cassette player	✓	✓	✓	✓	✓
8. Telephone	✓	✓	✓	✓	✓
9. Refrigerator	✓	✓	✓	✓	✓
10. Car	✓	✓	✓	✓	✓
11. Piped water	✓	✓	✓	✓	✓
12. Table to write on	✓	✓	✓	✓	✓
13. Mother education	✓	?	✓	✓	✓
14. Father education	✓	?	✓	✓	✓
15. Floor (home)	✓	✓	✓	✓	✓
16. Roof (home)	✓	✓	✓	✓	✓
17. Outside walls (home)	✓	?	✓	✓	✓
18. Lighting to read	✓	✓	✓	✓	✓

Indications : ✓ = criterion satisfied, ? = criterion not completely satisfied, ??? = criterion not satisfied

Table 5. Descriptive Statistics for PSESLOG and ZPSESCR.

	PSESLOG		ZPSESCR	
	SACMEQ I	SACMEQ II	SACMEQ I	SACMEQ II
N	2800	5600	2800	5600
Minimum	-4.08	-4.21	195.9	186.0
Maximum	3.88	4.16	817.8	839.6
Mean	-0.29	-0.19	492.2	500.0
Standard deviation	1.32	1.28	103.5	100.0

Table 6. Means and Sampling Errors of SACMEQ-SES Index in the SACMEQ I and SACMEQ II Projects

School System	SACMEQ-SES Index			
	SACMEQ I		SACMEQ II	
	Mean	SE	Mean	SE
Botswana	No data	No data	507.2	4.78
Kenya	499.4	3.68	470.2	3.94
Lesotho	No data	No data	471.6	2.74
Malawi	444.0	4.03	443.0	5.25
Mauritius	603.8	3.90	643.0	3.44
Mozambique	No data	No data	464.7	3.12
Namibia	514.6	4.69	484.1	2.99
Seychelles	No data	No data	625.6	1.50
South Africa	No data	No data	555.8	6.68
Swaziland	No data	No data	516.2	4.25
Tanzania (Mainland)	No data	No data	450.0	4.91
Uganda	No data	No data	440.8	3.54
Zambia	485.3	4.19	471.2	4.24
Tanzania (Zanzibar)	423.1	2.03	456.6	1.37
Zimbabwe	475.3	4.60	No data	No data
Average	492.2	3.87	500.0	3.77

Table 7. Socio-Economic Status of Grade 6 Pupils in the SACMEQ I and SACMEQ II Projects

Project	Low SES	Middle SES	High SES
	< 485	[485; 515]	> 515
SACMEQ I (1995)	Zanzibar (423)	Zambia (485)	Mauritius (603.8)
	Malawi (444)	Kenya(499)	
	Zimbabwe (475)		
SACMEQ II (2000)	Uganda (441)	Botswana (507)	Swaziland (516)
	Malawi (443)		South Africa (556)
	Tanzania (Mainland) (450)		Seychelles (626)
	Zanzibar (457)		Mauritius (643)
	Mozambique (465)		
	Kenya (470)		
	Zambia (471)		
	Lesotho (472)		
	Namibia (484)		

Table 8. SACMEQ-SES Index of Grade 6 Pupils between SACMEQ I and SACMEQ II Projects

School System	SES –SACMEQ Index					
	SACMEQ I		SACMEQ II		Difference	
	M ₁	ES ₁	M ₂	ES ₂	M ₂ - M ₁	ES _{M₂-M₁}
Kenya	499.4	3.68	470.2	3.94	- 29.2 **	5.39
Malawi	444.0	4.03	443.0	5.25	-1.0	6.62
Mauritius	603.8	3.90	643.0	3.44	39.2 **	5.20
Namibia	514.6	4.69	484.1	2.99	-30.5 **	5.56
Zambia	485.3	4.19	471.2	4.24	-14.1 **	5.96
Tanzania -Zanzibar	423.1	2.03	456.6	1.37	33.5 **	2.45

Indication : ** difference significant

Table 9. Coefficient of Correlation between SACMEQ-SES Index and Reading and Mathematics Scores of Pupils in the SACMEQ I and SACMEQ II Projects

School System	SACMEQ I	SACMEQ II	
	SES/Reading	SES/Reading	SES/Maths
South Africa	No data	0.64 *	0.57 *
Namibia	0.53 *	0.60 *	0.54 *
Mauritius	0.43 *	0.44 *	0.43 *
Botswana	No data	0.41 *	0.32 *
Tanzania-Mainland	No data	0.41 *	0.33 *
Kenya	0.27 *	0.41 *	0.32 *
Zambia	0.17	0.40 *	0.26 *
Swaziland	No data	0.38 *	0.23 *
Seychelles	No data	0.30 *	0.31 *
Uganda	No data	0.27 *	0.19
Malawi	0.21 *	0.27 *	0.17
Tanzania –Zanzibar	0.19	0.24 *	0.08
Lesotho	No data	0.22 *	0.11
Mozambique	No data	0.20 *	0.08
Zimbabwe	0.37 *	No data	No data
SACMEQ	0.38	0.42	0.37

Figure 1. An Example Item Characteristics Curve

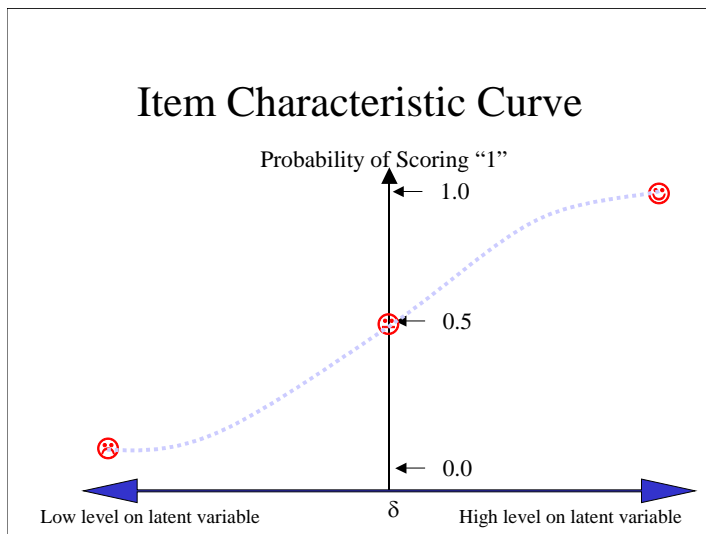


Figure 2. Linking Respondents and Items through an IRT Scale

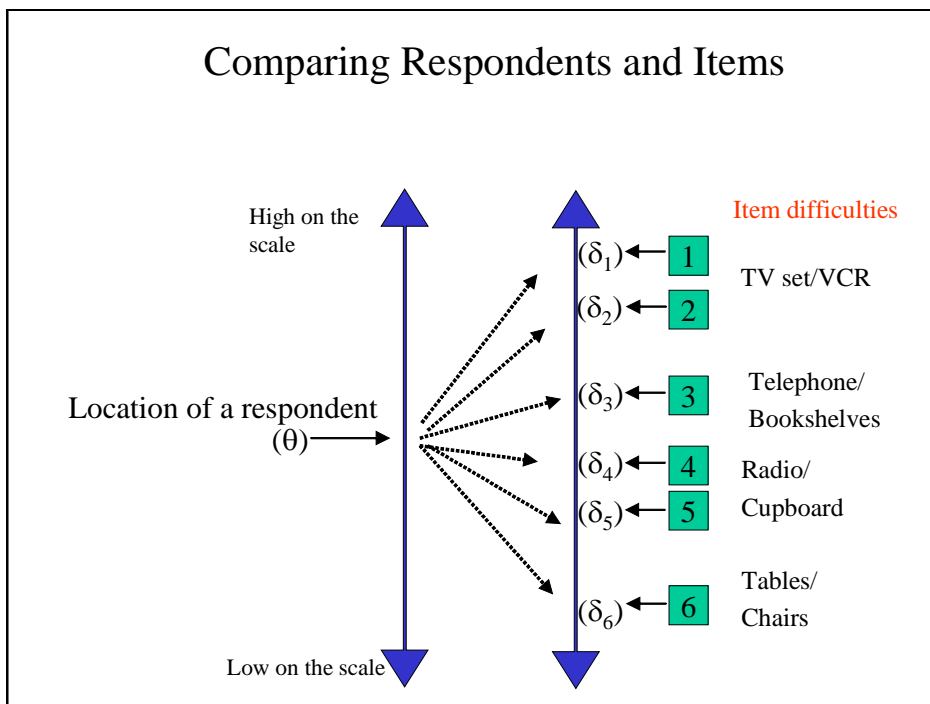


Figure 3. Data Matrix in CONQUEST

Project	School System	Item 1 ~ 17	Item 18 ~ 21
SACMEQ I (1995)	Kenya	XXXXXXXXXXXXXXXXXXXX	(missing)
	Malawi	XXXXXXXXXXXXXXXXXXXX	(missing)
	Mauritius	XXXXXXXXXXXXXXXXXXXX	(missing)
	Namibia	XXXXXXXXXXXXXXXXXXXX	(missing)
	Zambia	XXXXXXXXXXXXXXXXXXXX	(missing)
	Tanzania (Zanzibar)	XXXXXXXXXXXXXXXXXXXX	(missing)
	Zimbabwe	XXXXXXXXXXXXXXXXXXXX	(missing)
SACMEQ II (2000)	Botswana	XXXXXXXXXXXXXXXXXXXX	XXXX
	Kenya	XXXXXXXXXXXXXXXXXXXX	XXXX
	Lesotho	XXXXXXXXXXXXXXXXXXXX	XXXX
	Malawi	XXXXXXXXXXXXXXXXXXXX	XXXX
	Mauritius	XXXXXXXXXXXXXXXXXXXX	XXXX
	Mozambique	XXXXXXXXXXXXXXXXXXXX	XXXX
	Namibia	XXXXXXXXXXXXXXXXXXXX	XXXX
	Seychelles	XXXXXXXXXXXXXXXXXXXX	XXXX
	South Africa	XXXXXXXXXXXXXXXXXXXX	XXXX
	Swaziland	XXXXXXXXXXXXXXXXXXXX	XXXX
	Tanzania (Mainland)	XXXXXXXXXXXXXXXXXXXX	XXXX
	Uganda	XXXXXXXXXXXXXXXXXXXX	XXXX
	Zambia	XXXXXXXXXXXXXXXXXXXX	XXXX
	Tanzania (Zanzibar)	XXXXXXXXXXXXXXXXXXXX	XXXX

Figure 4. Characteristics Curve of Item 2 (Daily Newspaper)

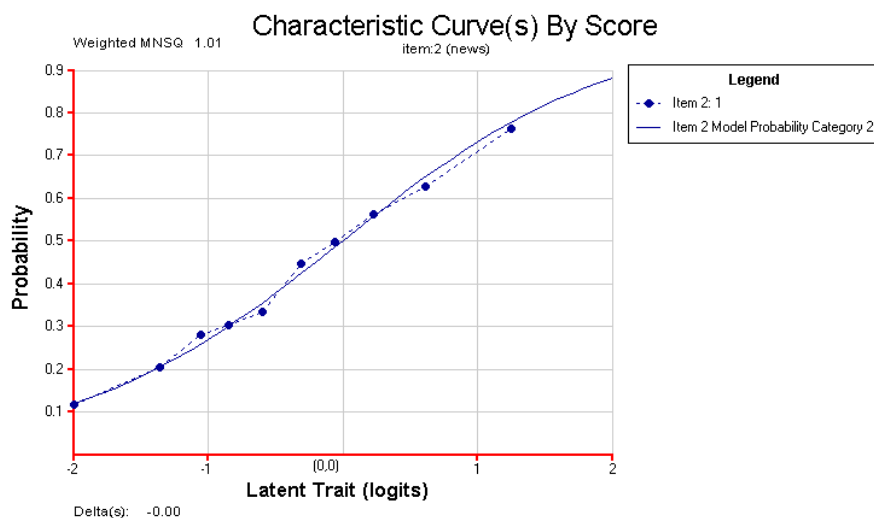


Figure 5. ICC of the BOOK, EDMO and EDMO Items

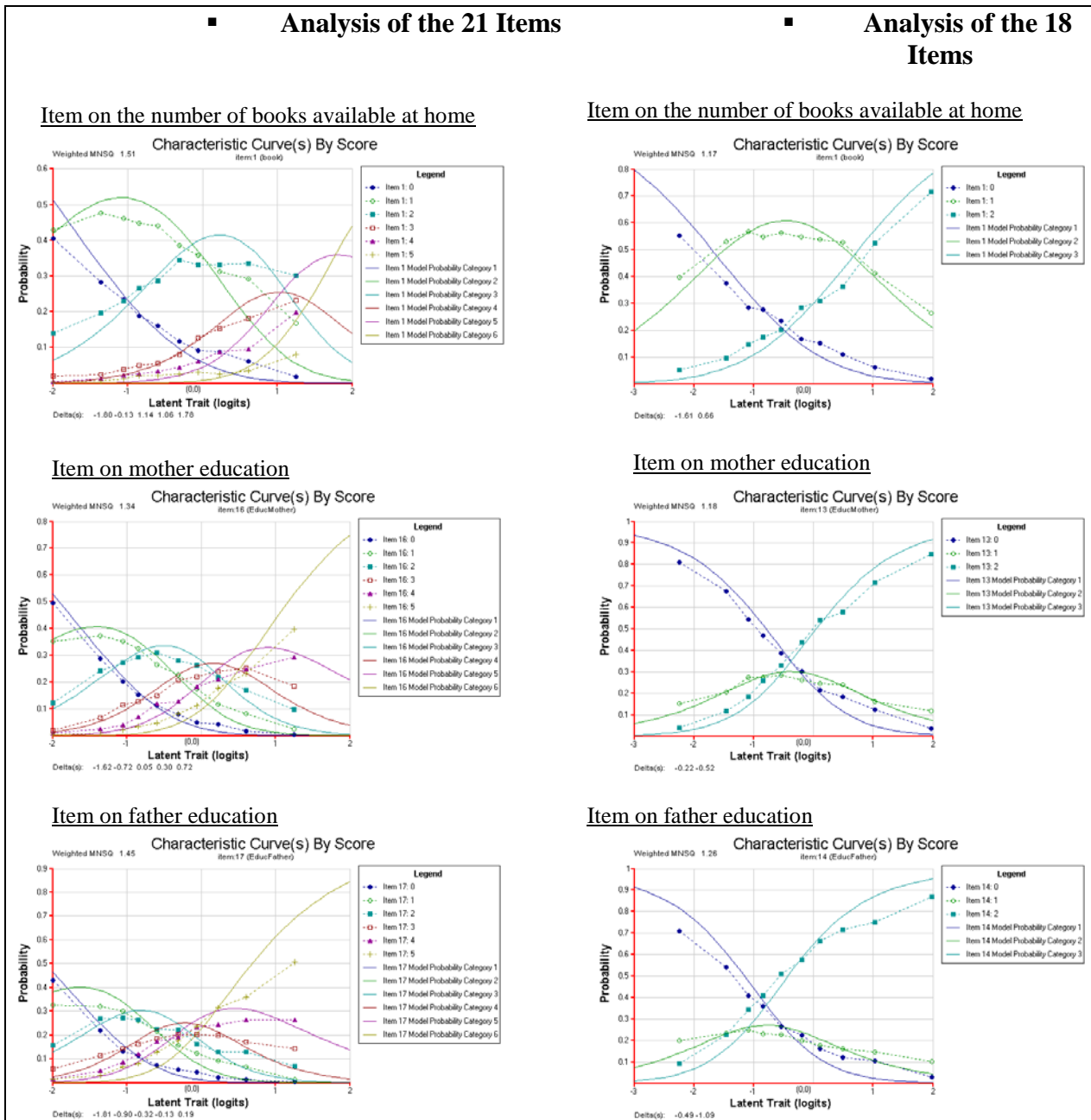
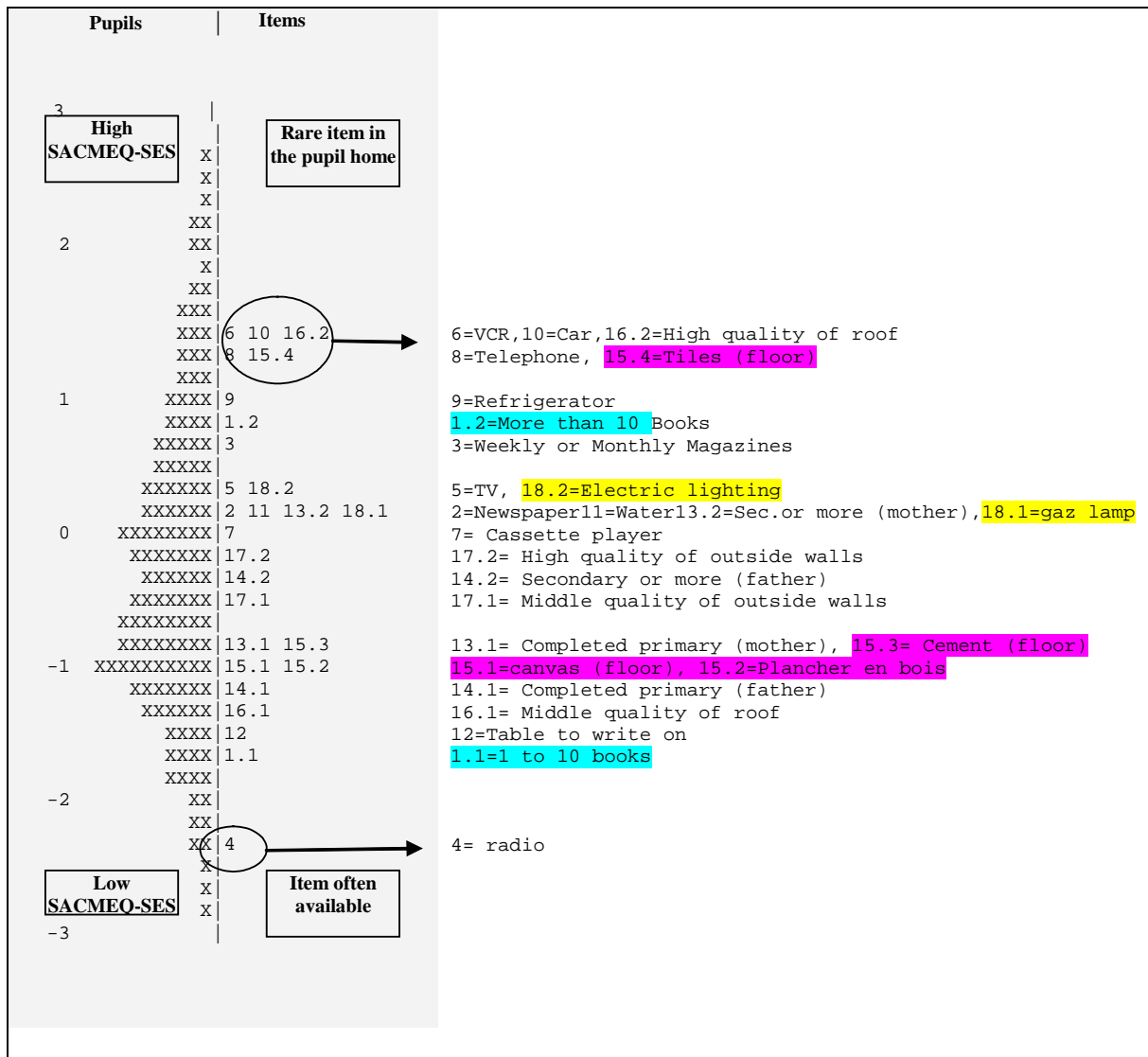


Figure 6. Items and Pupils in the SACMEQ-SES Scale



Each 'X' represents 117 pupils

Figure 7. Expected Score Curve of Item 15 (Quality of floor)

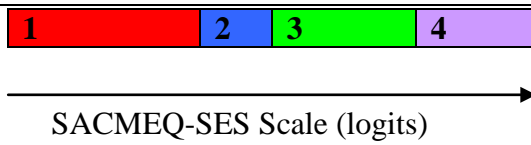
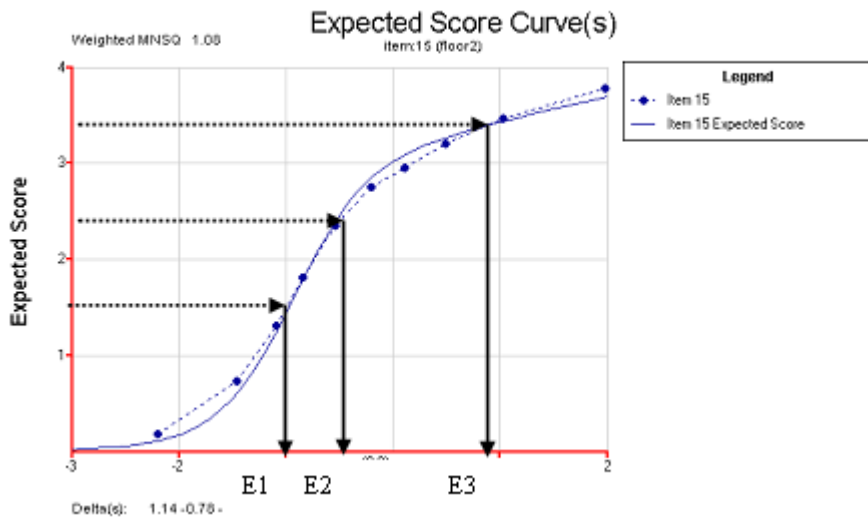


Figure 8. The SACMEQ-SES Scale by Response Modalities (SACMEQ II)

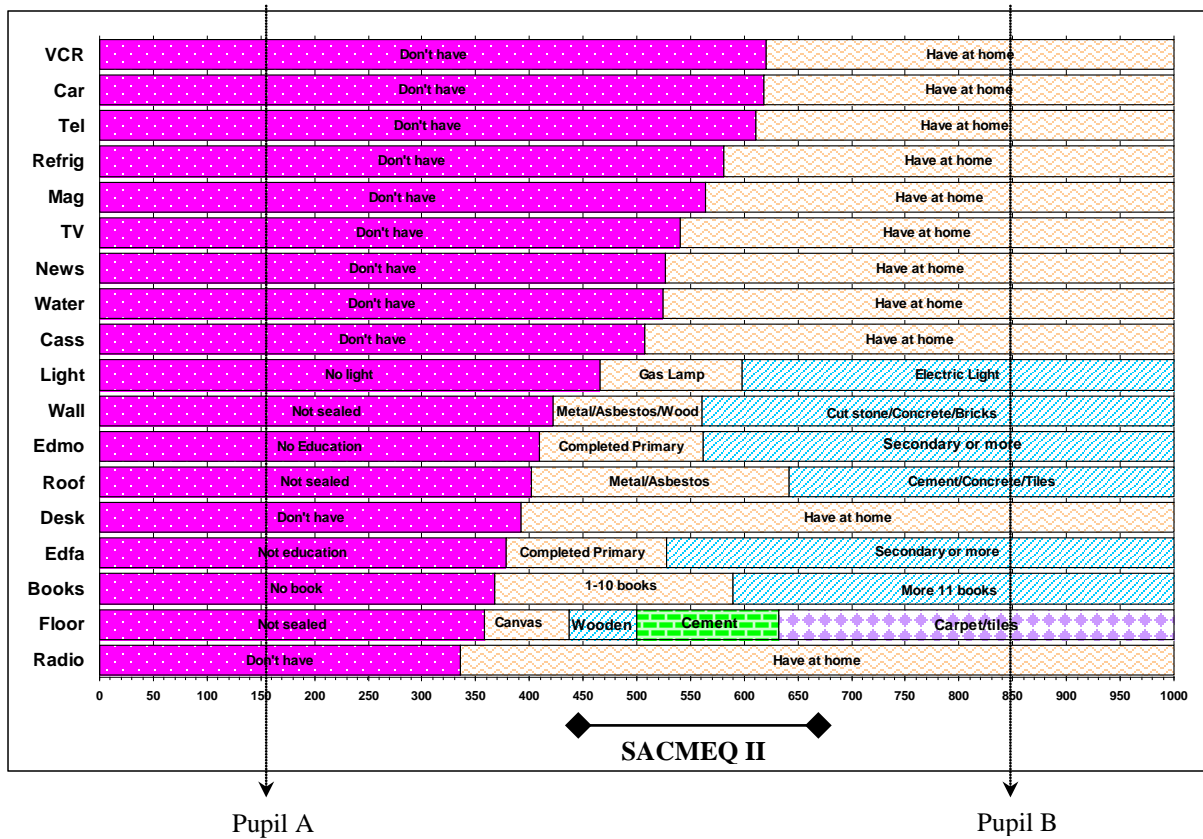


Figure 9. Pupil Scores in the SACMEQ-SES Scale in the SACMEQ II Project

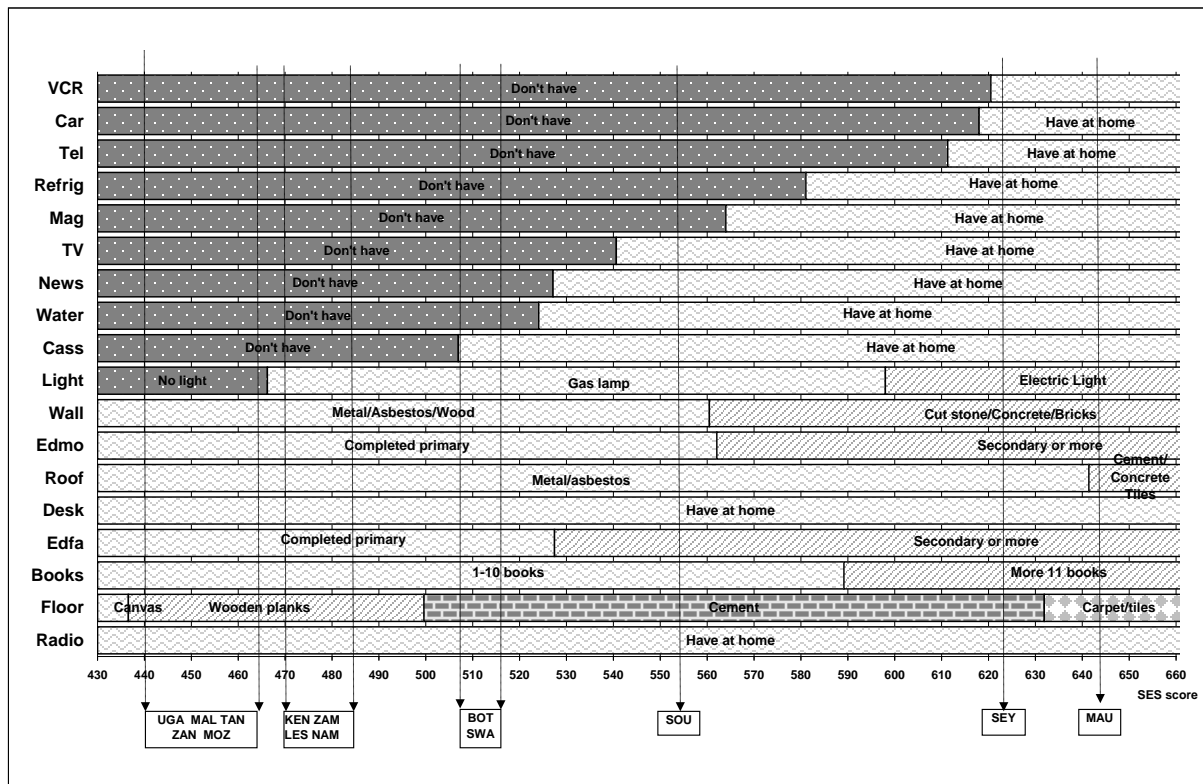
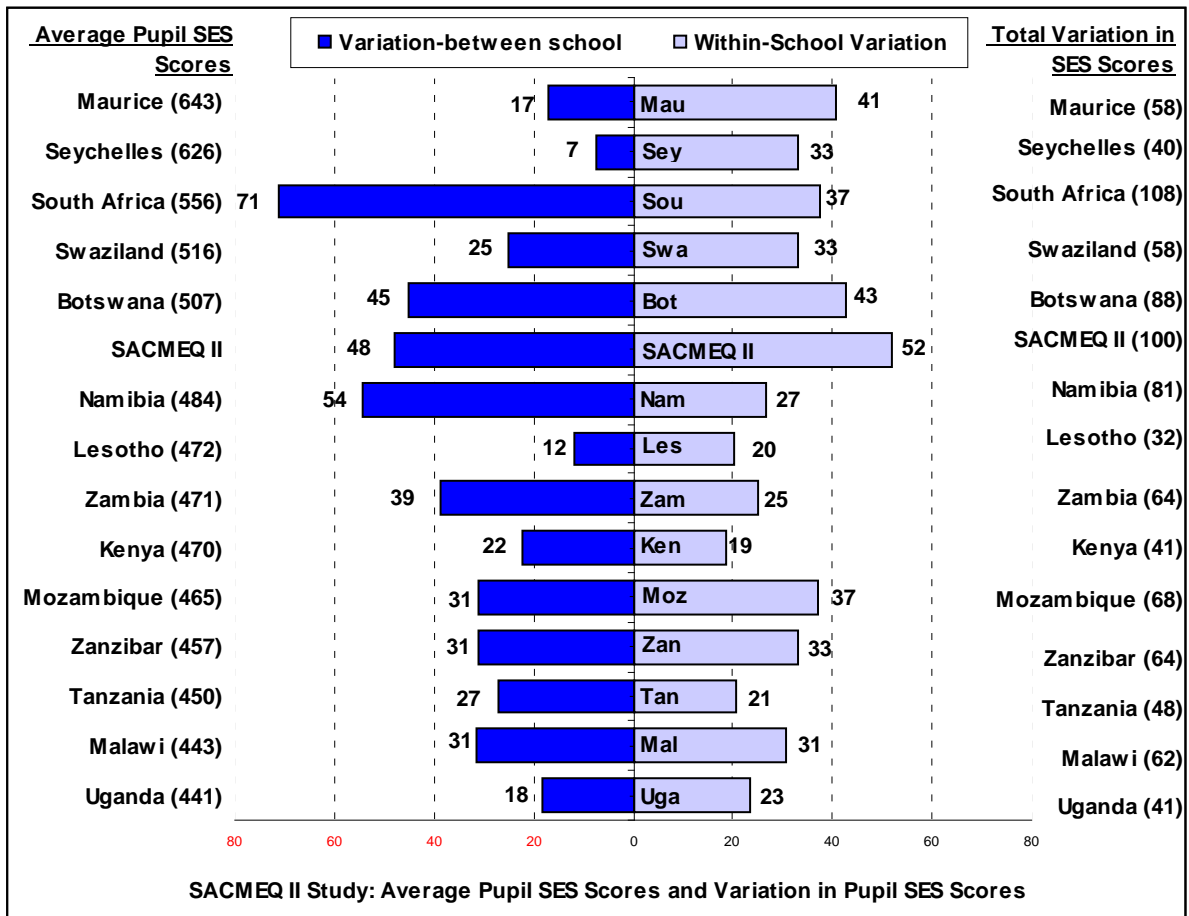


Figure 10. Averages and Variations for the SACMEQ-SES Pupil Scores in the SACMEQ II Project



▪ Appendix A
Selected Items in the Pupil Questionnaire
of SACMEQ I and SACMEQ II for the SACMEQ-SES Index

SACMEQ I

6. How many books are there in the place where you stay during the school week?
(Do not count newspapers or magazines.)

PBOOKSHM

(Please tick only one box.)

- (1) There are no books in the place where I stay during the school week.
- (2) 1-10 books
- (3) 11-50 books
- (4) 51-100 books
- (5) 101-200 books
- (6) 201 or more books

8. Which of the following things can be found in the place where you stay during the school week?

(Please tick one box for each line.)

		No	Yes	
8.01	Daily newspaper	<input type="checkbox"/>	<input type="checkbox"/>	▪
8.02	Weekly or monthly magazine	<input type="checkbox"/>	<input type="checkbox"/>	PPOSMAG
8.03	Radio	<input type="checkbox"/>	<input type="checkbox"/>	
8.04	TV set	<input type="checkbox"/>	<input type="checkbox"/>	
8.05	Video cassette recorder (VCR)	<input type="checkbox"/>	<input type="checkbox"/>	▪
8.06	Cassette player	<input type="checkbox"/>	<input type="checkbox"/>	▪
8.07	Telephone	<input type="checkbox"/>	<input type="checkbox"/>	▪
8.08	Refrigerator	<input type="checkbox"/>	<input type="checkbox"/>	▪
8.09	Car	<input type="checkbox"/>	<input type="checkbox"/>	
8.10	Motorcycle	<input type="checkbox"/>	<input type="checkbox"/>	▪
8.11	Bicycle	<input type="checkbox"/>	<input type="checkbox"/>	
8.12	Piped water	<input type="checkbox"/>	<input type="checkbox"/>	▪ PPO
8.13	Electricity	<input type="checkbox"/>	<input type="checkbox"/>	▪
8.14	Table to write on	<input type="checkbox"/>	<input type="checkbox"/>	

9. What is the highest level of education that your mother/female guardian have completed?
(Please tick only one box.)

- (01) Did not go to school
- (02) Completed some of primary school
- (03) Completed all of primary school
- (04) Completed some of secondary school
- (05) Completed all of secondary school
- (06) Completed some education/training after secondary school
- (07) I don't know.
- (08) I don't have a mother/female guardian.

10. What is the highest level of education that your father/male guardian have completed?
(Please tick only one box.)

- (01) Did not go to school
- (02) Completed some of primary school
- (03) Completed all of primary school
- (04) Completed some of secondary school
- (05) Completed all of secondary school
- (06) Completed some education/training after secondary school
- (07) I don't know.
- (08) I don't have a father/male guardian.

6. How many books are in the place (home) where you stay during the school week?
 (Please tick only one box. Please do NOT count newspapers, magazines or school textbooks.)

PBOOKSHM

- (1) There are no books
- (2) 1-10 books
- (3) 11-50 books
- (4) 51-100 books
- (5) 101-200 books
- (6) 201 or more books

7. Which of the following things can be found in the place (home) where you stay during the school week?

(Please tick all that apply. If an item is broken at present but can be mended, tick it)

- | | | | |
|------|---------------------------------------|------------------------------|---------------|
| 7.01 | Daily newspaper | <input type="checkbox"/> (2) | PPOS01 |
| 7.02 | Weekly or monthly magazine | <input type="checkbox"/> (2) | PPOS02 |
| 7.03 | Radio | <input type="checkbox"/> (2) | PPOS03 |
| 7.04 | TV set | <input type="checkbox"/> (2) | PPOS04 |
| 7.05 | Video cassette recorder (VCR) | <input type="checkbox"/> (2) | PPOS05 |
| 7.06 | Cassette player | <input type="checkbox"/> (2) | PPOS06 |
| 7.07 | Telephone | <input type="checkbox"/> (2) | PPOS07 |
| 7.08 | Refrigerator/freezer | <input type="checkbox"/> (2) | PPOS08 |
| 7.09 | Car | <input type="checkbox"/> (2) | PPOS09 |
| 7.10 | Motorcycle | <input type="checkbox"/> (2) | PPOS10 |
| 7.11 | Bicycle | <input type="checkbox"/> (2) | PPOS11 |
| 7.12 | Piped water | <input type="checkbox"/> (2) | PPOS12 |
| 7.13 | Electricity (mains, generator, solar) | <input type="checkbox"/> (2) | PPOS13 |
| 7.14 | Table to write on | <input type="checkbox"/> (2) | PPOS14 |

8 . What is the main source of lighting by which you can read in the place (home) where you stay during the school week?

(Please tick only one box.)

PLIGHT

- (1) Fire
- (2) Candle
- (3) Paraffin or oil lamp
- (4) Gas lamp
- (5) Electric lighting
- (6) There is no lighting

11. What is the highest level of education that your mother (or female guardian) has completed?

(Please tick only one box.)

PMOTHER

- (01) Did not go to school and had no adult education
- (02) Completed some primary education
- (03) Completed all of primary education
- (04) Completed some secondary education
- (05) Completed all of primary and secondary education (12 years)
- (06) Completed some education/training after secondary school
- (07) Completed university education
- (08) I don't know
- (09) I don't have a mother or female guardian

12. What is the highest level of education that your father (or male guardian) has completed?

(Please tick only one box.)

PFATHER

- (01) Did not go to school and had no adult education
- (02) Completed some of primary education

- (03) Completed all of primary education
- (04) Completed some of secondary education
- (05) Completed all of primary and secondary education (12 years)
- (06) Completed some education/training after secondary school
- (07) Completed university education
- (08) I don't know
- (09) I don't have a father or male guardian

13. What is the surface (covering) of the **floor** of the place (home) where you stay during the school week mostly made from?
(Please tick only one box.) **PFLOOR**

- (1) Earth or clay with or without covering
- (2) Canvas
- (3) Wooden planks
- (4) Cement
- (5) Carpet/tiles (plastic, ceramic or wooden)

14. What are the **outside walls** of the place (home) where you stay during the school week mostly made of?
(Please tick only one box.) **PWALL**

- (1) Cardboard/ Plastic sheeting/ Canvas
- (2) Reeds/ Sticks/ Grass thatch
- (3) Stones/ Mudbricks
- (4) Metal sheets / Asbestos sheets
- (5) Wood (planks or timber)
- (6) Cut stone/ Concrete blocks/ Burned bricks

15. What is the **roof** of the place (home) where you stay during the school week mostly made of?

(Please tick only one box.)

PROOF

(1) Cardboard/ Plastic sheeting /Canvas

(2) Grass thatch and mud

(3) Metal sheets/ Asbestos sheets

(4) Cement or concrete

(5) Tiles

■

▪ **Appendix B1 :Generalised Item Analysis Output for the 21 Initial Items**

To facilitate the comprehension of the file result of CONQUEST in the appendices B1 and B2, the glossary of the terms used is presented below:

Name	Definitions
Cases for this item	The number of subjects included in the item analysis
Discrimination	Discrimination indice
Item Threshold(s)	Item difficulty on the scale, expressed in logit
Weighted MNSQ	Fit indice of the item to the model
Label	Label of item response modality
Score	Score of item
Count	Frequency of subjects having answered the response modality of item
%of tot	Frequency expressed in percentage
Pt Bis	Point-biserial correlation
PV1Avg:1	Aptitude measure of the subjects having answered the response modality on the scale measuring the latent trait (expressed in logit)
PV1 SD:1	Standard deviation of the measure

=====
 ConQuest: Generalised Item Response Modelling Software
 GENERALISED ITEM ANALYSIS
 =====

Item 1

item:1 (book)

Cases for this item 16800 Discrimination 0.45

Item Threshold(s): -1.96 -0.23 0.78 1.30 2.16 Weighted MNSQ 1.51

Item Delta(s): -1.80 -0.13 1.14 1.06 1.78

=====
 Label Score Count % of tot Pt Bis t (p) PV1Avg:1 PV1 SD:1

0	0.00	2769	16.48	-0.29	-39.71(.000)	-1.03	0.82
1	1.00	6343	37.76	-0.17	-22.31(.000)	-0.62	0.83
2	2.00	4651	27.68	0.11	13.73(.000)	-0.24	0.84
3	3.00	1615	9.61	0.23	31.12(.000)	0.24	0.82
4	4.00	979	5.83	0.23	30.26(.000)	0.42	0.87
5	5.00	443	2.64	0.14	17.75(.000)	0.30	0.96

=====
 Item 2

item:2 (news)

Cases for this item 16786 Discrimination 0.42

Item Threshold(s): -0.01 Weighted MNSQ 1.01

Item Delta(s): -0.00

=====
 Label Score Count % of tot Pt Bis t (p) PV1Avg:1 PV1 SD:1

0	0.00	9835	58.59	-0.42	-59.92(.000)	-0.72	0.86
1	1.00	6951	41.41	0.42	59.92(.000)	0.02	0.87

=====
 Item 3

item:3 (mag)

Cases for this item 16786 Discrimination 0.44

Item Threshold(s): 0.44 Weighted MNSQ 0.98

Item Delta(s): 0.44

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	11295	67.29	-0.44	-62.66(.000)	-0.68	0.85
1	1.00	5491	32.71	0.44	62.66(.000)	0.13	0.86

Item 4

item:4 (radio)

Cases for this item 16786 Discrimination 0.31

Item Threshold(s): -2.25 Weighted MNSQ 1.03

Item Delta(s): -2.25

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	2873	17.12	-0.31	-41.58(.000)	-1.01	0.81
1	1.00	13913	82.88	0.31	41.58(.000)	-0.29	0.91

Item 5

item:5 (TV)

Cases for this item 16786 Discrimination 0.68

Item Threshold(s): 0.14 Weighted MNSQ 0.78

Item Delta(s): 0.14

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	10316	61.46	-0.68	-121.6(.000)	-0.87	0.73
1	1.00	6470	38.54	0.68	121.60(.000)	0.31	0.74

Item 6

item:6 (VCR)

Cases for this item 16786 Discrimination 0.57

Item Threshold(s): 1.07 Weighted MNSQ 0.85

Item Delta(s): 1.07

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	13085	77.95	-0.57	-89.00(.000)	-0.67	0.82
1	1.00	3701	22.05	0.57	89.00(.000)	0.49	0.76

Item 7

item:7 (Cass)

Cases for this item 16786 Discrimination 0.48

Item Threshold(s): -0.25 Weighted MNSQ 0.96

Item Delta(s): -0.25

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
-------	-------	-------	----------	--------	-------	----------	----------

0	0.00	8998	53.60	-0.48	-70.12(.000)	-0.80	0.82
1	1.00	7788	46.40	0.48	70.12(.000)	0.03	0.86

Item 8

 item:8 (telephone)

Cases for this item 16786 Discrimination 0.62
 Item Threshold(s): 0.96 Weighted MNSQ 0.81
 Item Delta(s): 0.96

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	12818	76.36	-0.62	-101.8(.000)	-0.70	0.79
1	1.00	3968	23.64	0.62	101.81(.000)	0.52	0.72

Item 9

 item:9 (refridg)

Cases for this item 16786 Discrimination 0.67
 Item Threshold(s): 0.63 Weighted MNSQ 0.78
 Item Delta(s): 0.63

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	11875	70.74	-0.67	-116.2(.000)	-0.77	0.76
1	1.00	4911	29.26	0.67	116.25(.000)	0.46	0.71

Item 10

 item:10 (car)

Cases for this item 16786 Discrimination 0.43
 Item Threshold(s): 1.06 Weighted MNSQ 0.96
 Item Delta(s): 1.06

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	13070	77.86	-0.43	-62.51(.000)	-0.61	0.86
1	1.00	3716	22.14	0.43	62.51(.000)	0.29	0.85

Item 11

 item:11 (motorbike)

Cases for this item 16786 Discrimination 0.23
 Item Threshold(s): 1.86 Weighted MNSQ 1.07
 Item Delta(s): 1.86

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	14726	87.73	-0.23	-30.31(.000)	-0.49	0.92
1	1.00	2060	12.27	0.23	30.31(.000)	0.11	0.88

Item 12

 item:12 (bicycle)

Cases for this item 16786 Discrimination 0.21

Item Threshold(s): -0.60 Weighted MNSQ 1.19
Item Delta(s): -0.60

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	7755	46.20	-0.21	-28.06(.000)	-0.62	0.90
1	1.00	9031	53.80	0.21	28.06(.000)	-0.24	0.93

Item 13

item:13 (water)
Cases for this item 16786 Discrimination 0.59
Item Threshold(s): -0.07 Weighted MNSQ 0.85
Item Delta(s): -0.07

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	9603	57.21	-0.59	-95.86(.000)	-0.85	0.75
1	1.00	7183	42.79	0.59	95.86(.000)	0.17	0.83

Item 14

item:14 (electricity)
Cases for this item 16786 Discrimination 0.71
Item Threshold(s): 0.24 Weighted MNSQ 0.75
Item Delta(s): 0.24

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	10660	63.51	-0.71	-129.2(.000)	-0.87	0.72
1	1.00	6126	36.49	0.71	129.27(.000)	0.38	0.72

Item 15

item:15 (desk)
Cases for this item 16786 Discrimination 0.40
Item Threshold(s): -1.61 Weighted MNSQ 0.98
Item Delta(s): -1.61

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	4459	26.56	-0.40	-57.12(.000)	-1.01	0.80
1	1.00	12327	73.44	0.40	57.12(.000)	-0.20	0.89

Item 16

item:16 (EducMother)
Cases for this item 14382 Discrimination 0.67
Item Threshold(s): -1.91 -0.81 -0.11 0.41 1.17 Weighted MNSQ 1.34
Item Delta(s): -1.62 -0.72 0.05 0.30 0.72

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	2069	14.39	-0.40	-52.36(.000)	-1.28	0.77
1	1.00	3301	22.95	-0.29	-36.88(.000)	-0.86	0.70

2	2.00	3265	22.70	-0.06	-6.77(.000)	-0.49	0.72
3	3.00	2272	15.80	0.18	22.15(.000)	-0.06	0.73
4	4.00	1885	13.11	0.29	36.08(.000)	0.22	0.74
5	5.00	1590	11.06	0.40	51.74(.000)	0.53	0.77

Item 17

item:17 (EducFather)

Cases for this item 13447 Discrimination 0.63

Item Threshold(s): -2.11 -1.06 -0.46 -0.00 0.68 Weighted MNSQ 1.45

Item Delta(s): -1.81 -0.90 -0.32 -0.13 0.19

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	1491	11.09	-0.36	-45.39(.000)	-1.36	0.77
1	1.00	2536	18.86	-0.29	-35.26(.000)	-0.92	0.72
2	2.00	2566	19.08	-0.14	-16.06(.000)	-0.64	0.73
3	3.00	2126	15.81	0.08	8.84(.000)	-0.27	0.77
4	4.00	2189	16.28	0.24	28.67(.000)	0.04	0.76
5	5.00	2539	18.88	0.42	54.24(.000)	0.31	0.80

Item 18

item:18 (floor2)

Cases for this item 11200 Discrimination 0.72

Item Threshold(s): -1.09 -1.02 -0.96 0.87 Weighted MNSQ 1.08

Item Delta(s): 1.09 -0.75 -3.27 0.85

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	3195	28.53	-0.63	-85.92(.000)	-1.34	0.61
1	1.00	328	2.93	-0.07	-7.22(.000)	-0.80	0.69
2	2.00	298	2.66	-0.02	-1.84(.066)	-0.50	0.78
3	3.00	5042	45.02	0.14	14.47(.000)	-0.31	0.68
4	4.00	2337	20.87	0.57	73.35(.000)	0.53	0.74

Item 19

item:19 (roof2)

Cases for this item 11200 Discrimination 0.59

Item Threshold(s): -1.39 1.09 Weighted MNSQ 0.92

Item Delta(s): -1.31 1.01

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	3274	29.23	-0.53	-66.97(.000)	-1.18	0.72
1	1.00	5851	52.24	0.16	17.37(.000)	-0.31	0.81
2	2.00	2075	18.53	0.42	48.66(.000)	0.32	0.83

Item 20

item:20 (wall2)

Cases for this item 11200 Discrimination 0.60

Item Threshold(s): -0.66 -0.32 Weighted MNSQ 1.06

Item Delta(s): 0.60 -1.58

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	4901	43.76	-0.57	-72.60(.000)	-1.01	0.75
1	1.00	1249	11.15	-0.00	-0.23(BIG_)	-0.45	0.77
2	2.00	5050	45.09	0.57	72.54(.000)	0.10	0.83

Item 21

item:21 (light2)

Cases for this item 11200 Discrimination 0.74

Item Threshold(s): -0.04 0.01 Weighted MNSQ 0.79

Item Delta(s): 2.89 -2.91

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	7004	62.54	-0.73	-113.0(.000)	-0.94	0.69
1	1.00	216	1.93	-0.02	-1.74(.081)	-0.57	0.76
2	2.00	3980	35.54	0.74	117.53(.000)	0.42	0.69

The following traditional statistics are only meaningful for complete designs and when the amount of missing data is minimal.

In this analysis 8.04% of the data are missing.

The following results are scaled to assume that a single response was provided for each item.

N	16800
Mean	16.61
Standard Deviation	8.23
Variance	67.76
Skewness	0.29
Kurtosis	-0.80
Standard error of mean	0.06
Standard error of measurement	4.24
Coefficient Alpha	0.73

▪ **Appendix B2 :Generalised Item Analysis Output for the 18 final Items**

To facilitate the comprehension of the file result of CONQUEST in the appendices B1 and B2, the glossary of the terms used is presented below:

Name	Definitions
Cases for this item	The number of subjects included in the item analysis
Discrimination	Discrimination indice
Item Threshold(s)	Item difficulty on the scale, expressed in logit
Weighted MNSQ	Fit indice of the item to the model
Label	Label of item response modality
Score	Score of item
Count	Frequency of subjects having answered the response modality of item
% of tot	Frequency expressed in percentage
Pt Bis	Point-biserial correlation
PV1Avg:1	Aptitude measure of the subjects having answered the response modality on the scale measuring the latent trait (expressed in logit)
PV1 SD:1	Standard deviation of the measure

ConQuest: Generalised Item Response Modelling Software
GENERALISED ITEM ANALYSIS

Item 1

item:1 (book)

Cases for this item 16800 Discrimination 0.51

Item Threshold(s): -1.70 0.76 Weighted MNSQ 1.17

Item Delta(s): -1.61 0.66

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	3755	22.35	-0.38	-53.02(.000)	-1.07	1.00
1	1.00	8225	48.96	-0.10	-12.42(.000)	-0.39	1.02
2	2.00	4820	28.69	0.45	66.08(.000)	0.53	1.15

Item 2

item:2 (news)

Cases for this item 16787 Discrimination 0.43

Item Threshold(s): 0.16 Weighted MNSQ 1.09

Item Delta(s): 0.16

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	9841	58.62	-0.43	-62.03(.000)	-0.68	1.07
1	1.00	6946	41.38	0.43	62.03(.000)	0.29	1.14

Item 3

item:3 (mag)

Cases for this item 16787 Discrimination 0.45

Item Threshold(s): 0.63 Weighted MNSQ 1.05
Item Delta(s): 0.63

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	11260	67.08	-0.45	-65.33(.000)	-0.63	1.06
1	1.00	5527	32.92	0.45	65.33(.000)	0.44	1.15

Item 4

item:4 (radio)

Cases for this item 16787 Discrimination 0.32
Item Threshold(s): -2.29 Weighted MNSQ 1.07
Item Delta(s): -2.29

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	2788	16.61	-0.32	-44.35(.000)	-1.09	0.99
1	1.00	13999	83.39	0.32	44.35(.000)	-0.11	1.17

Item 5

item:5 (TV)

Cases for this item 16787 Discrimination 0.70
Item Threshold(s): 0.33 Weighted MNSQ 0.78
Item Delta(s): 0.33

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	10372	61.79	-0.70	-127.3(.000)	-0.88	0.88
1	1.00	6415	38.21	0.70	127.39(.000)	0.69	1.00

Item 6

item:6 (VCR)

Cases for this item 16787 Discrimination 0.57
Item Threshold(s): 1.35 Weighted MNSQ 0.86
Item Delta(s): 1.35

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	13142	78.29	-0.57	-90.56(.000)	-0.61	1.01
1	1.00	3645	21.71	0.57	90.56(.000)	0.94	1.04

Item 7

item:7 (Cass)

Cases for this item 16787 Discrimination 0.51
Item Threshold(s): -0.10 Weighted MNSQ 1.00
Item Delta(s): -0.10

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	9034	53.82	-0.51	-76.20(.000)	-0.79	0.99
1	1.00	7753	46.18	0.51	76.20(.000)	0.33	1.14

Item 8

item:8 (telephone)

Cases for this item 16787 Discrimination 0.63

Item Threshold(s): 1.23 Weighted MNSQ 0.80

Item Delta(s): 1.23

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	12871	76.67	-0.63	-106.1(.000)	-0.67	0.97
1	1.00	3916	23.33	0.63	106.10(.000)	1.00	0.98

Item 9

item:9 (refridg)

Cases for this item 16787 Discrimination 0.69

Item Threshold(s): 0.84 Weighted MNSQ 0.77

Item Delta(s): 0.85

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	11887	70.81	-0.69	-122.9(.000)	-0.76	0.92
1	1.00	4900	29.19	0.69	122.90(.000)	0.91	0.96

Item 10

item:10 (car)

Cases for this item 16787 Discrimination 0.44

Item Threshold(s): 1.32 Weighted MNSQ 1.04

Item Delta(s): 1.32

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	13070	77.86	-0.44	-62.81(.000)	-0.54	1.09
1	1.00	3717	22.14	0.44	62.81(.000)	0.64	1.12

Item 11

item:11 (water)

Cases for this item 16787 Discrimination 0.61

Item Threshold(s): 0.12 Weighted MNSQ 0.87

Item Delta(s): 0.11

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	9712	57.85	-0.61	-99.49(.000)	-0.85	0.92
1	1.00	7075	42.15	0.61	99.49(.000)	0.51	1.09

Item 12

item:12 (desk)

Cases for this item 16787 Discrimination 0.41

Item Threshold(s): -1.57 Weighted MNSQ 1.04

Item Delta(s): -1.57

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	4472	26.64	-0.41	-58.67(.000)	-1.03	0.99
1	1.00	12315	73.36	0.41	58.67(.000)	-0.00	1.15

Item 13

item:13 (EducMother)

Cases for this item 14356 Discrimination 0.59

Item Threshold(s): -0.79 0.05 Weighted MNSQ 1.18

Item Delta(s): -0.22 -0.52

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	5410	37.68	-0.52	-72.88(.000)	-1.02	0.96
1	1.00	3181	22.16	-0.05	-5.69(.000)	-0.38	0.98
2	2.00	5765	40.16	0.55	79.72(.000)	0.45	1.06

Item 14

item:14 (EducFather)

Cases for this item 13480 Discrimination 0.53

Item Threshold(s): -1.15 -0.43 Weighted MNSQ 1.26

Item Delta(s): -0.49 -1.09

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	3993	29.62	-0.46	-59.81(.000)	-1.09	0.98
1	1.00	2602	19.30	-0.11	-12.37(.000)	-0.51	1.02
2	2.00	6885	51.08	0.50	67.38(.000)	0.25	1.09

Item 15

item:15 (floor2)

Cases for this item 11200 Discrimination 0.77

Item Threshold(s): -1.03 -0.95 -0.88 1.22 Weighted MNSQ 1.08

Item Delta(s): 1.14 -0.78 -3.11 1.20

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	3209	28.65	-0.67	-96.11(.000)	-1.40	0.69
1	1.00	304	2.71	-0.08	-8.68(.000)	-0.75	0.78
2	2.00	299	2.67	-0.03	-3.59(.000)	-0.45	0.86
3	3.00	5013	44.76	0.16	16.80(.000)	-0.09	0.80
4	4.00	2375	21.21	0.60	79.11(.000)	1.08	0.98

Item 16

item:16 (roof2)

Cases for this item 11200 Discrimination 0.62

Item Threshold(s): -1.29 1.47 Weighted MNSQ 0.99

Item Delta(s): -1.23 1.40

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
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0	0.00	3287	29.35	-0.57	-73.70(.000)	-1.21	0.84
1	1.00	5852	52.25	0.20	21.81(.000)	-0.05	1.01
2	2.00	2061	18.40	0.41	47.77(.000)	0.74	1.10

Item 17

item:17 (wall2)

Cases for this item 11200 Discrimination 0.61

Item Threshold(s): -0.48 -0.13 Weighted MNSQ 1.19

Item Delta(s): 0.76 -1.36

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	5003	44.67	-0.58	-76.26(.000)	-0.96	0.91
1	1.00	1170	10.45	-0.00	-0.10(BIG_)	-0.29	0.89
2	2.00	5027	44.88	0.58	76.32(.000)	0.48	1.08

Item 18

item:18 (light2)

Cases for this item 11200 Discrimination 0.76

Item Threshold(s): 0.19 0.25 Weighted MNSQ 0.86

Item Delta(s): 3.07 -2.63

Label	Score	Count	% of tot	Pt Bis	t (p)	PV1Avg:1	PV1 SD:1
0	0.00	7002	62.52	-0.74	-117.5(.000)	-0.88	0.82
1	1.00	203	1.81	-0.03	-2.68(.007)	-0.50	0.83
2	2.00	3995	35.67	0.76	123.04(.000)	0.88	0.92

The following traditional statistics are only meaningful for complete designs and when the amount of missing data is minimal.

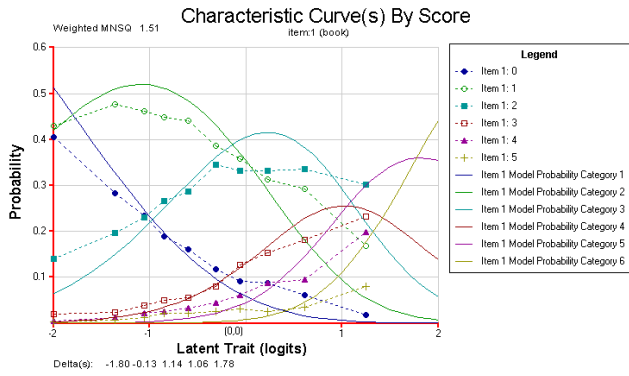
In this analysis 9.36% of the data are missing.

The following results are scaled to assume that a single response was provided for each item.

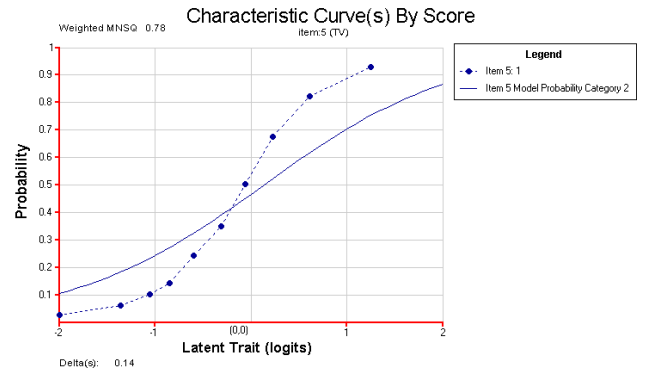
N	16800
Mean	12.53
Standard Deviation	6.72
Variance	45.18
Skewness	0.25
Kurtosis	-0.90
Standard error of mean	0.05
Standard error of measurement	3.27
Coefficient Alpha	0.76

▪ **Appendix C1 : Characteristic Curves of the 21 Initial Items**

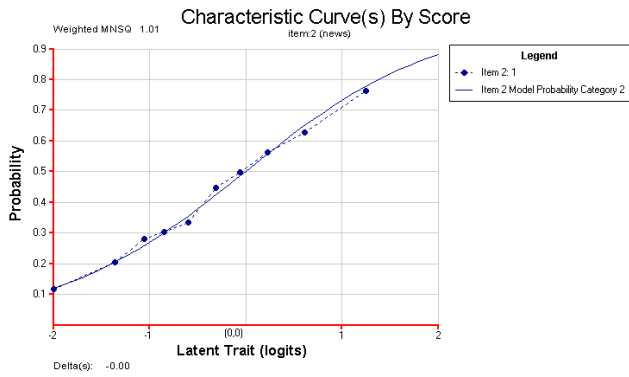
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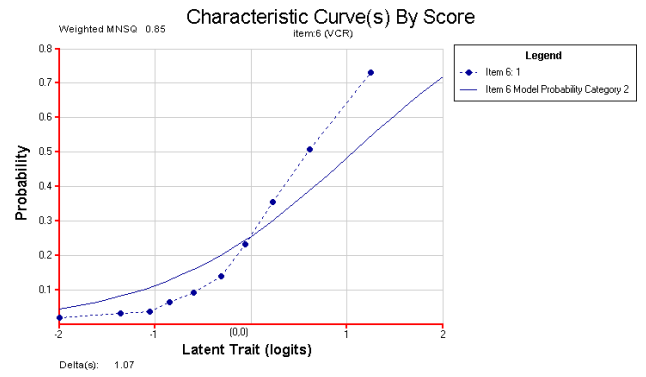
Item 5 :



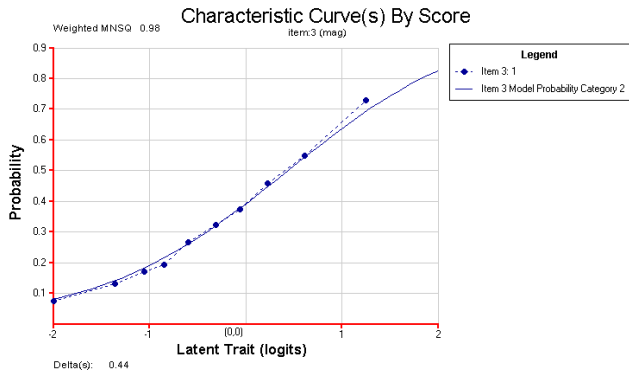
Item 2 :



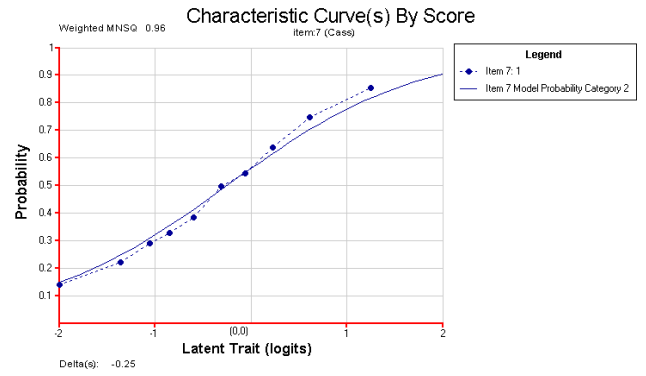
Item 6 :



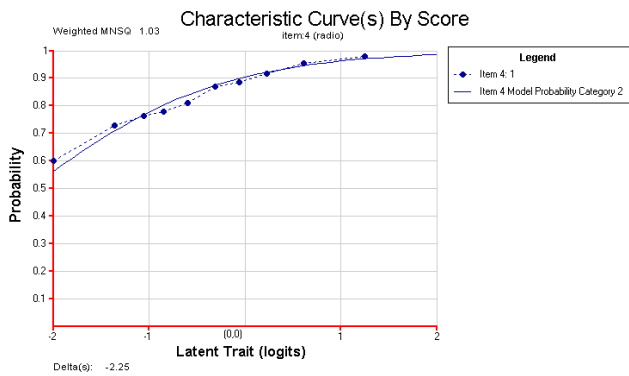
Item 3 :



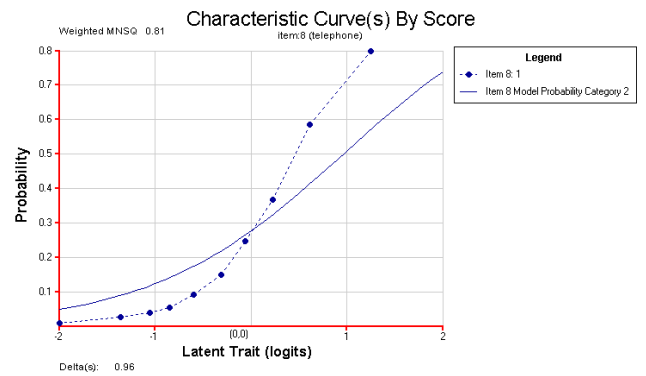
Item 7 :



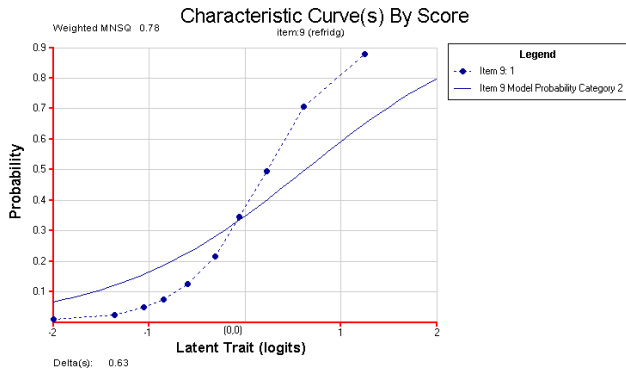
Item 4 :



Item 8 :



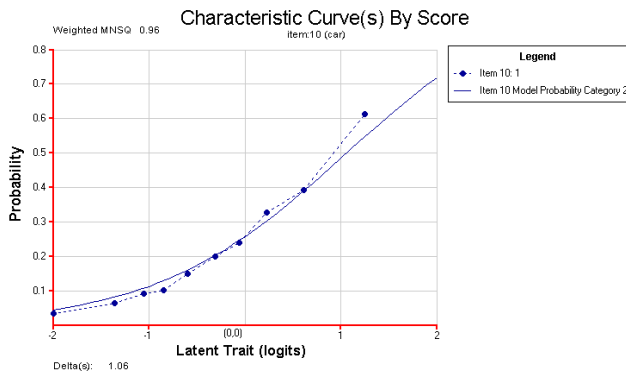
Item 9 :



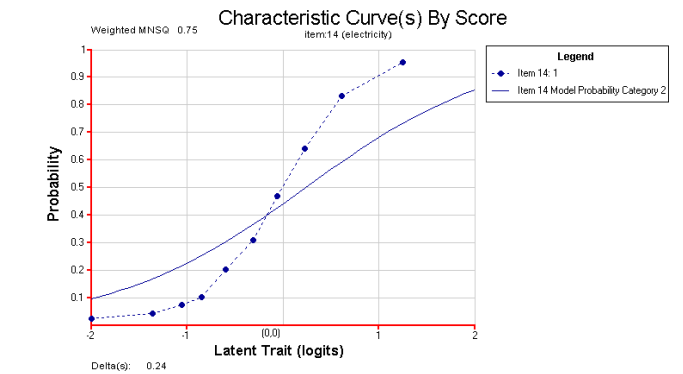
Item 13 :



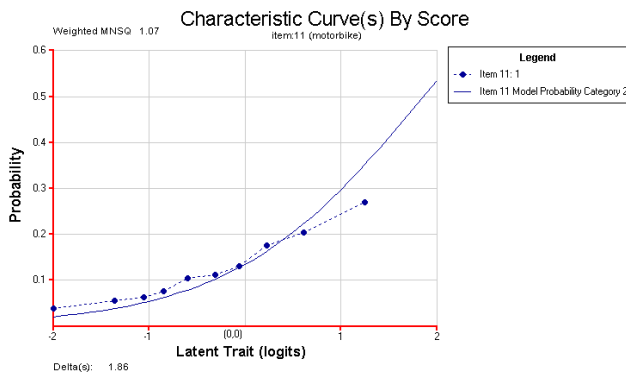
Item 10 :



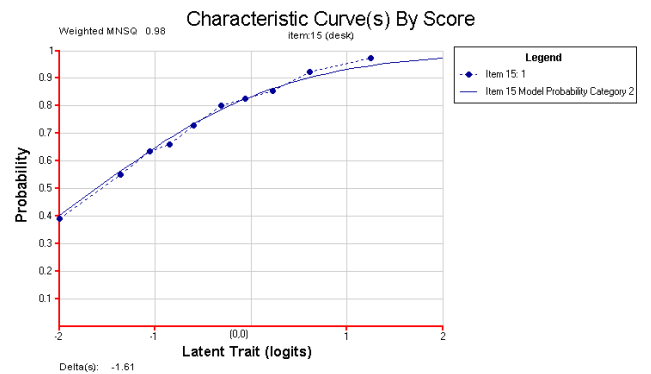
Item 14 :



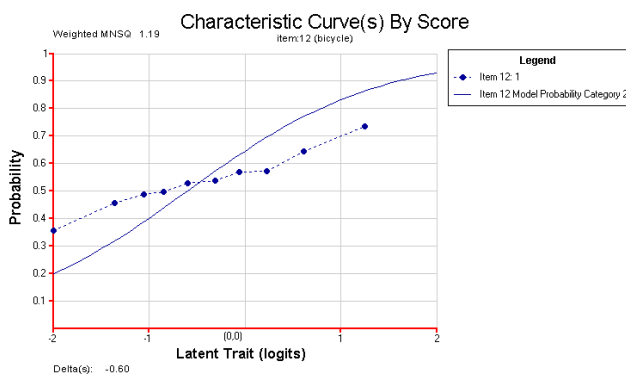
Item 11 :



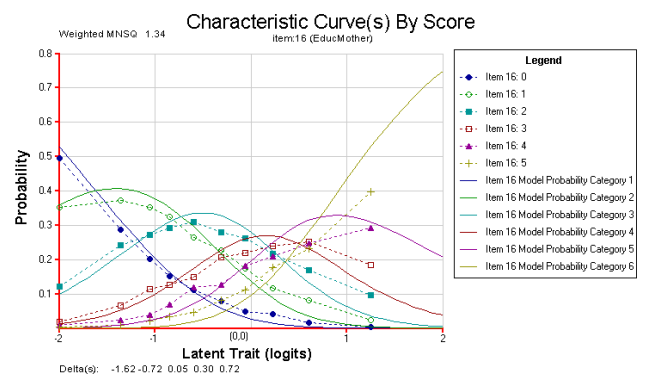
Item 15 :



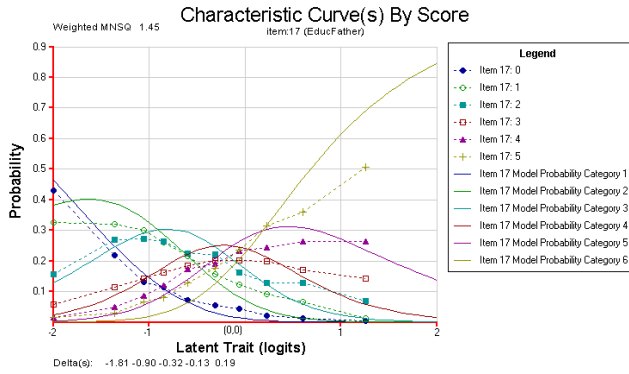
Item 12 :



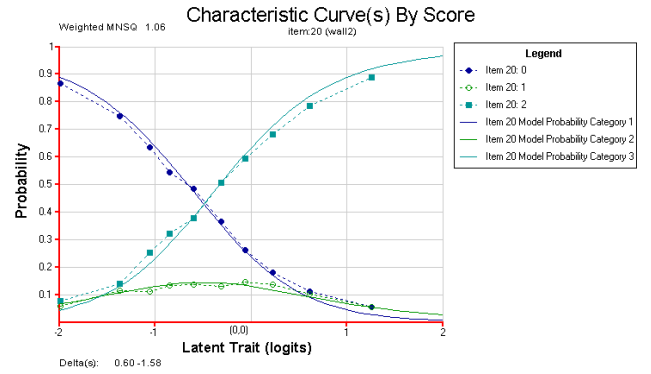
Item 16 :



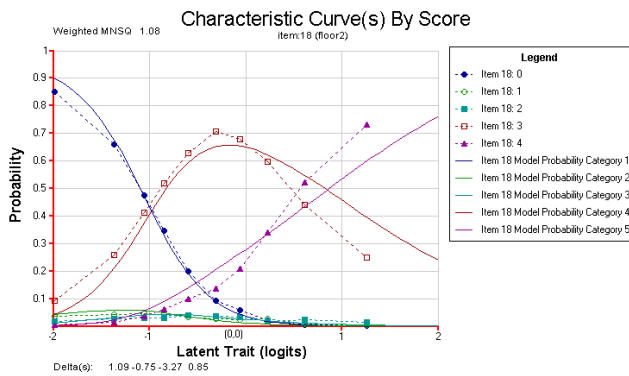
Item 17 :



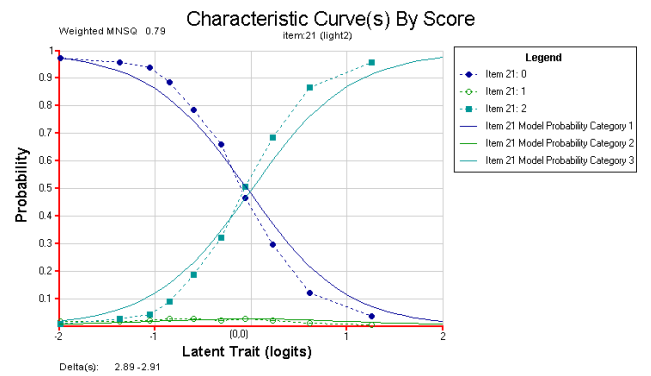
Item 20 :



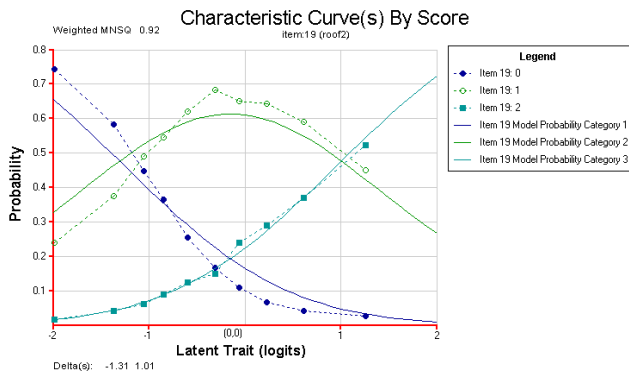
Item 18 :



Item 21 :

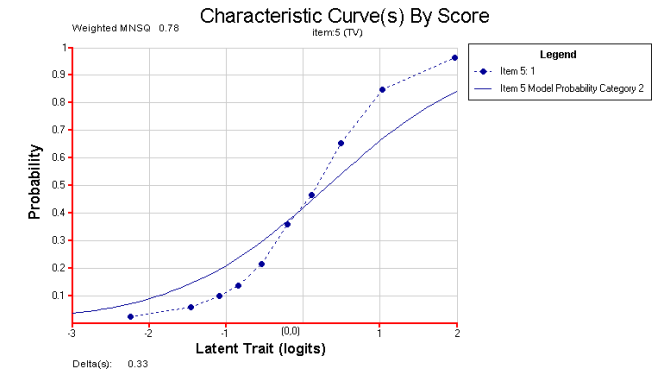
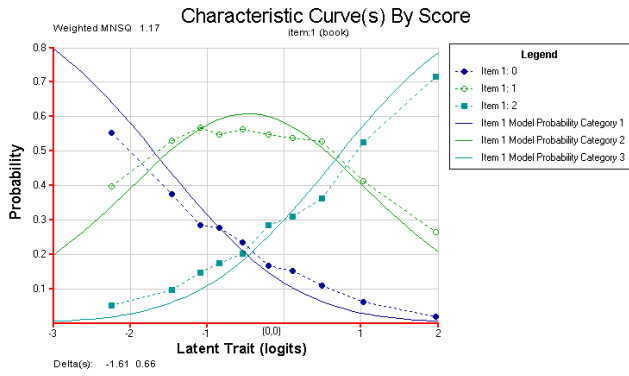


Item 19 :

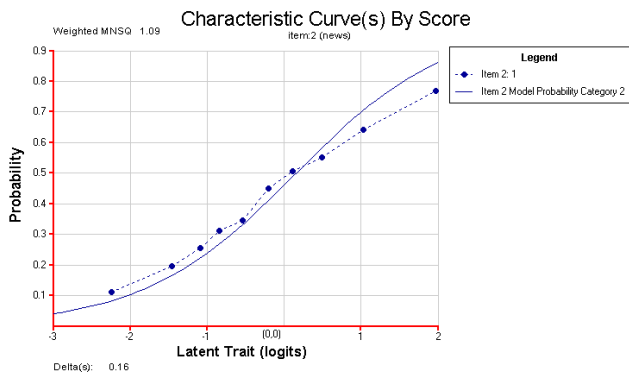


▪ **Appendix C2 : Characteristic Curves of the 18 Final Items**
Item 5 :

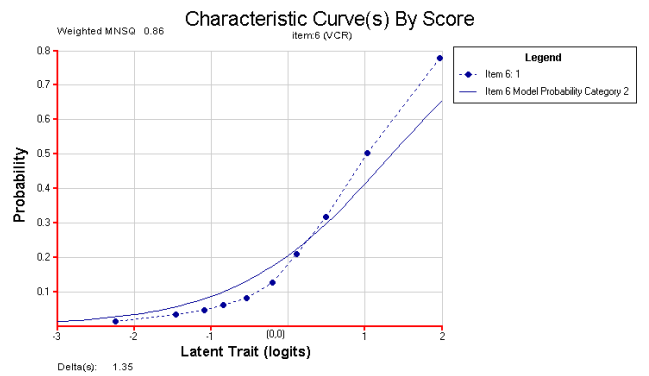
Item 1 :



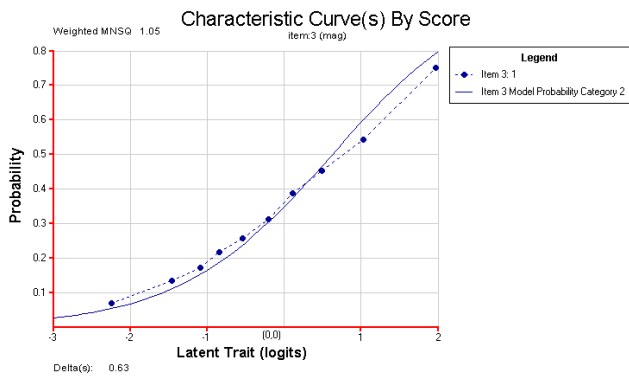
Item 2 :



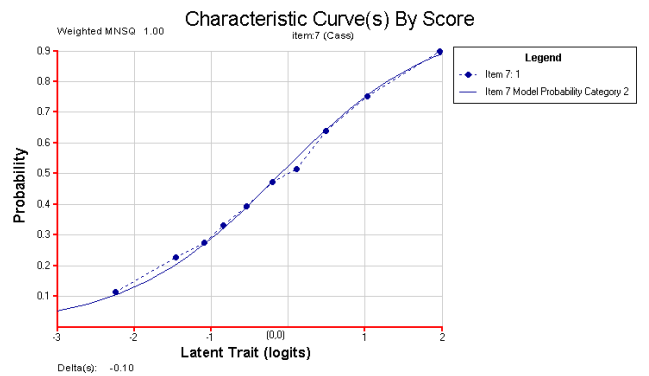
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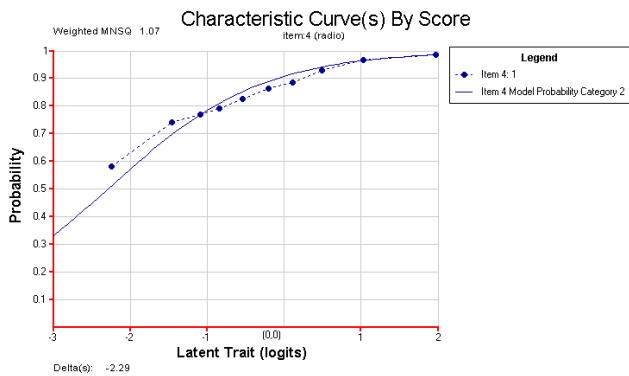
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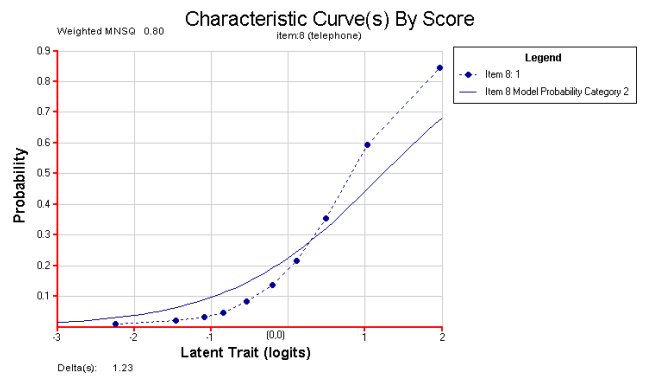
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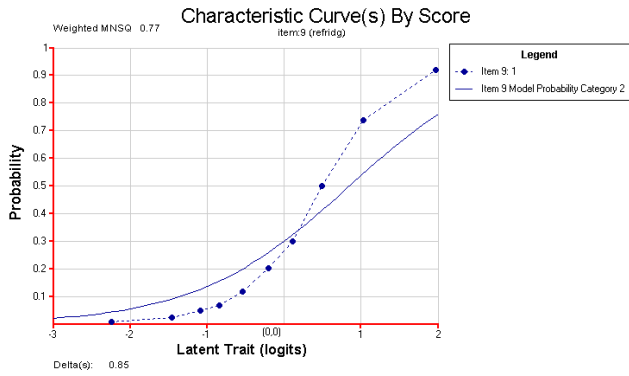
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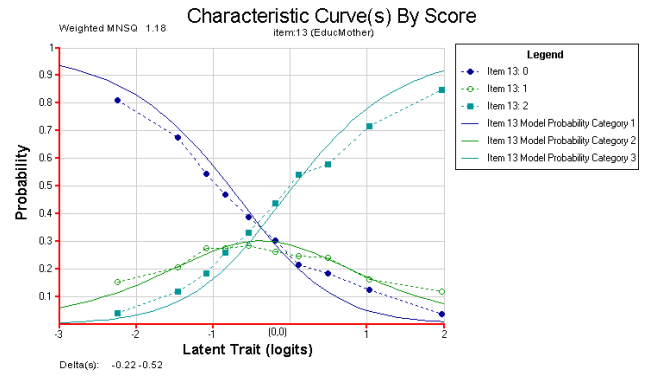
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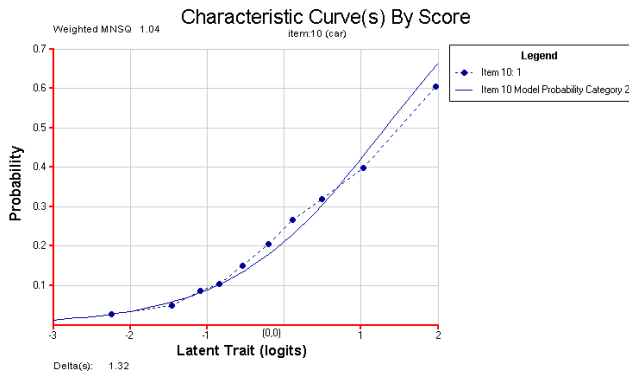
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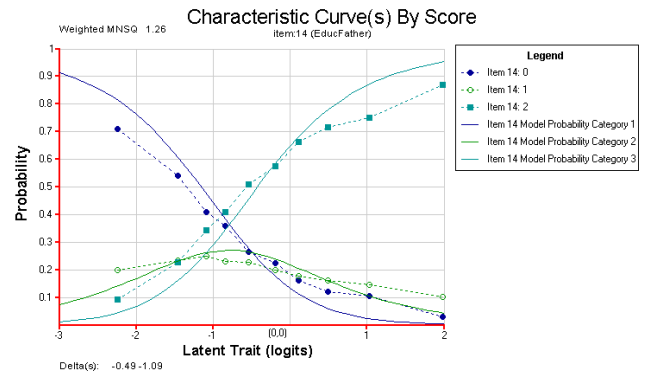
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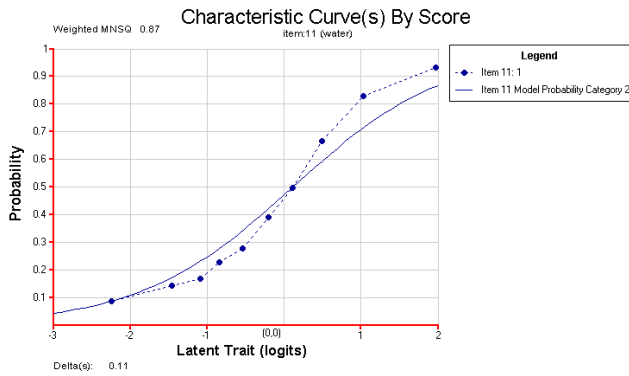
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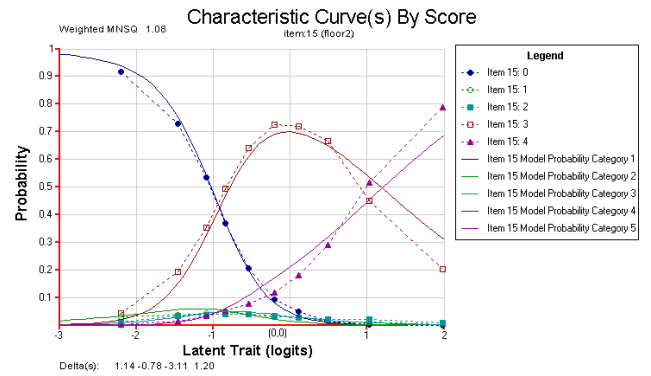
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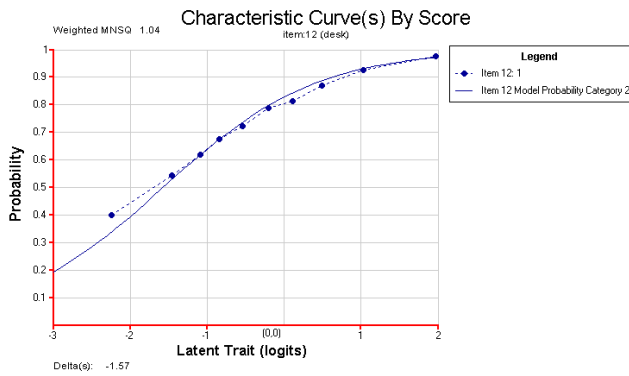
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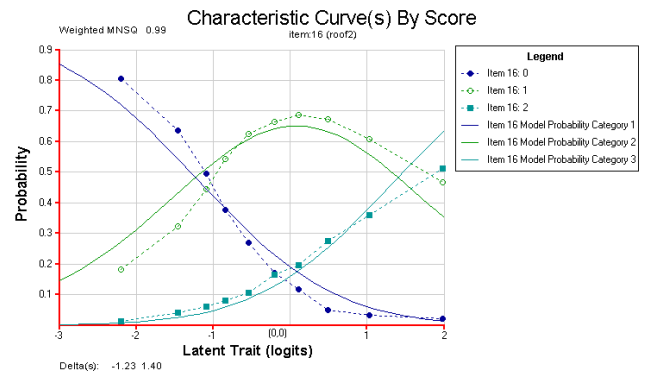
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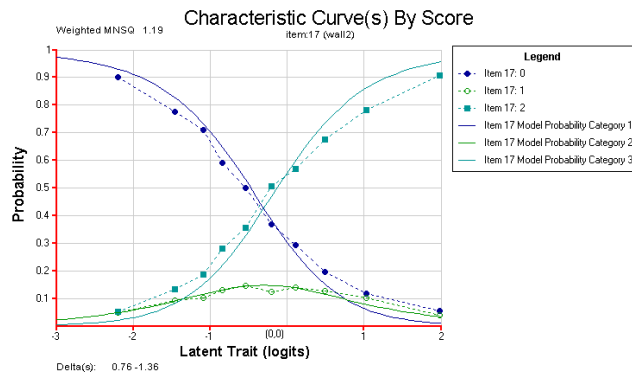
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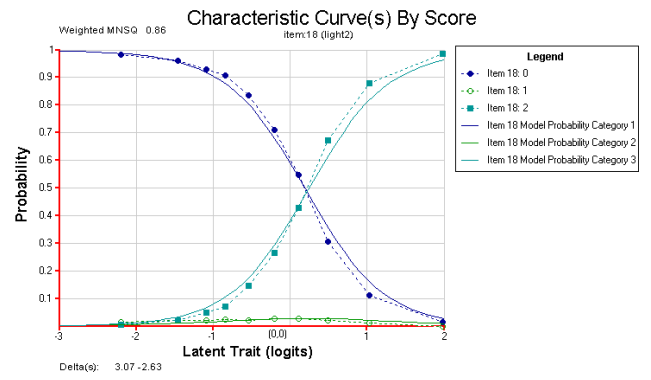
Item 16 :



Item 17 :



Item 18 :



Appendix D

Definitions of the six profiles of the Pupil SACMEQ-SES Index

1st SACMEQ-SES profile: Uganda, Malawi, Tanzania-(Mainland), Tanzania (Zanzibar) and Mozambique

In the place where the pupil stays during the school week (home), there are between 1 and 10 books. However the following items are not available: cassette player, running water, daily newspaper, TV set, weekly or monthly magazine, refrigerator, telephone, car and video tape recorder. As regards of the house, the floor is in wooden planks, the outside walls are sealed with materials of middle quality (metal, asbestos cement, concrete or tiles wood), the roof is sealed with materials of middle quality (metal or asbestos) and the principal source of lighting for reading is not satisfactory. Concerning pupils' parents, they completed the primary education cycle.

2nd SACMEQ-SES profile : Kenya, Zambia, Lesotho and Namibia

In the place where the pupil stays during the school week (home), there are between 1 and 10 books. However the following items are not available: cassette player, running water, daily newspaper, TV set, weekly or monthly magazine, refrigerator, telephone, car and video tape recorder. As regards of the house, the floor is in wooden planks, the outside walls are sealed with materials of middle quality (metal, asbestos or wood), the roof is sealed with materials of middle quality (metal or asbestos) and the principal source of lighting for reading is a gaz lamp. Concerning pupils' parent, they completed the primary education cycle.

3rd SACMEQ-SES profile : Botswana and Swaziland

In the place where the pupil stays during the school week (home), there are between 1 and 10 books and cassette player. However the following items are not available: running water, daily newspaper, TV set, weekly or monthly magazine, refrigerator, telephone, car and video tape recorder. As regards of

the house, the floor is in cement, the outside walls are sealed with materials of middle quality (metal, asbestos or wood), the roof is sealed with materials of middle quality (metal or asbestos) and the principal source of lighting for reading is a gaz lamp. Concerning pupils' parents, they completed the primary education cycle.

4th SACMEQ-SES profile : South Africa

In the place where the pupil stays during the school week (home), there are between 1 and 10 books, cassette player, piped water, daily newspaper and TV set. However the following items are not available: weekly or monthly magazine, refrigerator, telephone, car and video tape recorder. As regards of the house, the floor is in cement, the outside walls are sealed with materials of middle quality (metal, asbestos or wood), the roof is sealed with materials of middle quality (metal or asbestos) and the principal source of lighting for reading is a gaz lamp. Concerning pupils' parents, the mother completed the primary education cycle and the father commenced at least the secondary.

5th SACMEQ-SES profile : Seychelles

In the place where the pupil stays during the school week (home), there are more than 11 books, cassette player, piped water, daily newspaper, TV set, weekly or monthly magazine, refrigerator, telephone, car and video tape recorder. As regards of the house, the floor is in cement, the outside walls are sealed with materials of high quality (cut stones, concrete blocks or burned bricks), the roof is sealed with materials of middle quality (metal or asbestos) and the principal source of lighting for reading is electric. Concerning pupils' parents, both commenced at least the secondary education cycle.

6th SACMEQ-SES profile : Mauritius

In the place where the pupil stays during the school week (home), there are more than 11 books, cassette player, piped water, daily newspaper, TV set, weekly or monthly magazine, refrigerator, telephone, car and video tape recorder. As

regards of the house, the floor is in carpet or tiles (plastic, ceramic or wooden), the outside walls are sealed with materials of high quality (cut stones, concrete blocks or burned bricks), the roof is sealed with materials of high quality (cement, concrete or tiles) and the principal source of lighting for reading is electric. Concerning pupils' parents, both commenced at least the secondary education cycle.