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Literacy Assessment in the Third World: An Overview and Proposed Schema for Survey Use

Abstract

Many countries have sought to increase literacy among their populations. Rationales for such efforts usually involve the consequences for economic development, as well as for human development, health, and lower fertility. Programs for increasing literacy have often involved the expansion of educational programs, in particular primary schooling, and the creation of literacy programs and campaigns. However, a central paradox in efforts to reduce illiteracy in today's world is that much effort has been invested and little knowledge gained about how best to achieve success. According to one recent analysis by a Unesco expert, the well-known Experimental World Literacy Program (EWLP) ended with very little information being used by subsequent literacy programs. Yet although adult illiteracy rates of most developing countries are thought to be relatively stable (roughly 35-55 percent in Africa and Asia), population growth has meant that the number of illiterates has actually grown significantly, from 760 million in 1970 to 857 million in 1985.¹ Demographic and economic changes in the Third World have made literacy a key issue in the development programs of many countries. In spite of an increased sense of urgency, there is a lack of understanding of the breadth and depth of the "literacy program" in almost every society, particularly in societies where illiteracy appears greatest and evaluation resources are least available. Uncertainty about the nature and extent of literacy provides an important rationale for taking a new look at literacy assessment in Third World societies.²

Disciplines

Education | Educational Assessment, Evaluation, and Research | Educational Methods | International and Comparative Education | Language and Literacy Education

Literacy Assessment in the Third World: An Overview and Proposed Schema for Survey Use

DANIEL A. WAGNER

Many countries have sought to increase literacy among their populations. Rationales for such efforts usually involve the consequences for economic development, as well as for human development, health, and lower fertility. Programs for increasing literacy have often involved the expansion of educational programs, in particular primary schooling, and the creation of literacy programs and campaigns. However, a central paradox in efforts to reduce illiteracy in today's world is that much effort has been invested and little knowledge gained about how best to achieve success. According to one recent analysis by a Unesco expert, the well-known Experimental World Literacy Program (EWLP) ended with very little information being used by subsequent literacy programs. Yet although adult illiteracy rates of most developing countries are thought to be relatively stable (roughly 35–55 percent in Africa and Asia), population growth has meant that the number of illiterates has actually grown significantly, from 760 million in 1970 to 857 million in 1985.¹ Demographic and economic changes in the Third World have made literacy a key issue in the development programs of many countries. In spite of an increased sense of urgency, there is a lack of understanding of the breadth and depth of the "literacy problem" in almost every society, particularly in societies where illiteracy appears greatest and evaluation resources are least available. Uncertainty about the nature and extent of literacy provides an important rationale for taking a new look at literacy assessment in Third World societies.²

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¹ A. Gillette, "The Experimental World Literacy Programme: A Unique International Effort Revisited," in *National Literacy Campaigns: Historical and Comparative Perspectives*, ed. R. F. Arno and H. J. Graff (New York: Plenum, 1987); Unesco, *The Experimental World Literacy Program: A Critical Assessment* (Paris: Unesco/United Nations Development Program [UNDP], 1976); Unesco, *The Current Literacy Situation in the World* (Paris: Unesco, 1985).

² Of course, improvement in literacy assessment should not be restricted to Third World countries. Most countries, developing or industrialized, admit to having problems with literacy and educational efficiency (see Daniel Wagner, ed., *The Future of Literacy in a Changing World* [London: Pergamon, 1987]). However, industrialized countries have, for the most part, created standardized procedures

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Some Current Areas of Debate in Literacy Assessment

In order to provide worldwide statistical comparisons, Unesco has relied almost entirely on data provided by its member countries.³ These countries, in turn, rely on national census information, which most often determines literacy ability by self-assessment questionnaires and/or by the proxy variable of years of primary schooling. Many specialists would agree that such measures are likely to be unreliable indicators of literacy ability. Nonetheless, up to the present, little change in national literacy measurement has been forthcoming. While it is true that direct forms of measurement are more difficult and costly than prior-estimation methods, any changes in national literacy rates as a function of better assessment might also raise sensitive political questions as to literacy progress in many countries. Furthermore, in addition to technical and financial considerations, there has been a continuing debate in a number of other areas, such as those described below, that would have a significant impact on establishing valid and reliable national literacy rates.

A. Classification Issues

There is considerable diversity of opinion about the usefulness of classifying individuals in the traditional manner of “literate” versus “illiterate.” Several decades ago, when Third World countries began to enter the United Nations, it was common to find that the vast majority of the adult populations of these countries had never gone to school or learned to read and write. It was relatively easy in those contexts to simply define all such individuals as “illiterate.” The situation, as we begin the 1990s, is much more complex, as some contact with primary schooling, nonformal education programs, and the mass media is now made by the vast majority of families in the Third World. Thus, even though parents may be illiterate, it is not unusual for one or more of their children to be able to read and write to some degree. For this reason, it would seem that simple dichotomies—still in use by international organizations and most national governments—ought to be avoided, since they tend to misrepresent the range or continuum of literacy abilities that are common to most contemporary societies.

Some specialists have suggested that literacy may be best understood in terms of its functional utility in social context—hence Unesco’s term,

for measuring school-related literacy abilities, and some have carried out national literacy surveys (see, e.g., I. S. Kirsch and A. Jungeblut, *Literacy: Profiles of America's Young Adults*, final report of the National Assessment for Educational Progress [Princeton, N.J.: Educational Testing Service, 1986]). It should also be noted that literacy is not necessarily a “Third World problem”; many industrialized states consider their literacy situation to be quite serious, while numerous Third World countries (e.g., Sri Lanka) are thought to have little problem at all.

³ Unesco, *Revised Recommendation concerning the International Standardization of Educational Statistics* (Paris: Unesco, 1978) (hereafter *Revised Recommendations*), *Statistics of Educational Attainment and Literacy* (Paris: Unesco, 1983).

"functional literacy." Literacy may be seen as a set of individual skills, but these skills are relative, depending on the social and cultural context. Thus, being able to read a newspaper may justify the label of "literate" in one context, but, in a second context, may be a less relevant measure than a mother's ability to fill in a government health form for her sick child.⁴ Another approach to the issue is that taken by anthropologists who attempt to describe actual literacy practices and how they are more (or less) valued by differing persons and groups in a given society.⁵

There is also a general assumption that literacy skills may be transferred from one setting to another. While this may be true in some contexts, the degree of transfer may vary greatly. More dramatic differences may be seen if comparing across languages and literacies; an individual who can read and write in one language may be non-literate in another language. If an individual's literacy is in an "unofficial" language (as discussed below), should the government consider him or her to be "non-literate"? Appropriate assessment means taking a comprehensive and broad-based view of literacy, especially in the measurement of literacy levels.

B. Language Policy, Multilingualism, and Multiple Literacies

Most countries have formulated an explicit language policy that typically states which language or languages have official status. Often, the decision on national or official language(s) is based on such factors as major linguistic groups, colonial or postcolonial history, and importance of a given language to the concerns of economic development. Official languages are also those commonly used in primary school, though there may be differences between languages used in beginning schooling and those used later on. The use of mother-tongue instruction in both primary and adult education remains a topic of continuing debate.⁶

While there is usually general agreement that the official language(s) ought to be assessed in a literacy survey, there may be disagreement over

⁴ A comprehensive discussion of functional literacy is beyond the scope of the present article, but for a critical review, see K. Levine, "Functional Literacy: Fond Illusions and False Economies," *Harvard Educational Review* 52 (1982): 249–66. For a more sympathetic review, see C. S. Hunter and D. Harman, *Adult Illiteracy in the United States* (New York: McGraw-Hill, 1979).

⁵ S. B. Heath, "The Functions and Uses of Literacy," *Journal of Communication* (Winter 1980): 123–33; S. Scribner and M. Cole, *The Psychology of Literacy* (Cambridge, Mass.: Harvard University Press, 1981); B. V. Street, *Literacy in Theory and Practice* (Cambridge: Cambridge University Press, 1984); D. A. Wagner, B. M. Messick, and J. Spratt, "Studying Literacy in Morocco," in *The Acquisition of Literacy: Ethnographic Perspectives*, ed. B. B. Schieffelin and P. Gilmore (Norwood, N.J.: Ablex, 1986).

⁶ N. Dutcher, "The Use of First and Second Languages in Primary Education: Selected Case Studies," World Bank Staff Working Paper no. 504 (Washington, D.C.: World Bank, 1982); P. L. Engle, "Language Medium in Early School Years for Minority Language Groups," *Review of Educational Research* 45 (1975): 283–325; Unesco, *The Use of Vernacular Languages in Education*, Monographs of Fundamental Education no. 8 (Paris: Unesco, 1953); D. A. Wagner, J. E. Spratt, and A. Ezzaki, "Does Learning to Read in a Second Language Always Put the Child at a Disadvantage? Some Counter-evidence from Morocco," *Applied Psycholinguistics* 10 (1989): 31–48.

the assessment of literacy in nonofficial languages (where these have a recognized and functional orthography). In many countries, there exists a multitude of local languages that have varying status with respect to the official language; how these languages and literacies are included in this survey may be a matter of debate. For example, in certain predominantly Muslim countries in sub-Saharan Africa (e.g., Senegal or Ghana), the official language of literacy might be French or English, while Arabic, which is taught in Islamic schools and used by a sizable population for certain everyday and religious tasks, is usually excluded from official literacy censuses.

It seems reasonable to assume that *all* literacy abilities and literacies are human and national resources. To ignore such abilities is to underestimate these resources. Assuming available support for undertaking a broad and representative household survey, effort should be made to investigate and assess literacy in all “significant” linguistic populations (see further discussion below).

C. Comparability of Data: Balancing National and International Needs

Comparability of data across time and countries is a major concern for planning agencies. If definitions, categories, and classifications vary, it becomes difficult, if not impossible, to compare data collected from different surveys. Conversely, if comparability is the primary goal, with little attention paid to the validity of the definitions, categories, and classifications for the sample population, then the data become meaningless. International and national needs, definitions, and research strategies may or may not come into conflict over the issue of comparability, depending on the particular problem addressed. For example, as we have seen, Unesco typically suggests that literacy be measured in terms of the number of “literate” and “illiterate.” For most countries, this type of classification presents few problems at the level of census information, and it provides Unesco and other international agencies with a cross-national framework for considering literacy by geographic or economic regions of the world. Alternatively, national planners might want to know the effects of completion of certain grades of primary or secondary school or of a literacy campaign on levels of literacy attainment, so that a simple dichotomy would be insufficient. Furthermore, national planners might want to have precise data as to which languages and which literacies are used by region or ethnic group in addition to age and gender differences. Collection of such data has been largely ignored by international agencies. Household literacy surveys, allowing more time for in-depth questioning, offer the opportunity to provide a more detailed picture of literacy and its demographic correlates than has been previously available.

D. Measuring the Consequences of Literacy

Will a change from a lower to higher level of literacy make a concrete difference in an individual's life? Perhaps the only way to determine an answer is through ethnographic and case studies that delve into the actual lives of individuals.⁷ Looking at the average literacy rate and comparing this statistic with health indicators (such as infant mortality rates or fertility rates), or estimating employability from such a rate, cannot adequately illuminate the diversity of individual human plights. Work in rural low-literate Morocco has demonstrated that those with higher literacy tend to be better off economically but also that an increasing number of young adults believe that more education and more literacy will not necessarily lead to greater wealth since increasing numbers of school graduates have not found work. A common perception in rural Morocco is that both some literacy and some level of education are needed by some individuals in every family (or extended family) to meet the tasks required by government bureaucracy, but not everyone needs to be literate in order to accomplish such tasks.⁸

Since World War II, perhaps the most compelling argument for human resources development is that literacy and schooling will lead to economic growth in countries that make a sufficient investment in them. This is the approach sometimes referred to as investment in human capital.⁹ Bowman and Anderson, for example, went so far as to say that an 80 percent national adult literacy rate would be necessary for rapid economic development, while a 40 percent literacy rate would be required for a minimal amount of economic development.¹⁰ This claim makes use of aggregated data across many countries of the world, based on a significant correlation between gross national product (GNP) and literacy rates. Naturally, the implication of causality using such correlations is hazardous but is still common in the discourse of educational and literacy planners. On the contrary, one would probably be just as correct in claiming that literacy rates, like infant mortality rates, reflect the degree of economic development in most countries. If social and economic progress is being attained, one usually finds that literacy rates climb and infant mortality rates drop. Blaug, once a supporter of human capital theory, has since

⁷ S. B. Heath, *Ways with Words* (New York: Cambridge University Press, 1983); Schieffelin and Gilmore, eds.; D. A. Wagner, ed., Special Issue: "Literacy and Ethnicity," *International Journal of the Sociology of Language* 42 (1983), and Wagner, ed., *The Future of Literacy in a Changing World*.

⁸ Wagner, Messick, and Spratt.

⁹ G. Psacharopoulos and M. Woodhall, *Education for Development: An Analysis of Investment Choices* (New York: Oxford University Press, 1985); T. W. Schultz, *Investing in People: The Economics of Population Quality* (Berkeley: University of California Press, 1981).

¹⁰ M. J. Bowman and C. A. Anderson, "Human Capital and Economic Modernization in Historical Perspective," in Fourth International Conference of Economic History, ed. F. C. Lane (Paris: Mouton, 1973), p. 250, cited in I. Fagerlind, and L. J. Saha, *Education and National Development: A Comparative Perspective* (New York: Pergamon, 1983), p. 42.

come to the conclusion that neither years of schooling nor specific literacy rates have any direct effect on economic growth in developing countries.¹¹

It would seem that the intellectual tide is turning against those who argue that universal literacy would, independent of other factors, have dramatic economic consequences. Increasing numbers of policymakers in the area of educational planning are wondering if nations can bear the burden of ever-expanding educational costs with fixed or lowered economic resources. Mixed with economic arguments, one hears increasing reference to moral imperatives in both the developing and industrialized worlds,¹² yet there are many moral imperatives in today's world (such as life, liberty, health, and literacy), and choosing among them is not, in many cases, a scientific or empirical enterprise. Indeed, the political realities and the empirical association of literacy with health, nutrition, and other positive social outcomes are such that it is unlikely that governments will cease efforts to universalize literacy and primary education; indeed, the opposite appears to be the case with the advent of the UN International Literacy Year in 1990. Without better empirical support, however, making the case for literacy and its socioeconomic consequences will remain difficult. Finally, high rates of literacy have taken generations to achieve, in spite of the rhetoric of the literature on literacy campaigns and educational revolutions.¹³ As with economic development, literacy development has not taken place overnight.

Thus, the issue is not *whether* but rather *how* to promote literacy in a way that is consistent with overall policy objectives. Even if we had conclusive evidence of the marginal economic benefits of literacy, the question for literacy and development specialists ought to be: How can we most efficiently achieve increased literacy levels with the economic and social resources at our disposal? Here, the emphasis is on efficiency and appropriateness, domains in which specialists can play a crucial role.¹⁴ A literacy campaign may be efficient in a country undergoing revolutionary change, such as Nicaragua, where schools had been disrupted for years and where urban high school students were available for rural teaching. But such a campaign may be relatively less efficient in a country like Zimbabwe, where public

¹¹ M. Blaug, "Where Are We Now in the Economics of Education?" *Economics of Education Review* 4 (1985): 17–28.

¹² H. S. Bhola, *Campaigning for Literacy: Eight National Experiences of the Twentieth Century, with a Memorandum to Decision-makers* (Paris: Unesco, 1984); J. Kozol, *Illiterate America* (New York: Doubleday, 1985).

¹³ B. Eklof, "Russian Literacy Campaigns," in Arnove and Graff, eds. (n. 1 above); D. A. Wagner, "Review of H. S. Bhola, *Campaigning for Literacy*, and V. Miller, *Between Struggle and Hope: The Nicaraguan Literacy Campaign*," *Comparative Education Review* 30 (August 1986): 450–54; A. Lind and A. Johnston, *Adult Literacy in the Third World: A Review of Objectives and Strategies*, Educational Division Documents no. 32 (Stockholm: Swedish International Development Authority, 1986).

¹⁴ D. A. Wagner, "'Appropriate Education' and Literacy in the Third World," in *Healthy Human Development: Applications from Cross-Cultural Psychology*, ed. P. R. Dasen, J. W. Berry, and N. Sartorius (Beverly Hills, Calif.: Sage, 1988).

schooling has a well-established infrastructure, and where it would be difficult and expensive to provide teachers for the less literate countryside. What is efficient and appropriate, of course, brings forth a whole series of qualifiers: for whom? in which language? for what purpose? using what methods? Only through a better understanding of the types and levels of literacy in a given society can adequate policy initiatives be formulated.

The Assessment of Literacy: A Proposed Schema

One of the most troublesome issues in literacy research has been achieving consensus on a definition of the term itself. Any assessment procedure requires, of course, an operational definition to use as a yardstick. While, to some degree, each test assumes its own definition, there are a number of historical tendencies in the literature.

A. Some Prior Definitions of Literacy

A person is functionally literate when he has acquired the knowledge and skills in reading and writing which enable him to engage effectively in all those activities in which literacy is normally assumed in his culture or group.¹⁵

A person is *literate* who can with understanding both read and write a short simple statement on his everyday life. . . . A person is *functionally literate* who can engage in all those activities in which literacy is required for effective functioning of his group and community and also for enabling him to continue to use reading, writing and calculation for his own and the community's development.¹⁶

Literacy is a characteristic acquired by individuals in varying degrees from just above none to an indeterminate upper level. Some individuals are more literate or less literate than others, but *it is really not possible to speak of literate and illiterate persons as two distinct categories.*¹⁷

[An adequate] conception of literacy [is] *not simply . . . a set of isolated skills associated with reading and writing, but more importantly . . . the application of those skills for specific purposes in specific contexts.* . . . There is no single measure or specific point on a single scale that separates the "literate" from the "illiterate." Literacy can no longer be defined simply as the ability to sign one's name, completion of a particular year of schooling, or attainment of a specified reading grade level.¹⁸

Different countries and different assessment surveys have employed quite varying approaches to defining literacy. For example, some assessment surveys have focused on "ability to read aloud" from a newspaper in the national language, some have included basic arithmetic (numeracy) skills, while still others have focused on "being able to write your name." The present schema has adopted an approach which involves gathering a broad range of information within limited time and manpower constraints.

¹⁵ W. S. Gray, *The Teaching of Reading and Writing* (Paris: Unesco, 1956), p. 19.

¹⁶ Unesco, *Revised Recommendations* (n. 3 above) (emphasis added).

¹⁷ Unesco, *World Illiteracy at Mid-century* (Paris: Unesco, 1957), p. 18 (emphasis added).

¹⁸ Kirsch and Jungeblut (n. 2 above) (emphasis added).

Operationally, this means that both literacy (reading and writing) and numeracy measures are included and assessed in terms of simple and advanced skills, school-based and everyday usage, and languages of literacy.

B. Which Literacies Should Be Assessed?

“Significant” national languages are defined here as languages that typically include national (or official) languages of the country and written languages that are spoken by significant linguistic groups in the country. Which literacies should be assessed depends on three factors: (1) whether or not the language has a script that is used for everyday literacy activities (some do not); (2) the national language policy of the country; and (3) available survey resources for assessment. To determine which languages/literacies to include, some countries might wish to pick an arbitrary cutoff point, as, for example, when the estimated population of a particular minority group exceeds a certain percentage of the national population, or simply to pick the three most used languages/literacies. In practice, of course, there are countries such as China and India where even a small percentage may represent such a large number of people that smaller language/literacy groups might need to be assessed; conversely, in countries such as Nigeria and Botswana, where many small population groups exist, a different strategy may be necessary. Naturally, there are also cases in which a major spoken language has a written script (orthography) but its literacy usage is quite restricted and not used in education or other official contexts.¹⁹

In most situations in which resources are limited, one approach would be to assess only in an official language taught in formal schooling and in the respondent’s primary household written language (either mother tongue or a written language used by household members). This method would tend to set a *two-literacy limit* for individual assessment, as well as to reduce the number of potential literacies needed to be assessed in a given country. In countries where resources are even more restricted, it may be necessary to ask the respondent the literacy in which he or she is, by self-estimation, “most proficient” and assess in that single literacy. Since many countries are multiliterate as well as multilingual, determining accurate literacy rates should depend on assessment rather than on the respondent’s or interviewer’s opinion about which single literacy should be assessed; in other words, if resources permit, and the respondent claims knowledge of more than one literacy, a second literacy assessment is advised. Even though an individual may be assessed in only one or two literacies, the survey may need to incorporate more than two literacy

¹⁹ Such an example would be Vai literacy in Liberia, as documented in the work of Scribner and Cole (n. 5 above). Whether to assess for Vai literacy in a national survey would be, I suppose, a matter of considerable debate among Liberian policy planners.

instruments, depending on how many significant written languages there are in the country.

C. Two Methods of Assessment

Unesco has recommended two principal methods for the determination of literacy at the national level: (a) self-assessment as part of a complete census or sample survey; and/or (b) use of a standardized test of literacy (and numeracy) in a special survey.²⁰ In the discussion below, it is suggested that both of these methods—self-assessment and direct measurement—be employed in literacy surveys since they provide useful and complementary data.

1. *Self-assessment*.—According to Unesco “a person is literate who can, with understanding, both read and write a short simple statement on his everyday life.”²¹ In virtually all literacy data collection in Third World countries, this definition has been operationalized by asking the individual one or more questions of the following sort: “Can you read and write?” Occasionally, census takers collect information on which language or languages pertain to the above question, but rarely have time or resources been invested beyond this point. Indeed, Unesco—the primary source for statistics to most development agencies such as the World Bank, Unicef, and U.S. Agency for International Development (USAID)—typically provides neither data on the languages of literacy that were assessed, nor the method or categories used to measure literacy at the national level. Analysis of the relationship between self-assessment and direct measurement of literacy abilities has rarely been sought. The correlation between self-assessment and measured literacy might be expected to vary substantially, depending on such factors as the congruence between definitions of literacy, the rapport between the survey interviewer and the respondent being interviewed, and the respondent’s own concept of literacy. There are cases in which a respondent might be literate only in a nonofficial language (as discussed above) and therefore believes himself or herself to be “illiterate.” Survey interviewers may, of course, hold similar beliefs. Thus, the generally low level of social science training among survey fieldworkers is yet another reason to complement self-assessment with direct measurement of literacy. Nonetheless, there is some value in continuing to employ self-assessment methods in the estimation of national literacy rates, if only to make comparisons with prior analyses. The validity of these self-assessments, as noted above, may be questionable in light of local and national variation in the type of questions used and the type of survey conducted.

As already mentioned, many countries have conducted censuses that include a question or questions about literacy by asking the respondent

²⁰ Unesco, *Revised Recommendations*.

²¹ *Ibid.*

whether he or she “can read and write.” For the purpose of comparison with prior data sets, a respondent who says “yes” to the question “Can you read?” *and also* to the question “Can you write?” should be classified as “literate”; all others should be defined as “illiterate.” It is important to bear in mind that this dichotomy represents primarily a bureaucratic tradition and should not be considered a differentiation sufficient for making effective national-level policy decisions. Direct measurement, with its more fine-grained differentiation of variables, should be used for the latter purpose, as well as to provide a way to validate self-assessment questions. The two self-assessment categories are: (1) Illiterate. A person is defined as “illiterate” who says he or she *cannot* read and write with understanding a short simple statement in a significant language. (2) Literate. A person is defined as “literate” who says he or she can *both* read and write with understanding a short simple statement in a significant language.

2. *Direct measurement.*—Direct measurement of literacy typically involves tests that are constructed with the aim of obtaining performance or behavioral criteria for determining literacy or numeracy abilities in the individual. The large number and variety of literacy and numeracy assessment instruments precludes a complete discussion here. Generally, most literacy assessment instruments attempt to balance what are sometimes referred to as “objective” and “subjective” measures.

Objective measures rely primarily on test items to elicit valid and reliable data from the individual, with rather strict controls on the context and structure of the test. An example would be a multiple-choice test where the individual is presented with a short paragraph of text and is asked to choose, among four items, the item that best describes some particular piece of information mentioned in the paragraph. These measures are usually reliable in school settings and for silent reading, where test-retest correlations and cross-test correlations may be quite high. Their use in nonschool settings and with low-literate adults is less well known, since these tests assume a certain equivalence in “test-taking skill” across individuals tested. Such objective tests are particularly useful in settings where the interviewer has little prior experience in literacy assessment since relatively little subjective interpretation of test performance is required.

Subjective measures generally refer to the interviewer making a personal *judgment* about the performance of the respondent being assessed. Thus, an interviewer might judge that a respondent reads “well” or “poorly” based on some criteria that may be more or less satisfactorily related to judgments by other interviewers. In certain domains, such as judgments concerning writing ability, subjective assessments have been more widely used. Naturally, the better trained the literacy interviewer, the more likely that he or she will give consistent and accurate judgments. Objective and

subjective tests have one obvious point in common: both seek to measure individual performance. Though distinguishable from one another in a rough manner, there is clear overlap since no measure is entirely subjective or objective. An important implication follows. Given the fact that the survey interviewers and supervisors in Third World countries are typically untrained in educational assessment, objective measures should be used as much as possible in the literacy assessment instrument, assuming that these tests can be pretested sufficiently to guarantee a reasonable level of validity and reliability.

Literacy may be defined in terms of the individual's ability to read and write within the context of his or her society. The direct measurement of literacy skills using assessment instruments provides information on more refined categories than are available in self-assessment. While it is possible to make as many classifications as there are items in a literacy test, it would seem advantageous to choose a categorical breakdown that would provide enough information for use by policymakers and that could be easily constructed. In the present schema, there are four main classifications that would make sense in many countries: (1) Non-literate. A person may be classified as non-literate who cannot read a text with understanding and write a short text in a significant national language, and who cannot recognize words on signs and documents in everyday contexts and cannot perform such specific tasks as signing his or her name or recognizing the meaning of public signs. (2) Low literate. A person may be classified as a low literate who cannot read a text with understanding and write a short text in a significant national language, but who can recognize words on signs and documents in everyday contexts, and can perform such specific tasks as signing his or her name or recognizing the meaning of public signs. (3) Moderate literate. A person is moderately literate who can, with some difficulty (i.e., makes numerous errors), read a text with understanding and write a short text in a significant national language. (4) High literate. A person is high literate who can, with little difficulty (i.e., makes few errors), read a text with understanding and write a short text in a significant national language.

If a person can engage in literacy in more than one significant national language, then he or she should receive a classification for the highest level achieved in a significant language.

Developing Direct Measurement Procedures for Literacy Assessment

A. Some Difficulties in Literacy Assessment

1. *Determining levels of literacy.*—Given the diversity of literacy skills that even one person might possess, and the diversity of individuals in multilingual and multiethnic societies, it is theoretically and practically difficult to create a fair assessment instrument. There are two main types

of assessment instruments in the area of learning and literacy: (1) norm-referenced tests and (2) criterion-referenced tests. Each type of test has been used extensively, particularly in the measurement of school achievement, though use in literacy surveys has been more limited.²²

A synthetic method is proposed for the present schema, that is, a method that uses aspects of both norm- and criterion-referenced tests for the purposes of the household literacy survey. A criterion-referenced procedure, with some predetermined categories, is necessary for the comparison of abilities across languages/literacies. For example, word-decoding ability (its presence or absence) is a skill that may be understood across all languages/literacies (though it would take a different set of cognitive processes in, say, Chinese and English) and ought not to depend on a specific score within a specific normed population. Nonetheless, as in norm-referenced testing, the pretesting phases of instrument development would provide a contextual interpretation for scores achieved by a given population, thus enabling a better interpretation of the scores on a given set of items.²³

2. *Cross-language comparability in multilingual contexts.*—Cross-language and cross-orthographic (cross-script) comparison of literacy has become a topic of increasing concern, partly due to interest in bilingualism in industrialized nations. However, most research has been experimental in

²² Norm-referenced tests are those that use the performance of a reference group or sample to compare against an individual's performance. In such tests, an effort is usually made to refine (or standardize) the test instrument using a population sample similar to those who will eventually be taking the test for the purpose of assessment later on. Naturally, the norms themselves depend not only on the test items or materials included but also on the makeup of the norming sample. In the domain of literacy, it has not been uncommon to use the abilities found in certain grade levels in primary school as the way to describe beginning literates, whether child or adult. This tendency to use primary school norms for adults has been increasingly challenged by adult literacy specialists, though there is no consensus yet on the issue. In the case of a literacy survey, choice of a norming sample is a difficult problem, especially because the range of abilities across such diverse populations of the Third World necessitates a broader range of assessment items than in grade-level school-based tests. A significant advantage of using a norm-referenced test is that the population itself determines what is high, middle, or low performance, and this categorization of levels may be done within each language/literacy investigated. However, it then remains difficult to interpret how a high score in one literacy (or for one population) compares with a high score in a second literacy (or a second population) since the criteria for determining an individual's level depend only on the scores of individuals within a single literacy test (or a single population). Criterion-referenced tests are those that are linked to predetermined levels of performance on specific types of skills. Thus, such a test would be developed around a set of skills—such as word decoding or reading comprehension—that the test developers think are important to measure. Level of literacy would then be a function of how well an individual can perform the skills that are measured. In a major study of illiteracy among American youth, Kirsch and Jungeblut used criterion-referenced tests in their recent assessment of literacy among American adolescents.

²³ If it is desired to evaluate a specific campaign or program, then the literacy assessment instruments should be focused more directly on the literacy instruction actually provided. Likewise, measures developed for specific use in evaluating campaigns or programs should not be directly applied in a broader household-literacy survey since campaign-based assessments are usually tied to a specific curriculum and training and often differ from assessments of how many other individuals have become literate (such as through formal schooling). Conversely, with proper care, some campaign materials might be usefully adapted for the goals of literacy surveys.

nature, and little effort has been made to gather systematic information on multiple literacies in developing nations. Some of the research on the acquisition of biliteracy in Morocco done by my colleagues and me suggests similar processes in the acquisition and retention of literacy skills in Arabic and French, and the practicality of developing parallel and comparable measures in both languages.²⁴

In the present schema, it is suggested that "rough equivalency" be sought between the assessment instruments designed for multilingual/multiliteracy contexts. This may be achieved through a model that gathers information on the same types of component skills in each literacy, and that uses pretesting to obtain approximate norms for responding that are reliable within a single literacy.

B. A Suggested Model for Measuring Literacy Levels

Beyond the broad category labels of literacy levels presented earlier, there is no general agreement on how to actually assign such labels to individuals. Does scoring above 50 percent on a test of paragraph comprehension qualify an individual as literate, non-literate, or in between? To a great extent, such labeling has been and continues to be arbitrary. Also, while most assessment instruments use school-based and curriculum-based materials, there is increasing awareness among specialists of the importance of measuring "everyday" or practical literacy abilities. One method for dealing with literacy assessment is to determine the intersection of both literacy skills and domains of literacy practice.

1. *Types of literacy skills.*—There are, as noted earlier, many types of literacy tests and skills that specialists have thought were important not only for the measurement of actual literacy ability but also in terms of the underlying processes involved in being a competent reader or writer. The present schema cannot address all of these issues. Drawing on recent survey work by Kirsch and Jungeblut, it may be useful to think of literacy skills as involving at least four basic types of processes, as shown in table 1.

2. *Types of literacy text domains.*—In any society, individuals who use literacy may perform literate functions on a wide array of materials; in addition, certain individuals may specialize in specific types of literate

²⁴ A recent review of the substantial evidence on the effects of bilingualism and bilingual education is available in K. Hakuta, *Mirror of Language: The Debate on Bilingualism* (New York: Basic, 1986). Much less is known about the general effects of biliteracy and multiliteracy, and on the comparability (in terms of difficulty of acquisition, retention, etc.) of literacy acquisition across different languages and orthographies. A review of comparative reading issues is available in J. Downing, *Comparative Reading* (New York: Macmillan, 1973); specific orthographic issues are discussed in L. Henderson, *Orthographies and Reading: Perspectives from Cognitive Psychology, Neuropsychology, and Linguistics* (Hillsdale, N.J.: Erlbaum, 1984). For a description of research on biliteracy in Morocco, see: D. A. Wagner, J. E. Spratt, and G. Klein, "Myth of Literacy Relapse: Literacy Retention among Moroccan Primary School Dropouts," *International Journal of Educational Development* (1989), in press; and D. A. Wagner and J. E. Spratt, "Arabic Orthography and Reading Acquisition in Morocco," in *Scripts and Reading: East and West*, ed. I. Taylor and D. Olson (New York: Kluwer Academic, in press).

TABLE 1
PROCESSES AND DOMAINS INVOLVING LITERACY SKILLS

Skills and Domains
Literacy skills for direct measurement:
i. Decoding (e.g., pronouncing words; matching a familiar word with a simple picture)
ii. Comprehension (e.g., literal understanding of a paragraph; recognizing the paraphrase of a sentence)
iii. Writing (e.g., signing one's name; copying a written text; creating a text)
iv. Locating information (e.g., pointing to the required word in a paragraph)
Literacy domains for direct measurement:
i. Words, sentences (e.g., labels for objects; labels ["poison"]; signs ["danger", "stop"])
ii. Prose (e.g., simple newspaper story)
iii. Documents (e.g., official forms; directions on medicine bottle; advertisements; bills and receipts)

domains (e.g., lawyers, doctors, agricultural agents). Even individuals with low general levels of literacy skill may be able to cope successfully with written materials in a domain in which they have a great deal of practice (e.g., farm workers who deal often with insecticides). Therefore, since governments are generally interested in providing literacy for many categories of people, it would be prudent to sample across the domains where literate functions typically are found. These materials include single words, short phrases, tables, and forms, as well as texts. A breakdown of the types of text domains found in most societies is shown in table 1.

3. *Estimation of literacy skills by text domains.*—Table 2 presents a matrix of the intersection of literacy skills with text domains in which literacy skills can be thought to be applied. This matrix provides a breakdown of types of component skills in literacy. There is rarely consensus on which specific skills to test in literacy; the present choices are not only based on the basic importance of the skills described in the table but also on the short-term practicalities of developing reasonable assessment instruments with available resources. Each of the above concerns puts constraints on the development of assessment instruments. It should also be noted that the cells are only roughly ordered in difficulty from *a* to *g*, and this order would vary depending on life experience. For example, an individual who works in a regional cooperative might be quite competent at finding appropriate numbers and other information in a roster but not be competent at writing a short letter. Literacy levels, also shown in table 2, may be operationalized in terms of the cells in the matrix.

4. *Construction of literacy assessment instruments.*—The construction of assessment instruments is one of the more difficult aspects in preparation of a literacy survey, the details of which are beyond the scope of this

TABLE 2
OPERATIONALIZATION MATRIX AND LITERACY LEVELS FOR LITERACY ASSESSMENT

Domain of Text	Type of Skill			
	Decoding	Comprehension	Writing	Locating Information
Words, sentences	a	b	c	...
Prose	...	d	e	f
Documents	...	...	...	g
Operationalization of Literacy Levels for Assessment				
i. Non-literate:	Cannot effectively use skills			
ii. Low literate, <i>with some errors</i> :	Can decode words and sentences [a] Can identify words, signs in everyday context [b] Can write own name, copy some text [c] Can locate information in a short text [f]			
iii. Moderate literate:	Possesses skills in level ii, <i>and, with some errors</i> : Can understand a newspaper article [d] Can write short text [e] Can locate information in a complex document [g]			
iv. High literate:	Possesses all skills with few errors			

NOTE.—Letters a–g indicate intersections or “cells” that are to be assessed. Relevant cells are shown in brackets.

article. However, several key issues must be dealt with as part of the development of such instruments, including the types of tests in current use that may be adapted, the problem of how to sample appropriate text domains, and how to deal with translation problems when creating comparable instruments across linguistic and cultural groups. Some guidelines on these issues are provided in the Appendix.

The Assessment of Numeracy: A Proposed Schema

The inclusion of numeracy in discussions of the problem of illiteracy is a relatively recent phenomenon; it is also an area that has received little attention from researchers. While there is no standard definition comparable to literacy, most observers would agree that numeracy involves the ability to make effective use of a number system. At the top end of the scale used in this schema, a person is said to be “high numerate” who can, with little difficulty (i.e., making few errors), perform the basic four arithmetic functions in formal (school-type) and everyday settings. At the bottom end of the proposed schema would be the individuals who can engage in mental calculations using indigenous number systems.²⁵ In order to

²⁵ Of course, placing school-based numeracy at the top and everyday numeracy at the bottom is an arbitrary decision, but it conforms to the bias and tradition of those who see school-based

provide a way of measuring numerate behavior, it is essential to describe the types of skills implied in the definition and, as in the case of literacy, the domains where numerate behavior is practiced.

While Unesco includes "reading, writing, and calculation" in its definition of functional literacy, international comparative data have typically been gathered only on reading and writing; indeed, separate indices on numeracy rates for UN member nations have never been provided.²⁶ The origin of the linkage between reading/writing and numeracy remains somewhat obscure. Unesco, in the 1975 Declaration of Persepolis, consistently linked reading, writing, and arithmetic as part of the notion of functional literacy. Yet, almost no attention has been paid to the arithmetic part of the definition by international organizations and development planners.²⁷ Survey information has rarely been gathered on mathematical abilities in Third World countries, and the few literacy evaluations that have taken place and that include *separate* analyses for numeracy generally provide insufficient detail for judging specific numeracy abilities.²⁸

literacy as that which is most important for development purposes. This assumption remains, as far as I know, untested. Furthermore, in contrast to illiteracy, it may be assumed that complete "innumeracy" is a relatively rare phenomenon among adults, since there is now much evidence suggesting that young children begin to develop rather sophisticated cognitive skills that make use of number systems well before going to school (R. Gelman & C. R. Gallistel, *The Child's Understanding of Number* [Cambridge, Mass.: Harvard University Press, 1978]). Research on cultural variation in arithmetic systems has been undertaken in a number of Third World countries, such as Papua New Guinea (D. F. Lancy, *Cross-cultural Studies in Cognition and Mathematics* [New York: Academic Press, 1983]; G. B. Saxe "Body Parts as Numerals: A Developmental Analysis of Numeration among the Oksapmin in Papua New Guinea," *Child Development* 52 [1981]: 306–16); and Liberia (J. Gay and M. Cole, *The New Mathematics and an Old Culture* [New York: Holt, Rinehart & Winston, 1967]). This latter work considers indigenous mathematical systems and their relation to modern arithmetic systems. Recent research on everyday numeracy skills in the United States is an area that has recently become the focus of new attention; see J. Lave, *Cognition in Practice: Mind, Mathematics and Culture in Everyday Life* (New York: Cambridge University Press, 1988).

²⁶ Unesco, *Revised Recommendations*.

²⁷ L. Bataille, ed., *A Turning Point for Literacy: Proceedings of the International Symposium for Literacy, Persepolis, 1975* (Oxford: Pergamon, 1976). Girodet provides one of the very few studies of this sort that attempts to take into account the mathematical systems currently in use in several sub-Saharan African countries; see M-A. Girodet, *Calculs écrits, données culturelles et alphabétisation*, Document no. ED/83-W-S/117 (Paris: Unesco, 1983).

²⁸ The only solid literacy evaluation in a developing country that included separate numeracy analyses was that undertaken in Ethiopia; see M. Sjoström and R. Sjoström, *How Do You Spell Development? A Study of the Literacy Campaign in Ethiopia* (Uppsala: Scandinavian Institute of African Studies, 1983). Most of the international comparative research on mathematics achievement comes from cross-national studies focused primarily on industrialized nations; see L. C. Comber and J. P. Keeves, *Science Achievement in Nineteen Countries* (New York: Wiley, 1973); and T. Husen, *International Study of Achievement in Mathematics: A Comparison of Twelve Countries* (New York: Wiley, 1967). One interesting finding from a national survey undertaken in Australia may have some bearing on future comparative studies. It was reported that home and family variables may play a greater role in promoting numeracy than literacy in school-aged children; see S. F. Bourke and J. P. Keeves, *Australian Studies in School Performance*, vol. 3, *The Mastery of Literacy and Numeracy: Final Report* (Canberra: Australian Government Publishing Service, 1977). There are other reports as well that indicate that practice with numbers, even in unschooled youth or adults, can lead to higher levels of numeracy, e.g., T. N. Carraher, D. W. Carraher and A. D. Schliemann, "Mathematics in the Streets and in Schools," *British Journal of Developmental Psychology* 3 (1985): 21–29; and H. P. Ginsburg, J. K. Posner and R. L. Russell, "The Development of Mental Addition as a Function of Schooling and Culture," *Journal of Cross-Cultural Psychology* 12 (1981): 163–78.

Since no internationally accepted definition of numeracy has yet been determined, numeracy will be defined here in terms of the individual's ability to perform basic arithmetic operations within the context of his or her society through mental arithmetic and/or the manipulation of written symbols. The dichotomy between "numerates" and "innumerates," as with literacy, is maintained only for the self-assessment scale and for potential linkage with prior data sets. More refined categories may be made with the use of direct measurement instruments, and these will generally prove more useful and accurate when considering policy options. For example, if basic arithmetic skills is a policy goal, then it would be important to measure these abilities, rather than to expand assessment to cover more advanced mathematical skills.

A. Numeracy Categories Based on Self-Assessment

As in the case of literacy, numeracy levels may be solicited from the respondents directly. Two basic levels, parallel with the literacy self-assessment described earlier, are proposed here: (1) Innumerate. A person is defined as innumerate who says he or she cannot calculate arithmetic functions mentally and with pencil and paper. (2) Numerate. A person is defined as numerate who says he or she can calculate arithmetic functions both mentally and with pencil and paper.

B. Numeracy Categories Based on Direct Measurement

Within a survey format, it is necessary to be judicious with respect to the amount of time and effort spent on any given aspect of assessment. In the case of numeracy, it is clear that most surveys will be able to provide only a limited amount of time to direct measurement since numeracy assessment has, as yet, failed to be a major focus of any national Third World household survey. Therefore, it seems reasonable to limit to three the levels for numeracy ability (as opposed to four levels for literacy), thereby reducing the number of items needed to produce a reliable test outcome. The three levels may be defined as follows: (1) Non-numerate. A person may be classified as a non-numerate who cannot perform the basic four arithmetic functions mentally and/or in formal (school-type) written tests, and who cannot recognize and solve numerical problems on signs and documents in everyday contexts and cannot perform such specific tasks as writing numbers from dictation or reading numbers from a public sign or document. (2) Semi-numerate. A person is semi-numerate who can, with some difficulty (i.e., makes numerous errors), perform some arithmetic functions mentally or in formal (school-type) or in everyday settings or read and write numbers. (3) High numerate. A person is high numerate who can, with little difficulty (i.e., makes few errors), perform the basic four arithmetic functions mentally and in formal (school-type) and everyday settings and read and write numbers.

C. Suggested Model for Measuring Numeracy Levels

The broad category labels of numeracy levels presented earlier provide no specific guidelines for actually assigning numeracy classifications to individuals. As in the case of literacy, a useful method for dealing with numeracy assessment would be to determine the intersection of both numeracy skills and domains of numeracy practice.

1. *Types of numeracy skills.*—As with literacy, there are a great many types of mathematics tests and sets of skills that specialists have thought were important for the measurement of numerate ability. In terms of the present schema, and in a manner similar to literacy, numeracy skills involve at least four basic types of processes, as shown in table 3.

2. *Types of numeracy domains.*—In any society, individuals who use numeracy may perform numeracy functions on a wide array of materials. Certain individuals may also specialize in specific types of numerate domains (e.g., accountants, storekeepers, tailors) and have considerable expertise in mental arithmetic. Even individuals with low general levels of numeracy skill may be able to cope successfully with written materials in a domain in which they have a great deal of practice (e.g., mothers who mix baby formulas or farmers who deal with a certain kind of pesticide). Therefore, since governments are generally interested in providing numeracy for many categories of people, it would be useful to sample across the domains where numeracy functions typically are found. Naturally, these materials may also appear as single numbers or on signs, labels, texts, advertisements, or documents. A breakdown of the types of numeracy domains found in most societies is shown in table 3.

TABLE 3
PROCESSES AND DOMAINS INVOLVING NUMERACY SKILLS

Skills and Domains
Numeracy skills for direct measurement:
i. Decoding (e.g., recognizing and pronouncing written numbers) ii. Writing (e.g., writing numbers from dictation; copying written numbers) iii. Solving (e.g., ability to accurately perform the four basic arithmetic functions: addition, subtraction, multiplication, division) iv. Locating information (e.g., finding the required numbers in a paragraph or document as part of a problem)
Numeracy domains for direct measurement:
i. Written numbers (e.g., single numbers; isolated numbers on signs) ii. Numbers in prose text (e.g., labels for commercial or medicinal products; numbers in a newspaper article) iii. Numbers in oral text (e.g., numbers in oral discourse) iv. Numbers in documents (e.g., numbers in official forms; directions on a can of infant formula; advertisements)

3. *Estimation of numeracy skills by domains.*—Table 4 presents an operationalization matrix of the intersection of numeracy skills with domains in which numeracy skills are practiced. The proposed numeracy matrix attempts to provide a rough breakdown of the types of component skills in numeracy that could be measured and then used for classification according to the operational definitions of numeracy described above (see table 4). Relative to literacy, there is perhaps somewhat more consensus on which skills to test in numeracy. As with literacy, the present choice of numeracy skills is based on the practicalities of developing reasonable assessment instruments. Matrix cells are ordered roughly from “a” to “g,” in terms of increasing expertise; however, this order also would vary depending on life experience. For example, an individual who works in a regional cooperative might be quite competent at finding appropriate numbers and other information in a roster, but not be competent at calculating the quantity of pesticide to use per hectare of maize.

D. Construction of Numeracy Assessment Instruments

The actual construction of numeracy assessment instruments can be as complex as that of literacy tests. Several key issues must be considered in the development of such instruments, including the types of tests in

TABLE 4
OPERATIONALIZATION MATRIX AND NUMERACY LEVELS FOR NUMERACY ASSESSMENT

Domain of Use	Type of Skill			
	Decoding	Writing	Solving	Locating Information
Written numbers	a	b	c	...
Numbers in prose text	...	...	d	e
Numbers in oral text	...	...	f	...
Numbers in documents	...	...	...	g

Operationalization of Numeracy Levels for Assessment

- i. Non-numerate:
Cannot effectively use skills
- ii. Semi-numerate, *and, with some errors*:
Can decode (identify/say) numbers in isolation [a]
Can decode (identify/say) numbers on signs in everyday context [a]
Can write numbers, copy written numbers [b]
Can locate numerical information in a short text [e]
Can solve simple “oral” arithmetic problems mentally [f]
- iii. High numerate:
Possesses skills in level ii, *and, with some errors*:
Can solve basic written arithmetic problems “on paper” [c]
Can solve written story-based problems “on paper” [d]
Can solve basic “oral” arithmetic problems mentally [f]
Can locate and identify numerical information in a complex document [g]

NOTE.—Letters a–g indicate intersections or “cells” that are to be assessed. Relevant cells are shown in brackets.

current use that may be usefully adapted, and the problem of how to sample appropriate domains. As with literacy, numeracy-instrument development contains a number of inherent psychometric issues that require attention. Some guidelines on these issues are provided in the Appendix.

Literacy Surveys and Literacy Policy

The present survey schema is designed to gather information on literacy and education in any country, irrespective of whether that country has engaged in specific literacy campaigns or nonformal education programs. In such surveys, the assessment instruments are expected to gather a broad range of data on the respondent's literacy abilities and educational background. Thus, literacy surveys undertaken at the household level can provide important information that can be used to address key questions of contemporary policy concern such as those that follow.

A. How Much Literacy/Numeracy Is Retained after School Leaving?

It is sometimes claimed that a certain level of primary school attainment will "ensure" that academic skills such as reading, writing, and arithmetic are retained after school leaving.²⁹ While hypotheses abound concerning the minimum amount of primary schooling (or nonformal education or campaign experience) necessary for literacy to be "fixed" in the child or adult, little reliable information is currently available. One recent study of primary school dropouts in Morocco appears to support the notion that moderate literacy levels are, indeed, retained after 5 years of primary schooling, but whether less schooling or more schooling would have differential effects is still unknown.³⁰ Since the amount of educational instruction is a primary cost factor in policy decisions, more information on this question should be obtained. The household literacy survey, with repeated assessments across years, is one of the most efficient means for gathering such information.

B. How Important Is Literacy to the Family in Low-literate Societies?

A major assumption among many development specialists is that literacy is a key component in economic development. As mentioned above, this argument posits the need for literate individuals to accomplish economic tasks in an increasingly complex world. In addition to the economic argument, it is often suggested that literacy can also contribute to individual and family security by providing a defense against the incursions of both

²⁹ M. J. Hartley and E. V. Swanson, *Retention of Basic Skills among Dropouts from Egyptian Primary Schools*, Report no. DRD171 (Washington, D.C.: World Bank, 1986); J. Simmons, "Retention of Cognitive Skills Acquired in Primary School," *Comparative Education Review* 20 (1976): 79–93.

³⁰ Wagner, Spratt, and Klein found that literacy was retained among children for 2 years following fifth grade primary school dropout in Morocco. It is interesting to note that numeracy skills dropped during the same time period. Gender differences were also found indicating that girls were more likely to retain literacy skills than boys.

literate government officials and poorly understood literate materials in the ecology. For example, literacy can protect the family against erroneous or unscrupulous taxation and against improper use, say, of medicinal products.

There is little doubt that these latter forms of literacy defense may be of considerable importance to the family. But the situation of family literacy in the Third World has changed dramatically over the past several decades. Where it was once the case in many communities that no individual was literate in an extended family, the advent of primary schooling and nonformal campaigns has meant that most extended and even nuclear families have someone to rely on for literacy help in case of need. It will be the rare Third World community in the 1990s where everyone is completely illiterate. What, then, is the development rationale for trying to achieve universal literacy? While all would probably agree that universal literacy is a laudable goal, both economic and defense rationales have been weakened by virtue of the changing demography of literacy in the late twentieth century. The days of the illiterate or "preliterate" society are virtually gone. Both communities and families have literate resources to draw on. The consequences of such change in the ecology of literacy require further exploration.³¹

The same consideration should be given to numeracy in contemporary Third World countries. The ready availability of hand-held calculators has already made substantial inroads in areas where mental arithmetic and abacus use once dominated. The gradual disappearance of local markets has also led to changes in how numeracy is used for household purchases. These changes do not necessarily indicate a decrease in the need for numeracy. Indeed, the opposite may be the case, but so little is known in this domain that further inquiry would seem to be imperative.

C. Does Female Literacy Lead to Lower Fertility and Mortality?

According to estimates, the number of female illiterates in today's world exceeds that of the male population by between 50–100 percent, depending on the geographic region of the world. Unesco states that the world illiteracy rate (for the adult population aged 15 and over) was 34.9 percent for females, while the male rate was 20.5 percent.³² In Africa, the rates were 64.5 and 43.3 percent, respectively; in Latin America, they were 19.2 and 15.3 percent; in Asia, 47.4 and 25.6 percent; and in Oceania, 10.2 and 7.6 percent. Although these are estimates, it is clear that female

³¹ See D. A. Wagner, "Literacy as Culture, and Some Policy Implications," in *The Consequences of Literacy*, ed. A. Purves (Albany: State University of New York Press, in press). The argument is made that few, if any, societies have large numbers of individuals with no knowledge of print culture. How much literacy is needed by which groups of people (by individual, family, or community) remains a topic requiring serious examination.

³² Unesco, *The Current Literacy Situation in the World* (n. 1 above).

illiteracy has generally been found to be considerably higher in most parts of the world. Given the common recognition of the key roles that women play in fertility planning, infant care/nutrition, and the economic life of the community, it is not surprising that female illiteracy is seen as a major obstacle to social and economic development.³³

However, even though the correlation between female literacy and health indicators is often significant—for example, high literacy rates are often correlated with low fertility rates on a cross-national basis—there is remarkably little evidence that shows a causal relationship between these variables. Indeed, the available evidence indicates that it may be formal schooling, rather than literacy per se, that changes the motivation and aspirations of women, which then could be a potential cause for decreased fertility.³⁴ Considerably more information will be required—and pilot intervention programs should be attempted—before national policy decisions should be made to increase female literacy as the primary basis for the desired outcomes of lowered fertility and infant mortality.

D. How Effective Are Adult Literacy Campaigns?

As noted earlier, little reliable data are available on the effectiveness of most contemporary literacy campaigns. Available evidence shows that adult literacy campaigns may be costly and inefficient in promoting literacy in many countries.³⁵ With literacy and education returning to the top of the political agenda in many developing countries, it is increasingly important to provide adequate evaluations as to the effectiveness of such campaigns. Utilization of literacy surveys of the type described in this article may be helpful in evaluating not only a particular campaign but also its effectiveness compared with other literacy initiatives.

E. Are There Informal Systems for Literacy Diffusion in Society?

How literacy ability is spread from one person to another within and across generations is sometimes referred to as literacy “diffusion” or “intergenerational” literacy. The data collected from a literacy survey can be useful for understanding how this diffusion takes place in a given society. There are a number of key variables that are thought to influence the spread of literacy such as age, gender, access to schooling, and educated parents and siblings. The use of multiple regression techniques with survey data should provide some idea of the contribution of various inputs leading

³³ A. Bernard and M. Gayfer, *Women Hold Up More than Half the Sky: A Third World Perspective on Women and Nonformal Education for Development* (Toronto: ICAE, 1983).

³⁴ R. A. LeVine, “Schooling, Attitudes, and Fertility in Mexico,” *Educational Researcher* (December 1987): 21–27; S. H. Cochrane, “Education and Fertility: An Expanded Examination of the Evidence,” in *Women’s Education in the Third World: Comparative Perspectives*, G. P. Kelly and C. M. Elliott (Albany: State University of New York Press, 1982).

³⁵ Arnove and Graff, eds. (n. 1 above); D. A. Wagner, “Literacy Campaigns: Past, Present, and Future,” *Comparative Education Review* 33, no. 2 (May 1989): 256–60.

to literacy levels in a given written language. In this regard, it would also be useful to supplement such data with a more sociological or anthropological descriptive account of literacy use in the home and community. Such descriptions have been found especially useful in interpreting quantitative findings, in correcting erroneous generalizations, and in developing new hypotheses that a statistical survey would not generate.³⁶

Conclusion

Literacy attainment and educational efficiency are increasingly important development goals. Making better policy decisions is always subject to limits imposed by the reliability and validity of the data one can bring to bear on the problem addressed. In the case of literacy, policymakers have been hampered not only by too little data but also by a failure to capture the varying types and levels of literacy extant in each society. Up to the present, international policymakers and educational specialists have also been limited by simplistic dichotomies, such as literacy versus illiteracy, which not only suggest inappropriate ways of conceptualizing human resources but also inhibit effective decision making. Despite the social and economic resources that have been made available for literacy work, we still know relatively little about the nature and extent of the "literacy problem" in the Third World. Are current estimated literacy rates too low or too high? Are we measuring literacy in too few languages? How effective are nonformal adult literacy programs or campaigns? What are the long-term literacy retention characteristics following primary school dropout? Is numeracy as important as literacy, and should numeracy skills be measured in surveys? What are the economic and health consequences for different levels of literacy and numeracy achievement? Should a special effort be made to teach literacy to women, or should resources be focused on those already in the workplace who need upgraded literacy skills? The list of such questions could be long, and relevant answers will be difficult to produce. However, until we have better ways to assess literacy and numeracy in widely varying cultural contexts, the answers we do have will remain only conjectures and political rhetoric.

Appendix

For more detail on sampling from literacy/numeracy skills and domains, refer to United Nations, *Measuring Literacy through Household Surveys* (New York: United Nations Statistical Office, 1989), which contains a more detailed account of the same topics. A brief schematic overview of these issues is presented below:

- A. *Sampling skill domains in literacy: some useful instruments.* Many literacy skill assessment tests are currently available, although the large majority of

³⁶ Ethnographic or descriptive accounts of literacy in both industrialized and developing countries may be found in several recent volumes (see nn. 5 and 7 above).

these have been constructed and normed on school children. Across this proliferation of test instruments, a number of *types* of tests have gained popularity due to their ease of construction, ease of explanation to the respondent being assessed, and ease of scoring. They are, therefore, the kinds of tests that are appropriate for assessment use in literacy surveys. The majority of these tests are predominantly nonverbal and are in multiple-choice format. Note that the letter in brackets refers to the cell of skill/domain as described in table 2.

1. *Oral reading*. [a] In many languages, reading with understanding can be accomplished if the person understands the alphabetic principle and knows how to pronounce letters in combination (i.e., words) and words in combination (i.e., sentences). A common way to measure oral reading is to present the respondent with a series of common words to pronounce, then a series of common sentences. An additional series of words that are embedded in pictorial 2-dimensional displays (such as read the “stop” on a stop sign) serve as an additional measure of early reading ability.
 2. *Word-picture matching*. [b] A common way to measure beginning reading ability is to find out if the respondent can recognize which of several words “matches” with a given picture. Show (say, over 10 trials) a series of four words spread out in a row, asking the respondent to find a specific word that matches the picture.
 3. *Name signing and writing*. [c], [e] The most elementary skills in writing typically include signing one’s name and the ability to copy text [c]. These skills can be useful everyday skills since signing one’s name can be used for voting, receiving a package at the post office, and many other essential tasks. Likewise, copying text not only demonstrates elementary ability but also may be used to fill out forms and similar tasks. Skilled writing [e] consists of presenting the respondent with a picture that corresponds to a simple oral story. The respondent is asked to write a few sentences related to the story.
 4. *Paragraph comprehension*. [d] This test generally consists of a paragraph of expository text that is a few sentences long followed by several (three or four) written questions. The respondent is asked to select the best choice of response from a series of four possible responses.
 5. *Locating of information*. [f], [g] Simple locating of information [f] requires the individual to point to (or underline) a given word in a paragraph. Skilled locating of information in complex documents [g] has increasing utility in many societies. In this task, the respondent is presented with a document such as a government electricity bill and is asked to find out, for example, to whom the bill is addressed and what the amount is that needs to be paid.
- B. *Sampling appropriate text domains in literacy*. A comprehensive assessment instrument should include the possible domains in which literacy is practiced in each language in a society, without focusing, as some tests do, on domains based uniquely on school-related exercises. As described in the text, an attempt has been made to combine school-related domains with

those typically found in everyday activities such as publicity, religious documents, and signs. If the goal is to establish a measure for literacy that is "functional," effort must be devoted to discovering what kinds of texts people need in order to function (see Kirsch and Jungeblut, n. 4 above).

C. *Translation issues in literacy instruments.* Two main issues arise: (a) the problem of accurate comprehension of the oral instructions and procedures for both respondents and interviewers, and (b) the problem of translation of the written contents of instruments where the survey is undertaken in multilingual and multiliterate societies.

1. *Oral instructions and procedures.* While there is now a substantial scientific literature on various aspects of this problem (see R. W. Brislin, "The Wording and Translation of Research Instruments," in *Field Methods in Cross-cultural Research*, ed. W. J. Lonner and J. W. Berry [Beverly Hills, Calif.: Sage, 1986]), there are two main principles that should be followed in order to achieve maximum comprehension. First, all oral instructions to the respondent should be communicated, where possible, in his or her mother tongue (or an acceptable household language if there is more than a single mother tongue in the household). At no time should the interviewer assume that a second language is sufficient for clear understanding of instructions or procedures. Second, all instructions must be able to pass the process of "back translation," whereby instructions are first translated from one language to a second language, and then, by a different person, are translated back into the first language.

2. *Written contents.* The question of how to provide equivalent written contents across languages/literacies is a complex topic that has received insufficient scientific attention. For example, in Zimbabwe, the English word *ant* may be translated into Ndebele as *nyenama* and into Shona as *nhoda*. While the meaning of *ant* is probably similar across the other two languages (unless ants are greatly different across these two linguistic groups), nonetheless the Ndebele and Shona words may be more difficult, if only because they have more syllables (hence letters) to process. Similarly, a sentence in Ndebele might have the same number of words as Shona to express roughly the same thought, but each word might be almost twice as long in letters. As yet, there is no adequate theory of comparative reading that enables the developer of tests to reach more than an approximation of equivalency across languages and orthographies. At present, common sense will have to be the guide with respect to developing approximate levels of difficulty across languages, and equivalences can eventually be worked out through psychometric standardization techniques.

D. *Sampling skill domains in numeracy; some useful instruments.* As is the case with literacy, many mathematics assessment tests are currently available, although the large majority of these have been constructed and normed using school children as the norming samples. However, unlike literacy, there is usually only one "official" numeracy in a given country, virtually

always based on the Euro-Arabic number system. Yet there also exist traditional indigenous number systems—using base 5 or base 8, rather than the typical base 10 system—still utilized by many groups of people, and especially nonschooled women (see Girodet, n. 28 above). To the extent possible, the present numeracy assessment should be sensitive to the existence of these skills, which may be critical to daily life in certain cultural groups. Whenever indigenous systems are in use, it would be important to include problems that can make use of, and measure skill in, these mathematical systems. The majority of these tests are predominantly nonverbal and are in multiple-choice format. Note that the letter in brackets refers to the cell of skill/domain as described in table 4.

1. *Number naming.* [a] In any written numerical system, a basic ability to name the numbers would seem fundamental. In this simple test, the respondent is asked to name several numbers on the page and on simple signs in everyday contexts.
2. *Number writing.* [b] Elementary numeracy skills include being able to write and copy numbers. These can be useful everyday skills since number writing and copying can be used for recording dates, prices, and other numerical information.
3. *Solving oral arithmetic problems.* [f] This test generally consists of several problems presented orally. A simple example would be as follows: “If your father gave you two bushels of corn and your uncle gave you two more bushels of corn, how many bushels of corn would you then have?” A more complex example might involve more than one arithmetic function, such as the following: “Ahmed inherited 20 hectares of land; he decided to let his uncle farm half of this land, and he allowed his cousin to use two of his remaining hectares. How many hectares did Ahmed farm for himself?” In oral or mental arithmetic, the respondents are required to solve the problems without using pencil and paper.
4. *Solving written arithmetic problems.* [d] These are often called arithmetic “story” problems. They are written versions of the previous type of problem (3) but are written in short paragraphs. They are, of course, dependent on the respondent’s literacy skills as well as numeracy skills but represent a common form of arithmetic tasks that individuals face in many contexts, that is, a combination of literacy and numeracy, and they can be presented in multiple-choice format.
5. *Solving arithmetic equations.* [c] Normally associated with school-based mathematics, the solution of simple arithmetic equations is a task increasingly seen in everyday contexts, such as in the formulas for mixing instant foods for babies. Examples might include the following: $2 + 7 = \underline{\hspace{1cm}}$; $81 - 73 = \underline{\hspace{1cm}}$; $5 \times 9 = \underline{\hspace{1cm}}$.
6. *Locating of information.* [e], [g] Simple locating of numbers [f] requires the individual to point to (or underline) a given number in a paragraph. Skilled locating of numbers in complex documents [g] has increasing utility in many societies. In this task, the respondent is presented with a document, such as a health document on infant diarrhea, and is

asked to determine, for example, what is the suggested dosage and, for a given amount of water, how much salt solution to mix in.

- E. *Sampling appropriate numeracy domains.* As with the case of literacy, a numeracy assessment instrument should ideally include all the possible domains in which numeracy is practiced in a society, without focusing, as many tests do, on domains based only on school-related exercises. In table 3, an attempt was made to combine school-related domains with those typically found in everyday life. Nonetheless, there are many activities which, for expediency, have been excluded from sampling. For example, knowing how to tell time or keep accounting books are two skills that would be useful to assess, if more resources were available.