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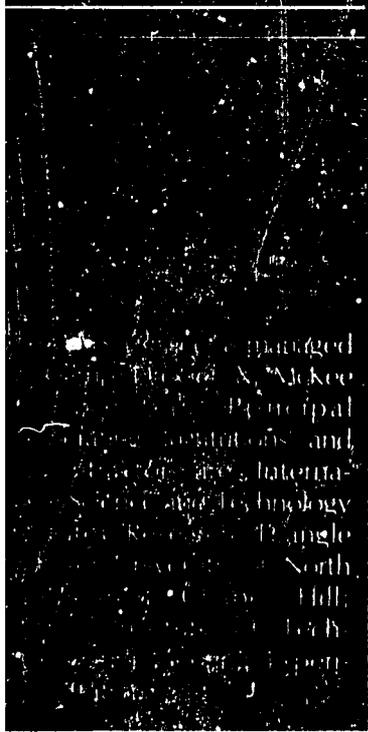
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PRETESTING AND REVISING INSTRUCTIONAL MATERIALS FOR WATER SUPPLY AND SANITATION PROGRAMS

WASH TECHNICAL REPORT NO. 24

OCTOBER 1984



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Office of Health
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Prepared for the Office of Health, Bureau for Science and Technology
U.S. Agency for International Development
under Task No. B-339

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PREFACE

When preparing health education materials for audiences in developing countries, it is critical that designers consider the ability of the intended audience to "read" such materials. If this important principle is overlooked, educational materials are often misinterpreted. This report, therefore, attempts to address this problem by detailing a process for determining how to field test educational materials and how to ensure that they convey the intended message. Guidelines for designing and selecting instructional materials appear in the appendices to this report.

Chapter 1

INTRODUCTION

This report supplies guidelines for field testing and revising health education materials for use in water supply and sanitation programs. Although the guidelines are illustrated within the context of water supply and sanitation efforts, they are not specific to either a particular subject matter or to a particular country. Rather, they are developed and produced primarily for people with limited experience in designing visual materials and who wish to ensure that the materials they develop are suitable for conveying the intended messages. These guidelines assume that materials have been initially designed and selected for use in water supply and sanitation programs and that the intended audience has little, if any, experience in interpreting visual materials. When producing educational materials to motivate and instruct, it is critical to consider the experience and educational level of the intended audience.

Effective visual materials promote learning. Such a learning device may be depicted as objects (water pumps), models (wooden models of water pumps), printed illustrations (drawings of water pumps), photographic prints (black and white or full-color pictures of water pumps), filmstrips (a series of projected color photographs of water pumps), or motion pictures (a movie about water pumps). While these guidelines are intended primarily for pretesting and revising drawings and photographs, they are generally applicable to any type of educational materials.

The ability to understand visual materials is not automatic. Picture comprehension, pictorial depth perception, and the meaning of the conventions often used in printed illustrations must be learned (Parlato, 1981). "Audiences having no familiarity with information presented three-dimensionally have extreme difficulty understanding graphic images" (Deregowski, 1968). Visual materials must, therefore, be designed or selected based upon the extent to which the intended audience has been exposed to visual materials and has learned to understand them.*

It might be assumed that visual materials serve their purpose, provided that the intended audience is able to identify the items depicted or to describe either the portrayed condition or activity. This assumption, however is oversimplified in terms of judging the value of health education materials. Effective communication through visual aids is dependent upon a number of factors. One major premise is that establishing effective communication through visual materials is more complex and difficult than doing so through printed material. This premise appears to be particularly valid in attempting to produce and use visual materials with people who have limited experience with them. To achieve effective communication through the use of visual materials, the total communication process must be considered. Figure 1 lists important questions and shows the relationships among the questions, the development process, and the ultimate educational goal. The figure should

* For a description of how to design and select visual materials, see Appendix C.

serve as a clear overview of the complex task of communicating through visual materials.

The majority of the research on visual materials in developing countries focuses on problems of perception and recognition. Most of the testing of such materials has been concerned with the type of question such as: "Which animal is the closest to you? The cow, the pig, or the dog?" The objective of such questions is to determine whether the intended audience is able to identify, read, and understand the visual image. This type of inquiry is valuable and necessary and places the learner in the "gateway" of communication. To stop here, however, and not follow up with more important questions precludes changing attitudes and behavior--the ultimate objective of most educational activities. The ability to identify what is seen is not enough. Members of the intended audience also must believe what they see, value what they see, and be persuaded by what they see. Only then will attitudes and behavior change.

Figure 1

Questions About Visual Aids as They Relate to the Process of Communication

	Aspects of Communication
I.	
● Is the visual aid identifiable?	Entering The Gateway
● Is it "readable"?	
● Is it perceived?	

II.	
● Is the visual aid convincing?	Meeting The Goal
● Is it persuasive?	
● Is it memorable?	
● Is it exciting?	
● Is it different?	

III.

- Is the visual aid credible? Getting
Attention
- Is it valued?
- Is it important to the viewer?

IV.

- Is the visual aid culturally appropriate? Holding
Attention
 - Is it believable?
 - Does it contain images from the viewer's repertoire?
-

Prior to outlining specific methods of pretesting and revising visual materials, it is imperative to note that such materials must be viewed in context. This context is defined by the program in which they will be used. Does the program have clearly defined behavioral objectives? Has a series of messages been defined for each objective? What other methods of reaching behavioral objectives are being planned in addition to the use of media? Satisfactory answers to all of these questions must be obtained before visual materials are designed. Only then will the designer know how to specify themes, to integrate materials into other activities, and to use them to supplement other media approaches. Visual materials, alone, do not teach people. They inform, remind, and emphasize important points, but they allow no feedback and offer neither support nor rewards. As such, educational materials must always be used with other approaches to changing behavior.

Chapter 2

GUIDELINES FOR DESIGNING AND SELECTING VISUAL AIDS

Although designers of visual materials for use in various public health programs, including water supply and sanitation projects, are aware of the need for pretesting materials, only a small number of them actually do so. It should be emphasized at the start that field testing is not an option in most cases but rather the only way to ensure that materials are relevant, acceptable, and effective. Considerations such as cost of transport to field sites, as well as a lack of time and qualified personnel often preclude pretesting. Even more influential is the prevailing attitude that to find errors in one's work is to expose one to the threat of losing either status or a position.

Field testing may be made less costly by using subjects close at hand, such as members of the same ethnic group as the intended audience but who live in the city. One- to two-day workshops could be used to train field workers in pretesting techniques. In this way, the ability of the designer of the materials to pretest them can be extended. To counteract the bias against field testing, the program for developing materials could be set up within the organization where it is housed, with the assumption that pretesting is an integral part of the development process and that no materials are considered final unless field tested.

The following are guidelines for conducting such field tests. These guidelines may be used for field testing any type of health education materials, including visual aids, printed words, or spoken words. The following steps indicate how field testing is an integral part of the process of developing educational materials:

1. Decide what the intended audience needs to be able to think and do after the materials are used; that is, decide on the objectives of the program for which the materials are being used.
2. Ensure that there is a clear understanding of what the intended audience already thinks and does about the subject.
3. Ascertain what needs to be communicated (that is, what the audience needs to be able to think and do but cannot think and do at present).
4. Develop or select visual materials designed to convey needed information.
5. Pretest the materials to determine whether, or to what extent, they actually convey the intended message.
6. Revise the materials until they communicate the desired message.

The following guidelines for field testing health education materials for water supply and sanitation programs including visual aids, (some drawn from experiences in water and sanitation) assume that the first four steps have been taken. If these steps have not been carefully followed, field testing

will have to await the completion of missing steps before meaningful testing of the materials (Step 5) can be completed. The main objective of Step 5 is to obtain information that will be helpful in revising the materials (Step 6). This discussion of field testing describes how Step 5 can best be accomplished as a part of the overall process of developing educational materials.

Field testing of health education materials may take place at two different times: one while the materials are being developed, another while testing the effectiveness of materials after they have been developed. In the first instance, the process of testing is called pre-testing and the results are used for revising the materials before finalization. In the second instance, the results of testing are to make a final adjustment in the materials before general distribution. Sometimes in the latter process, the effectiveness of materials is compared to that of other materials or with situations where no materials at all are used. These comparisons are not discussed in this paper, but many aspects of the two types of field testing are so similar that their discussion is intermingled in the sections that follow.

2.1 Pretesting of Educational Materials¹

Field testing visual materials enables both the designer and producer to revise them according to criteria such as readability, perceptibility, cultural relevance, memorability, ability to provoke action, and so forth. Field testing formats help to ensure that established criteria are being met. Examples would be to test only the materials in question, to test together several materials treating the same theme, or to place the material to be tested in the midst of varying educational materials on the same theme.

It is preferable that the artists designing materials, as well as those who produce them, participate actively in the field testing because they will be making revisions and will, therefore, be able to benefit from the feedback.

Following are seven steps involved in field testing materials:

1. Select materials that are thought to be crucial to the program, that contain ideas perceived to be either new or strange to the audience, or that are likely to be the most widely disseminated.
2. Ensure that the objectives for the selected activities are clear.
3. Decide what will be acceptable evidence that each objective has been met.
4. Select members of the intended audience.
5. Pretest the educational materials and record the results.

¹ Basic references: Mager, R. F., 1969; Gagne, R. M. and Briggs, L. J., 1974; Popham, J. W., 1972; Tuckman, B. W., 1972.

6. Analyze the collected data and make recommendations for revising the materials.
7. Revise the educational materials accordingly.

2.1.1 Selecting Educational Materials for Field Testing

Because the primary purpose of field testing is to make decisions about the need for revising educational materials, one should not wait until all of the materials have been developed before initiating field testing. In general, the initial stage of field testing is conducted with part of the educational materials and with one or more persons from the intended audience. While the emphasis here is on field testing visual materials, an important consideration is that they may be only a part of the total program of educational materials and will have to be field tested along with other materials. Following are three examples of situations requiring the use of visual materials:

- A poster on handwashing is to be placed in a prominent place in a dispensary in hopes that onlookers will not only understand the message but will also be motivated to take certain action.
- Informal discussions are planned for a women's meeting regarding personal hygiene. A flipchart and a flannelgraph are both to be used to help members of the group to understand the discussion topics.
- An information booklet is being prepared that gives details concerning certain food- and water-handling practices. The booklet incorporates both printed words and visual aids used to reinforce the printed words.

In the first situation, the poster is, of course, the educational material. In the second, the educational materials include both the content of the informal discussion and the visual aids to be used. Because the printed material and visual aids are intended to be used together, they should also be field-tested simultaneously. To attempt field testing only the visual aids, without including the pertinent parts of the informal discussion, could result in misleading information. In the third situation, the educational materials include both the printed words and the visual aids. Again, the results of trying to field-test the visual aids without the words or printed material without the visual aids could be misleading.

Blocks of educational materials that require 5 to 15 minutes to present are ideal for field testing. Once the small blocks of materials have been field-tested and most of the problems corrected, larger blocks may be used. While the selected materials do not necessarily have to be in their final form, all of the factors likely to affect the understanding of the intended audience should be included. For example, if color photographs are to be used in the final product, the field testers should not use black and white if they think that there is a possibility that the choice of the color will affect the ability of the intended audience to grasp the message.

One critical requirement of the block of material selected for field testing is that it have logical beginning and ending points. The selected materials need to cover a subject sufficiently to make sense to the intended audience. Usually, beginning or ending in the middle of a series of closely related ideas should be avoided. For example, if a flipchart on child care includes both the steps in preparing an oral rehydration solution and techniques for bathing a baby, all of the steps in preparing the solutions should be field-tested together, and all of the techniques for bathing should be field-tested together separately. Once a block of materials has been selected for an initial field test, an assessment should be made of how this block of materials is related to the total program. For example, if the selected block is taken from the middle of the program, the field tester should determine whether there are earlier materials that are necessary to understanding the materials selected for field-testing. If so, either a different selection will have to be made or the necessary earlier materials will have to be included in the block to be field-tested. Clearly then, there are some advantages to developing and field-testing the materials in a sequence that will allow each new block of materials to build upon previous ones.

If the materials consist only of a single poster, the poster, of course, will be the block of materials to be field-tested. If the materials represent an informal discussion supported by the aids, the first 5 to 15 minutes of the discussion supported by visual aids might be selected for the first field test. After this part of the effort has been field-tested and any necessary revisions made, the following 5- to 15-minute block can be field-tested. If possible, this next block should be field-tested with the same people. In this way, one can ensure that the participants already know the information in the first part that is required to understand the second part. Additional blocks of materials may then be field-tested until the entire educational program has been completed.

Field testing of printed materials requires the same guidelines as the assessment of informal discussions supported by pictures. As such, the first field testing should be conducted with a 5- to 15-minute discussion that has a logical beginning and ending point. Subsequent segments may then be selected until the entire educational program has been completed.

2.1.2 Identifying Program Objectives

Because the purpose of the field testing is to ensure that the educational materials do what they are intended to do, a clear understanding of program objectives is essential. Effective educational practices usually incorporate a complete list of educational objectives and appropriate materials to meet those objectives. Those responsible for field testing the materials should be knowledgeable of the established objectives. Because the blocks of educational materials selected for field testing have logical beginning and ending points, there should be one or more objectives indicating what each block of materials is supposed to accomplish.

Objectives, which must be established prior to field testing, may be defined as valid statements of what the intended audience is supposed to know, or know how to do, as a result of the educational program. One of the

objectives of the flipchart mentioned earlier, for example, might be to promote the audience's understanding of the reasons for preparing an oral rehydration solution. Another objective might be to enable the audience to understand the steps involved in preparing the solution. The form or structure of the statement of objectives is not so important as how well the statement describes the expected outcomes.

In producing educational materials, it is important to understand that there may be a distinction between what the intended audience knows how to do and what it actually does. For example, a poster might have been designed to motivate people to wash their hands before eating. While the immediate objective might be to help the viewer understand the importance of washing his hands before eating, a long-term objective might be to persuade the audience to do so. Additional program elements would be required if this behavioral objective is to be met. For present purposes, the focus is on attaining immediate objectives: what the intended audience will understand or know how to do immediately after exposure to the educational materials, even if it is only a matter of arousing their interest in the subject.

2.1.3 Determining Criteria for Meeting Program Objectives

Once those responsible for materials are familiar with what the selected block of materials is expected to accomplish, they become more knowledgeable about exactly how to determine the degree to which the materials are acceptable. At this juncture, they must either develop specific guidelines or tests for not only the total block of materials but also each significant part. For example, if the materials to be evaluated consist of 30 pictures, the field evaluators need to determine whether the total series, as well as each of the pictures, is acceptable. Simply knowing something is wrong somewhere in the 30-picture series is not so important as knowing, for example, that pictures 14 and 19 are being erroneously interpreted. For this reason, field testers need to develop a test that includes items for each segment being assessed. For the flipchart mentioned earlier, one of the possible objectives was to enable the audience to understand the steps involved in preparing an oral rehydration solution. A test for this objective might be that each member of the audience describe each step in preparing the solution. Such a test would not only indicate whether or not the objective was met but also which steps, if any, were not understood. Such a process is beneficial in identifying specific pages of the flipchart that require revisions.

Test items may be divided into two categories: one requiring that the respondents select from alternatives, and the other requiring that they develop a response to a question. An example of the first type of test item might include respondents selecting "true" or "false" to describe a statement or when they choose an answer to a multiple choice question. An example of the latter type of category involves descriptions or explanations given by respondents or demonstrations of manual skill in response to questions. By way of example, the audience described the steps in preparing an oral rehydration solution. If the test had consisted of presenting a number of activities and asking the audience whether or not each activity was one of the steps in preparing the formula, the audience would simply have selected a "yes" or "no" response for each activity.

Each type has both advantages and disadvantages. With selected response items, it is relatively simple to determine whether or not the responses indicate that the educational materials are acceptable. One merely identifies in advance which of the alternatives are correct. Unfortunately, selected responses provide only limited information regarding why a particular response is given. Audience responses, however, make it more difficult to determine correct and incorrect items. For example, if the test item for evaluating a particular picture requires the respondent to describe a particular procedure, how will the field tester decide whether or not the description provided is adequate? This type of response may, however, give the field tester useful information regarding how the respondents perceive instructional materials. Such insights are quite beneficial when revisions are required.

2.1.4 Selecting the Intended Audience

The number of people selected for field tests depends upon various factors, including the size of the budget and time one has to do the pretesting. Generally, one or two people selected from the intended audience are adequate for initial testing of the educational materials. Larger numbers may be used later when most of the problems have been corrected. Further, the number of people involved in a particular field test usually is not as important as how many times the materials are field-tested with different individuals and small groups. For example, if 20 people were available for use in an initial field test, conducting the field test with all 20 would not be particularly productive. It would be better to field-test with one or two people, revise the materials as necessary, retest with one or two more people, and so forth, until most of the problems were corrected. Then groups of perhaps five to eight could be used for further tests until few, if any, problems remained. Drawing on a sample of people to participate in this type of field testing to obtain scientific precision is not required. It is important to remember that at this point, the effort involves developing or selecting materials rather than attempting to prove that the materials are preferable to another educational approach.

Within the context of pretesting materials, it is critical to remember that the people selected for the field tests be representative of those for whom the educational materials are being developed. As noted earlier, the materials should have been developed based on certain assumptions about the intended audience. These assumptions might include characteristics such as age or sex, ethnic group, language, educational level, experience, interests, attitudes, and prejudices. More importantly, perhaps, is that assumptions are made about what the intended audience already thinks and does. A helpful procedure would be to select, using a table of random numbers, a list of 50 to 100 potential persons to participate in testing the materials.

To use a table of random numbers, start by determining the number of persons to be tested, for example, 100 as suggested in the preceding paragraph. You prepare in advance a list of names from which these 100 will be selected, assigning each a consecutive number from 1 to whatever the last number is, in our example, 356. Starting at the upper left hand corner of the table, select numbers whose first three digits are less than the number of names, skipping any that recur, until a total of 100 have been selected. Since 356 is a three

digit number, we consider only the first three digits when determining which numbers to select. In the example shown in Table 1, the first three-digit number in the upper left hand corner is 797. Beginning with that number, 100 numbers have been selected. They are circled in the names list and in the table of random numbers. The names whose numbers correspond to those selected form the sample of persons to be tested.

Next these persons are classified according to age, sex, and education, or any combination of criteria deemed important. Groups of persons combining these characteristics could then be formed. For example:

<u>Women</u>	<u>Men</u>
5 - 14	5 - 14
15 - 44	15 - 44
45+	45+

For each sex-age group then one can categorize by educational level as follows:

- None
- 1 - 4 years
- 5 years
- 10 years or more

Persons with whom to test materials could be selected from each subgroup, for example, from the group of women 15 to 44 with 1 to 4 years of schooling. They could then be tested either individually or in groups representing several subgroups. From each subgroup then, (for example, women 15 through 44 with one to four years of schooling) persons with whom to test materials could be selected, either individually or in groups representing several subgroups. One could proceed in a similar fashion using the other criteria depending on their relative importance. For example in a multi-ethnic setting it might be good to use this criterion for classifying those to be tested as well.

TABLE 1 - TABLE OF RANDOM NUMBERS AND THEIR USE

7972	8825	4491	4617	1293	3069	9319	5201	8521	7748
1445	2793	9608	8735	9858	2584	9193	3207	2178	0272
2593	5218	5646	7715	2283	8846	0375	9367	8670	2167
5583	7102	6697	7251	9566	1091	6589	0194	4114	3734
9189	9058	1819	5648	7382	7031	6524	9000	1759	8206
7114	1843	0903	1671	4848	4232	5425	9602	6624	5355
5666	6219	9104	0202	9566	3688	8501	6640	6587	0021
1720	2534	4486	4224	7269	5178	1261	4783	0027	9073
4515	1814	2274	1899	1161	1435	2885	5605	9548	4022
6102	2716	3093	2525	6606	7458	1980	9323	3793	2882
6687	7556	4224	5780	5898	6534	4803	0681	2717	3388
3645	4892	3068	7422	2535	5328	9686	0986	4963	2123
7721	8186	4010	4660	7247	2264	0367	2258	5135	1646
0340	5096	1998	4578	9015	8880	8614	9285	7010	1354
7244	0025	2667	0883	1598	1315	0686	8416	9554	2313
4583	2194	3662	7370	4653	6464	2528	1733	6576	9891
6421	3955	4831	9379	4997	7185	8480	4012	6041	9867
9198	4597	9831	8281	9200	1376	4211	7883	2634	4464
5266	2935	7831	7996	2259	3093	2302	0435	0114	4341
8641	4464	8244	9537	8464	8200	1982	0668	8338	9783
4579	8486	5534	4698	4198	2185	9833	1519	5607	9233
2978	7578	1008	4239	7306	2737	8090	2493	0353	6964
8513	5476	0860	1566	7774	4690	6526	6997	5253	7417
2357	6183	7206	3511	9337	4943	4100	6195	7754	4879
9862	2944	3886	1137	2378	2393	8496	2085	6383	8908
4025	3236	0912	8115	8520	3494	5238	1813	4317	8828
1006	2738	4535	1699	8618	6251	7085	9632	5378	5429
8361	6555	0276	0124	1676	2640	2376	1616	5699	2069
9497	5887	8776	7742	8510	8978	4010	5337	8194	6804
5223	9191	4820	0907	9470	6529	3015	3013	1876	3163
0779	2555	4682	0955	3157	8161	9626	3183	6389	4595
2198	4146	3649	8367	7824	3697	0805	0032	5629	2684
0651	3531	5444	1305	7773	6332	1660	7062	5585	8166
7109	1834	5520	3582	2525	1457	3972	9453	3245	9156
7815	8210	3996	5334	2218	0846	4468	4372	7175	7895
3664	7531	5107	6122	6487	1536	5244	3110	5293	8616
9725	4917	9161	8922	4191	2915	4859	2169	2830	9178
6619	4956	1942	5087	3487	8622	0492	7614	4975	6174
6629	3646	4313	6487	8069	9746	4410	3194	3539	6821
4668	4548	9724	8655	1350	6737	1290	3938	7051	0660

In our example, there was a list of 356 persons. Let's reproduce that list for brevity using only family names (taken from throughout Africa).

- | | | | |
|--------------|----------------|-----------------|------------------|
| 1. Yabo | 51. Fall | 101. Bouyay | 151. Yokadouna |
| 2. Zerbo | 52. Sondo | 102. Bembereke | 152. Sangherima |
| 3. Abdo | 53. Mossi | 103. Bambala | 153. Ebolowa |
| 4. Zima | 54. Lambundu | 104. Nikki | 154. Dschangdele |
| 5. Maldoni | 55. Ekenyi | 105. Djougou | 155. Berberti |
| 6. Nyambo | 56. Lambo | 106. Nattingou | 156. Bouar |
| 7. Etula | 57. Mbarga | 107. Boukombe | 157. M'baiki |
| 8. Adeniyi | 58. Atangana | 108. Baterou | 158. Bozoum |
| 9. Adebo | 59. Lulenyi | 109. Bassila | 159. Bossangua |
| 10. Atangana | 60. Tshipala | 110. Pira | 160. N'Dele |
| 11. Ndjema | 61. Tshibungi | 111. Koda | 161. Bamingui |
| 12. Mungji | 62. Tshombe | 112. Parakou | 162. Kanga |
| 13. Nganga | 63. Aba | 113. Tcharourou | 163. Bandoro |
| 14. Obo | 64. Abia | 114. Kyibo | 164. Batangafo |
| 15. Isambo | 65. Abomey | 115. Bename | 165. Alindao |
| 16. Mbarga | 66. Achebe | 116. Agoua | 166. Bakouma |
| 17. Ivelo | 67. Adamoua | 117. Savatou | 167. Yalinga |
| 18. Anyi | 68. Adana | 118. Dassa | 168. Yaka |
| 19. Musinga | 69. Adjarie | 119. Zoume | 169. Bongo |
| 20. Tordo | 70. Admete | 120. Djidja | 170. Djema |
| 21. Djama | 71. Adoua | 121. Aplahoue | 171. Obo |
| 22. Djerna | 72. Teke | 122. Lokossa | 172. Dongou |
| 23. Yema | 73. Senoufo | 123. Tschilapa | 173. Mfonpo |
| 24. Zinga | 74. Akan | 124. Athieme | 174. Ouessou |
| 25. Obengo | 75. Akosombo | 125. Ganvie | 175. Sembe |
| 26. Adula | 76. Alebenodjo | 126. Galavi | 176. Souanke |
| 27. Obendjo | 77. Kananga | 127. Sakete | 177. Mbomo |
| 28. Ewe | 78. Shungu | 128. Abeokuta | 178. Etoumbi |
| 29. Yoruba | 79. Tshibala | 129. Maroua | 179. Etoundi |
| 30. Ibo | 80. Tshimenge | 130. Kaele | 180. Fkala |
| 31. Hausa | 81. Adoula | 131. Tcholipe | 181. Nsona |
| 32. Fanga | 82. Sonchi | 132. Martata | 182. Ouando |
| 33. Ubanqi | 83. Lubango | 133. Tibeti | 183. Mossaka |
| 34. Adenoho | 84. Nyimbi | 134. Foumbandu | 184. Gamboua |
| 35. Ekenyi | 85. Damba | 135. Bafang | 185. Lekape |
| 36. Addo | 86. Kumbele | 136. N'Kemsamba | 186. Djambala |
| 37. Kwami | 87. Uige | 137. Edea | 187. Ngaba |
| 38. Kwashi | 88. Dala | 138. Balmayo | 188. Bateke |
| 39. Mbuji | 89. Iando | 139. Kumba | 189. Zananga |
| 40. Mayi | 90. Kibala | 140. Ashu | 190. Kindamba |
| 41. Kigenge | 91. Bailundo | 141. Goure | 191. Tshela |
| 42. Mutenga | 92. Kassinga | 142. Tessoua | 192. Kungu |
| 43. Korina | 93. Menogui | 143. Malbaza | 193. Kangu |
| 44. Kynenyi | 94. Gayo | 144. Tahoua | 194. Mayombe |
| 45. Kikuyu | 95. Dundo | 145. Tillabéri | 195. Myama |
| 46. Samba | 96. Ngira | 146. Abija | 196. Mouyoyezi |
| 47. Djallo | 97. Ngongo | 147. Oshogbo | 197. Sibiti |
| 48. Senghor | 98. Kandi | 148. Aba | 198. Mossendjo |
| 49. N'Diaye | 99. Segbana | 149. Ede | 199. Komono |
| 50. Lo | 100. Berou | 150. Batouri | 200. Makabama |

201. Kindamba
202. Muyonzi
203. Louboma
204. Divente
205. Mindou
206. Loubima
207. Kinkali
208. Sanhala
209. Iugrèla
210. Mbingue
211. Koutou
212. Boudjali
213. Kongo
214. Opombo
215. Wembo
216. Nyama
217. Ishilapa
218. Bondouko
219. Odimba
220. Diko
221. Niakara
222. Zouba
223. Mankano
224. Botro
225. Katiola
226. Diabakala
227. Bondobko
228. Ouelle
229. Agnimekou
230. Abengourou
231. Daoukro
232. Bokanda
233. Kouibi
234. Zeale
235. Duekoue
236. Grebeo
237. Daiba
238. Nzo
239. Guigle
240. Soubre
241. Liakota
242. Divo
243. Tiassale
244. Dimokoro
245. Daoukro
246. Sinifra
247. Oume
248. Issia
249. Idoua
250. Asselia

251. Goba
252. Yabela
253. Gore
254. Dollo
255. Dombolo
256. Gambela
257. Dangula
258. Bitamo
259. Oyembo
260. Nkolabona
261. Belinga
262. Mokambo
263. Batoala
264. Makoku
265. Okandia
266. Ndebela
267. Mounane
268. M'Bigou
269. Koulamoutou
270. Mobutu
271. Fougamou
272. Mpape
273. Mpabi
274. Ibanda
275. N'Djole
276. N'Kolaboma
277. N'Doum
278. Bogatange
279. Tamaleni
280. Kintampo
281. Akosombo
282. Samankesa
283. Odja
284. Anloga
285. Tarkwa
286. Piresti
287. Babatanga
288. Bereksum
289. Sekondi
290. Takoradi
291. Maleya
292. Touque
293. Foutra
294. Gundara
295. Gaoua
296. Sangaredi
297. Kamsara
298. Labe
299. Dinguireye
300. Telimeli

301. Boffa
302. Dubreka
303. Faranah
304. Pita
305. Touque
306. Dalaba
307. Koure
308. Timbo
309. Fria
310. Oula
311. Mamou
312. Kissoudou
313. Guecke
314. Macenta
315. Beyla
316. Sinko
317. Kerouane
318. Kouroussa
319. Nouna
320. Dedou
321. Gaoua
322. Orrodara
323. Kampti
324. Batie
325. Po
326. Zabre
327. Tanko
328. Diapaga
329. Djibo
330. Tougouri
331. Kaya
332. N'Gourma
333. Garissa
334. Embu
335. Sakuru
336. Yella
337. Vonjama
338. Kakata
339. Tapeta
340. Toulepelu
341. Koutiala
342. Banembe
343. Markala
344. Bougoumi
345. Kolondi
346. Ngongo Tete
347. Massinga
348. Mapai
349. Nampula
350. Gemena

351. Mbanza
352. Ngunqu
353. Lodja
354. Lubefu
355. Luebo
356. Ndombe

2.1.5 Documenting the Effectiveness of Health Education Materials

The initial field tests generally involve the persons conducting the tests and one or two people from the intended audience. In this one-to-one field testing, the tester should inform the selected audience that the materials are in the developmental stages and that their assistance is needed in helping to improve them. The field tester then requests that the materials be reviewed on a part-by-part basis. Those selected to review the materials should be encouraged to evaluate part of the materials and to point out any areas that result in confusion, produce uncertainty, or do not seem appropriate given preceding information. For example, when field testing the flipchart discussed earlier, the selected persons would indicate to the evaluator what each page meant to them. The following questions are useful in eliciting such information: "Can you tell what this picture is about? What did this picture mean to you? Do you think other people will know what it means? Could it be made better?" (McBean, 1980). As the people proceed through the materials, the appropriate test items for each significant part should be used to decide whether or not the objectives are being met. If the individuals respond incorrectly to a test item, the field tester should discuss the related part of the materials with them and attempt to determine what went wrong.

Usually, the field tester takes copious notes while conducting this type of field test. When a person responds incorrectly, the field tester records the response and notes the events or ideas that appeared to lead to that response. The field tester may have to assist the respondent in understanding various parts of the materials. To the extent that the field tester's assistance is part of the planned program, the nature and extent of such assistance should be noted.

This one-to-one field testing should be continued on small blocks of educational materials until the entire program (or a selected part of a large program) has been tested one or more times and needed revisions have been made. Then additional testing is made with a small group of people from the intended audience. The procedure for this group testing differs from that for one-to-one testing in that there is less interaction between the field tester and the small group. Again, the people in the group should be members of the intended audience. A group of perhaps five to eight is preferred, except where the completed program is planned for either individuals or small groups. In the latter case, individuals and small groups should be used. While the group should be told that the educational program is in the developmental stage, they also should be encouraged to give the materials a fair trial by using them in basically the same manner as planned for the fully developed program.

Once the small group has completed the portion of the program being field tested, the group is given the test items covering the materials. In situations where the field tester wishes to ascertain whether what the group learned was a direct result of the program, the test also is given to the group before they participate in the program. For example, when field testing the flipchart discussed earlier, each person in the group might initially be asked to describe the steps in preparing an oral rehydration solution and to answer similar questions regarding additional objectives. These same questions could be asked again after the flipcharts had been studied. This

approach would give the field tester an idea of how much members of the audience already knew and how much they learned from the flipcharts. In addition to the testing, each person in the group usually is interviewed regarding problematic areas presented by the educational materials. This information, along with the test data, is recorded for analysis. As with the one-to-one tests, the small group tests and any needed revisions are repeated until all of the educational materials are acceptable.

2.1.6 Analyzing the Data and Making Recommendations for Revising the Materials

During the field trials, two types of data are collected. First, test data are assembled that assist the tester in making requisite decisions concerning revisions to selected blocks of materials and that provide useful information regarding which specific parts should be revised. Further, information from interviewees should help the field tester to determine the nature of the needed revisions. By reviewing the parts of the materials for which the response was unacceptable, and studying the interview information regarding possible reasons for the failures, the field-tester should be able to recommend revisions that have an excellent chance of improving the educational materials. Once the revisions are made, the materials should again be field-tested, particularly if the revisions are extensive. This sequence of testing, revising, and retesting should continue until all of the materials are satisfactory, or until available time and resources are exhausted.

2.1.7 Revising Educational Materials

If the artists and the producers of materials have participated actively in the field testing and analysis of the data, they will then be well prepared to effect the needed revisions. For example, was there a feature in the pictures that distracted the attention of viewers, such as children's feet in a flipchart drawing concerning child nutrition that attracted the attention of the audience more than the featured food? Was there a mistaken assumption about roles in a given culture, such as those of older siblings in rural Africa who give over care of sick young ones to their mothers and were, therefore, not the primary audience for learning how to mix oral rehydration solution (ORS)? Did the audience misconstrue the ORS package as food and therefore as unacceptable when it was shown being sold in a shop? If it had been portrayed as being sold in a pharmacy, it would have been viewed as a medicine and therefore would have been accepted.

All of the foregoing are merely examples of the findings that can emerge from pretesting so as to give rise to early revisions of visual materials. These examples underscore the value of pretesting and support the notion that it should be an integral part of developing materials.

Chapter 3

SUMMARY AND CONCLUSIONS

The mistake most often made in selecting or designing visual materials is that of misjudging how the intended audience will react to particular visual aids. One reason for this mistake is that many users of health education materials have never really thought about the fact that people have to learn to "read" materials, that people do not automatically interpret materials the way the designer intends. Moreover, users often have to make "guesses" about how visual materials will be interpreted -- and they often make the wrong guess.

All of the guidelines presented in this report may be summarized by stating the three major steps that will lessen the chances of making the foregoing errors. First, make the visual aids as simple and realistic as possible. In this way, it will be far easier for people with limited experience with visual images to "read" them. And, fortunately, making the materials simple and realistic will not seriously hinder their ability to communicate to all people, regardless of their experience. Second, test "guesses." Developers and producers of educational materials may think the intended audience will react a given way to certain visual aids, but they cannot know how the audience will react until the materials are tested. Third, be prepared to revise materials according to the findings of the field testing.

These three steps may sound like the simple dictates of common sense, but they probably are avoided more often than they are followed. Following these steps, as described in some detail in the preceding guidelines, will require some effort. But this effort will markedly improve the ability of health education materials to convey the intended message.

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APPENDIX A

Annotated Bibliography of References
for Further Study

Annotated Bibliography of References for Further Study

The following are brief descriptions of several references that may be helpful to a person who wishes to know more about designing and field testing visual aids. Because the number of such references must be kept small, only items that seem likely to be particularly helpful to work in Africa are included.

1. Gagne, Robert M. and Briggs, Leslie J. Principles of Instructional Design. New York: Holt, Rinehart and Winston, Inc., 1974.

The 270-page book describes both the derivation and application of methods that can be used to design topics, courses, and lessons of instruction, in a variety of subjects, based upon principles of human learning and performance analysis. These methods also are related to the design and evaluation of instructional systems. The book is intended for use in instructing teachers and other educational specialists having responsibility for the planning and operation of instructional programs. It focuses on the function of designing curriculum and instructional sequences and also on the skillful development of individual lesson plans and procedures for assessment of teaching outcomes.

An introductory chapter contains a background of learning principles on which the design of instruction will be based and includes a brief overview of the contents of succeeding parts. Chapter 2 defines and illustrates the major classes of learning outcomes for programs of instruction, including intellectual skills, information, attitudes, motor skills, and cognitive strategies. Chapters 3 and 4 describe the conditions of learning applicable to acquiring these capabilities. Chapter 5 outlines procedures for defining learning outcomes. Chapter 6 provides an account of procedures for determining sequences of instruction applicable to courses and to curricula. Chapter 7 introduces some general principles for the design of instructional events at the lesson level, and Chapter 8 describes practical procedures for arranging effective learning conditions in the design of single lessons. The topic of assessing student performance is taken up in Chapter 9. Chapter 10 outlines the larger framework of instructional design in terms of a complete system such as might be adopted by a school system. The employment of procedures for individualized instruction in such a system is detailed in Chapter 11. Chapter 12 examines procedures for evaluating instructional programs.

2. Fuglesang, Andreas. About Understanding--Ideas and Observations on Cross-Cultural Communication for Workers in Adult Education and Primary Health Care Nutrition. Stockholm, Dag Hammarskjold Foundation, 1982.

In this 331-page volume, Fuglesang provides interesting perspectives on the practical problems of social development and education for development in Third World countries. It is an updated expansion of his earlier work, Applied Communication in Developing Countries--Ideas and Observations.

In the preface, Sven Hamvell states, "Fuglesang introduces new and bold perspectives in his analysis of the role of communications in social and

economic development. His argument that social transformation can be described in terms of social information processing provides new and valuable insights. But as a practical guide to the issues of development communication, the book is primarily focused on the dilemmas confronting development workers in the Third World. In this book, they will be gratified to find many valuable observations and ideas that they can apply to their respective work situations. With his unflinching trust in people, his advocacy of people's ability to decide the direction of their development, and his demonstration of solutions found by people, Fuglesang has made a significant contribution to the conception of "another development" and to the discussion of the approaches and strategies involved in reaching this goal. The failure of the ideals of international understanding and solidarity may be accounted for in part by the fact that we have not built into our practical approach a component for an empathetic appreciation of what our sisters and brothers in other cultures really have to say. It is this challenging objective that Andreas Fuglesang has set for himself in this new book About Understanding, which is likely to have a profound impact on the development and direction of the emerging field of cross-cultural communication."

3. Mager, Robert F. Developing Attitudes Toward Learning. Belmont, California: Fearon Publishers/Lear Siegler, Inc., 1968.

There is no question that what we teach is often different from what we tell. Sometimes we teach the beauty and importance of a subject as well as the substance of it. Sometimes, however, we teach people to dislike, and then to avoid, the very subject we are teaching them about.

Developing Attitudes Toward Learning is about a universal objective of instruction--the intent to send students away from instruction with at least as favorable an attitude toward the subjects taught as they had when they first arrived. It is about the conditions that influence this attitude, about how to recognize it, and about how to evaluate it. This book is not about what to teach. It is simply about a way to help students get the best use of what they have been taught and about how to influence them to learn more about your favorite subject after they have left you. The 104-page book includes sections on developing objectives, recognizing approaches, consequences, positives and aversives, modeling, evaluating results, and improving results.

4. McBean, George, Norbert Kaggwa, and John Bugembe. Illustrations for Development, Nairobi, Afrolit Society, 1980.

This 69-page manual presents practical guidelines for designing visual aids in developing countries. The manual is an attempt to improve visual communications development by suggesting to artists in Africa ways and means of producing more communicative illustrations. The stated objectives of the manual are to help the artist to:

- Understand better why and how to adapt art work to the visual experience of the intended audience.
- Recognize the need for good quality professional illustration at all levels of communication materials.

- Be able to brief an artist more precisely regarding the work required and the audience who will see it.
- Be able to conduct a simple workshop for local artists, stripping away unnecessary art teachings and focusing only on the skills required in illustrating for development programs.
- Assess the final professional work of the artist more confidently.
- Evaluate the success and effectiveness of both the illustrations produced and the workshop conducted.

Chapter 1 of the manual discusses what the artist needs to know (for example, the artist as part of a communication team may need to know something about the latest findings from research on how people perceive visual images). Chapter 2 outlines what the artist needs to know about the subject being presented and about the intended audience. Chapter 3 provides guidelines for drawing round objects, square objects, and people. Chapter 4 includes information regarding field testing and final layout and reproduction. Chapter 5 provides summary guidelines for skills improvement for those seeking a career as a developer of illustrations.

5. Popham, James W. An Evaluation Guidebook. Los Angeles: The Instructional Objectives Exchange, 1972.

This guidebook is designed to assist those individuals who are responsible for conducting educational evaluations. An attempt has been made in the guidebook to bring together a collection of technical procedures relevant to educational evaluation and to describe these procedures in a straight-forward fashion. The need for this type of guidebook arises from the rather significant technological advances that have occurred during the past several years in the fields of curriculum, measurement, instruction, and evaluation. A body of technical information now exists which, if used properly, can improve the quality of evaluation carried on by an educator. An Evaluation Guidebook was prepared to make readily accessible these advances in evaluation thinking, thereby stimulating the improved quality of educational evaluation. Because most persons engaged in educational evaluation are extremely busy, the guidebook is brief (89 pages).

The 20 guidelines listed are organized into three sections: (a) Objectives, (b) Measurement, and (c) Data Collection and Analysis. In the section on objectives seven guidelines are presented that focus on such matters as how objectives should be specified so that they will be of most use to the educational evaluator. The measurement section contains five guidelines concerning such problems as how the evaluator should devise measures that satisfactorily assess whether an objective has been achieved. The section on data collection and analysis includes eight guidelines regarding types of designs evaluators should employ for various situations and how to treat the data secured by way of these designs. A summary of all guidelines is presented at the close of these three sections.

A final section of the guidebook, "Playing by the Rules," provides a fictitious example of an educational evaluator who conducts her work consonant

with the guidelines described in the previous pages. The reader may enjoy seeing how various guidelines can be employed in practical situations. A set of selected references organized around the major sections of the guidebook concludes the volume.

6. Tuckman, Bruce W. Conducting Educational Research. New York: Harcourt Brace Jovanovich, Inc., 1972.

To function effectively, the professional educator must have some knowledge of research methodology. At a minimum, each educator can be called a "consumer" of research, in that he or she reads and draws conclusions from research literature, or hires someone to do research and evaluation. To evaluate and interpret research findings, the educator must understand the limitations imposed by the techniques used in data collection and analysis. The educator must know that correlation does not necessarily imply causation, that generality is often limited by sample selection procedures, that changes can sometimes be accounted for by uncontrolled environmental variables, and that statistical tests suggest certain prior assumptions about the data.

This 400-page tome provides a thorough coverage of all phases of educational research, including evaluation studies, and is suitable for use as either a resource book or as a textbook. It includes chapters on defining the role of research, selecting a problem and constructing hypotheses, identifying and labeling variables, constructing operational definitions of variables, identifying techniques for the manipulation and control of variables, constructing research designs, describing procedures for observation and measurement, constructing and using questionnaires and interview schedules, carrying out statistical analyses, using procedures for data processing, writing a research report, and conducting evaluation studies.

While the chapter on evaluation studies provides in-depth coverage of summative evaluation, little information is given on formative evaluation because the latter subject typically is not considered pertinent to educational research.

APPENDIX B

How the Information Search was Conducted

How the Information Search was Conducted

In developing these guidelines for designing and field testing visual aids, a major effort was made to review the literature for pertinent information. Because researchers, educators, and health professionals have used visual aids with African populations for many years, there is considerable data available, including research studies, conference proceedings, syntheses of experiences, book reviews, expert opinion treatises, and "how-to" booklets. A number of such items were obtained from a variety of sources and reviewed to determine their pertinence to this report.

Relevant information in periodicals and journals was obtained by using the following descriptors in an on-line literature search: perception, visual perception, visual displays, visual aids, literate/illiterate, and all the nations of sub-Saharan Africa. The following data bases were searched: psychological abstracts, educational resource information centers, public affairs information service, social science stations, dissertation abstracts, and sociology abstracts.

Through the computer search, some books also were located. Others were located by use of the card catalog in the library of the University of North Carolina at Chapel Hill. Still others were located in the International Training and Health Library of the Duke University Library and in the Library of the Research Triangle Institute in Research Triangle Park, North Carolina.

Search results have revealed that few works focus on both visual perception and visual aids. Studies and articles are concerned either with research on visual perception or with descriptions of activities in which visual aids are used with African audiences. The research studies typically do not involve purposeful visual communication (for example, visual aids about water supply and sanitation); rather, they describe testing of the audience regarding depth of field, size relationships, figure/ground dimension, and similar areas. Likewise, the articles that describe the use of visual aids are primarily non-research oriented presentations which merely describe their use.

Whereas studies have been documented regarding research in the area of visual perception in the nations of sub-Sahara Africa, one generally can conclude from reading both journal and book references that there is little or no empirical evidence in the areas of visual perception and use of visual aids. Further, while a considerable amount of literature is available regarding field testing of materials, little such information is available that specifically applies to visual aids particularly as used in water supply and sanitation projects. Fortunately, much of the literature on field testing appears generally applicable to all media approaches and thus can be useful within the present context.

APPENDIX C

Recommendations for Designing
and Selecting Visual Materials

Recommendations for Designing and Selecting Visual Materials

All of the recommendations for designing and selecting educational materials may be grouped into two related themes and summarized as follows:

- Understanding visual materials is not automatic; if the materials are to be understood, they should present images that are similar to the experiences of the viewers.
- Introducing educational materials to an audience with limited experience in "reading" them requires that the visual aids be as realistic as possible.

The following recommendations, then, expand on these two themes by offering detailed suggestions on how to design or select visual aids that are most likely to present images that are closely related to audience experiences.

1. Make sure that you need a visual aid to help accomplish your program goals and your particular educational objective.

After becoming familiar with the intended audience and determining the intended message, you may find that visual materials are neither necessary nor appropriate. A visual material may or may not enhance the communication of your message. Be sure you have considered why you are using visual material as opposed to other methods of communication.

2. Explore the many possible types of visual aids that could be used to illustrate the message.

Many types of visual materials are available. Be certain you know what they are, how practical they are, and whether they are locally available. Further, consider their credibility with the intended audience. That is, will the intended audience reject the message because of the medium of presentation or the technique used to visualize the message? For example, some audiences might reject a health message in motion picture form because they think movies are for entertainment and not for learning. Or, an adult might reject a message because the ideas are in cartoon form and cartoons are perceived as being for children. A number of types of visual aids were listed in the introduction to this report. Explore them all. Choose those that will be the most cost-effective and efficient in accomplishing your goal (both programmatic and educational).

3. When attempting to communicate about objects, first consider using real objects.

Much of what is taught in basic health care on water supply and sanitation could be taught with real things (Holmes, 1968). While "the real thing" usually is the best thing to use, making it available is often difficult or impractical if not impossible.

4. Photographs often are the most effective visual materials to use, however, with some qualifications.

Photographs may convey information about reality more effectively than line drawings (Fuglesang, 1982). Photographs with background objects eliminated are better for viewers who have limited experience with photographs (Fuglesang, 1982, McBean, 1980). If a plain background is impossible when the photograph is taken, the object to be shown can be cut out of the original photograph and used without the background. This approach, however, usually results in some loss of realism. Another problem with the use of photographs is that reproduction, particularly by a photocopy process, often results in loss of clarity.



Avoid a photograph with a detailed background.



Use a photograph with clear and undistorted background.

Photographs should have broad white margins around them. If you are using a series of photographs, they all should be taken from the same angle (Jenkins, 1981). The angle should be close to that at which most people normally see.



Avoid a high angle shot (shot from a ladder).



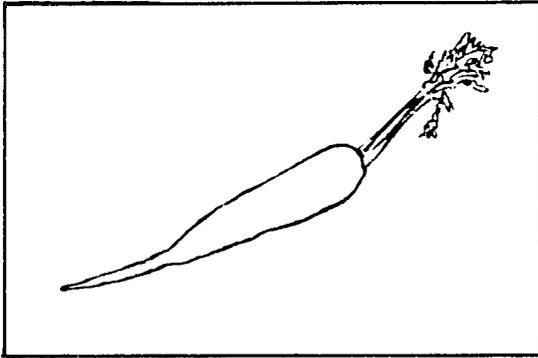
Use a "normal" angle shot.



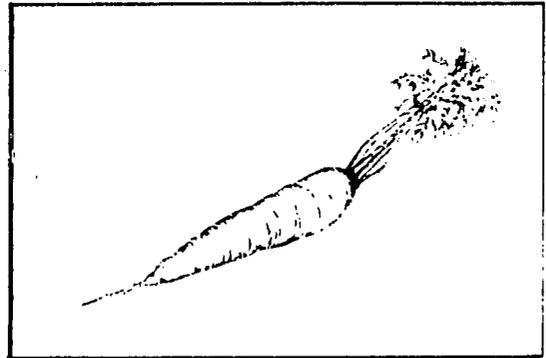
Avoid a low angle shot (shot from the floor).

5. Illustrations that are both well drawn and realistic more than likely will suffice when photographs are either unavailable or impractical to produce.

Simple drawings can be used to communicate visual messages (Nicholson, 1977). Silhouettes, stick figures, or outlined figures, however, are not perceived as well as toned or shaded-in line drawings (McBean, 1980; Cook, 1981, DeLaney, 1978). Details in pictures need to be absolutely accurate (Jenkins, 1981). Care should be taken to draw objects and people as realistically and in as much detail as possible, keeping in mind that adding more detail than necessary for realism can be confusing to the viewer.



Avoid a simple line drawing.



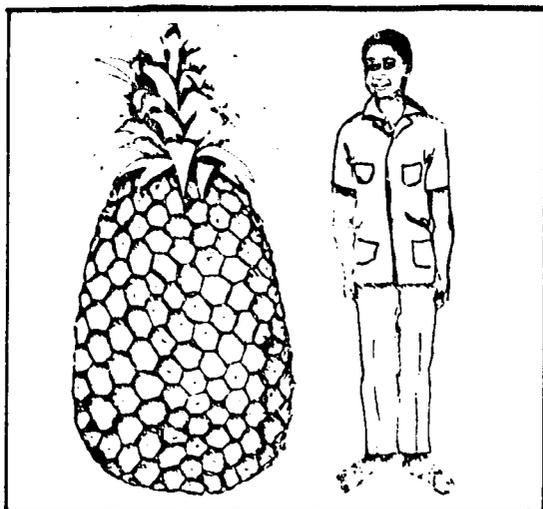
Use a detailed shaded-in drawing.

6. When possible, depict people in visual materials who look like the people who are to view them.

What depicted people wear, what they do, how they respond, and so forth are all important to motivating viewers (McBean, 1980). For example, visual materials to be used with women should be based upon the knowledge of womens' appearance and activities. Since they are quick to identify "correct" domestic procedures...they cannot be fooled (Fuglesang, 1981).

7. When showing objects and people in visual materials, keep them on the same scale.

Try to keep all objects and people on the same scale. Images should convey a sense of scale to ensure accurate perception (FAO, 1974).



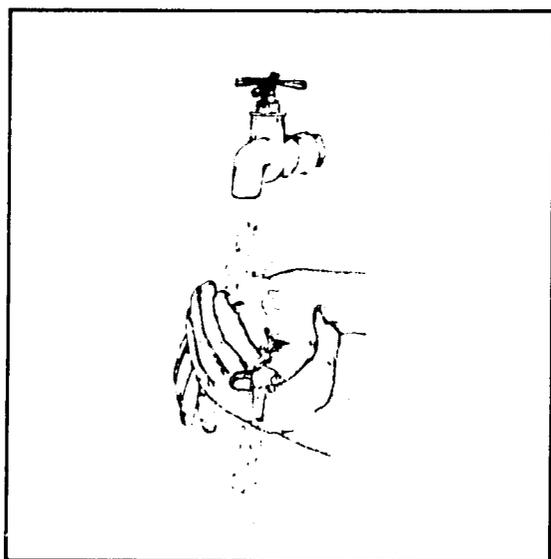
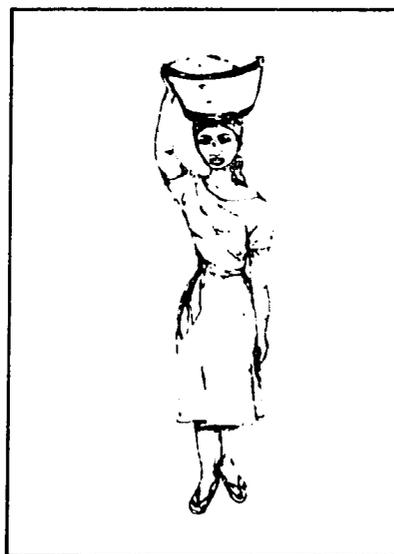
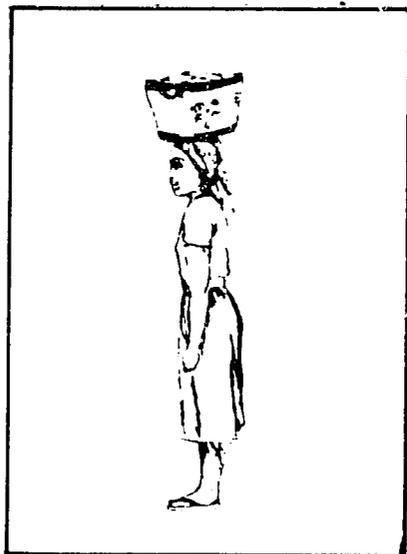
Avoid out-of-scale images.



Use images in the same scale.

8. When showing people in visual materials, include the entire body rather than just a part of the body (Fuglesang, 1982).

Full-figure drawings usually are understood and should be used when working with villagers with "low visual literacy" (McBean, 1980). Stated another way, objects and people are better represented in their entirety (Jenkins, 1981).

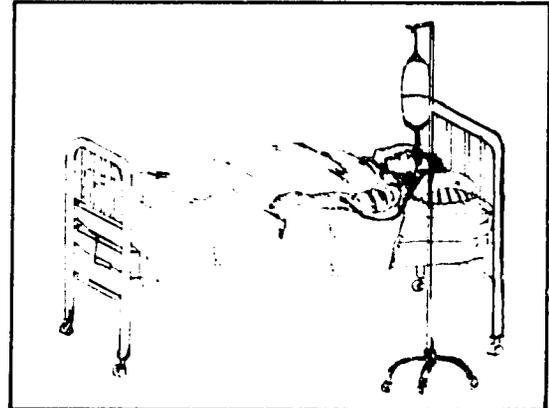
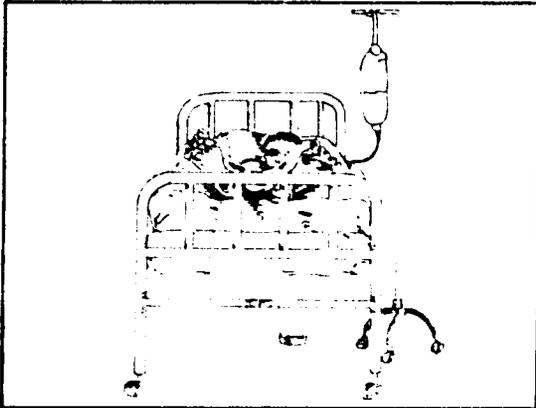


Avoid a drawing that shows just a part of the body.

Use a drawing that shows the entire body.

9. Use drawings of people and objects at visual angles normal to viewers (Jenkins, 1981).

"Some people misunderstand cues such as relative size, foreshortening, and overlapping" (Chaplin, 1971).

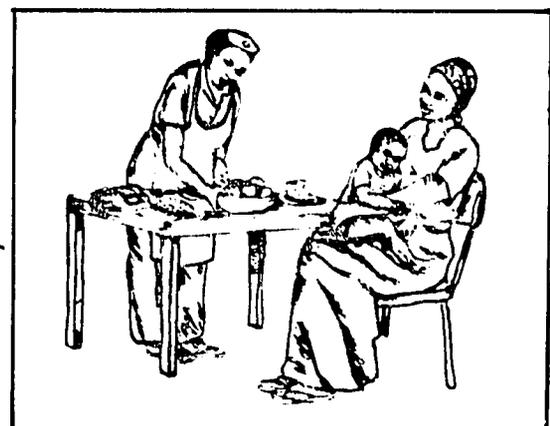
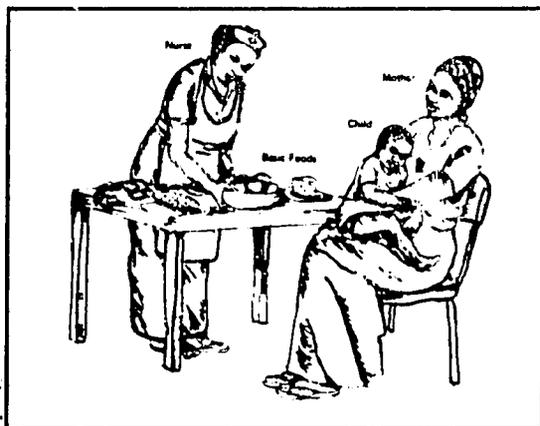


Avoid foreshortening or "dramatic" angles in showing people and objects.

Use people and objects at visual angles that are normal to the viewer.

10. Place written captions adjacent to drawings.

Using captions with visual aids is an age-old custom in western visual aid development, but it may be quite confusing to village learners (Higgs and White, 1977). The speech bubble, so prevalent in comics, also may cause difficulty in understanding. It too should be avoided. If written words must be used with the picture, put the words adjacent to (below or on the side) rather than in the picture. This latter caption should be short and clear.



Avoid including words in the visual aid.

Use a visual aid without words included in it.

11. The relationship between the figure and the background in a visual aid may (or may not) contribute to the viewer's perception of the message.

When drawing images, be aware that audiences will "read" either the figure or the background on which the figure is drawn; one or the other will be perceived as being more substantive (Fuglesang, 1982).



Avoid having the people or objects the same shade as the background.



Use drawings of people or the objects that are a different shade than their background.



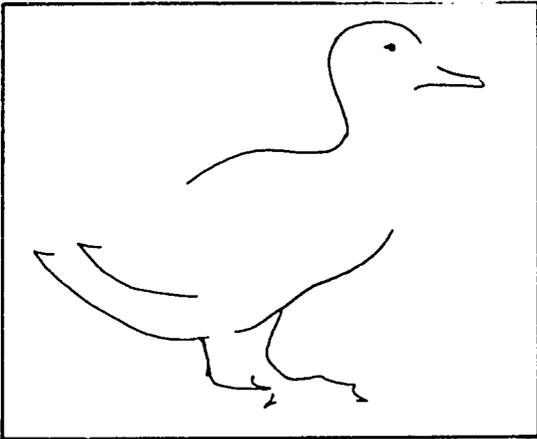
Avoid detailed, cluttered backgrounds that are not essential to the intended message.



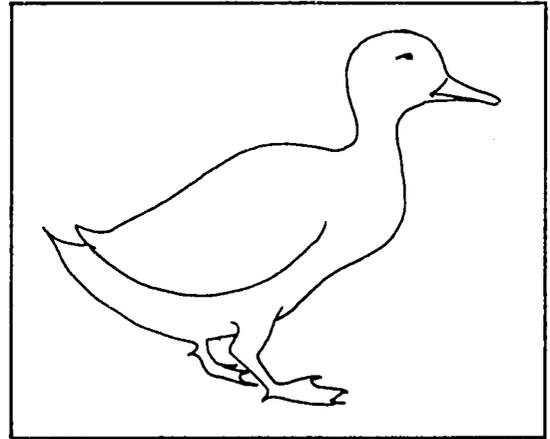
Use drawings in which people or objects are distinct from the background on which they are drawn.

12. If the visual material is to be a line drawing, use a complete line drawing.

The ability to read a drawing depends primarily on the viewer's ability to decipher meaning from drawn lines. Viewers with limited experience who are viewing images drawn on a printed page may or may not understand what they are viewing. The more complete the line form of a drawing, the more recognizable the image being shown (Chaplin, 1961).



Avoid a line drawing that is incomplete.



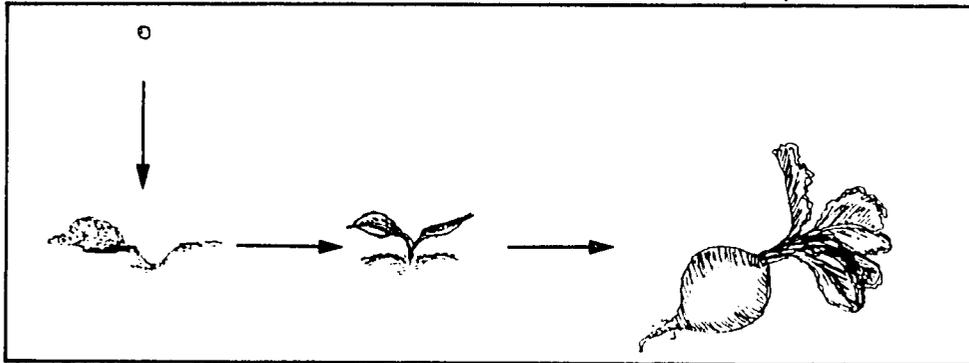
Use a line drawing that is complete.

13. When using color, use natural color for objects and people.

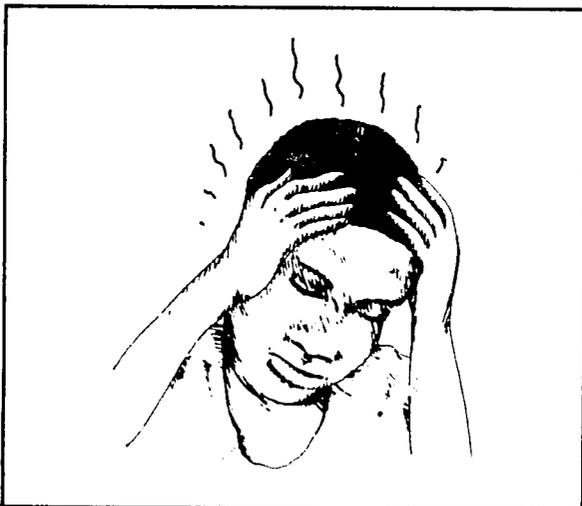
Local color preferences and local color traditions should be followed (Holmes, 1968). Most people see reality in color. Use color when it is economically possible. It will enhance the realism of your visual aid.

14. Be cautious in using arrows to point out objects, circling lines to depict speed, shaking lines to depict chills, and other such graphic devices to highlight or emphasize either an illustration or a photograph.

These graphic devices often are not in the viewer's experience and, therefore, may have no meaning (Fuglesang, 1982). If such devices must be used, introduce them slowly and patiently (McBean, 1980).



Avoid using arrows in a picture.



Avoid using shaky lines to represent an emotion or condition.



Avoid using circles to highlight an area of an illustration.

15. The effective layout or composition of the visual material will contribute significantly to its effectiveness.

When working on the composition of visual materials give as much attention and thought to the empty space (space where there is no information) as to the illustration (space where there is information in the form of images and/or words) (Fuglesang, 1982). Use empty space liberally. That is, leave a lot of white space around images (Jarmul, 1981). The layout should be unified and balanced (FAO, 1974). Skill in composition requires study and practice as well as a willingness to explore alternative ways to present visual information.

16. Design messages that require little effort to understand, and try to include in the message some promise or reward.

Audiences select the communication to which they will pay attention based upon either (a) the degree of effort required to understand or (b) the potential reward for paying attention to the message (Schramm, 1960). Remember that a person is not likely to bother with trying to understand visual material unless he or she thinks what is to be gained from it is worth more than the time and energy invested in trying to understand it.

17. Field test all visual materials during the design phase.

Try visual materials out on the intended audience. Revise them if the test results call for it. Consider not using visual materials if revisions do not lead to effective communication of messages (Mangan, 1978).