TWO-WAY CABLE TELEVISION AND CITIZEN PARTICIPATION:

POSSIBLE MECHANISMS OF MANIPULATION

by

ZALE ANIS

B.S., ILLINOIS INSTITUTE OF TECHNOLOGY

(1974)

SUBMITTED IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE

DEGREES OF

MASTER OF SCIENCE IN MECHANICAL ENGINEERING

and

MASTER OF SCIENCE IN POLITICAL SCIENCE

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

(January, 1977)

Signature of Author..
Departments of Mechanical Engineering
and Political Science, Janaury 1977

Certified by..
Thesis Supervisor, Department of Mechanical
Engineering

Certified by..
Thesis Supervisor, Department of Political Science

Accepted by..
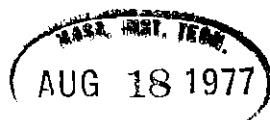
TWO-WAY CABLE TELEVISION AND CITIZEN PARTICIPATION:

POSSIBLE MECHANISMS OF MANIPULATION

by

ZALE ANIS

Submitted to the Departments of Mechanical

Engineering and Polictcal Science on January,   1977

in Partial Fulfillment of the Requirements

for the Degrees of Master of Science

in Mechanical Engineering and Master of Science

in Political Science

ABSTRACT

The purpose of this thesis is to analyze possible consequences of utilizing two-way cable television technology as a means of increasing citizen participation in government. Specifically, effects on the political process are investigated in terms of the problem of audience manipulation. After an examination of the technical configurations likely to be employed in large-scale cable participation systems, the results of a series of laboratory simulations are presented. These simulations point out several of the characteristics of cable systems that may eventually serve as a basis for manipulatory effects. Three specific mechanisms by which such effects may be generated are evaluated by comparing the results of the simulations to relevant material from the existing social-psychological literature. It is concluded that the three mechanisms of 'bandwagon', 'agenda', and 'network' effects, could all become possiblefactors in any eventual development of manipulation problems in two-way cable participation systems. Research designed to specifically investigate the presence of such effects within the context of actual programming is recommended.

Thesis Supervisors:

Thomas B. Sheridan, Professor of Mechanical Engineering

Ithiel de Sola Pool, Professor of Political Science

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

                            of New Technology................ 6

        I. The General Task of Technological
            Forecasting.................................. 8

       II. Forecasting the Effects of Cable
            Technology................................... 12

      III. Plan of Study............................... 15

CHAPTER TWO: Background: General Knowledge of Relevant
                          Social Institutions.............. 17

        I. Citizen Participation in a Democracy....... 19

       II. The Issue of Manipulation.................. 21

CHAPTER THREE: Observation: Simulation of Two-Way Cable
                              Programming................... 27

        I. Focusing on Probable Technology.......... 27

       II. Investigating Probable Characteristics
            of Cable Systems............................ 35

CHAPTER FOUR: Discussion: Implications for the Issue
                            of Manipulation................. 65

        I. Continuous Feedback: Bandwagon Effects... 65

       II. Branched Patterns of Discussion:
            Agenda Effects.............................. 74

      III. The Structure of Communications:
            Network Effects............................. 85

CHAPTER FIVE: Conclusions.................................. 101

        I. Suggestions for Future Research........... 103

       II. Manipulation Effects and the Process of
            Technology Assessment....................... 106

CHAPTER ONE

THE PROBLEM: ANTICIPATING THE EFFECTS

OF NEW TECHNOLOGY

Within recent years a great deal of enthusiasm has been gener-
ated over the prospect of two-way cable television. The technology
for interactive cable is currently available, and pilot systems have
already been introduced. The question of how such systems are to
be used, however, still remains largely unanswered. One possible
application which has received particular attention is the use of
cable technology as a means to increase citizen participation in
governmental decision-making. When we appreciate the fact that cable
technology offers the potential to involve large portions of the
population, it seems apparent that the consequences of any such
citizen participation programs will almost certainly have profound
impacts on society.

This realization has been the source of claims concerning the
great benefits to be had from the implementation of such programs
as well as of ominous predictions of deeply harmful consequences
for society. The problem which this thesis addresses is how to dis-
cover characteristics of the emerging technology which possibly hold
some implication for eventual harmful effects. Specifically, we wish
to focus upon the potential inherent in the technology for covert
manipulation of the audience.

By manipulation we mean the alteration of group behavior such
that outcomes other than those which would have otherwise emerged
during the course of cable participation programming might occur.
Such alteration of behavior may of course be conscious and intentional.
However, a more likely possibility is that it may arise unitentionally
as a result of systemic factors inherent in the technology of the
communication process. With time, such factors might come to be
exploited intuitively by those skilled in the utilization of cable
technology for public participation.

It is hoped that by identifying possible problem areas, future
empirical reserach might eventually verify the existence or nonexist-
ence of characteristics having manipulatory potential in actual citizen
participation programs conducted over two-way cable. The particular
methodology employed in this analysis has been adapted for the task
of predicting qualitative impacts of technology upon social systems.
For this reason it is necessary to briefly examine the prior problem
of technological forecasting in general.

I. The General Task of Technological Forecasting

Contemporary society has become aware of the necessity to analyze

new and existing technologies in terms of possible effects upon the

environments in which they are introduced. The complete social setting

within which any technological innovation is implemented consists of

several interelated spheres such as the biological, economic, and

political. The rapid pace of technological advance within the last

few decades has provided innumerable instances of technologies developed

for the purpose of solving a particular problem in one sector, only to

give rise to new problems involving several sectors.

In order to analyze such problems it becomes necessary to make a

distinction between the first- and second-order effects of technologi-

cal change upon the physical and social environment. In the past, the

evaluation of new technological developments in terms of possible

social consequences was often solely concerned with the effectiveness

of the technology as a solution to some immediate problem which had

arisen in society. Assessment of technology on this level, however,

does not extend beyond an analysis of first-order consequences. But

as Raymond Bauer states, the realities of the contemporary world

have forced us to the recognition of the fact that "...even if we did

things that we regarded as inherently desirable, they might produce

second- and third-order consequences that were undesirable, and of

greater ultimate magnitude than the direct consequences of the original

action."[1]

Bauer's framework for the assessment of technological development is based upon the assumption that society is sufficiently complex to insure that any action will inevitably result in some second-order effects. These effects are not necessarily bad, however; they may be desirable or undesirable. They can also be intended or unintended, anticipated or unanticipated. In view of this state of affairs, Bauer asserts that

> "...the major task in control over our destiny is to make as many second-order consequences as possible intended, anticipated, and desirable; and reduce to a practical minimum those that are unintended, unanticipated, and undesirable."[1]

Methods of Anticipation

The major difficulty encountered in this task is undoubtedly the anticipation of second-order effects. Within the past few years, interest in the field of technology assessment has generated an extensive literature dealing with formal methodology for technological forecasting. Much of this material, however, deals only with the future behavior of technology itself. Typical of the predictive aids to be found is a model of the process of technological innovation developed by James Bright. In this model the growth of technological capability is described as a fundamentally exponential process.[2] Although such theoretical tools are useful for helping us to understand the nature of technological growth, they tell us little about what the eventual impacts of new technology may actually be.

This is a point which Bauer makes in his treatment of the problem qualitative prediction.[1]p.31 According to his analysis the"...actual anticipation of a specific future state that may follow from a given technological change is a work of imagination."[1]p.32 The tools which we bring to bear on the problem are of two kinds. They either provide a base of factual information from which the imagination can draw, or they act as direct stimuli to the imaginative process.

In an essay appearing in 1964[3], Daniel Bell discusses twelve modes of prediction commonly encountered in the social sciences. Three of these techniques often serve as major sources of generalized knowledge of social institutions. The 'structural certainties' of a stable social system describe "... an order of events that are legally preserved and traditionally reinforced".[3]p.854 They enable us to make behavioral predictions based upon fixed and explicit patterns of conduct. Patterns of conduct which are implicit, on the other hand, are referred to as the 'operational code'. This code sets forth the underlying rules of the game by which political actors consciously or unconsciously adapt to new situations. The third mode of analysis focuses on the 'structural requisites' of a social system. These requirements constitute the minimal set of concerns which the system must satisfy in order to continue functioning. Predictions made from this perspective have their greatest utility in the delineation of the limits of change.

This sort of knowledge of institutional behavior undoubtedly serves as a framework upon which predictions of technological impacts can be built. Yet, as Bauer maintains, qualitative prediction remains a work of the imagination requiring an imaginative stimulus. Several of Bell's modes of prediction fall under this category as well. Bell refers to 'social physics' as the use of explicit models developed for the purpose of illustrating hypothetical 'social laws'. Another predictive technique utilizes the formulation of 'alternative futures'. In the course of this type of speculation, a structured set of conditions is used as a guide for the writing of several possible scenarios of future behavior. Additional predictive aids cited include game theory, decision theory, and the use of simulation. Bauer, however, considers the use of analogy to be the most pervasive stimulus to the imagination.

II. Forecasting the Effects of Cable Technology

Bauer's analysis of the problem of prediction is based upon the assumption that second-order effects of technological change must always exist. In the case of cable technology used to increase citizen participation, this assumption seems justified based solely on a realization of the large number of people that would be affected. However, all mass communication systems are similar in this respect, and it is for this reason that some insight into our problem may be gained by examining the social ramifications of communications technologies already in existence.

An obvious case to single out for consideration would be one which addresses the specific issue of participant manipulation. In their study of 1964 presidential elections, Kurt and Gladys Lang[4] attempt to answer the question of whether or not the broadcasting of early election returns in areas where the polls were still open had any real effects upon voter behavior. A major conclusion of the study was that the broadcasts had no net effect on the actual outcome of the election. However, the investigators did discover that individual attitudinal reactions on the part of voters did occur. Since the potential for the outcome to have been altered by such ancillary effects was a function of the historical circumstances peculiar to that election, it is not clear whether further election outcomes would remain similarly unaltered. Commenting, therefore, on

the importance of indirect effects, Lang and Lang state that:

> "Direct effects-or the lack of them-do not exhaust
> the whole range of effects attributable to commun-
> ications. Maintaining stability in the face of in-
> fluences toward change involves some kind of adjust-
> ment, and communication research has gradually learned
> to include these other effects within its range of
> interest."[4]p.ix

According to Bauer's classification of technological impacts, the direct effects mentioned above would be considered second-order. However, the attitudinal changes which may possibly influence the psychological process by which stability of voting intention is maintained could be referred to as third-order effects. In fact, the Lang study makes the conclusion that new election regulations are necessary to insure against possible harmful effects of early returns broadcasts. The conclusion is based upon the existence of the indirect and possibly long-range higher order effects rather than upon a demonstration of any direct effects.[4]p.168

The Lang study was based upon empirical data gathered on the attitudinal reactions of voters. Although we may be fairly assured that citizen participation via bidirectional cable has the potential for causing similar higher-order effects, we are not able to draw our conclusions on the basis of actual observation. In our case the problem is more difficult as the technology in question has not yet come into actual use. Although pilot two-way systems have already been developed by private interests such as the Mitre Corporation and Hughes Aircraft Company[5]p.49-50, little has been done

to develop non-commercial services such as citizen participation.
In a report prepared for the Rand Corporation in 1971, Walter S. Baer
attributed this situation to a 'chicken-and-egg' effect. That is,
that the capital outlay required for the installation of the necessary
hardware will not be made until a sufficient market for such services
has been demonstrated. However, no demand for the services can be
generated until they actually become available to the public. The
end-result is that:

> "Those interested in the community uses of
> interactive cable television have two alternative
> courses of action. The first is to wait until com-
> mercial services have brought two-way terminals into
> enough homes to make non-commercial uses attractive
> on a marginal cost basis...The other course of action
> is to seek public support today for a few experiments
> to develop and test non-commercial use of interactive
> television."[6]p.87

In order to meet this need, the National Science Foundation
decided to solicit proposals for experimental programs in the ap-
plication of two-way cable to non-commercial public services in
urban areas. In 1974, grants were made to seven universities and
non-profit research organizations for developing their proposals in
detail by working with local governments and cable communications
operating companies. Several of these proposals, including those
of the Urban Institute,[7] the University of Southern California,[8]
the University of Denver[9], New York University[10], and Lehigh
University[11], dealt explicitly with programs designed to increase
citizen participation in government.

III. Plan of Study

None of these proposals extend their investigations much beyond a concern for the first order effects of the technology. That is, for the basic capability of two-way cable systems to provide such services. These studies are therefore of only limited utility in an analysis of higher order effects such as those discussed in the Lang study. In view of this fact, our analysis must of necessity remain a work of imagination. The methodology we employ will therefore have to conform to that described by Bauer in which two fundamental types of tools are used to anticipate second-order effects.

Political analysis based upon general knowledge of relevent social institutions can afford insight into the possible forms that higher-order effects may assume. This first stage of analysis is the focus of the second chapter of this thesis. In order to obtain more detailed knowledge of possible manipulatory effects, however, new sources of information are needed to stimulate the imaginative process. What is needed, therefore, are actual observations which can be analyzed for indications of factors likely to lead to manipulatory effects. For this purpose, the results of simulations carried out during the course of the M.I.T. Community Dialog project were utilized. Chapter Three begins with an investigation of the probable future configurations of cable participation systems and then proceeds to compare these characteristics with those of the Community Dialog system. Relevant results from the simulations are then reported.

These simulations were designed as rough investigations of

the characteristics of cable participation systems in general rather

than of the problem of manipulation in particular. However, three

of the observations made during the course of the Community Dialog

simulations can serve as important inputs to an analysis of mani-

pulatory effects. It remains to evaluate the implications of those

observations within the context of the relevant social-psychological

literature. Such a discussion is presented in Chapter Four which

outlines three possible mechanisms of manipulation. The major issue

addressed in this chapter is the question of whether or not it is

valid to grant that such effects might in fact occur. Finally,

Chapter Five restates these conclusions and presents suggestions

for further research.

CHAPTER TWO

BACKGROUND: GENERAL KNOWLEDGE OF RELEVANT SOCIAL INSTITUTIONS

Much of the analysis which has already appeared in the political
science literature can provide valuable insights into the nature of
the possible impacts of cable technology on society. Any review of
this literature, however, should begin with a discussion of the
motivation behind citizen participation applications of the cable.

A primary stimulus to the development of cable participation
has been the alarming trend of growing alienation present in American
society. The results of a Harris poll conducted during the late
sixties and early seventies [12]p.1 indicate that in 1972, 53% of
the respondents agreed with the statement: "What you think doesn't
count much." In addition, fifty percent felt that the people running
the country really didn't care about them. Several factors have been
suggested to account for this - among them, the idea that the alien-
ation of citizens is directly related to the increasingly complex
nature of government. [7]p.II-4 Government is no longer only res-
ponsible for providing basic services. It must now administer pro-
grams which interface in complex ways with important social issues;
and it must do this with little knowledge of the correct way to
procede.

Insufficient communication between policy makers and citizens
often results in decisions which are unresponsive to the needs of
the community. This tends to cause further alienation which in turn

leads to decreased communication producing a vicious circle.

Another contributing factor which has been cited lies in the nature of existing communications. In the age of mass-media, the flow of communication is usuually one-way. This results in a situation in which

"...the citizen watches T.V., reads newspapers, and
listens to radio, but he has no way of talking back.
He hears, but he is not heard. At least that is the
way he feels."[12]p.1

Since existing channels of communication appear to be inadequate, the solution may be to provide additional feedback links from the citizen to decision-makers. In doing so, the individual may gain a sense of particpation while decision-makers would be provided with better information on the attitudes of their constituents.

The advocates of two-way cable list several advantages which seem to favor it as a new means of citizen feedback. The first advantage is that cable can reach a large potential audience in their homes (or at least at neighborhood terminal locations). It is also an economically feasible medium for programming addressed to small specialized audiences because of its large channel capacity. In addition, cable is, after all, a visual medium and can therefore convey more information than most other means of communication.

I. Citizen Participation In A Democracy

Some of the most important conclusions to be made concerning
the possible consequences of cable technology have been derived from
a general knowledge of the role of citizen partipation in the function-
ing of a democratic society. Some of the benefits which increased
citizen participation might bring have just been stated. However, as
Ithiel de Sola Pool points out in his article on citizen feedback[13],
we must pay a price for these benefits. The objective for any new
system for increased citizen participation must therefore be weighed
in terms of a series of trade-offs.

This fact is especially clear with respect to the issue of
referenda. Adherents of the vision of a direct democracy have proposed
the use of two-way cable for instant referenda in which the people
themselves vote on the issues. However, most authorities agree that
increasing citizen participation to this extent would be unfeasible
due to the nature of the legislative process. The typical legislator
is faced with a massive complex of bills and issues which require
his full attention. Even so, most legislators are forced to special-
ize in just one area in order to be able to act effectively. In other
areas they must simply take the advice of trusted colleagues. It
therefore does not seem possible that any citizen participating
during his leisure time would be able to competently decide upon
issues.

Increasing citizen participation to the point of direct democracy, however, is an extreme in a wide range of possibilities. What can be said about the impact of less extreme increases on a political structure such as our own; that is, one based on a balance of pluralism and consensus? One possibility which Pool points out in his article is that high-level decisions may become harder rather than easier to make[13]p.243. As more and more people are brought into the decision-making process, discussion becomes more time consuming and often ends in stalemate.

However, the trade-off in this case involves more than just the relative efficiency of decision-making processes. Stalemates are generated when a population becomes more politicized and citizens become increasingly committed to particular points of view. It soon becomes apparent that if "...citizens are brought by effective personal participation to the point of caring very deeply about political outcomes, then there had better not be too many important political decisions; for every time one is made ther^ are losers as well as winners."[13]p.244 And we know that for any highly politicized minority

> "... the more vital the sphere of politics,
> the more disillusioned they will be at society's
> failure to accept their version of the truth. Thus
> the price for having a politically active citizenry
> in a free society is a sufficient devaluation of
> political decisions so that losing is not intolerable
> to the losers."[3]p.245.

It is for this reason that society tries to reduce the necessity

for consensus in the decision-making process as much as possible.

National government passes the responsibility for many decisions

down to more localized levels such as the city and the state. In

this way different segments of the population may make different

decisions and thereby avoid nationwide conflict. The general

conclusion to be drawn is that the objectives of any system designed

to increase citizen participation must be limited enough in scope

so that the necessary political balance can be maintained.

II. The Issue of Manipulation

General knowledge of factors which determine the fundamental

role of citizen participation within a democracy must certainly

be a prerequisite for the analysis of cable participation programs.

However, it is unlikely that observing anything less than an actual

large-scale, real-world system would provide any practical information

on how to maintain a proper pluralistic balance. There are other

consequences of cable participation programs, however, which may be

more amenable to analytical treatment on a practical level. The issue

which is of   greatest in concern in this paper is that of mani-

pulation. Pool summarizes the problem with respect to two-way

cable when he states that

> "...better communication technologies that create
> more effecient, more extensive, and more intensive
> interaction between public figures and their con-
> stituents may reduce the sense of alienation by

> making the public figures better able to
> respond to their constituents and to influence
> them. There is no electronic difference between
> these two prcesses. They are both enhanced by
> efficient two-way communication. The spector of
> electronic manipulation is simply the other side
> of the same coin of the hope of electronic demo-
> cracy." [13]p.242

Knowledge From Past Experience

Past experience with experimental citizen participation programs

which did not utilize cable technology indicate that several possib-

ilities for overt manipulation by government officials do in fact

exist. One study which was completed in 1974 reported on the operation

of the Televote system which was designed to aid rapid two-way communi-

cation between decision-makers and their constituents.[14] The system

was demonstrated during the course of a seven month experiment in

the San Jose Unified School District.

In this experiment, votes on various issues were taken amont a

large number of citizens who voluntarily registered to participate.

For a particular poll, schoold district officials would define the

issues and state the reasons behind the various policy choices. This

information and a questionnaire had a corresponding numerical code

which the participants could dial on their telephones once they had

made their choices. A computer registered and tallied all the votes

entered in this manner, and the results were relayed to school officials

within two days. The polling results and any impacts they may have had

on public planning were later publicized to reinforce participation

in the program.

One opportunity for manipulation to which officials might

possibly avail themselves is itself related to a question concerning

the first-order effects of the technology. Specifically, did the

system perform the function for which it was intended; that is, to

provide current information on citizen views to public officials

so that their decisions would be more responsive to the needs of the

community. The summary of the report indicates that few conclusions

can be drawn with respect to this question:

> "...A long-range aim of a televote system is to make
> public decisions more responsive to the desires of the
> constituency served. Whether any progress was made in
> this direction in this brief demonstration is difficult
> to say...but the fact that the televotes often gave
> school officials new information at least provided them
> better opportunities to be responsive."[14]p.20.

It is apparent that no conclusion on whether decisions actually

were more responsive seems to have been drawn. However, the results

included in the report do appear to indicate a few general trends.

A total of thirteen votes were taken over the seven month period

of the experiment. Seven of these votes were on issues related to

official planning efforts already under way. The officials themselves

took the leading role in defining the questions for these votes, and

it is clear that the voting results had an impact on the final decision

in four of these cases. External circumstances seem to have prevented

the results from having a similar impact in the three remaining cases.

The other six votes taken during the course of the project were not

initiated by officials, but by students, staff, or citizens. Of

these the report states,

"...It may be too early to make final judgements about the eventual effects of such televote results, but as yet there seems to be no tangible impact on district policy or decisions as a result of those televotes not initiated in connection with official planning for a specific decision."[14]p.19

Although it appears from this that officials weighed public opinion only on a selective basis, the citizen response to the televote system was quite favorable. The program also seems to have effected a change in attitude among some sections of the population towards school officials. This is especially apparent in the responses to a survey question which asked participants how interested they thought the local shcool district was in their opinions. The question was asked of suburban residents in a pre-experiment survey and again a year later after the experiment had been completed. The number of those who chose either 'very interested' or somewhat interested' rose from 47% on the pretest to about 62% after the experiment. A control group had a 52% response both years. [14]p.31

It seems clear that many of those who had participated found some degree of satisfaction in doing so even though it is not clear whether decision-makers were in fact more responsive to citizen needs. The question then becomes whether the real effect of the technology is the "...psychic satisfaction that it gives to the participating citizen or the achievement of better governmental performance."[13]p.237 It is therefore conceivable that politicians could actually use the medium for the reduction of community pressures rather than as a means of becoming more responsive to them.

The results of the experiment also seem to indicate a second
potential source for the overt manipulation of citizens. We have
already noted that the results of the project indicate that officials
only responded to votes on issues which they had taken the leading
role in defining. In commenting on this fact, the report suggests
that:

> "...giving officials more freedom to define issues
> as they see fit would increase use of results. Such
> a change would require special attention to whether
> all sides of an issue were stated fairly. Planners
> might be tempted to propagandize rather than to en-
> courage citizens to weight all relevant factors and
> make a judgement in the public interest.[14]p.19

State of Current Knowledge

All these possibilities have been suggested by past experience
and a general knowledge of political systems. But to what extent
are the manipulation problem and similar consequences of the techno-
logy treated in proposed programs of experimentation? Among the
experimental proposals submitted to the National Science Foundation,
that of the Urban Institute[7] is indicative of a growing concern
for possible undesirable effects of cable participation. Unfortunately,
the Urban Institute program does not seem to deal with the problems
of manipulation and privacy beyond the stage of ensuring that they
don't arise during the course of that particular experiment.[7]p.II-15

It would seem, then, that the base of factual and analytical
knowledge just reviewed can provide us with general guidelines for
determining constraints on future cable participation systems.

However, it also seems clear that such knowledge does not provide us with the more detailed information needed to speculate on the actual mechanisms of higher-order manipulatory effects.

CHAPTER THREE

OBSERVATION: SIMULATION OF TWO-WAY CABLE PROGRAMMING

In order to discover the characteristics of two-way cable

participation systems that might result in possible manipulatory

effects, it is first necessary to reach some conclusion on the

probable future configurations of such systems. Once the general

technological configuration has been agreed upon, laboratory simu-

lations can be carried out using experimental subjects The results

of these simulations may then serve as part of our basis for

speculation on the higher-order effects of technology.

I. Focusing on Probably Technology

Possible system configurations will obviously be dependent on

the particular functions individual participation programs are

intended to serve. Some of the possible applications which have been

proposed for two-way cable systems include:

1. choosing policy alternatives

2. identification of issues, problems, and areas
    of discontent

3. interest group recruitment

4. feedback to decision-makers including stands on
    issues and evaluation of government performance
    [9]p.84, [15]p.8.

The first possibility amounts to using the technology for

instant referenda, and we may now exclude it from consideration

for reasons previously discussed. As shall be seen shortly, the

fourth application has the greatest potential for involving large

segments of the population, while the second and third possibilities

seem to be relatively smaller in scale.

Perhaps the most natural way to implement the fouth application

would be to use the cable to extend existing opportunities for feed-

back. The traditional forum for expression of public response on

issues is the hearing. Although public hearings often precede the

making of a decision, they are clearly inadequate as channels of

real feedback. Due to the invonvenience of attending these hearings

and the general lack of knowledge concerning them on the part of the

public, attendence is often limited to a few experienced advocates

of the various contending positions. It may be possible to correct

the inaccessibility of public hearings by televising them and offering

the possibility for instantaneous feedback. A true extension of the

public hearing, however, would require a full video return channel

capability.

Such systems can only be employed on a limited basis, however,

and the potential audience would most likely be restricted to

neighborhood terminal locations. In order to involve a larger

participant audience, the upstream communication link would have to

be limited to carrying audio signals utilizing microphones or ordinary

telephone lines, or simple digital signals produced by terminal

keyboards or some less complex combination of response switches.[16]p.17

Small-Scale Applications

The possible configurations of two-way cable systems to be employed in the extension of public hearings encompasses the full range of technical options available; namely, those which utilize visual, aural, or digital signals for upsteam transmissions from the audience to the point of program origination. Configurations which offer full two-way visual and aural capability are thought to be best suited for performing the second and third functions listed above, those of issue identification and interest group involvement. Both these applications require group-to-group teleconferenceing capability. One teleconferencing system which has already been implemented is that of the Metropolitan Regional Commission of New York[17] although it transmits by means of microwave relay rather than cable. However, several of the experimental proposals submitted to the National Science Foundation do outline programs which utilize the cable. New York University's design emplys neighborhood communication centers for the elderly[10]p.125, while the University of Southern California's proposal discusses video conference facilities for the interaction of citizen groups and planners.[8]p.62

In a Masters thesis submitted to the Department of Politcal Science at M.I.T., Michel Guite' describes attempts to enlarge the potential audience of such meetings by substituting digital or purely aural channels for visual ones.[15]p.44 Guite' contends, however, that these methods are largely unsatisfactory for several

reasons; the first being that "...button-pushing isn't highly sati-
sfying way to participate in group-discussion when the influence of
one button pushed is almost imperceptable."[15]p.45

And yet, button pushing seems to be the only way to involve
large numbers of people, for as Guite' points out, even with the
use of simple aural channels, participation is still restricted to
the number of people whose comments can be broadcast during the
program.[15]p. 45 The conclusion to be drawn is that the face-to-
face requirements for satisfactory group discussion necessarily
restrict cable programming initiated for the purposes of interest
group activity and group identification of issues to relatively
small audiences.

Large-Scale Applications

The primary focus of interest in this paper, however, is the
higher-order effects such as those discovered in the Lang study
which may possibly affect large parts of the population simultaneously.
This is not to say that important media effects are not present in
the case of smaller-scale communication. The Joint Unit for Planning
Research at University College, London has in fact carried out important
studies of teleconferencing networks which include topics relateing
to the decision-making process, interpersonal conflict, and reaction
to strangers.[18]

Of the four proposed applications for two-way cable, the one
which seems most likely to involve large numbers of participants

is that of feedback to decision-makers. Of the already existing

channels of citizen feedback, the one which has received the widest

acceptance seems to be the public opinion poll. Interactive cable

seems especially suited for this application as it is a visual medium

with an instantaneous response which lends itself easily to the polling

process. Participants can receive adequate information before making

their decisions, and the questions can be modified in light of

feedback already received during the course of the polling. It has

been predicted, however, that public opinion polling by cable will

not come to receive serious consideration because of the fact that

a self-selected sample, such as a television audience, is not

statistically representative.[19]p.80

Two basic approaches have been taken in response to this problem.

In the televote experiment described in the previous chapter, the

total number of participants was 6000 or about 4% of the eligible

population drawn from the San Jose Unified School District. The

average number of people participating in any single poll was 700.[14]p.46   √

Even though a large number of people voted, the criticism concerning

the representativeness of the sample is certainly still valid. For

the purposes of scientific survey analysis, therefore, the results have

to be viewed critically. However, one response to this is that a

valuable function was still performed in that the amount of citizen

feedback to planners had increased considerably. Therefore, although

a self-selected polling sample is not representative, most existing

alternatives are even less so.

Another response to the problem is to simpley employ scientific
polling techniques. This is the approach taken in several of the
NSF proposals that include polling applications of two-way cable as
part of their programs. The proposal prepared by the Urban Institute[7],
for instance, contains an extensive polling project to be carried out in
Peoria, Illinois. It describes a series of eleven polling experiments
to be conducted in 150 randomly selected households. These homes
are to be equiped with terminals capable of conveying a one-digit
response to questions presented during special television programs.
As in the televote experiment the questions are designed to supply
information to the local government which would enable it to make
more responsive decisions.

As several of the NSF proposals point out, opinion polls con-
ducted over two-way systems would not be limited to traditional formats
currently in use. In the Lehigh University proposal, for instance,
electronic feedback provides the means by which participants can
voice preferences for topics of future polls.[11]p.66 As Guite'
points out, participant modification of the polling process could
be extended beyond this point through the use of interactive question-
naires[15]p.41 With such an arrangement, questions could be modified
within the course of the same poll. The utilization of instantaneous
feedback therefore enables televised polling to become an essentially
dynamic process in nature.

It is conceivable then, that when combined with video back-
ground materials,this sort of dynamic process could result in a
responsive exploration of issues which might approximate that found
in group meetings. The goal in attempting such programming would
be to obtain a feedback channel offering greater flexibility and
potential for participation than the conventional opinion poll, but
which would still not be required to handle the face-to-face com-
munications necessary to true group meetings. Thus, while still
unsuitable for the smaller scale citizen participation applications
discussed earlier, two-way cable employing digital upstream trans-
mission does seem optimal as a means for providing large-scale
feedback to decision-makers.

Systems Utilizing Limited-Response Digital Transmission

Once digital upstream transmission has been recognized as the
most likely choice for large-scale cable participation networks,
it becomes a relatively easy matter to predict the technological
features of such systems. Michel Guite', for instance, has proposed
a design for a useful two-way system to beinstalled in a community
with a potential of several thousand subscribers.[15]p.50 The con-
figuration which he recommends for the home terminal consists of a
ten-button response pad, converter to translate between cable and
home equipment, and a frame-grabber. This recommendation was based
upon an estimated cost for the system ($350) being weighed against
potential benefits of additional equipment.

The ten-button response pad included in the design provides
enough flexibility to permit an interactive polling process. It is
for this reason that Guite' prefers it to less expensive four-button
response units which don't offer that capability.[15]p.51 Increasing
the information capacity of the unit beyond ten buttons, on the other
hand, does not seem justifiable either. Although he feels that a full
alpha-numeric keyboard would permit open-ended response leading to
greater satisfaction in communication, Guite' indicates that the
extra expense involved would be prohibitive.[15]p.41

The conclusion of a most likely terminal configuration consisting
of a limited arrangement of response switches is also reasonable from
perspectives other than the cost-benefit approach taken by Guite'.
This is especially clear in light of the fact that the type of
response capability available for community services will most
probably be determined by the response capability already available for
commercial services. Commercial equipment manufactured for per-program
pay TV systems closely resembles that required for public opinion
polling, and it is therefore not surprising that most of the NSF
projects have obtained their systems from this source.

The Urban Institute's proposal, for instance, gives a detailed
account of its search for equipment suitable for adaptation to com-
munity servies.[7]VII-17 The University of Denver project uses a
modified version of the Hughes SRS system console which consists of
a channel selector and small response button pad. The Lehigh Univer-

sity system is similar and is part of the Twin County Trans-Video

pay TV system configuration.[11]p.36

## II. Investigating Probable Characteristics of Cable Systems

The necessity to limit the response capability of home terminals

used in large-scale polling applications is also clear from another

viewpoint. Guite' excluded full alpha-numeric keyboard terminals

from consideration on the basis of cost. However, in the context

of live interactive programming, they are clearly unsuitable for

reasons he already stated in connection with verbal participation

in group meetings; namely, that participation would be restricted

to the number of people whose comments could be broadcast during the

program.[15]p.45 Clearly, for any type of polling process involving

large numbers of people, the vast amount of information contained

in the open-ended responses of alpha-numeric keyboards would be

impossible to process adequately, even with the aid of the computer.

The Community Dialog Project

It is evident from the above discussion that our final choice

for a most likely system configuration should include a home terminal

which uses a limited arrangement of response switches for upstream

transmission. Having decided upon this configuration, however, what

can be said about characteristics of the system which may hold some

implication for the problem of manipulation? Speculation on the

possible mechanisms of manipulatory effects must still be based

upon some knowledge of how the system will actually function. An

attempt to gain such knowledge has been made in our case through the
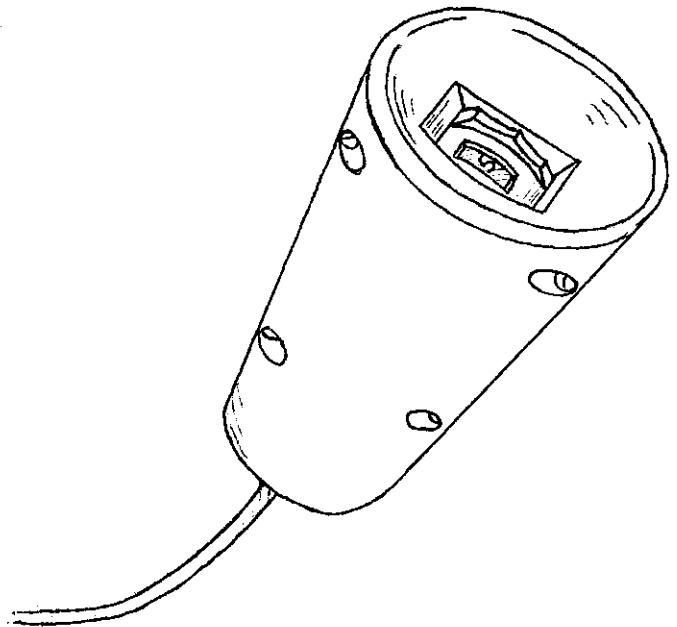
use of simulation.

Figure 1.

Community Dialog Project Equipment
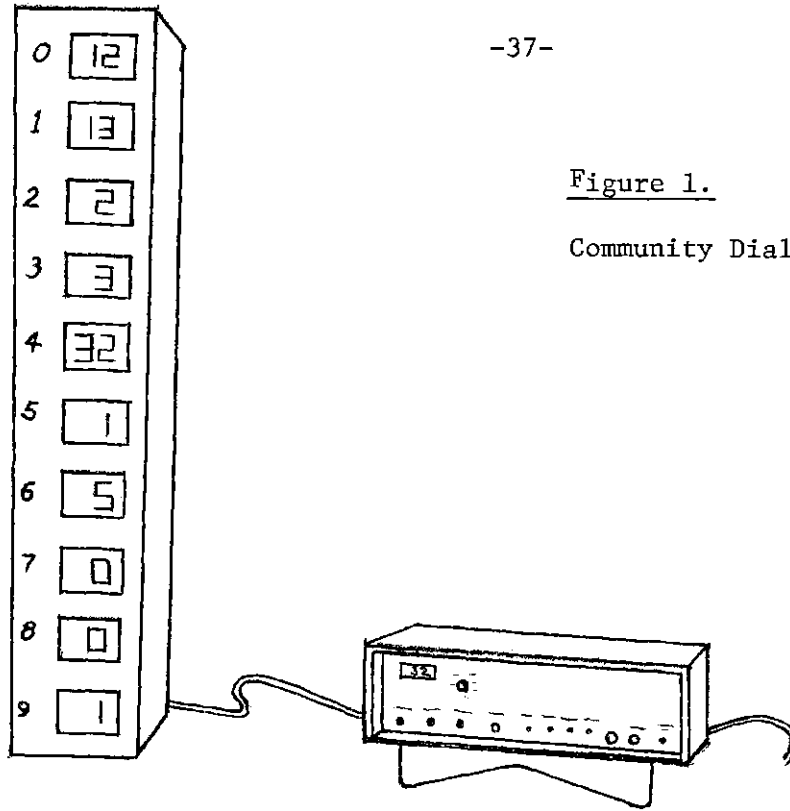
Display

Controller

Handheld
Response
Switch

In order to carry out such simulations, use has been made of the
work of the MIT Community Dialog Project. The focus of the Community
Dialog Project is on the use of an electronic polling device as an
aid to discussion in face-to-face group meetings. The hardware em-
ployed in this system is shown in Figure 1. The technology is similar
to that of our hypothetical home terminal in that each member of the
group is supplied with a handheld response unit which can enable him
to vote in one of several possible categories. These individual
switches are wired to a small special-purpose computer which displays
the results of the vote. By using this system, each member of the group
is able to

> "...make an annonymous coded response to questions
> posed by the moderator or another participant, and
> to observe instantaneously a tally of how may people
> voted in what category. The purpose is to get a rapid
> appraisal of where there is consensus and where there
> is controversey, to allow participants to reveal their
> ignorance, to deal with controversial questions without
> intimidation, and generally to make the discussion more
> responsive to real interests and needs of the group".[20]p.1

The instantanous feedback obtained during the course of such a
discussion enables the moderator to direct the flow of dialog in
response to the desires of the group. In this way a meeting can
very quickly focus upon issues which are of importance to all the
participants. The intended function of electronic feedback in group
meetings is to serve as an aid to discussion rather than as a means
of obtaining finalized votes on specific issues.

Using the Community Dialog voting apparatus to simulate the

the operation of our hypothetical two-way cable system seems
reasonable simply on the basis of the fact that participants use
the technology to respond in a limited way; they must vote in one
of ten available categories. There are, in fact, obvious differences
between home users of cable technology and the participants in an
actual group meeting who are not limited in their response to the
operation of swithces.

Nevertheless, some of the characteristics of these wired group
meetings may still be of interest. In addition, it is possible to use
the technology under conditions which account for these differences
and therefore simulate the operation of interactive cable systems.
One final motivation for building upon the Community Dialog studies
is the fact that the type of dialog achieved with electronic feedback.
does constitute a loose approximation of the dynamic polling process
which was described earlier with reference to large-scale citizen
participation applications of two-way cable.

Previous Observations

Two of the characteristics of interactive cable technology upon
which we shall base our speculations of possible manipulatory effects
are directly evident in the face-to-face group meetings of the Com-
munity Dialog Project. These two characteristics are the instantan-
eous nature of the feedback and the distinctive branched tree pattern
which dialogs conducted in this manner are constrained to assume.
Both these features are fundamental to the technique by which the
technology is used.

The general technique employed has been developed over the course

of the more than two hundred group meeting which have been conducted

using the electronic feedback device.   In essence, it consists of a

series of several steps and is continually repeated during the course

of the discussion.[20]p.7   Initially, the moderator poses a question,

typically writing it on a blackboard, and lists a number of alternative

responses, each coded with a number from 0 to 9.   In the second step,

each member of the group votes for one of the alternatives by making

the appropriate selection on his voting switch.   The vote tally is

displayed, and the group then proceeds to discuss the result.   After

this initial reaction the question may be rephrased, or a new question

may be asked and the cycle repeats.

The ability to instantaneously display voting results is essential

to the interactive process of question and response.   In addition,

by focusing discussion upon a series of explicit questions linked

by group reaction to preceding votes, a branched discussion pattern

emerges.   This pattern has been described in an MIT Doctoral thesis

written by Noam Lemelshtrich.[21]p.115   Due to the fact that instantan-

eous feedback and branched discussion appear to be characteristic

of all interactive question-and-response type dialogs, it seems

safe to assume that they would also be part of any dynamic polling

process carried out over two-way cable.

Although these two characteristics will prove to be of funde-
mental importance in our discussion of possible manipulatory effects,
further information is still needed. Also, it is necessary that
this new information be obtained under experimental conditions
specifically designed to simulate interactive television.

In the face-to-face meeting of the Community Dialog Project,
electronic feedback is used to encourage natural discussion among
the participants. However, in our televised approximation to the
group, digital feedback from the audience completely replaces natural
discussion. A major question therefore arises as to whether such a
limited response capability eliminates the possiblity of ever achieving
a dynamic sort of dialog over a televised medium. Other differences
between face-to-face meetings and interactive television exist as
well, and it is for this reason that other simulations were undertaken
to discover functional characteristics peculiar to the medium of
two-way cable television.

Simulation

Two sets of experimental simulations were carried out in November
and December of 1974 with the cooperation of the Center for Advanced
Engineering Study at MIT. The programming application under study
in each of these simulations was that of interactive polling used
to approximate the type of participation attained with group meetings.
Although the group meeting setting can never really be fully extended
to the case of large-scale programming applications, it was hoped that

a dynamic polling process could prove flexible enough to allow for more audience-directed participation than could otherwise be obtained. The underlying purpose of these simulations was to discover the problems involved in actually implementing such systems so that the functional characteristics revealed in these problems could be studied in greater detail. It was for this reason that the simulations were carried out in two stages; the first concentrated on problem discovery, while the second explored the characteristics of these problems.

First-Stage Simulations

One of the most important features of any communication medium must be the potential quality of interaction it makes available. Evaluations of the quality of interaction made during the Community Dialog feedback experiments were based largely upon subjective criteria. Participants were provided with questionnaires which enabled them to indicate the degree of satisfaction they found in the group meetings. Studies of these results and of other observations have indicated that the feedback technology interacts strongly with the behavioral dynamics of the group. [20]p.14-19

In the Community Dialog meetings, the purpose of the electronic feedback was to agument natural discussion. All the face-to-face interactions which are present during normal group meetings were also present during the Community Dialog meetings. However, this situation is drastically altered in the case of interactive television. If the meeting consists of interactive program received in individual

homes, most of the members of the 'group' are physically isolated from one another. The elimination of all interaction between group members (other than that made possible by simply observing the collective feedback) should have a considerable impact on the dynamics of the group.

An additional interaction which is eliminated in the case of two-way cable is the one which occurs between the moderator and the group. In the case of interactive television, the participants can no longer feel that they are being observed by the group leader. Of perhaps even greater importance is the fact that the moderator no longer receives information about the group's non-verbal behavior. The only feedback he is able to receive is that which appears on the electronic display. As a result of these considerations, it was initially decided that any simulation of interactive programming would have to reporduce conditions of isolation between group members and between the group and the moderator.

During the experiment, each subject was seated before a television monitor on which he viewed the program. The participants were also supplied with handheld switches that enabled them to feedback their responses. Because of physical limitations, no more than eight subjects could be supplied withmonitors at any one time. In addition, the monitors had to be located quite close to each other so that it became necessary to separate the subjects with only simple plywood partitions. The monitors and the partitions rested on two tables with four subjects

being seated at each table. The television program originated

from the next room so that the moderator would be physically isolated

from the audience. The device which displayed the voting results

was operated by the moderator and was visible to the audience over

the television. A representation of this configuration is shown
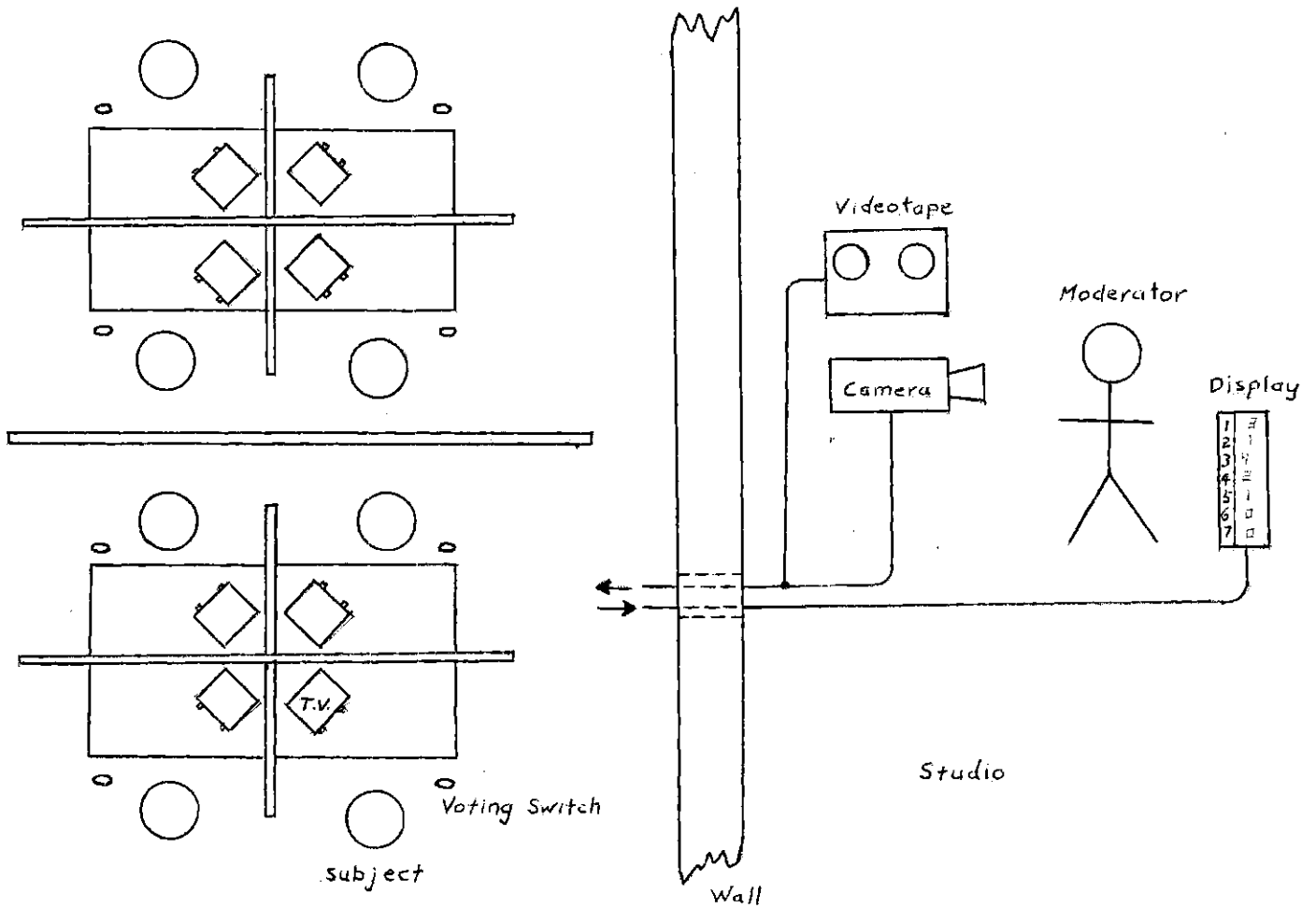
below in Figure 1.

Figure 2. Physical Configuration of First-Stage
           Simulations

The programming format used in the first simulation was
similar to the meeting format used in the Community Dialog Project.
As in the Community Dialog meetings, this experiment employed one
moderator who asked questions of the audience and operated the
electronic display. Throughout the entire length of the program,
the camera focused upon the moderator and the display simultaneously.
The topic of the meeting was student residential life at MIT, and
it consisted of a series of prepared questions to which the audience
responded by using their voting switches.

In the non-television feedback sessions, simply drawing up a
list of questions was usually all the preparation a moderator needed
to make before a meeting. The questions served as a framework for
discussion drawn from the audience. As a result, any extensive pre-
paration would often prove to too inflexible. In fact, the primary reason
for using the feedback technology in these meetings was to stimulate
and direct group discussion rather than to obtain voting statistics
for a list of questions.

The clearest result of the televised experiment, however, was
that such discussion never occurred. Obviously, it had been expected
that the audience of a televised meeting would be incapable of actually
vocalizing their feelings using the electronic devices as their
only means of feedback. But the assumptions prior to performing the
experiment was that by interpreting the responses to his questions,
the moderator could formulate new questions which would reveal the
desires of the audience and thus enable an evolving dialog to take

place. However, the televised meeting contained little discussion

and was for the most part completely static. The audience responded

to the questions one at a time in a manner similar to the way in

which they would have responded to an ordinary poll.

The Community Dialog experiments indicate that the skill of

the moderator is often an important factor in achieving satisfactory

dialog.[20]p. 13 The moderator in this experiment, however, did have

a great deal of experience in running group feedback sessions. The

apparent conclusion is that the methods which had previously been used

in trying to draw discussion from the audience had failed in the case

of the televised meeting.

Most of the experimental subjects for this simulation were

students from an undergraduate course dealing with television and media.

The use of electronic feedback in group meetings had been demonstrated

during a class session prior to performing the experiment. For this

reason, most of the subjects were already familiar with the type of

group discussion carried out in the Community Dialog experiments.

When asked to evaluate the televised meeting, therefore, several of

the replies mentioned the lack of dialog in the simulated cable program.

For instance, in response to the question which appeared on the follow-

up questionnaire.

1) Did you feel a sense of participation in the 'discussion'?

one of the subjects wrote:

"Yes, but about as much as a questionnaire, even though
there was more immediacy."

And when asked to compare the televised meeting to the face-to-face

electronic feedback session, another respondent replied that in the

face-to-face meeting..."you could reclasification of a question."

But in the televised meeting, however..."I felt a good deal of

frustration about clarification, and also because I couldn't explain

my answers."

Several of the questionnaire re sponses described the problem as

being one of 'frustration'. The audience's limited ability to respond

apparently led to a breakdown in communication. This is indeed the

problem which had been anticipated prior to performing the experiment.

Although the feedback devices used by the audience were the same as

those used in the Community Dialog meetings, the ability to respond

was severely restricted in the case of the televised meetings in

which the moderator was unable to call upon members of the audience

to explain their vote or to pose new questions. In addition, televised

meetings eliminate all the non-verbal cues which often enable a moder-

ator to remain   touch with his audience. It is therefore apparent   √

that it is the limited response capability of electronic feedback

which poses the fundamental problem for its application to inter-

active television.

Second-Stage Simulations

a. Preliminary Sessions:

Although the results of the first simulation reveal the existence
of frustration in communication, they do not give us much information
on the specific characterisitcs of the group meeting which actually
play a role in the communication breakdown. Only general conclusions
concerning the effect of the limited response capability of electronic
feedback could be drawn from the questionnaire responses. However, if
we wish to achieve satisfactory dialog without resorting to additional
channels of communication, we must discover features of moderation
technique and program software which might prove useful in solving
the problem.

In order to obtain results which would be more concrete than
those of the first simulation, some type of controlled experimental
method had to be employed. This required a familiarity with specific
factors of interest prior to the formulation of the experiment design.
For this reason, a series of weekly preliminary sessions were held
during which televised group meetings were simulated and then analyzed.
During the preliminary sessions the experimenters themselves acted as
moderator and audience. By using closed-circuit television equipment
and the electronic voting apparatus, group members had the opportunity
to test a variety of programming and moderation techniques before
deciding upon the variables to be investigated in the final experiment.

During the first of these weekly sessions, the group discussed

the subjective criteria by which any particular technique was to be

judged. It was decided to assess the quality of any interactive process

by evaluating the three general characteristics of participation,

nature of feedback, and efficiency. A subject's sense of participation

should reflect the extent to which he/she is actively involved as

well as the impression he/she develops of the importance of their

own feedback. The latter factor provides a measure of the perceived

responsiveness of the moderator. The second major characteristic,

the nature of the feedback, denotes the extent to which the qualities

of subtlety and richness of information may be found in communication.

Finally, the third characteristic, efficiency, signifies the amount

of time and effort which must be spent on any particular programming

technique. This factor has implication for the continuity of the

program and for its consequent ability to maintain audience interest.

During the preliminary session, the techniques employed in each

trial were analyzed in the context of the above general criteria. Most

of these trials consisted of televised group meetings moderated by a

single person in a manner similar to that of the first stage experi-

ments. By occasionally interrupting the proceedings, the experimenters

were able to analyze the ways in which the moderator interpreted or mis-

interpreted the feedback. The conclusion immediately drawn was that

the results of these first initial trials were identical to those

of the first stage simulation. That is, the inflexibility of the

response system had led to a breakdown in communication.

This breakdown most often occurred in relation to the moderator's inability to correctly interpret audience responses. For example, members of the audience would sometimes vote for category numbers which had not been associated with any of the alternative choices for that vote. The moderator would often take these votes to mean that a portion of the audience simply couldn't decide on an answer to his question. In actuality, however, voting for an undefined category was usually the only means available for signalling any one of a number of possible messages. Aside from signifiying 'don't know', these votes for undefined numbers were also seen to have meant 'question unclear', 'other', 'insufficient information', 'object to question', and 'combination of these'.

Providing an extra category such as 'other' often does little to end the confusion as the moderator is still unable to discover what the audience is trying to say. This is illustrated in the record of one of these sessions:

Moderator: Do you think that grading at MIT should be based on:
1. letter grades   (2 votes)
2. pass-fail   (1 vote)
3. other   (2 votes)

Moderator: What do those who voted for 'other' want?
1. combination of grades and pass-fail (3 votes)
2. no grades at all   (0 votes)
3. other   (2 votes)

Moderator: Should we have a combination consisting of:
1. only freshman year pass-fail   (0 votes)
2. courses outside major pass-fail   (1 vote)
3. certain number of courses pass-fail   (2 votes)
4. other   (2 votes)

This exchange is typical as the moderator never does find out what the two individuals who voted 'other' in answer to the first question had in mind. It appears that none of his quesses may have been correct as two votes still appear in the 'other' category. However, the answers to the second question do indicate that those who voted for the choices of letter grades and pass-fail in the first question may actually have wanted a combination of the two. Being unable to discover what the two 'other' votes signified, the moderator decided to concentrate of the three individuals who wanted a combination of letter grades and pass-fail. From the results of this third vote, it is clear that he had indeed lost the other two members of the audience as two votes continue to appear in the 'other' category.

Typical of the comments made by several of the individuals who acted as moderator was the statement: "The information is there, but I just don't know how to get at it." One common opinion as to the reason for this was the idea of the moderator being too close to his own questions. It was felt that having framed the questions from his own point of view, the moderator would often misinterpret feedback from others. This led to the idea of using two moderators, one of whom should not have been involved in the formulation of the questions. It was hoped that by doing this, the discussion could be directed in the context of a wider perspective enabling better interpretation of feedback. In several cases, such as in the following discussion of

public transportation, this procedure seemed to work:

First Moderator: How often do you use the MTA?
1. often
2. sometimes (majority vote)
3. never

Second Moderator: How much difference would it make if the Red Line stopped at 77 Massachusetts Ave.?
1. big difference
2. some difference
3. no difference (majority vote)

(Discussion between first and second moderators and a new line of questioning follow).

In this exchange, the second moderator wanted to find out why most of the audience only used public transportation occasionally. The responses to the second and third questions indicate that improved service and lower cost would not increase use appreciably. During the discussion which followed, the two moderators concluded that the reason for the low usage of public transportation was the geographic characteristics of this particular audience. That is, the audience was composed of students who lived on or very near to the campus. They therefore had little need for public transportation. At that point the moderator decided to discard several additional prepared questions concerning individual use of public transportation. If only the first moderator had been present, it is likely that he would have continued down his list of prepared questions without realizing that they were not suited to this particular audience.

Comments made by the moderators and by members of the audience during the follow-up discussion confirmed this conclusion. There was general agreement that having one unprepared moderator increased the ability of the moderators to correctly interpret the feedback. The two moderator technique was also judged to be valuable on the basis of other considerations as well. One important conclusion was that it resulted in an increased sense of participation on the part of the audience. A major element of this effect seemed to be the fact that having two moderators in front of the camera enabled the audience to see a discussion which they could feel a part of. With a single moderator, the discussion was usually reduced to little more than a poll.

However, it was also observed that too much discussion between moderators had the effect of shutting out the audience. It often appeared that prolonged discussion between moderators resulted in their reaching a common conclusion which caused them to be as un-receptive to the feedback as the single moderator had been. The tendency for the moderators to become overaly involved in their own discussion led the group of experimenters to hypothesize that having a full panel discussion before the camera could result in even greater isolation of the audience.

But for the most part, the group agreed that the technique of using two moderators was an extremely valuable one. By providing more objectivity and increased ability to formulate questions, it

enabled more responsiveness to the audience. By introducing actual

discussion into the televised program, it added an element of

entertainment so that the audience was able to maintain greater interest.

The number of moderators was not the only variable investigated

during these preliminary sessions. In addition, several new program-

ming techniques which consisted of variations in the question format

were introduced. The complaint which was most often made during the

first stage experiments was that the multiple-choice question format

was too restrictive. The basic problem of frustrtation arises when

members of the audience cannot agree with any of the avaiable response

choices. They then tend to vote for an undefined category number or

for an 'other' category if one is provided. If a significant number of

participants vote in this way, the moderator must try to discover the

audience's problem.

When trying to formulate a strategy capable of accomplishing this,

the first idea which came to mind was that of a simple game of 'twenty

questions'. It was felt that by developing some optimum technique for

progressing through a binary tree of yes-no type questions, the moder-

ator would have a procedure which could eventually tell him what his

audience was thinking. However, this idea was ruled out during the

first of the weekly preliminary sessions. It was felt that any

procedure which required a long series of questions in order to

clarify one particular point of discussion would simply be too time-

consuming.

As an alternative, a 'frustration question' format was developed. It consisted of a prepared list of alternative responses which the audience was confronted with as soon as communication began to break down over some particular point of discussion. This list included such choices as 'insufficient information', 'object to question', 'don't know', etc. Although such a format cannot completely solve the problem, it was hoped that its use would introduce a greater degree of flexibility. Another attempt to increase flexibility was made by developing a gradated choice scale. In using such a scale, the audience would be instructed to rank their opinions on a scale of 1 to 5 with 3 being the null position. Thus, if the extremes of the scale were defined as 'agree' and 'disagree', for instance, subjects would have a range of five possible choices: 'agree', 'agree somewhat', 'no opinion', 'disagree somewhat' and 'disagree'.

Experiment Design

In order to discover the relative merits of various programming and moderation techniques, the experiment had to be designed so that the effects of any particular technique could be isolated. For this reason, the experiment was divided into three separate sections, each consisting of a program segment which was approximately twenty minutes in length. The first segment consisted of a televised group meeting which was moderated by a single person. The second segment had two moderators, and the third was a panel discussion in which there were four persons appearing before the camera. During each of the program

segments, three types of question formats were employed. The re-

sulting arrangement of variables is summarized in Figure 2. One

audience was to be shown each of the three program segments in the

above order. The three types of question-format were incorporated

into each session.

Program Format / Question Format	1 Single Moderator (20 min)	2 Double Moderator (20 min)	3 Panel Discussion
Standard Multiple-Choice			
Scale			
Frustration Technique			

Figure 3: Experiment Design Scheme

The degree of control which can actually be obtained by using

this scheme is not as great as it might appear. It must be remembered

that the nine specified variables were purposely incorporated into

the experiment design as a result of the deliberations which took

place following the preliminary sessions. Therefore, the design does

not take into account the effects of any variables which may not have

been uncovered during those sessions. But in view of the fact that the

experimental goal is still one of general problem exploration, this

deficiency seems acceptable. If there were any other major factors

at work during the experiment, general observations and questionnaires

responses could hopefully reveal their existence in a manner similar
to the way in which the original variables were discovered.

Aside from an analysis of program content and participant be-
havior made on the basis of video tape recordings, additional data was
obtained in the form of questionnaires. It has already been stated
that during the preliminary sessions, the various techniques were
evaluated on the basis of three different subjective criteria. A
questionnaire was designed so that the opinions of the audience could
be indicated in the context of these criteria. The same set of questions
was asked of the subjects immediately after the conclusion of each
program segment so that the relative merits of each technique could be
evaluated by comparing responses. In addition, a set of more general
questions was asked after the entire experiment had been completed.
A copy of the questionnaire appears in the appendix.

An additional factor which had to be considered in the experiment
design was that of program content. The acceptability of the program
material to the audience is a variable of obvious importance. If
subjects were to become bored with a particular program segment, cross
comparisons between the results of that segment and the results of
other segments would become difficult if not impossible to make.
Attention was therefore given to the proper choice of topics for each
of the three program segments. The topics chose were 'grades at MIT'
for the single moderator segment, 'students and the right to privacy'
for the double moderator segment, and 'world hunger' for the panel
segment. All three segments were limited to twenty minutes in length,

Another consideration for experiment design was the question of
whether to isolate the subjects physically from one another. During
the first stage experiment subjects had been separated by plywood
partitions in order to simulate the actual conditions of interactive
programming received in the home. But when partitions were used each
subject had to be supplied with his own television monitor, and the
limitaion on the number of monitors available for the experiment held
the maximum number of subjects down to eight. When this was considered
in light of the fact that the small number of subjects was a major
deficiency in the first simulation, it was decided that the partitions
should be dispensed with. Instead, a larger audience was gathered
in front of a single television monitor. As before, each member of
the audience was supplied with his own hand-held response switch.
Subjects were instructed not to talk with each other in and attempt
to minimize the influence of one subject on the behavior of another.

c. Results

The second stage television feedback simulation was performed
early in December 1974. An audience of thirteen students was seated
before a single television monitor to watch a program which originated
from another room. In each of the three program segments, the modera-
tor or moderators appeared before the camera with the electronic
display of voting results. A videotape recording of all three program
segments was made so that general experimental observations could
be made at a later time. Observations made from the tape as well as

additional observations of the audience were combined with the
questionnaire responses to form the body of experimental data.
Upon analysis, this data was found to exhibit several clear trends.

The most distinct of these trends occurred in relation to
the number of moderators. As expected, the single moderator case
drew favorable comment with regard to being the best prepared and
best organized segment. However, the questionnaire responses also
show that it was considered to be the most responsive of the three
segments. This is surprising in light of the fact that in the
opinion of the experimenters, the videotaped record of the segment
tends to bear out the prior conception of single moderator performance
which developed during the preliminary sessions. The tape shows that
the moderator often had to ignore votes which appeared in undefined
categories, confirming an impression of the single moderator being
less responsive.

In the case of the double moderator segment, favorable comments
were received concerning the smooth flow of discussion during the
program. The audience also seems to have felt that the two moderators
were better able to frame questions and alternative responses. The
same conclusion was reached by the experimenters on the basis of
viewing the videotape. No other distinct trends were observed in the
double moderator case.

The audience's characterization of the panel discussion, however,
is quite explicit. This segment ranked last in almost all the response
categories which appeared on the questionnaire.

Of all these results, the unfavorable impression of the panel

discussion is perhaps the most easily interpreted. One of the most

important variables to be considered in the interpretation of any

result appears to be moderator performance.[20]p.13 However, this

factor does not seem to explain the poor rating of the panel segment.

In the opinion of those who viewed the videotape, the quality of

moderator performance appeared to be approximately the same for all

three program segments. No obvious failure on the part of any

individual moderator was indicated.

Two external factors, though, do seem to have played a role in

the audience's evaluation of the panel segment. Firstly, the program

itself was not performed as originally planned. The intention was

to have a panel consisting of one moderator and at least two 'experts'

of opposing viewpoints. It was hoped that the audience could then

participate in the debate so that a high level of interest could

be maintained during the program. However, the experts never

materialized, and their places were taken by several students who

had no particular stand on the issues. As a result, much of the

potential interest in the discussion was lost. A factor of perhaps

even greater significance was that the panel discussion was the last

of the three segments to be televised. Observers who were present in

the viewing room have indicated that the audience was extremely restless

by the time the panel discussion began. It is clear that the audience

had become impatient as a result of the length of the experiment.

The audience characterization of the single moderator segment
as the most responsive of the three is a puzzling result. Because
of the single and double moderator trials performed during the pre-
liminary sessions, it was exptected that the double moderator
segment would be the more responsive of the two. In the experimenter's
opinion, an evaluation of the videotape tends to confirm this expect-
ation. However, a majority of the questionnaire responses contradict
it.

One possible way to interpret these two conflicting sets of evi-
dence might be that several good characteristics of the single moderator
segment such as its high level of organization may have fostered a
favorable overall impression of the program. This impression may
have in turn had an effect upon the way in which the audience perceived
other characteristics of the segment such as its degree of responsiveness.
Another factor which may explain the conflicting results is that
the topic of the single moderator segment was grading policy. Although
the topic of the double moderator segment was equally interesting, the
subject of grades may have had a more immediate appeal to the student
audience.

It is also possible that an external factor may have played a
role in the audience's preference. A great deal of difficulty had
been encountered in trying to obtain suitable subjects for both the
first and second stage experiments. Most of the subjects for second
stage experiments were students who had been contacted by members of

the group that conducted the experiment. As it turned out, a large
number of these students were later found to be unsuitable as experi-
mental subjects. Unfortunately, they were found to have been biased
in favor of the single moderator segment even prior to their having
viewed the program. It therefore comes as no surprise that their
responses favored it.

The second set of variables to be studied consisted of several
types of question formats. These included a gradated choice scale
and a special 'frustration question' as well as the standard multiple-
choice format used in previous experiments. On the basis of the
questionnaire responses, it appears that of the three, the gradated
scale seemed the most satisfactory to the audience. However, the
significance of this result is limited due to the fact that although
the questionnaire is comparative in context, the techniques themselves
differ in purpose. For instance, the gradated scale is of no use in
trying to eliminate a particular source of frustration. It is also un-
suitable for manysituations in which a multiple-choice format must
be used. Yet it is clear that when used in conjunction with the
multiple-choice format, the gradated scale provides for a good deal
more flexibility than multiple-choice alone.

It was also found that the multiple-choice format rated highest
in frustration during the single moderator and panel segments. This
conforms to the expectation developed during the preliminary sessions.
During the double moderator segment, however, the multiple-choice

format was exceeded in frustration by the 'frustration question'
format. There seem to be several reasons for this result. First
is the fact that the three techniques were not employed equally in all
program segments. In particular, the frustration category technique
was mainly used in the double moderator segment.

Another factor may be that the set of alternative responses
set aside for use in a frustration situation did not include a choice
for those who had not been frustrated originally. This resulted in
some confusion. The inevitable consequences of prolonging such
confusion over a relatively long portion of the program were irritation
and even more frustration on the part of the audience.

In order to be of any real use, the frustration question format
must receive extensive revision. But even allowing for eventual
improvement of the technique, it does appear to exhibit one defficiency
which seem uncorrectable. As the process of probing one particular
point of discussion begins to occupy more and more time, portions
of the audience become increasingly disinterested. And since the
frustration technique must of necessity take up a disproportionate
amount of time, it seems to be an inherently inefficient procedure.

In order to justify spending relatively large amounts of time
in trying to discover a particular problem bothering one segment of
the audience, the technique being used must have some value in itself.
That is, the procedure should be of interest to the entire audience.
The conclusion was reached on the basis of comments and audience

observation. It therefore seems that actual live discussion, of

interest to the audience in itself, should be utilized rather than

a list of more unanswered questions.

Thuswe find that in order to supply the additional information

about the audience's feeling of need to deal with problems of frustration,

at least one channel of natural language communication must be included

in any overall system configuration. Such supplementary channels

are common to many communication systems already in use. The in-studio

audience and the telephone call-in are examples used in contemporary

broadcasting. Regardless of the form of such supplementary channels,

we are forced to conclude that they will most probably have to become

an integral part of any future large-scale, limited-response communication

system such as digital-return cable.

CHAPTER FOUR

DISCUSSION: IMPLICATIONS FOR THE ISSUE OF MANIPULATION

As a result of the investigations carried out in the preceding

chapter, we are aware of three characteristics of large-scale cable

participation systems. From the work of the Community Dialog Project,

we know that the first two characteristics, instantaneous feedback

and branched discussion patterns, are likely to be fundamental

features of such systems. In addition, special simulations have

indicated that supplementary communication channels must be available

if these systems are to be utilized to their full potential. The

purpose of this chapter is to speculate on the possibility of each

of these characteristics serving as a source of manipulatory effects.

I. Continuous Feedback: The 'Bandwagon' Problem

Ideally, dynamic polling conducted within the context of inter-

active cable programming should create an opportunity for responsive

exploration of citizen views on a larger scale than would otherwise

be possible. Although cable participation sessions can only approximate

a group meeting type of format, the exploratory nature of their content

requires an iterative pattern of question and response. Thus a

fundamental distinction between cable programming and conventional

polling is the fact that in a televised group session, key questions

are bound to be repeated or voted on again later in modified form,

while in a static poll the respondent casts his voted on an issue

only once.

A fundamental requirement for the development of a dynamic

polling process is that the audience be provided with instantaneous

feedback of its response to questions. This feedback is obviously

essential if the moderator is to elicit audience reaction to the

results of previous votes. However, because the outcome of a session

is usually the result of an entire series of questions rather than of

one single vote, this feedback also has the effect of providing members

of the audience with prior knowledge of group preferences. We can

therefore draw a parallel between this situation and that of announcing

predictions of early returns during elections. This parallel could

serve as the basis for a fear of manipulatory effects. Herbert Simon

describes the nature of such effects and states that they are based

on the supposition that

> "...the voting behavior of at least some persons is a
> function of their expectations of the election outcome;
> published poll data are assumed to influence these ex-
> pectations, hence to affect the voting behavior of these
> persons. If persons are more likely to vote for a
> candidate when they expect him to win than when they
> expect hi" to lose, we have a 'bandwagon effect'.[22]p.245

In view of the traditionally held belief that bandwagon effects

stem from a desire to be on the winning side,[4] p. 144 the parallel

between elections for public office and group votes on issues seems

a reasonable one to make. However, the suspicion that bandwagon

effects may play a role in televised citizen participation sessions

is also supported by the experience of the Community Dialog Project.[20]p.35

Within the context of demonstrations performed over the course

of the Community Dialog Project, the moderator would ask his audience

to choose among alternative answers to some factual question. (The

question typically asked was "How long is the Nile River?".) After

displaying the voting results, the moderator would procede to elicit

comments from individual members of the audience. The vote would then

be repeated and the results displayed a second time. After several

iterations of this process, it was often found that the group's votes

would gradually converge upon one particular choice (usually the

wrong one). The explanation for this phenomenon appears to be that

the instantaneous display of group preferences provided the basis

for a bandwagon effect.

The Fleitas Experiment

Before concluding that bandwagon effects do indeed play a signi-

ficant role in group feedback sessions, we must first refer to attempts

already undertaken to verify the existence of bandwagon effects in

elections. The experimental study which appears to approximate

our situation most closely is that done by Danial Fleitas.[23]

In Fleitas' experiment, several large groups of college students voted

for one of two imaginary candidates under conditions of minimum in-

formation. A minimal-information election is one characterized by

"... a relative or total lack or relevant information with which

voters can evaluate the candidates."[23]p.434 A condition of

minimal inforamation also characterized the Community Dialog sessions

in which participants had to vote for factual alternatives of
which most had to real prior knowledge. For this reason the two
cases do in fact appear analogous.

As it turns our, however, Fleitas was not able to demonstrate any
effect on voting behavior similar to that occuring in the Community
Dialog meetings. Three groups of voters participated in a series of
four successive ballots in a simulated mayoralty election. The
experiment was designed to isolate the effects of facked balloting
results and qualitative bandwagon/underdog messages on votes. In his
conclusion, Fleitas states that the experiment

> "clearly demonstrated that mere poll results are
> insufficient to impel would-be bandwagon or underdog
> identifiers to switch their votes. Rather, the voting
> behavior that results from these identifications does
> not occur until sensitized or cued by a strong quali-
> tative stimulus."[23]p.438

In light of this conclusion, we are now forced to question the value
of the Community Dialog demonstration. If bandwagon effects cannot
be attributed to poll results in the analogous case of minimal-
information elections, what are we to conclude in the case of issue
votes in which voters may have considerable prior knowledge?

Although the situation is unclear, though, there still appears
to be a possible explanation for the differing results of the Fleitas
experiment and the Community Dialog demonstrations. Fleitas found
manipulatory effects to be linked to the qualitative messages he
determined to his experimental subjects. This fact makes it reasonable
to suspect that the bandwagon effect observed in Community Dialog
meeting did not stem so much from the instantaneous display of
vote tallies alone as from the discussion which followed each vote.

The fact that the occurence of bandwagon effects seemed highly
dependent upon moderator technique appears to bear out this theory.

The Lang Study

Such explanations remain conjecture, however, and it would
therefore do well to examine other attempts to verify the existence
of bandwagon effects. One report which has already been described is
that of the Lang study on the effects of broadcasting early returns.
This study refers to bandwagon effects as part of the 'political
folklore' often cited by individuals as reason for their opposition
to broadcasts of early returns. The study concludes, however, that

> "...the impact of early returns on behavior was minimal.
> Very few examples of bandwagon and underdog effects, of
> either the direct or indirect variety, were encountered.
> The few we were able to document had little to do with
> what respondents had heard about the presidential race
> prior to voting."[4]p.109

The report discusses possible reasons for this result and
attributes the relationship between early returns and voter reaction
to what is referred to as the 'law of minimal consequence'.[4]p.4
According to this theory, voter intentions crystallize gradually

over a period of time preceding the election. Because the effects
of mass communication are essentially cumulative in nature, the voter
can only absorb new knowledge, such as early returns broadcasts,
in terms of the overall information structure already built up in
his mind. Thus

"...on election day, when the returns begin to come in,
few members of the electorate are still open to influence...
Had there been any significant bandwagon effect...it would
already have had its impact on vote intentions before
election day."[4]p.4,5

At this point, a distinction between the dynamic polling procedure

employed in cable participation sessions and the election process

investigated in the Lang study should be made. Votes taken during

Community Dialog sessions are not completely analogous to election

votes for two reasons. The first is that because questions are often

repeated, issue votes are not irrevocable as election votes are.

Secondly, in issue exploration sessions, final outcomes are the

result of an extended series of votes rather than of one single vote.

It is this feature which may in fact account for the bandwagon

effect encountered in the Community Dialog meetings in a way consistent

with the Lang theory of minimal consequences. Throughout the Community

Dialog sessions, no really dramatic shift in group preferences was

observed as the result of any individual vote. Instead, the effect

manifested itself as a gradual shift occurring over the course of the

entire series of votes. This suggests that sudden manipulatory effects

similar to those discounted in the Lang study were not needed for the

outcome of the sessions to change. Instead, the bandwagon effect

had made its impact felt during the gradual process of attitude

formation. The conclusions on vote stability made by the Lang report

for the case of election outcomes may have to be altered considerably

in the case of interactive polling due to the introduction of
the dynamic element characteristic of such processes.

The Asch Experiments

In addition to theories such as the 'law of minimal consequences',
researchers have posed other explanations for the inability to observe
bandwagon effects. Both Lang[4]p.147 and Fleitas[23]p.436 cite the
results of past social-psychological studies of conformity as a
reason for discounting the existence of such effects. In this, they
are both referring to the Asch experiments of the late 1950's.[24][25]
These experiments focused upon disagreements generated between
individuals and groups over matters of simple fact. In an introduction
to one of these studies, Asch states that he was concerned with

> "...public independence and lack of independence in the
> face of arbitrary group opposition. The aim was to
> observe the impact of these conditions when the question
> at issue was that of resisting or bowing to a prevailing
> group direction."[24]p.2

To the individual subject, the experiment was ostensibly designed
to measure visual perception. A group of college students would each
be asked in turn to judge the lengths of several lines displayed
before them. However, only one of these students was actually a
subject, the others having been told by the experimenters which
answers to give. In one experiment, all of these students were
instructed to give the same wrong answer so that the reaction of
the subject to unanimous opposition could be observed. Asch found

that in these cases, fully one third of the minority answers were distorted toward the majority.[24]p.69 Moreover, the effects of group pressure appeared to be greatly reduced in other experiments in which the subject was opposed by less than a unanimous majority.[25] Due to the fact that unanimous majorities are not characteristic of most elections, Land and Fleitas maintain that group influence would probably not have a significant effect in those situations.

Although it certainly seems reasonable to draw such a conclusion from the results of the Asch investigations, it should be kept in mind that those experiments were performed under idealized conditions which don't necessarily conform to those characterizing most elections. Asch himself explicitly listed these conditions and discussed the limitations which they impose on any interpretation of his results.[24]p.66 One factor relates to the object of controversey itself. In the Asch experiments, the object of judgement was clear and unambiguous; this is hardly case in most disagreements that concern issues or candidates. As ambiguity increases, voting takes on the character of minimal-information elections so that we would expect the effects of group pressure to increase accordingly.

The experiments can be distinguished from voting situations on the basis of other conditions as well. Unlike most participants in group controversy, the experimental subjects of the Asch studies had independent access to the facts in question. In addition, there was no possibility of restructuring facts as in most social disagreements,

so that the conflict situation occuring in the experiment was ir-
reconcilable. In fact, the character of the controversy itself was
unique due to the fact that it was not understandable.

All of these conditions point out the difficulty encountered in
trying to apply the results of social experiments to actual situations.
This is not to say that the lessons of the Asch experiments cannot be
applied to the issue of bandwagon effects. However, the significance
of differences in the conditions governing the two situations is not
yet clear. For example, a key factor in the Asch study was that
subjects were forced to declare their choices publicly before the
group. In the Community Dialog meetings, on the other hand, all votes
were taken anonymously. If anything, we would expect the condition
of anonymity to all but wipe out any effects of group pressure. And
yet, it was during these very meetings that such effects were observed.

It therefore seems that few if any real conclusions can be drawn
regarding bandwagon effects in interactive polling situations. Although
the existence of such effects have not been proved, they cannot be
entirely discounted either. The role of instantaneous feedback in
supplying audiences with prior knowledge of group preferences there-
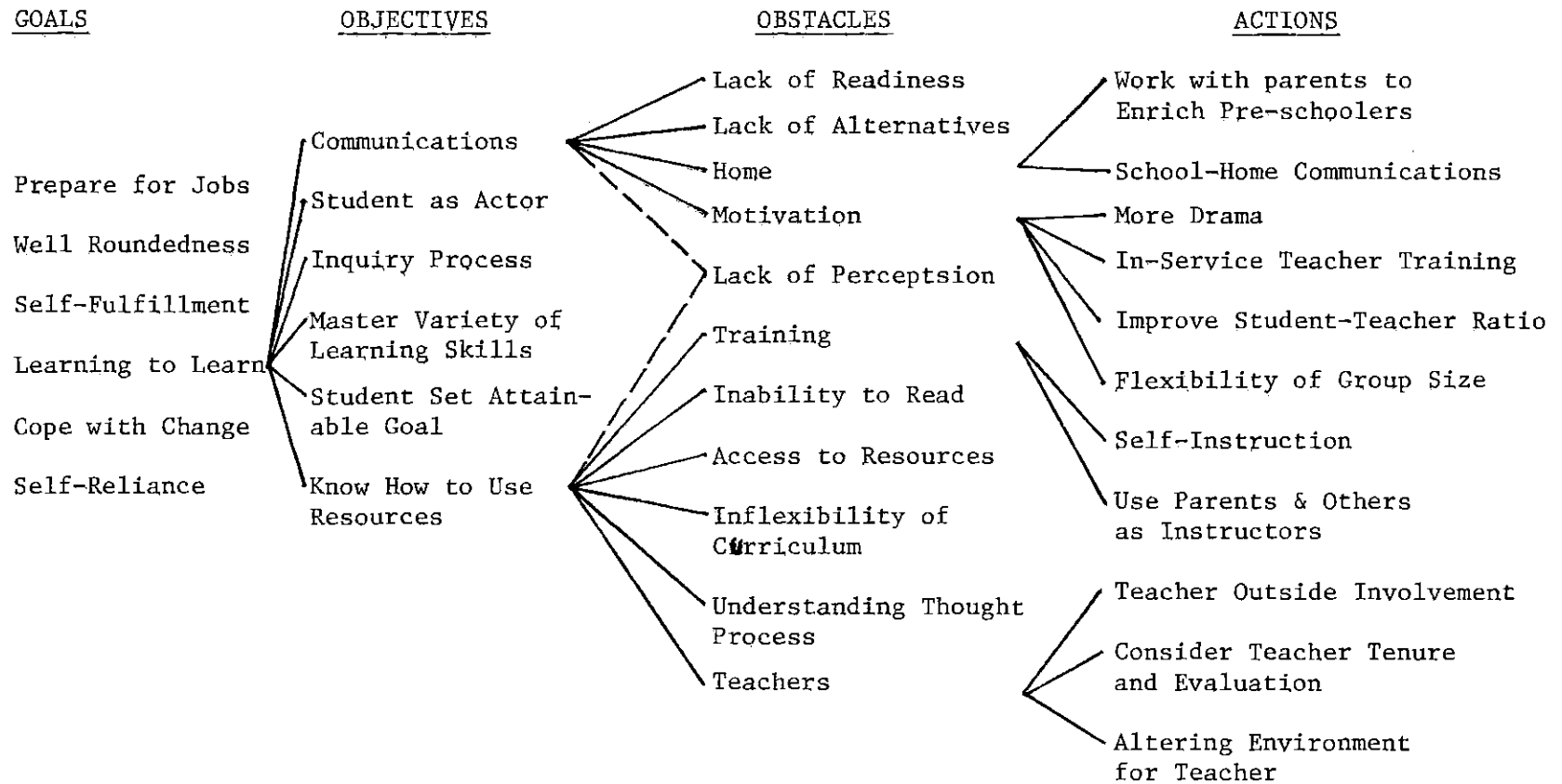fore remains suspect as a possible source of manipulatory effects.

II. Branched Patterns of Discussion: Agenda Effects

The second characteristic of interactive polling processes that was mentioned in the preceding chapter was that of branched discussion patterns. Due to the fact that the dialog in cable participation sessions must follow a series of questions with explicit audience responses, a formal order is imposed on the discussion. This order can often be represented as a branched discussion tree of the type shown in Figure 4. Although audiences are usually able to determine the direction of such discussions to some extent, it is the moderator who maintains the greatest degree of control over the evolving structure. It is this fact which leads us to investigate the possible role of these patterns in the manipulation of group outcomes.

One feature of the discussion tree over which the moderator retains complete control is the sequence in which topics are taken up for voting. Although the sequence in figure 4 appears to be the most logical one, it is not hard to conceive of situations in which any number of alternative agendas would be acceptable. Common experience with various types of group meetings has shown that the form of the agenda can often be crucial to the outcome of a discussion. In a book entitled How Nations Negotiate, F.C. Ikle analyzes the importance of agendas in international diplomacy.

Figure 4. Example of Branched Discussion Tree

Taken from (20) Fig. 4, this diagram represents the structure of a discussion on education.
The discussion took place during a 90 minute television program conducted as part of the
MIT Community Dialog Project.

GOALS	OBJECTIVES	OBSTACLES	ACTIONS
Prepare for Jobs	Communications	Lack of Readiness	Work with parents to Enrich Pre-schoolers
Well Roundedness	Student as Actor	Lack of Alternatives	School-Home Communications
Self-Fulfillment	Inquiry Process	Home	More Drama
Learning to Learn	Master Variety of Learning Skills	Motivation	In-Service Teacher Training
Cope with Change	Student Set Attainable Goal	Lack of Perceptsion	Improve Student-Teacher Ratio
Self-Reliance	Know How to Use Resources	Training	Flexibility of Group Size
		Inability to Read	Self-Instruction
		Access to Resources	Use Parents & Others as Instructors
		Inflexibility of Curriculum	Teacher Outside Involvement
		Understanding Thought Process	Consider Teacher Tenure and Evaluation
		Teachers	Altering Environment for Teacher

"...Agreement on the agenda has two implications. First,
it means that prior to, or at the beginning of a conference
the parties agree on the subjects they will discuss. Second,
the agreed agenda constitutes a procedural agreement as to
the sequence in which the subjects will be negotiated. Both
of these implications affect the outcome of negotiations:
the subjects that are discussed obviously determine the
issues that may be settled, and the particular sequence in
which separable issues are negotiated may favor one side
and handicap the other."[26]

The issue of the agenda determining the topics to be discussed

appears to be relatively straightforward. In fact, this problem

has already been mentioned with regard to audience manipulation

in the discussion of the televote project appearing in Chapter Two.

Analyzing how the sequence of topics affects outcomes, however, seems

to be a more complex problem. Although the influence of agenda seems

to be a fact intuitively, to what extent has there been empirical

validation or theoretical understanding of this intiuition?

Empirical Research: The Work of Charles Plott

Charles Plott of Cal Tech has addressed this problem in the con-

text of group meeting having the task of choosing one alternative

from among many. There are several conclusions made in Plott's

paper; among them, the claims that,

"...first, the agenda or groupings in which alternatives
are considered for adoption or elimination can be a
major parameter in determining what the group will actually
choose. Second, the nature of the influence is sufficiently
systematic to yield to an analytical model."[27]p.2

The paper reports on several stages of an effort to develop
a formal theory of how the agenda of a meeting can affect its outcome.
The work began when Plott was offered an opportunity to draw up the
agenda for a special meeting of a flying club to which he belonged.
The purpose of the meeting was to decide on the composition of a new
fleet of airplanes which the club was to buy for the use of its
members. On the basis of a crude theory, it appeared that several
equally acceptable agendas would each favor a different outcome.
In the way of an experiment, Plott decided to devise an agenda which
would favor the outcome he desired personnally. The experiment turned
out to be a success with the result that work soon began on a formal
mathematical model. Finally, laboratory experiments were undertaken
for the purpose of validating the model. This attempt met with only
partial success, however, with the result that Plott comes to conclude
that "... even though our general theory may be right, the specific
means of expressing or modelling it that we have developed is
probably wrong."[27]p.40

A brief explanation of the flying club example would be highly
instructive for the purposes of understanding both the general nature
of the theory and its implications. The club was faced with a choice
of several types of aircraft from which to compose its new fleet
of six or seven planes. The four models being considered were:

    1. Beechcraft Bonanza A36 (abbreviated: A)
    2. Beechcraft Bonanza F33A (abbreviated: F)
    3. Refurbished Beechcraft Bonanza E33A (abbreviated: E)
    4. Cessna 210 (abbreviated: C)

From among these alternatives, Plott drew up his own list of prefer-
ences:

    1st choice: 7 planes, EEEEECC or EEEFFCC

    2nd choice: 6 planes, EEEEEC or EEEFFC

    3rd choice: 7 planes, EEEEEEA or EEEFFFA

In order to design an agenda which would bring about the outcome he
desired, Plott first needed information on the preferences of the
group as a whole. These preferences were estimated as follows:[27]p.6

	35%	35%	10%	3%
1st choice	6 or more E's and F's	6 or more E's and F's	mostly A's	mostly C's
2nd choice	several E's and F's with a few C's (*)	several E's and F's with a few A's		
3rd choice	several E's and F's with a few A's	several E's and F's with a few C's (*)		

where (*) indicates Plott's own preference.

This breakdown was based on the assumption that most of the group
would prefer to continue flying Beechcraft (the type of aircraft which
made up the old fleet), but would also want less expensive alternatives
such as Cessnas (C) and Beechcraft E's. A small but influential
portion of the group prefered the more expensive A's, while the
governing board of the club wanted Cessnas, apparently because of
thier relationship to the local Cessna dealership. As can be seen

from the above chart of preferences, it seemed highly unlikely that
in the absence of any manipulation Plott's choices could be voted in.

Essentially, Plott's theory states that the agenda can influence
the way in which the initial set of alternative choices is partitioned
by a sequence of votes into successively smaller subsets. This
influence can be felt in two ways. First, because of the fact that
group preferences are revealed by voting and the contents of each
vote are determined by the agenda, it is possible to limit the
infromation available to individuals on the patterns of group pre-
ference. Thus there is little chance for the preferences of others
to influence individual voting behavior adversely. The second way
in which the agenda determins outcomes is be determining the set of
strategies available to the individual at any point in time.[27]p.14

A final element needed to implement this theory is a knowledge of
the decision rules by which individuals choose between sets of
alternatives. One hypothesis is that people vote for the set
containing their most preferred alternative, while another holds that
they tend to vote against the set containing their least preferrred
alternative. In devising the agenda for the flying club meeting,
Plott assumed that club members would follow only the first rule.

The fundamental task encountered in the designing of the agenda
was to order the five questions correctly. The sequence finally chosen
as well as the resultant pattern imposed on the discussion are
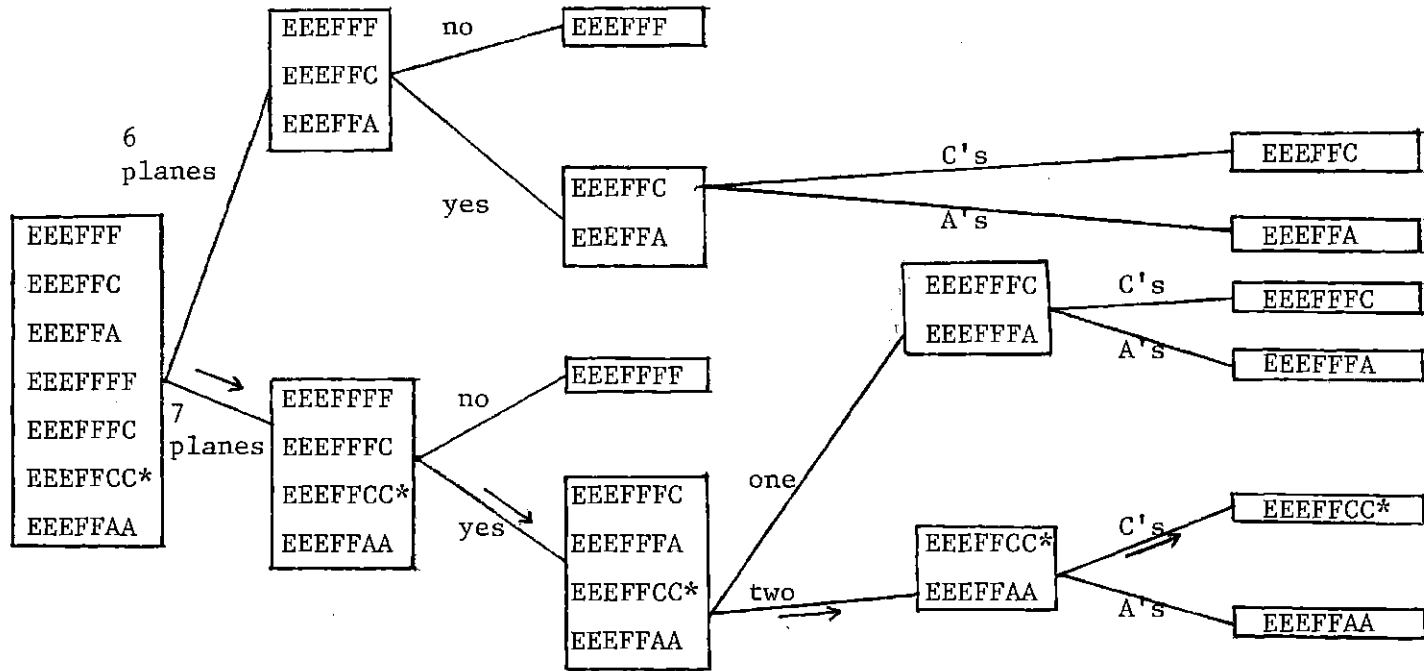presented in Figure 5. The first question voted on concerned the

makeup of the primary fleet. The reason for putting this question

first was because if given the opportunity, most of the group would

have voted for a fleet made up entirely of inexpensive planes. The

next question concerned the desired number of planes to be bought.

Many members wanted six E's and F's and no A's or C's. By pitting these

members against those who wanted seven plane fleets, Plott insured that

there would still be an opportunity for choosing some A's or C's later

in the agenda.

The next question asked the group to decide whether they wanter

any planes of a type other than that already chosen for the primary

fleet. Since more members preferred a secondary fleet, the meeting

moved on to the decision of whether that secondar fleet should have

one or two planes. Due to the fact that the successful vote on a mixed

fleet had already ensured a margin large enough to vote in at least

two A's or C's, this question was also decided in Plott's favor.

Finally, the type of aircraft in the secondary fleet was also choosen

according to plan because the already high cost of a seven-plane fleet

had compelled the group to select C's over the more expensive A's. In

the end, therefore, the agenda has achieved its intended purpose.

One of the most interesting things to be learned from the meeting,

however, centered around the behavior exhibited by the chairman.

The meeting chairman was himself determined to see to it that the

final choice included at least some A's. He therefore made several

attempts to change the agenda during the meeting in order to achieve

Figure 5.   STRUCTURE OF FLYING CLUB MEETING

Question 1:	Question 2:	Question 3:	Question 4:	Question 5:
Type of Primary Fleet. (original set of alternatives)	How many planes total?	Planes of Type other than in Primary Fleet?	How many planes in secondary Fleet?	Type of planes in secondary Fleet?

*indicates Plott's prefernce
⟶ indicates path actually taken in meeting   (Diagram adapted from (27) p.10, Fig. 3)

Figure 6. Chairman's 2nd Attempt to Change Agenda

Figure 7: Chairman's 3rd Attempt to Change Agenda

QUESTION 1:

Type of Primary Fleet
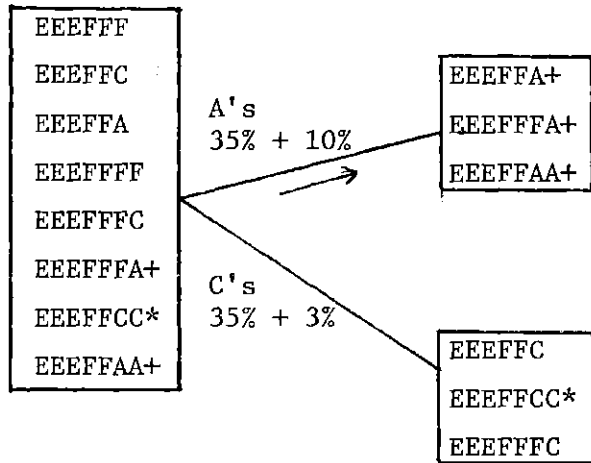
QUESTION CHANGE:

A's or C's in Secondary Fleet?

QUESTION 3:
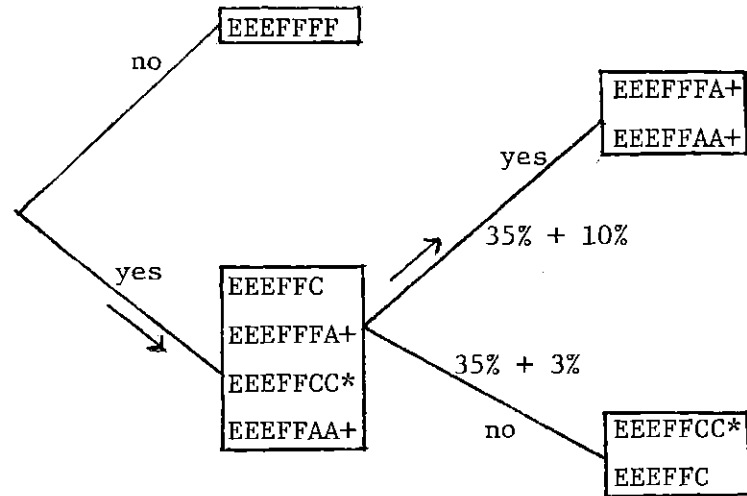
Planes of Type other than that in Primary Fleet?

QUESTION CHANGE:

Do we want at least one A?

EEEFFF
EEEFFC
EEEFFA
EEEFFFF
EEEFFFC
EEEFFFA+
EEEFFCC*
EEEFFAA+

A's
35% + 10%

EEEFFA+
EEEFFFA+
EEEFFAA+

C's
35% + 3%

EEEFFC
EEEFFCC*
EEEFFFC

EEEFFFF

no

yes

EEEFFC
EEEFFFA+
EEEFFCC*
EEEFFAA+

yes

35% + 10%

EEEFFFA+
EEEFFAA+

35% + 3%

no

EEEFFCC*
EEEFFC

-82-

* indicates Plott's preference
+ indicates Chairman's preference
⟶ indicates path of discussion if change were to be made in agenda

this goal. Plott, however, managed to get each attempt ruled out

of order. The first such attempt came as a call for a vote at the

beginning of the meeting on whether or not an all Beechcraft fleet

should be chosen. Had this vote actually been taken, it would

almost certainly have passed ensuring the inclusion of at least

one A in the final outcome.

The other attempts to change the agenda were equally skillful.

Before the size of the fleet was to be decided upon, the chairman

called for a vote on whether A's or C's should make up a secondary

fleet. At this point the group would have chosen A's with the result

that the ultimate choice would have been a seven-plane fleet that

included one A. This situation is illustrated in Figure 6. Before

a vote was to be taken on the number of planes in the secondary fleet,

a final attempt was made to change the agenda. In this case the chairman

asked whether there should be at least one A. At this point the vote

would again have been affirmative as shown in Figure 7. Plott finally

observes that

> "...the remarkable thing about the chairman's behavior is
> that agenda rigging is not easy business-for us at least.
> There are thousands of competing agendas. Yet he seems to
> know which ones were to his advantage. Not once did he
> make a mistake, at least according to our theory. Could
> he have instinctively understood the thing that we had so
> laboriously arrived at?"[27]p.13

While it is true that future cable participation sessions may

not always be direct real-world analogs to meetins such as the one

described above, the implications for cable meetings are nonetheless

clear. If it is indeed true that the sequence in which questions are

asked can affect outcomes to the extent that intuitive knowledge of

the process is available, then the agenda of a meeting must certainly

be considered as a possible source of significant manipulatory effects.

III.   The Structure of Communications: Network Effects

A major result of the simulations reported earlier in Chapter
Three is the finding that additional channels of information must
be utilized if large scale dynamic polling processes are to be feasible.
The simulations clearly indicate that if cable participation programs
come to rely solely on the limited response capability of pushbutton
home terminals, breakdowns in communication become inevitable.   There
are several ways to circumvent this problem, however.   One method
with which we are already quite familiar is the use of telephone
call-ins during the broadcast.   In addition, live interaction between
the moderator and a studio audience may also serve to clarify the
desires and frustrations of the audience.   Finally, several of the
proposed NSF experiments suggest the possibility of neighborhood
communication centers where full video upstream transmission capability
would be available on a limited scale.

If we consider combinations of these supplementary channels, the
number of possible physical configuations for future cable participation
systems seems quite large.   It therefore seems reasonable to ask
whether variations in the communication structure of these configurations
might possible affect audience behavior.   One area of research contained
within the social-psychological literature does in fact suggest the
existence of a relationship between networks of communication and group
behavior.[28]   These investigations have taken the form of laboratory

studies in which the number and pattern of communication channels

linking the members of small groups have been taken as independent

variables. The hypothesized relationships have included a number

of dependent variables such as task performance, morale, satisfaction,

and influence, any of which may have some possible implication for

the problem of manipulation.

The relevance of small group studies to large-scale participation

programs becomes clearer upon examining several probable configurations

for such systems. Several of the communication structures which

characterize alternative cable participation systems are illustrated

in Figure 8. Figure 8-a represents the situation in which the system

consists of only a moderator transmitting from the point of program

origination at the cable's head-end and the members of the home audience.

Full audio and visual communication channels and face-to-face communi-

cations are depicted in the diagram as solid lines, while digital

transmission is indicated by dashed lines. Figures 8-b and 8-c

illustrate networks resulting from the introduction of studio audiences

and neighborhood terminal locations; obviously, any number of other

arrangements are possible as well.

The three patterns shown in Figure 8 are examples of what will

be referred to as 'full-communication' networks. That is, they imply

that all participants have unlimited access to broadcast time, and

that any communication initiated by a participant is transmitted

directly over the cable. In other words, the program moderator has

Figure 8. Several Alternative 'Full-Communication' Networks
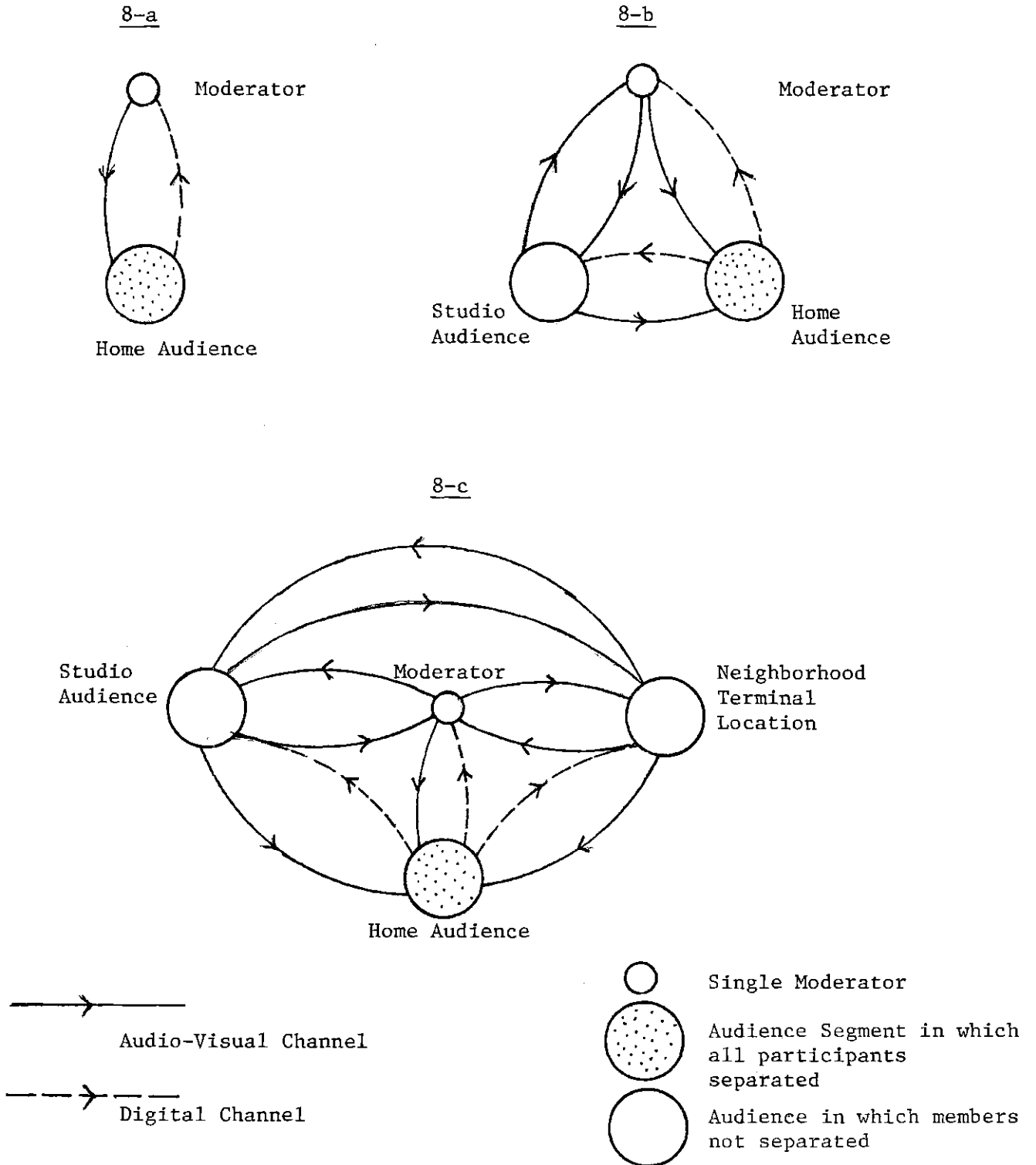
little or no control over the communication of other participants;

he can neither restrict the use of channels nor intercept messages

in order to relay them himself.

Such a characterization of communication structure is undoubt-
edly unrealistic. However, by describing alternative physical con-
figurations in terms of 'full-communication' networks, the differences

in potential patterns of communication are emphasized. If the nodes

of these networks are thought of as individual members of small groups,

Figure 8 can then be considered to represent different patterns of

small group communication.

The differences in patterns of communication that possibly hold

some implication for cable systems go beyond differences of physical

configuration alone. If the assumption of 'full-communication' is

altered, a large number of variations in communication structure

become possible for any one physical configuration. In such 'restricted-
communication' variations, the flow of communication in any of the

original channels is controlled by the moderator who acts as a gate-
keeper. Such control is usually considered necessary to the success

of group participation meetings. However, if   exerted beyond the

level required for such success, manipulation problems inevitably

arise.

In order to illustrate this, Figure 9 depicts several 'restricted-
communication' variations of the full network appearing in Figure 8-c.

In 9-b for instance, the moderator relays all communication himself

with the result that the separate segments of the audience can no
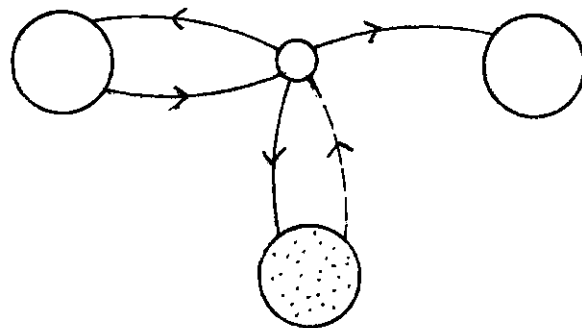
Figure 9. 'Restricted-Communication' Variations For A 'Full' Network

Studio
Audience

Moderator

Neighborhood
Terminal Location
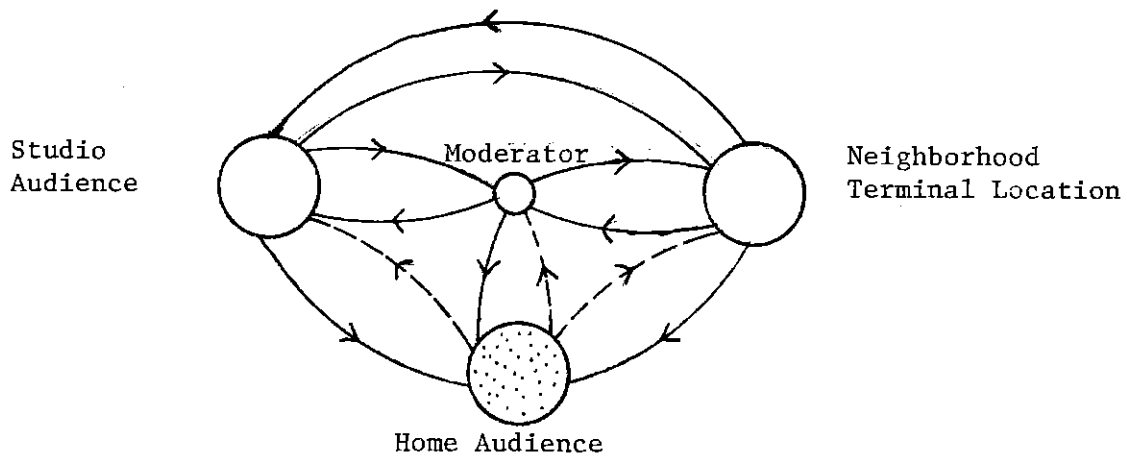
Home Audience

9-a. Full Network
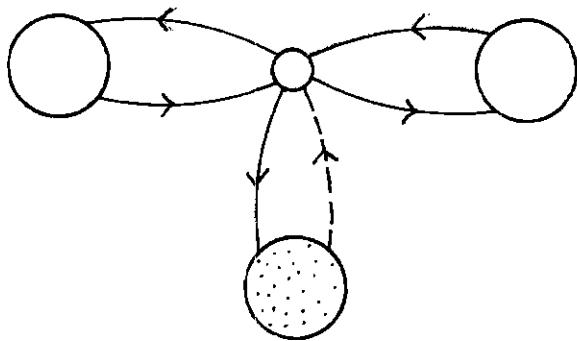
9-b. Moderator acts
as gatekeeper

9-c. Segement of Audience
isolated

longer contact each other directly. The moderator is even able to

selectively isolate particular sections of the audience as in

Figure 9-c by shutting off out-going communication. This situation

is especially likely when audience segments are not representative

of a cross-section of opinion, but instead possess distinctive

viewpoints. The major concerns of the group psychology studies,

however, are with the more subtle effects of network structure on

group behavior.

Early Network Studies

The earliest discussion of such effects appears in the work of

Alex Bavelas.[29] Although most patterns of communication emerge as

the result of social processes, Bavelas chose to focus upon fixed

patterns. Such patterns may be imposed by a larger organization (as

Bavelas himself had in mind) or by the actual technology of communication as

in the case of cable participation systems. In a paper appearing in 1950

Bavelas raises the question of

> "...how a fixed communication pattern may affect the
> work and life of a group...It may be that among several
> communication patterns, all logically adequate for the
> successful completion of a specified task, one gives
> significantly better performance than another. What
> effects can pattern, as such, have upon the emergence
> of leadership, the development of organization, and
> the degree of resistance to group disruption?"[29]p.726

Bavelas hypothesized that the mechanisms of such effects might

be grounded in the geometric properties of patterns of communication.

Specifically, he felt that differences between patterns might account

for differences in the behavior and performance of groups, while

geometric differences within patterns might account for differences

between individual members of the group.

The geometric concept which serves as the basis for these

differences is the notion of 'distance'. If the internal distance

between two members of the group is defined as the number of links

that separate them,then the sum of these distances for all positions

in the net can be used as a measure of the pattern's dispersion. This

measure of dispersion could then serve as a basis for comparison

between patterns. Bavelas also states that comparisons between

positions in the same pattern can be made on the basis of the

'realtive centrality' of each position. This quantity is defined

as the ratio of the sum of internal distances for all positions to

the sum of distances from any particular position.[29]p.72

Among the first of the experimental studies to investigate

Bavelas' geometric hypotheses was that conducted in 1951 by Harold

H. Leavitt.[30] Using an experimental procedure which was to later

serve as the model for many future investigations, Leavitt employed

a characteristic type of group task. Each member of the group

was supplied with a list of symbols, only one of which appeared on

the other members' lists. The group was then faced with the problem

of discovering the common symbol. The subjects communicated by

passing written messages to each other through slots in the partitions

that separated them. By selectively closing some of these slots,

Leavitt was able to form four communication nets, diagrams of which

appear in Figure 10. These nets, as well as the individual positions

within the nets served as the independent variables of the experiment,

while task performance measures, questionnaires, and content analysis

were used to study the dependent variables of interest.

Based on the results of these experiments, Leavitt concludes that

differences in behavior can in fact be attributed to factors

relating to the structure of communication in groups. In addition,

the chief correlate of these differences does appear to be an operational

notion of centrality. In conclusion, he suggests that centrality

affects behavior by imposing limitations on the independent action

of individuals within the net.This leads to the prediction that

> "...Where one position is low in centrality relative to
> other members of the group, that position will be a
> follower position, dependent on the leader, accepting
> his dictates, falling into a role that allows little
> opportunity for presitge, activity, or self-expression."[30]p.50

Investigating Influence Relationships

Although of obvious interest, Leavitt's conclusions are essentially

very general in nature. As a result, his study was eventually followed

by almost twenty years of additional study by other experimenters.

During this period, interest has shifted from variables intended as

measures of performance to psychological indicators of influence,

leadership, and group morale. The work of Goldberg[31] and of Shaw,

Rothschild, and Strickland[31] are of particular interest as they

Figure 10. Communication Nets Used in Leavitt Study

Chain

Circle

'Y'

Wheel
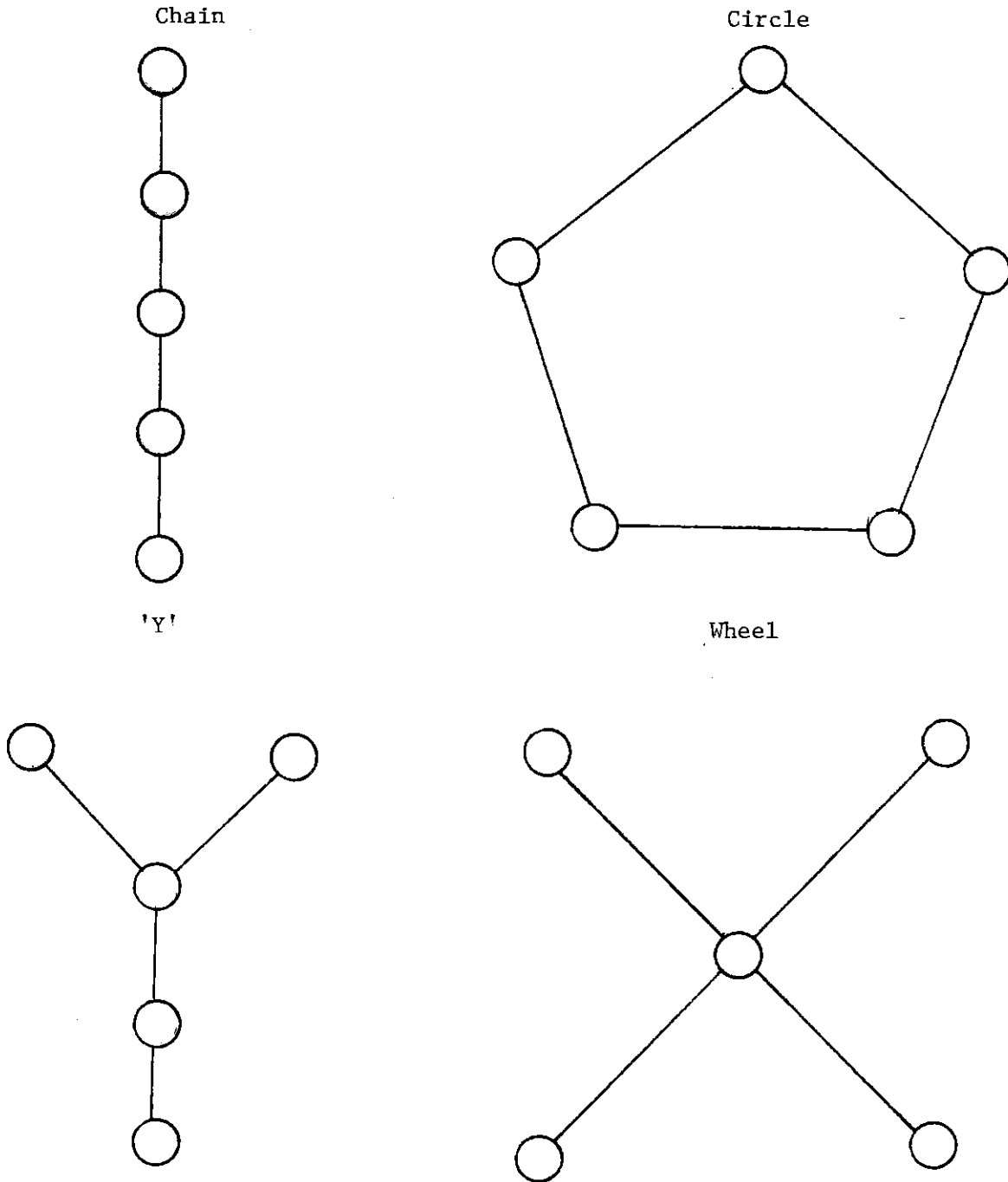
investigate the patterns of influence relationships within communication
networks.

Citing Leavitt's conclusions on the role of centrality in networks,
Goldberg hypothesized that the more central the position held by a
group member, the less that individual would be influenced as the
group reached its decision. In addition, Goldberg also believed
that the greater the centrality of a position, the more likely
it would be that the person occupying it would be perceived as a
leader by other members of the group. The networks employed in the
experiment were the 'chain', 'wheel', and 'Y' patterns of the Leavitt
study. It had been Goldberg's intention to show that his hypothesized
relationships could be demonstrated for all three networks.

Designed to yield an operational measure of group influence,
the experimental task required that each individual judge the
number of dots appearing on a card held up before him. By passing
messages to each other, group members had to reach a common conclusion
on the number of dots that had appeared. The initial guess of each
individual minus his final guess served as a measure of the extent
of group influence. In addition, information on leadership attributes
was obtained by polling each of the subjects individually.

Goldberg's results confirm the relation reported by Leavitt between
position centrality and leadership perception. This confirmation seems
particularly strong in light of the fact that the group task used by
Goldberg differed considerably from the one used by Leavitt. However,

the experiment does not appear to confirm the hypothesis concerning

centrality and influence. Goldberg himself, though, sums up his

results in the following way:

> "...Our results can be considered an indication of
> the importance of situational factors operating in
> influence and leadership phenomena. We have shown
> that one's position in a communication network has
> a bearing on the extent to which one is influenced
> by one's group in decision making. However, the
> hypothesis we proposed was confirmed only in the
> case of one type of network, the fork.[31]p.121

Rather than reject the hypothesis for the reason that only

partially confirming evidence had been obtained, Goldberg assumes

that some additional variables must have intervened in the case of

the 'chain' and 'wheel' patterns. He therefore concludes that more

experimentation is necessary in order to explore such a possibility

in a greater variety of networks.[31]p.121

The conceptual perspective of Shaw, Rothschild, and Strickland

differs slightly from that of Goldberg in that they focus upon the

relation between net position and the ability to maintain a deviant

opinion. Employing a group task and influence measure that resemble

those used by Goldberg, the Shaw study attempts to verify the existence

of one of two theoretical possibilities. If it aan be observed that

those in central positions change their opinions in the face of opposi-

tion more readily than those in peripheral positions, then it would

be reasonable to assume that those in central positions are more

vulnerable to group pressure. If on the other hand, the center were

to change less readily, then it would be likely that those individuals use their positions in the net to convince others.

Shaw, Rothschild and Strickland divided their investigation into two separate experiments. In each experiment, only one network was used; a four-man 'Y' pattern. In the first experiment, all four positions were filled by subjects who were permitted to change their opinions. The experimental results show that when all other positions disagreed, the center position changed opinions as often as any of the peripheral positions. However, when the group was evenly divided, the half made up of the center and one peripheral position changed opinions less frequently than the other two positions did.

Shaw considers this second result to correspond to Goldberg's finding that more central members of the group are influenced less as a decision is approached.[32]p.329 However, he also raises the question of whether this lack of change on the part of the center position is due to the fact that:

1) only two opponents remain,

2) a supporter is present, or

3) there is non-unanimous opposition.

An answer to this question in the context of communication nets is certinaly relevant to the previous discussion of the Asch experiments. This fact seems to suggest the possibility of interaction between the influence characteristics of communication nets and the phenomenon of bandwagon effects.

Shaw's second experiment was intended to shed light on the

reason behind the center position's relative lack of opinion change.

In this experiment, only one member of the group was actually an

experimental subject; the other three were plants instructed by

the experimenters as in the Asch experiments. Aside from position

in the net, the degree of group support was also used as an independent

variable. Among the conclusions which the investigators draw are

that:

> "...(a) The central S more than the peripheral S tries
> to change the opinion of those who disagree, but if he
> fails, he himself changes more, presumably because of his
> greater vulnerability to direct pressure, (b) the presence
> of one supporter strengthens the resistance of an S
> relatively more than the mere reduction of size of opposition
> and more than the simple fact that the opposition is not
> unanimous."[32]p.330

Net Studies in Persepctive

The confirmation of Goldberg's conclusions and the finding that

the presence of a supporter (which in the case of cable participation

systems might be represented by one of the several audience segments)

strengthens the influence of the central position lends credance to

the idea that communication structure can serve as a possible source

of manipulatory effects. However, the implications of both these

studies are not this clear-cut. The fact of the matter is that

Goldberg found confirming evidence only for the case of the 'Y' network.

As a result, he was forced to postulate the existence of some intervening

variable to explain the negative result obtained in the cases of other

patterns. While Shaw does claim to have confirmed Goldberg's
positive result, the confirmation was also made only for the case
of the 'Y' network. Other networks in which additional intervening
variables might play a role were simple not investigated.

When viewed as a body, all the communication network studies
seem to display a similar sort of ambiguity. In an article reviewing
the first decade of research in this area, Glanzer and Glaser[28]
state that the two fundamental questions originally posed by Bavelas
concern the effects of communication structure on group efficiency
and mor ale respectively. After examining the results of the
experimental studies, however, the occurence of ambiguous and even
contradictory conclusions lead them to state that:

> "..There is no simple answer to the first question.
> The effect of structure depends in part on the
> requirements of the task. Contrary to Leavitt's
> original generalizaton, in a number of studies the
> highly centralized structures are <u>less efficient</u>
> that other structures."[28]p.18

In 1968, Robert L. Burgess conducted a series of experiments
with the intention of discovering variables capable of resolving
the contradictions of earlier studies.[33] Hypothesizing that
motivation and learning behavior play important roles in group
performance, Burgess increased the number of consecutive trials
in his experiment to approximately 1000. (This is in comparison
to the 25-60 trials typical of previous experiments.) In addition,
he also introduced reinforcement as another independent variable.

The results of the experiments reveal a learning curve in which

differnces in efficiency between nets disappear in a progression

with time. Burgess therefore concludes that

> "...previously asserted 'differences' in solution
> rates between communication structures, in which
> there were no physical limitations favoring one
> network over the other, were a function of experi-
> mental artifacts. Had previous experimenters in-
> cluded reinforcement contingent upon performance,
> and had they observed their experimental groups over
> sufficient time periods, the collection of a vast
> array of contradictory findings could have been
> avoided."[33]p.335

In light of this result, are we not to conclude that communi-

cation structure cannot really serve as a source of manipulatory

effects after all? At this point in time, the answer must remain

unknown. Burgess's results don't force us to reject such a re-

lationship outright for the reason that his conclusions only con-

cern the issue of efficiency and not that of influence. In addition,

it appears that any reluctance to draw general conclusions from the

earlier studies would be well applied in this case as well. This

is because important differnces exist between the experimental

situations described in these studies and the probable reality

of future cable participation systems.

The greatest of these differences lies in the nature of the

group task itself. It would certainly be difficult to generalize

results based on the performance of 'Leavitt-type' tasks to the

case of complex decision processes. Task complexity has in fact

been made a variable of interest in several studies. Aside from

being examined in the Shaw, Rothschild, and Strickland article,
this variable was also the focus of an experiment conducted by
Shaw in 1954.[34] In addition, it is also an issued of concern
in an article written by Heise and Miller.[35] The Heise and
Miller study also pointed out other differences which happen to
exist between the common experimental context and our proposed
reality of two-way cable systems. Specifically, they investigate
the effects of channel noise and one-way channels on the performance
of different networks. Finally, Macy, Christie and Luce have
studied the role of semantic noise on group performance as well.[36]

In order to draw any solid conclusions on the role of communication
structure in the generation of manipulatory effects, it is therefore
necessary to conduct experiments within the actual context of
cable participation systems. Previous studies may suggest the
possibility of manipulatory effects, but because of the differences
and ambiguities contained in them, they can in no way serve as a
guide for the prediction of those effects.

CHAPTER FIVE

CONCLUSIONS

The mechanisms by which manipulatory effects may arise in future citizen participation programs are almost certainly dependent on the cable technology used to implement them. The preceding discussion has focused upon several of these characteristics as potential sources of manipulatory effects.

Observations made during the course of the MIT Community Dialog Project have served as a basis of conjecture for some of the relevant aspects of cable technology. In particular, these judgements are based upon an investigation of the likely configurations of future large-scale cable participation systems. This investigation indicated that such systems would most probably utilize digital signals for up-stream transmission in a manner similar to the operation of the Community Dialog apparatus.

Although not designed for the purpose of investigating the manipulation problem specifically, these simulations were nonetheless able to serve as useful inputs to this study as they pointed out the existence of three characteristics of probable large-scale cable participation systems. These three characteristics, continuous feedback, formalized patterns of discussion, and the necessity of supplementary channels of communication, were in turn analyzed with respect to their potential as sources of manipulatory effects.

After examining literature pertinent to the task of establishing whether or not the suggested manipulatory effects may in fact exist, it was concluded that each of the above three characteristics remains suspect as the basis for several possible mechanisms of manipulation. Within the context of dynamic polling processes used to approximate group discussion, it has been seen that continuous feedback of group preferences may give rise to 'bandwagon effects'. In addition, formalized patterns of discussion can result in a situation in which the structure of the agenda used in such meetings may have a significant influence on group outcomes. Finally, it has also been suggested that the structures of communication imposed by cable systems as a result of the necessity to include various arrangements of supplementary channels might generate characteristic sets of influence relationships.

But just how likely are these possibilities? Even after the brief examination of the literature likely to pertain to each of these three cases, the question still remains unanswered. With regard to the possiblity of bandwagon effects and to the implications of different communication networks, the evidence appears to be contra-dictory. And, although the influence of agendas on the determination of group outcomes has been demonstrated, it is not clear that cable participation sessions would in fact be real-world analogs of the experimental situation.

Thus the most that can be done in a paper such as this is to speculate on the possibilities of manipulatory effects rather than on the probabilities of their actual occurence. The phenomena of interest are sufficiently complex to prohibit widespread generalization and extension of existing experimental results. It should therefore be apparent that only experimentation conducted within the specific context of two-way cable participation systems can be of assistance in assessing the actual likelihood of various manipulatory effects.

I. Suggestions for Further Research

In carrying out such research, there are several issues of experimental concern which should be kept in mind. Various factors that might contribute to the existence of bandwagon effects have already been mentioned in the preceding chapter. Among these are qualitative audience stimuli, the dynamic qualities of the discussion, the structure of communication, and the degree to which audiences possess prior knowledge of the issues. Ideally, therefore, experimental designs should control for the inclusion of these variables. The design of Fleitas' experiment in which a series of successive votes was taken among several different groups of similar participants seems particularly suited for this purpose.

Due to the fact that no study has as yet disputed Plott's results, the problems involved in investigating the role of agenda effects in determining outcomes are not as numerous. However, the fundamental

question that we do have in this case concerns the correspondence of
cable participation sessions to the experimental situation of success-
ively partitioning an initial set of choices into alternative subsets.
Future experiments should therefore concentrate on the problem of
determining the range of applications for which Plott's general
conclusions seem to hold true.

If anything, the third potential source of manipultory effects,
namely, the network characteristics of the communication system,
poses even greater problems for the implementation of practical
experimentation. The role of communication networks in the develop-
ment of influence relationships remains unclear despite almost two
decades of research. Factors such as the nature of the group task
and the characteristics of the communication channels must obviously
become part of any experimental configuration.

However, in addition to these factors there is one general issue
which, although relevant to any investigation of manipulatory effects,
is of special concern in the case of communication net experiments.
Simply stated, we are faced with the question of how to measure re-
lationships of influence. On the most fundamental level, one encounters
the theoretical problem of trying to define power and influence re-
lationships. It is generally argued that power relationships are
causal; for A to have power over B, A must cause B's behavior.
However, in accepting this argument, we must also accept the difficulties
involved in detecting causal relationships.[37]p.410,[38]

Besides basic theoretical issues, we are also faced with practical problems of measurement. James G. March discusses several advantages and disadvantages of the different techniques used to measure influence.[39] The first method which he discusses is that of attributed influence; that is, simply asking subjects to rank each other in terms of perceived influence. While directly asking subjects about how they were influenced does distinguish real from psuedo-influence, it does have a number of other shortcomings. Specifically, this method necessarily involves some degree of distortion, and in addition, provides no basis for comparison between ranking systems.

The second method which March discusses involves the use of before-and-after measures of opinion change. This is the technique employed in the Goldberg and Shaw studies. While this method, unlike measures of attributed influence, is external to the individual, it does require that answers be given on a continuous scale. A problem then arises as to the meaning of such units. In addition, overt measures often fail to distinguish between real and apparent influence.

Finally, one other approach would be to count attempts at influence using the techniques of interaction analysis. Interaction analysis breaks down all observable behavior and communication into a number of well-defined categories. During experimental sessions, trained observers record the occurences of each type of event. One of the problems with this approach is the equality assumption on the impact

of message units. Another is the fact that when analysis is
directed towards interaction, it often tends to ignore unobservable
events.

In light of the advantages and disadvantages associated with
each of the methods used to measure influence, it seems reasonable
to conclude that a combination of techniques should be incorporated
within the framework of future experimental studies.

II. Manipulation Effects and the Process of Technology Assessment

Undoubtedly, the results of experiments and simulations conducted
within the specific context of citizen participation applications of
two-way cable can be of great benefit in the prediction of higher-
order technological effects. Even so, however, we should realize
that the boundless complexity of social and political realities
makes absolute confidence in the extrapolation of such results
an impossibility. The only method by which unequivocal knowledge
of these effects might ever be obtained is the actual observation
of functioning systems.

This fact does not lessen the significance of speculative studies,
however, for they are an essential part of the overall process of
technology assessment. By anticipating possible problem areas,
they permit us to focus attention directly on the aspects of
technological systems most likely to be of importance. In his article
on prediction, Bell states that:

"... the correct identification of relevant problems
is obviously the first step in the conjecture about
the future; it is easier to make because it tends to
be an extrapolation of the present."[3]p.869

Because such extrapolations are dependent upon present reality,

it seems reasonable to conclude that the process of problem identi-

fication does not remain constant over time. Different problems

can obviously be identified before and after implementation of any

particular item of technology. However, the process of technological

innovation does not consist of these two stages alone. James Bright

describes the innovation process in terms of eight stages occurring

within the technological environment, each of which may be dependent

on factors deriving from non-technical environments.[2]p.7

Present reality changes with each successive step of the innovation

process, and for this reason, problems can continually be perceived

in new ways. Thus, prediction of the higher-order effects of technology

must of necessity be a gradual process of speculation, simulation,

and experimentation in which complete knowledge crystallizes only

in the final stage of the innovation process.

With respect to the introduction of cable participation systems,

we now find ourselves between stages four and five in Bright's out -

line of the process of technological innovation.[2]p.7 That is, we

are at the stage of technological development in which laboratory

demonstrations have already been completed, but full-scale field

trials have only just begun. It seems clear that it will be

some time before the technology comes into actual widespread use

within society. It is therefore also true unfortunately that we

still have some way to go before any practical knowledge of the

problems of manipulation can be obtained. But this fact should not

make us particularly uneasy, however; for as the Lang study notes:

> "...Any innovation in communication-the admisstion of the
> press to legislative debates, the broadcasting of political
> party conventions, the televising of presidential press
> conferences, etc. -has invariably invoked alarm. Some
> change always accompanies such innovation, but the potential
> danger to political institutions is, in retrospect, almost
> always found to have been exagerated. The process by which
> individuals react and the remifications of their reactions
> for the workings of institutions is always more complex, and
> hence the effects far more subtle than the alarmist can
> anticipate. Indeed, the high pitched sense of alarm may
> itself be on of the firmest guarantees against sudden disjunctive
> change."[4]p.163.

Although knowledge of the changes brought about by technology can

only be obtained gradually, such changes are usually too complex to

result in far reaching impacts on society in only very short periods

of time. Thus, we have the possibility of anticipating problems

in time to direct observation to the more critical aspects of tech-

nological innovations. In this way, it may be possible to design

around problem areas as they are encountered.

The conclusion of this thesis is that three specific mechanisms

by which manipulatory effects may be generated are in fact distinct

possibilities for future large-scale two-way cable participation

systems. Based on currently available information, there does not

appear to be any way of determining the likelihood of these event-
ualities. However, we do have the ability to design experiments
which can determine the existence of these mechanisms within the
context of the actual systems as they come into use. Hopefully,
the results of such investigations will enable us to deal with
what might have otherwise remained important but unforseen higher-
order effects of the technology.

APPENDIX

I. REFERENCES

1. Bauer, R.A., Second-Order Consequences: A Methodological Essay on the Impact of Technology; MIT Press, Cambridge, Ma. 1969.

2. Bright, J.R., The Process of Technological Innovation-An Aid to Understanding Technological Forecasting: in: Bright, J. and Schoeman, E (eds) "A Guide to Practical Technological Forecasting", Prentice Hall, Englewood Cliffs, N.J. (1973).

3. Bell, Daniel, Twelve Modes of Prediction - A Preliminary Sorting of Approaches in the Social Sciences; Daedalus, V. 93, Sept. 1964, p. 845-80.

4. Lang, Gladys and Lang, Kurt, Voting and Non-voting: Implications of Broadcasting Returns Before Polls Are Closed, Blaisdell Publ. Co. Waltham, Ma., 1968.

5. Jurgen, R.K., Two-Way Applications for Cable Television Systems in the '70's, IEEE Spectrum, Nov. 1971, p. 39-55.

6. Baer, W.S., Interactive Television: Prospects for Two-Way Services on Cable, The RAND Corp., R-888-mf, 1971

7. The Urban Institute; Design Study for Urban Telecommunications Experiments, proposal to the N.S.F., 1975.

8. University of Southern California; Implementing Two Urban Tele-communications Experiments Designed to Deliver Municipal Services, proposal to the N.S.F., 1975.

9. Denver Research Institute, University of Denver, Design Study for Urban Telecommunications Experiments - Summary Report, proposal to the N.S.F., January 1975.

10. New York University, Experiment in Urban Telecommunications; proposal to the N.S.F., 1974.

11. Lehigh University, Implementation of Urban Telecommunications Experiments, proposal to the N.S.F., 1974.

12. Pool, I. de Sola (ed), Talking Back: Citizen Feedback and Cable Technology, MIT Press, Cambridge, Ma. 1973.

13. Pool, I. de Sola, Citizen Feedback and Political Philosophy, (in Talking Back); MIT Press, Cambridge, Ma. 1974.

14. Campell, V., The Televote System for Civic Communication: First Demonstration and Evaluation, American Institutes for Research, Palo Alto, Ca., 1974.

15. Guite', J.C.M., CATV Technology for Citizen Feedback to Government, M.S. Thesis, Dept. of Politcal Science, MIT, 1974.

16. Jones, W.B., Riter, S. and Hambrick, R., Telecommunications in Urban Public Services, IEEE Transactions on Communications, V23, N.1, Jan. 1975.

17. Bretz, R. and Dougherty, L.A., Two-Way TV Teleconferencing for Government: The MRC-TV System, RAND Corp, Santa Monica, Ca, R-1489-MRC, April 1974.

18. Reid, A., Communications Study Group: Interim Report, Joint Unit for Planning Research, University College, London, England, July 1971.

19. Pool, I. de Sola, Politics in a Wired Nation, in Talking Back, MIT Press, Cambridge, Ma. 1973.

20. Sheridan, T.B., MIT Community Dialog Project-Progress Report, July 1974.

21. Lemelshtrich, N., Feedback Technology and Small Group Interaction, Interdepartmental Ph.D. Thesis, MIT, October 1973.

22. Simon, H., Bandwagon and Underdog Effects and the Possibility of Election Predictions, Public Opinion Quarterly, V28, p. 245, Fall 1954.

23. Fleitas, D.W., Bandwagon and Underdog Effects in Minimal-Information Elections, American Political Science Review, V65, p. 434, 1971.

24. Asch, S.E., Studies of Independence and Conformity: I. A Minority of One Against a Unanimous Majority, Psychological Monographs, V70, N9, p. 1, 1956.

25. Asch, S.E., Effects of Group Pressure Upon the Modification and Distortion of Judgements, in EE. Maccoby et al, Readings in Social Psychology, 3rd ed. Holt, Rinehard, and Winston, New York, 1958.

26. Ikle', F.C. How Nations Negotiate, Harper and Row, New York, 1964.

27. Plott, C.R. and Levine, M.E., On Using the Agenda to Influence Group Decisions: Theory, Experiment and Application, Social Science Working Paper, N. 66, California Institute of Technology, April 1975.

28. Glanzer, M. and Glaser, R., Techniques for the Study of Group Structure and Behavior: II. Emperical Studies of the Effects of Structure in Small Groups, Psychological Bulletin, V58, N1, p. 1-27, 1961.

29. Bavelas, A., Communication Patterns in Task-Oriented Groups, Journal of the Acoustical Society of America, V22, N6, p. 725-30, Nov. 1950.

30. Leavitt, H.J., Some Effects of Certain Communication Patterns on Group Performance, Journal of Abnormal and Social Psychology, V46, p. 38-50, 1951.

31. Goldberg, S.C., Influence and Leadership as a Function of Group Structure, Journal of Abnormal and Social Psychology, V51, p.119, 1955.

32. Shaw, M.E., Rothschild, and Strickland, J.R., Decision Processes in Communication Nets, Journal of Abnormal and Social Psychology, V54, p. 323-30, 1957.

33. Burgess, R.L., Communication Networks: An Experimental Reevaluation, Journal of Experimental Social Psychology, V4, p. 324-37, 1968.

34. Shaw, M.E. Some Effects of Problem Complexity Upon Problem Solution Efficiency in Different Communication Nets, Journal of Experimental Psychology, V48, N3, p. 211-17, 1954.

35. Heisse, G.A. and Miller, G.A., Problem Solving by Small Groups Using Various Communication Nets, Journal of Abnormal and Social Psychology, V46, p. 327-36, 1951.

36. Macy, J., Christie, L.S. and Luce, R.D., Coding Noise in Task-Oriented Groups, Journal of Abnormal and Social Psychology, V48, p. 401-09, 1953.

37. Dahl, R.A., Power, article in International Encyclopedia of the Social Sciences, V.2, Macmillan Co. and The Free Press, 1968.

38. Simon, H., On the Definition of the Causal Relation and Notes on the Observation and Measurement of Political Power, in "Models of Man: Social and Rational", Wiley, N.Y. (1957), p. 50-70.

39. March, J.G., An Introduction to the Theory and Measurement of Influence, American Political Science Review, V49, p. 431-51, 1955.

II. TELEVISION FEEDBACK EXPERIMENT QUESTIONNAIRE

(Second Stage)

SEGMENT(1): Single Moderator

1. Indicate the degree of participation which you felt during this segment:

    circle: no participation 1 2 3 4 5 much participation

2. Did you often feel a lack of communication during the segment?

    circle: never 1 2 3 4 5 often

3. Was the pace of the discussion too fast or too slow?

    circle: too slow 1 2 3 4 5 too fast

4. Did the discussion hold your interest?

    circle: no 1 2 3 4 5 yes

5. Do you feel that the direction of the discussion was responsive to the audience's interests?

    circle: not responsive 1 2 3 4 5 responsive

6. Check off any question format techniques which you found particularly satisfying:

    yes-no_____, multiple choice_____, scale of choice_____,

    frustration category_____.

7. Check off any question format technique which you found particularly frustrating:

    yes-no_____, multiple choice_____, scale of choice_____,

    frustration category_____.

SEGMENT(2): Two Moderators

1. Indicate the degree of participation which you felt during this segment:

    circle: no participation 1 2 3 4 5 much participation

2. Did you often feel a lack of communication during the segment?

    circle: never 1 2 3 4 5 often

3. Was the pace of the discussion too fast or too slow?

   circle: too slow 1 2 3 4 5 too fast

4. Did the discussion hold your interest?

   circle: no 1 2 3 4 5 yes

5. Do you feel that the direction of the discussion was responsive to the audience's interests?

   circle: not responsive 1 2 3 4 5 responsive

6. Check off any question format techniques which you found particularly satisfying:

   yes-no___, multiple choice___, scale of choice___,

   frustration category___

7. Check off any question format techniques which you found particularly frustrating:

   yes-no___, multiple choice___, scale of choice___,

   frustration category___

SEGMENT(3):   Panel Discussion

1. Indicate the degree of participation which you felt during this segment:

   circle: no participation 1 2 3 4 5 much participation

2. Did you often feel a lack of communication during the segment?

   circle: never 1 2 3 4 5 often

3. Was the pace of the discussion too fast or too slow?

   circle: too slow 1 2 3 4 5 too fast

4. Did the discussion hold your interest?

   circle: no 1 2 3 4 5 yes

5. Do you feel that the direction of the discussion was responsive to the audience's interests?

   circle: not responsive 1 2 3 4 5 responsive

6. Check off any question format technique which you found particularly satisfying:

    yes-no___, multiple choice___, scale of choice___,

    frustration category___

7. Check off any question format techniques which you found particularly frustrating:

    yes-no___, multiple choice___, scale of choice___,

    frustration category___.

TELEVISION FEEDBACK QUESTIONNAIRE - SUMMARY

1. Rank the single moderator, double moderator, and panel segments in terms of your sense of participation, Explain.

2. Rank the single moderator, double moderator, and panel segments in terms of the quality of communication you felt. Explain.

3. Rank the single moderator, double moderator, and panel segments in terms of their ability to hold your interest. Explain.

4. Did group feedback make the discussions more satisfying for you? Explain.

5. Did the group's feedback influence your response in any way? Explain.

6. Do you think your responses have differed had this been a large face-to-face meeting? Explain.

7. Did you like this technique? Please make any comments or suggestions which you might have. (Use reverse side).