# New Development-Oriented Models of Communication Research for Africa: The Case for Focus Group Research in Africa

by Isaac Obeng-Quaidoo.\*

#### **Abstract**

This paper explores the nature of communication research going on in Africa. The author argues that while the absence of a research tradition in Africa compels researchers on African affairs to adapt and replicate some American, European, and Soviet research strategies, there is a real need for communication researchers to take cognizance of the cultural context in which their research in Africa takes place. He singles out the 'focus group' approach as being particularly suitable for data elicitation from Africans because it harmonizes well with their social-group orientation. This approach, he argues, has the merit of generating new hypotheses since it allows interviewees to respond or behave in unanticipated ways. The author, however, does not expect the approach to be problem-free and he makes useful suggestions as to how some of the anticipated problems may be overcome.

#### Résumé

Cet article fait le point de la nature des recherches en matière de communication en cours en Afrique. L'auteur démontre que, si à cause de l'absence d'une tradition de recherche africaine, les chercheurs sont obligés d'avoir recours et d'adapter des stratégies de recherches américaines, européennes et soviétiques, il y a un besoin réel pour les chercheurs en communication de prendre en compte les contextes culturels dans lesquels ont lieu lis recherches qu'ils effectuent en Afrique. Il cite l'approche de "groupe focal" comme étant particulierement adaptée pour comprendre les données de la part des Africains dans la mesure où elle s'harmonise bien avec les orientations de groupes socieux. Il avance que cette approche a le mérite de générer de nouvelles hypothèses; en effet, elle permet aux interviews de répondre et de se comporter de façons non prévues. Toutefois, l'auteur ne s'attend pas à ce que cette approche soit sans problème; aussi-il d'utiles suggestions sur la manière de resoudre certains problemès qui pourraient se poses.

<sup>\*</sup>Dr. Isaac Obeng-Quaidoo is a Senior Lecturer at the School of Communication Studies, University of Ghana, Legon.

#### Introduction:

In a paper presented at a conference in Lome 1984, and subsequently published in 1985 (Obeng-Quaidoo), we pleaded for certain research innovations and changes in methods and methodologies we Africans have borrowed from the developed countries. The earlier paper argued on the unsuitability of the individualized survey interview (for certain African problems) in certain contexts, and suggested group interviews instead. We were actually calling for some qualitative approaches to communication studies which seemed to have been ignored in Africa.

There is no one basic trend, and we can argue that African

There is no one basic trend, and we can argue that African communication research is not as yet grounded in a particular mode, yet it behoves the researchers in the field to evolve and explicate a cultural context within which several research efforts can be appraised for decision-making and developmental processes. Lack of an African view of communication is due, inter alia, to the absence of a processual definition of African culture, and also the multiplicity of African researchers and Africanist commentators who take solace in several sources. We have those with American communication bias who consider the testing of hypotheses as the supreme effort in arriving at the truth. We have those who hate the very idea of "chi-square" and consider the European critical approach as 'sine qua non' of any truth seeking.

And we also have scholars trained in the Soviet Union or the eastern bloc who look through the ideological prism in finding truth. All these approaches are healthy, and like everywhere else on the globe, "We must develop critical, eclectic methodology capable of doing justice to the complexity of our subject" (Halloran, 1986:63).

Being latecomers to the communications scene, Africans cannot avoid adaptations and replications of the research formats which obtain in America, Europe, or the East, but African communicators obtain in America, Europe, or the East, but African communicators cannot afford to ignore the cultural context in which every research should be situated. Pluralism of efforts is necessary, but imitation of methods and methodologies devoid of any cultural truth would lead to sterile results which benefit only the academic.

This paper thus offers some concrete tests of some of the methodological suggestions contained in the earlier paper. We have tested the utility of some of the earlier assumptions and assertions - taking the African cultural and social contexts into

account.

# Qualitative methods and focus group research

Since we have not come across any communication study in the African context using focus group methodology, what we shall do in this paper is to outline qualitative method and focus group methodology; relate everything to the African cultural context, and then illustrate our ideas with practical findings and examples from the field.

Initially, our remarks should not be construed as an attempt to pitch qualitative methods against qualitative survey methods. Such a comparison would be meaningless "since the two types of methodology are designed, and largely used to tackle, different types of problems" (Dickens, 1982 pp 4-43, emphasis his). According to Dickens, "The problems qualitative research is most frequently required to address are those of understanding as opposed to assessment. Whilst the proper methodological response to "assessment" questions is the methodology of a "test", the proper response to "understanding" questions is that of a "search". Most problems of human social behaviour involve complex variables, where the relationship is not reflex or selfexplanatory". Thus questions such as 'how patients perceive the activities of the primary health care information campaign before working in Accra' are, of necessity qualitative questions for which the method of research would be the most appropriate. The word search here means getting to know and understand the workings of a process as opposed to test which would be testing hypotheses and predicting the possible outcome of a phenomenon.

# What is focused group research?

The focused group research (or, as sometimes referred to, focused interview) is a subject methodology of the qualitative method. There are certain distinguishing characteristics of this approach. First of all, the persons interviewed are supposed to have been involved in a particular situation or not at all. For example, they may have watched a film, heard an advertisement on radio, or they may be users or non-users of a particular product, such as a contraceptive. Second, the initial assumption is that, "the significant elements, patterns, processes and total structure of this situation have been provisionally analysed" (Merton et al., 1956:3) by the researchers. Through this situational analysis, the researcher then develops an interview/question guide which will enable him to conduct the enquiry. Finally, this kind of interview is focused on both the objective and subjective experiences of the

persons exposed/or not exposed to the provisionally analysed situation so that the researcher can ascertain their definitions of the situation

The numerous responses from interviewees either augment our understanding of a situation or an issue, or "to the extent that it includes unanticipated responses, gives rise to fresh hypotheses for more systematic and rigorous investigation" (Merton et al., 1956:3).

The focus group session, as a method for collecting useful data, is hardly discussed in research methods books or lecture rooms, yet this methodology was the subject of a paper by Bogardus in 1926 (Cited by Mayone Stycos, 1981:450-456) (This writer came across this methodology serendipitously after a long search and review of the contexts of certain communication studies in Ghana).

The focused group methodology was fully developed and implemented in the United States to meet the demands generated by communications research and propaganda analysis during the World War. Nowadays this research approach is frequently used by communications researchers, anthropologists, demographers, and especially social marketing researchers.

In order to achieve a comprehensive focused interview, certain criteria would have to be borne in mind. This will differentiate amateurish from professional research data. The criteria are

(Merton, Fiske, Kendall, 1956:12):

1. Range: The interview should enable interviewees to maximize the reported range of evaluative elements and patterns in the stimulus as well as the range of response

2. Specificity: The interview should elicit highly specific reports of the aspects of the stimulus situation to which

interviewees have responded.

3. **Depth:** The interview should help interviewees to describe the affective, cognitive and evaluative meaning of the situation and the degree of their involvement in it.

4. Personal context: The interview should bring out the attributes and prior experience of interviewees which endow the situation with these distictive meanings.

Generally, in the social sciences, one of the reasons for using interviews rather than questionnaires in research is to elicit diversity of relevant responses from the interviewee, whether the interviewer had initially anticipated them or not. If the interview guide turns out to be the type of fixed, stock questions, like the questionnaire format, then the spontaneity and the nondirective

nature of the focused interview is destroyed, and the interviewee resorts to the socially acceptable responses.

## What goes into focus group interviews?

The size and nature of the group: This should be governed by two considerations. It should not be so large as to be unwieldy or offset the active participation of all members, nor should it be so small that it provides responses of the type one gets by interviewing an individual. Some researchers may suggest ten to twelve persons. Where a researcher is interested in a range of definitions of the situation, rather than in intensive reports, the larger group is preferred. Merton et al. advise that "whatever the purpose, the group should not be enlarged to the point where the many constitute little more than an audience for the few who have opportunity to speak their mind" (p:37)

Field experiences have taught us that in the African context the size of a group should be between six to eight persons for an interview which lasts between one and a half hours to two hours. With a lively group of eight where every person wants to express his/her view, the situation at times becomes cumbersome and time-consuming. A group of six, it seems, is manageable and less time-consuming. Moreover, the interviewer and interviewees hardly notice the time if the interview situation is spontaneous and lively. Boredom and impatience enter the situation when two or more members of the group decide to agree with whatever one member of the group says. These "other-directed" quiet types drag boredom and artificiality into the whole process.

It is a fact that the researcher wants neither the too garrulous nor the too quiet type of interviewee, but since there is no guarantee that one or two of such persons are not likely to filter into the group, the researcher only has to rely on such factors as occupation, religion, age sex, and education in selecting focus group members. And of all the factors mentioned above, educational homogeneity of members appears to be the most important for all kinds of focus group studies. Field experience has taught us for example, that it is never ideal to bring one university graduate into a group of secondary school graduates. The former will not only monopolise the discussion, but his/her mannerisms and language will either alienate the rest or they will all submit to his/her views.

# Recruiting Interviewees and creating an atmosphere

Obtaining a group consisting of six to twelve persons who are homogeneous in terms of age, sex, education, marital status, religion, or ethnicity, (depending on the topic under study) is not easy. If individuals are part of a captive audience like the army, journalists, a sociology class, or primary health-care attendants, then selecting group members becomes fairly easy since the demographic data would be available in all cases. But if a researcher is thrown into an urban environment, how does he/she obtain a group for a discussion?

Again, field experience has taught us to have trained recruits who may be sent to selected neighbourhoods in the chosen town, village or city. The recruiters could intercept passersby and screen them for eligibility. Thus, in most cases, the sampling is purposive and accidental.

After this, we tell the selected candidates that there is going to be a discussion on a stated topic for an hour and they will be rewarded at the end of the session.

In the family planning communication study which is briefly discussed below, we normally had the sessions in meeting rooms in hotels in all the four cities. Before each session started, the interviewer/moderator would meet the group, screen each member (according to a prepared demographic form), and then serve them with some snacks. After this, participants would be introduced to each other in order to establish rapport among them so as to create a congenial atmosphere for the discussion.

We also found that sitting in a circle with the interviewer or moderator as a member of the group was the best arrangement. Interviewees should never sit in rows facing the interviewer as if it were a classroom experience. Usually we want the interviewer to be as unobtrusive as possible, while at the same time he/she controls the situation. Sitting in rows automatically assigns the moderator the role of a teacher and the participants become students, and inevitably participants would perceive the situation as a test of their knowledge or views on an issue.

# Advantage and disadvantage of focus group interview

Every methodology has its strong as well as weak points, and it is through constant discussion and elaboration that we improve on it or overcome the disadvantages. Let us first examine some of the advantages. We have already indicated above that focus group interviews are useful in generating new hypotheses since interviewees respond or behave in unanticipated ways. Focus interviews offer the skilful interviewer more scope for the exercise of his/her intuition.

In Africa, the individualized private interview is hardly private (Obeng-Quaidoo, 1985), and since subcommunity institutions such as the clinic, health centre, ethnic associations, spiritual organizations have become the foci of group activities, focus group techniques have become necessary for the discovery of motivations rarely voiced in surveys.

Another advantage of the focus group technique is that, apart from providing richer information, particularly information which relates to emotional processes and inner reasons, it inhibits other group members from exaggeration. It is quite easy to lie, boast about or exaggerate an issue if one is alone with an interviewer, but the person becomes guarded and circumspect if he/she knows that other group members can cross-check their experiences against his/her statements.

According Merton et al., another advantage of this methodology is that "the interaction in the group may not only lessen inhibition of intimate reporting; it may also serve to bring to each individual's mind details of his experience which would otherwise not be recalled" (pp:46)

Several years of field research have taught us that quantitative survey methods at times leave a great deal of unanswered questions when we talk in terms of studying a whole nation. Ethnic, economic, social, and cultural heterogeneity within the nations of the developing world at times render our much cherished survey generalizations futile. The argument is that, "unless there is adequate sub-group representation, one cannot make valid inferences about nations or even smaller sub-divisions with a separate cultural identity, however great the temptation. Data collected from the Yoruba do not provide generalizations applicable to the Hausa, just as data on the Meo do not explain behaviour of the Lao (Rogers et al., 1976:1-41). In this context, the usefulness of focus interviews would be brought to bear on such heterogeneous situations.

There are some disadvantages in the use of the focus group method. Group interaction may be dysfunctional due to the particular topic under discussion since interviewees can easily form alliances and the whole discussion may become a kind of parliamentary debate instead. Stycos concurs with Deutch that in the group situation "There tend to be fewer idiosyncratic thoughts, more moderation in judgement, more common associations, more cautiousness, and a general taking into account of the anticipated

reaction of the audience" (Stycos, 1981:450-456). Although this might be a disadvantage yet we agree with Stycos that "group sessions have various effects - they inhibit some respondents, draw out other, and encourage exaggeration on the part of still others, depending on the topic, the composition of the group, the personality of the individual, and the particular chemistry stirred up by the group leader."

We have already mentioned the unsuitability of bringing a higher status person to join a low status group. But in any group a leader emerges, even if the group members are of similar status. The "leader effect" can be a disadvantage in group sessions since other members may defer to the leader's opinions. The interviewer/moderator can offset this situation by starting questions with different members of the group other than the "naturally" emerged group leader. If two or three people become "joint leaders" of the group, then the whole discussion collapses. The remaining members become mere listeners instead of participants. What we usually do at the beginning of a discussion (and in case the "leadership issue" enters the process) is to tell the group that it is required of everyone to express his/her own opinions. If a member persists in being loquacious, then the interviewer might have to say, "I will come back to you", "let's hear what Mr. B. also says."

Another general disadvantage is the inability of the interviewer to understand the local language or dialect. Studying the nuances, colloquialisms of the place usually facilitates the flow of the discussion. In the study summarized below, the moderator at times had to speak two or three different ethnic languages since some interviewees felt more at home in expressing themselves in their own native tongues.

As we said earlier, every method has its merits and demerits, but it is by recognizing the latter that we can work diligently at turning them into advantages.

Let us now examine the focus group methodology and how it fits into the African culture. There are certain African culture imperatives which facilitate the focus group methodology.

# African culture and the focus group methodology

In the non-Europeanized/Americanized semi-urban or rural parts of Africa, the group norms of behaviour still operate. A keen observer only has to examine the constant bi-monthly or monthly visits of even urban salaried workers to participate in family gatherings, clan associations, and the elaborate funeral rites and birth ceremonies. Moreover, the group methods of behaviour are not confined to the ruralites only. In the urban areas, the ethnic associations do exist, for, in order to offset the alienated anonymity of the African Urban environment, it is necessary for a Fante, Yoruba or Kikuyu to know that other Fantes, Yorubas or Kikuyus live at the same urban centre, and this has perpetuated the ethnic groupings.

Another situation has emerged in the urban centres whereby benevolent or voluntary associations have proliferated in many neighbourhoods. These associations sometimes cut across ethnic boundaries. According to Little, most voluntary associations are formed "to cater for their members" material needs, in the shape of money. This applies particularly in commerce because the main requirement of most of the petty traders thronging the markets is capital (Little, 1974:88). This situation has brought about a lot of schemes; for instance esusu in Yoruba and susu in Fanti. Little points out that "Esusu is merely a fund to which a number of individuals make fixed contributions of money at stated intervals; the total amount contributed by the entire group being assigned to each of the members in turn" (Little, ibid). This kind of rotating credit exists throughout East and West Africa.

Apart from the material/financial rewards that an individual obtains by being a member of a group, there is also the psychic income which accrues simultaneously to the person. A person is highly regarded in society if during times of tribulation group members can emerge to sing and mourn with him/her.

Again, Little intimates that "the natural benefit societies in general, usually have social activities in addition to their economic interests. Some Ghanaian associations for example, include excursions and picnics, concerts, singing, dancing and drumming; religious talks and discussions, literacy classes, debates and cinema shows; first-aid services; initiation ceremonies for new members; and the laying of wreaths on graves of former members (Little, pp:89). Without being accused of stating the obvious, all the above activities constitute group communication formats which African researchers have neither explored nor described in detail.

There are also numerous neo-Christian prophetic or messianic movements in both urban and rural centers (independent of the traditionally established Catholic or protestant churches).

Our main aim in this section of the paper has been to illustrate that, willy-nilly, most Africans belong to one or more associations or groups. Grouping constitutes the natural cultural context within which the African finds him/herself, and we consider it very natural for communication researchers in Africa to shift some of their quantitative individualized methodologies to qualitative group ones. All this means that the formation of focus groups for the expression of views is better in the African context than isolating an individual from the group for questioning. Moreover, field observations in the past years have taught us that, in most cases, the individualized quantitative survey interviews do not function as would be desired since "frequently it is difficult, if not impossible, to draw one member of the family aside and interview him/her. We find that a whole troop of youngsters and even other adults would like to listen to the kind of questions the interviewer is going to ask one member of the family. Persistent persuasion that the interview is for only one member of the family sometimes falls on deaf ears, and the interviewer is quite helpless to drive away the unwelcome crowd" (Obeng-Quaidoo, 1985:109-120). This has necessitated the urgent call for group interviews.

## Focus group interview: practical example from the field

The lengthy discussion on focus group methodology has been necessary since we normally do not find any such discussion in the research method text books. Moreover, African research studies using the focus group interviews are non-existent. We shall now conclude the paper with an example of focus group sessions conducted in Ghana.

In April 1986, two researchers (Obeng-Quaidoo and Arthur, forthcoming) conducted twelve focus group interviews in four major urban centres in Ghana in order to find out the ideas people have about family planning, peoples' contraceptive status generally, their sources of information about issues and family planning. The cities were Accra, Kumasi, Sekondi-Takoradi and Tamale. The research team comprised two researchers (male and female), a professional recorder, and two professional recruiters (male and female). The male researcher conducted the male interviews and the female did the same with the female groups.

In each city, the recruiters selected certain neighbourhoods; the male intercepted prospective male candidates; told them of a would-be discussion and a reward at the end. If they agreed, he conveyed them in the research car or a taxi to the hotel conference room where the discussion was to take place. The female recruitment was not easy. We normally did not want two friends to be in the same group.

As one time, for example, the female recruiter was looking for only

current contraceptive users above the age 30 with at least one child, and combing through neighbourhoods for people with such characteristics was frustrating and time-consuming. Sometimes the mere idea of a woman coming to a hotel did not sound right to some prospective interviewees. (In Kumasi, one woman's husband followed her to the hotel to be sure there was going to be a research discussion as she claimed.) One alternative to the hotel room would be to find a room in a quiet community centre, or if it is in the village and it is a week-end, a room in the local primary or secondary school would be ideal. A problem would arise, if there is no electricity, or the recorder cannot use dry cell batteries).

In each session, the recorder sat unobtrusively in a corner of the hall or the room and since the group normally sat in a circle, the recorder (with his tapes and other gadgets) faced the intervierwer, in case he wanted to signal the interviewer to change a tape.

As indicated earlier, we had a question or topic *guide*, and it consisted of general questions and a lot of possible probes. The basic idea, as (stressed) many times in this paper, was that the interviewer was there only to facilitate and guide the proceedings; changing from topic to topic. (A separate article will discuss the main findings of this study.) We shall now share our experiences in using the focus group interview sessions.

There appeared to be variability in the way some Ghanaian female adults and adolescents perceive the world, family planning, and their use and non-use of contraceptives. Females in Takoradi area tended to be shy, guarded, and generally had the demeanour of "ladies" trying to say the "right" things. In Kumasi, the females were highly outspoken and independent, and this might be due to the early training in capital formation and marketing of goods. Tamale females tended to be less outspoken and depended more on the man in making decisions about family planning. The Accra females were generally very much aware of family planning and they were ready to discuss the pros and cons of the issues. Of the four urban areas, Kumasi is the most ethnically cohesive place, and people belong to more associations and groupings there than any other place in Ghana. Perhaps this offers a further explanation of the variation in the behaviour of the females from Kumasi.

Our culture has conditioned the Ghanaian male to be outspoken on even issues affecting females, and thus both the adolescent and adult males were ready to express opinions on family planning and contraceptives. However, the unemployed young interviewees seemed to be less outspoken. Perhaps, this variation can be explained through large scale quantitative survey.

All group members in the four areas relied more on inter-

personal communication channels (friends, priests, family members, schoolmates, workmates) in making decisions as to whether to use or not to use contraceptives.

Earlier in the paper, there was an argument as to whether group members become inhabited or open during focus sessions. Our observation from the field was that during the discussion of the Ghanaian mass media, interviewees were very vocal in enumerating the numerous ailments of the government-controlled mass media. Respondents blamed the Government for not creating the right atmosphere for journalists to feed the public with the right information. Generally, interviewees regarded radio, television, and the newspapers as the megaphones of the Government.

Such explicit remarks about the stifling of the media systems by the Government have never been expressed candidly in any of the surveys we have conducted over the years.

Perhaps, in the survey situation, an interviewee did not feel secure and comfortable in telling an interviewer his/her true opinions about the behaviour of the Government towards the mass media systems. In fact a survey respondent (in the African context) can never be sure whether the interviewer is not working for the Government. But in a group situation, it might be difficult to pinpoint one person and later accuse him/her that he/she said the Government was authoritarian and was stifling the freedom of expression. There is security and comfort in being part of a group.

The focus group sessions have taught us that people rely on other individuals (through their churches, benevolent associations, clubs) and groups to obtain information on important issues in Ghana. Beer, pito, akpeteshie bars, rumours, and friends from military barracks have become important sources of news about events in the country. One turns to the mass media if one wants the Government version of events.

## Studies generated by the focus group interviews

Instead of listening to all the hypotheses which we have generated from the focus group interviews for subsequent quantitative survey analyses, we prefer to share the ideas on further researches which the group session have generated, and are currently being studied.

We found out from the study that certain family planning clinics are not disseminating the correct information about contraceptives. For instance, in Kumasi, we were informed during sessions that a family planning clinic nurse had informed some attendants that constant use of the oral contraceptive would make a woman barren. Also, that the condom could get torn and remain in the womb of a woman, and could only be removed by surgery. At times, the correct size of the IUD was not inserted. All these have necessitated a study to find out what the family planning clinic nurses themselves know about family planning and contraceptives.

We also learnt from the group interviews that the verbal and non-verbal communications that ensued between young contraceptive buyers and drugstore, chemical store, and pharmacy attendants at times embarrass the buyers and consequently they either change shops or stop buying altogether. Sometimes a shop attendant would smile sardonically, laugh or wink suggestively when a young man mentions that he wants a contraceptive. This finding from the group session has also generated a study: ("The Mystery Shopper" forthcoming) which uses young men and women, and singles and couples to enter shops and try to purchase contraceptives; and then observe the behaviour of the attendants. The result of this study would help to train the shop attendants on how to communicate with customers.

The results from the focus study have also generated quantitative survey research in four villages within a radius of 80 kilometres from Accra. The questionnaires would deal with the general KAP survey questions; issues on oral rehydration, measles and other preventable childhood diseases; traditional herbal treatment of diseases; and the flow of information to parents concerning these childhood diseases.

### NOTE:

The author thanks Nana Gerbrah Aidoo, M.A. candidate at the School of Communication Studies, Legon, for reading through the paper and making some suggestions. Our appreciation also goes to Lintas Advertising Co., Ghana, for allowing the use of some of the focus interview data.

### REFERENCES:

Dickens, J. "The Fresh Cream Cakes Market: The Use of Qualitative Research as part of a Consumer Research Programme" in Applied Marketing and Social Research 1982, Ute Bradley (ed.) Van Nostrand Reinhold Co. Ltd. New York N.Y.

Halloran, James D. "The Social Implications of Technological Innovations in Communication," *The Myth of the Information Revolution: Social and Ethical Implications of Communication Technology, 1986.* Michel Traber (ed.), London: SAGE Publications pp. 46-63.

Little, Kenneth. Urbanization as a Social Process: An Essay on Movement and Change in Contemporary Africa. 1974. London: Routledge and Kegan Paul.

Merton K. Roberts, Marjorie Fiske, Patricia L. Kendall: *The Focused Interview* 1956. illinois: The Free Press, Glencoe.

Obeng-Quaidoo, I. "Culture and Communication Research Methodologies in Africa: A Proposal for change" in GAZETTE (1985) 36:109-120.

Obeng-Quaidoo and Alexina Arthur, "Focus Group Research and Contraceptive Status of Ghanaians" forthcoming.

Obeng-Quaidoo and Monica Bleboo, "The Mystery Shopper: Contraceptive Customers and their Interaction with Drugstore Attendants" forthcoming.

Rogers M. Everett, H. Niehoff, Lalit K. Sen, Anne van den Ban and Geral Hursh-Cesar, "Research for Development, in Third World Surveys: Survey Research in Developing Nations 1976, Gerald Hursh-Cesar and Prodipto Roy (eds.) Delhi, The MacMillan Co. of India Ltd. pp. 1-41.

Stycos J. Mayone, "A Critique of Focus Group and Survey Research: The Machismo Case" in Studies in Family Planning, Vol. 12, No. 12 (1981) pp. 450-456.