Participatory Research and Utilization in the Technology Assessment Process

Issues and Recommendations

STEVEN C. BALLARD
THOMAS E. JAMES
University of Oklahoma

Technology assessments (TAs) are interdisciplinary applied policy studies undertaken (1) to inform public and private policymakers and interested citizens about the likely consequences of a decision to develop a technology, and (2) to identify, evaluate, and compare alternative policies and implementation strategies for dealing with problems and issues likely to arise when a technology is developed (White et al., 1978: 76). TAs, as do applied policy studies generally, involve technical and policy analyses.[1] Technical analyses attempt to evaluate and compare technologies on the basis of unbiased scientific and technical criteria. Policy analyses interpret the results of the technical analyses in the context of the social and political system within which the technology is developed.

The purpose of this article is to discuss the policy analysis component of TA. First, utilization—central to the design, conduct, and interpretation of applied policy analysis—is discussed. Second, participatory research is assessed as a utilization strategy. Third, issues associated with utilization strategies are identified and several recommendations for the conduct of TAs are presented. The discussion that follows is based on a decade of research conducted by the Science and Public Policy (S&PP) program at the University of Oklahoma. S&PP, an

Knowledge: Creation, Diffusion, Utilization, Vol. 4 No. 3, March 1983 409-427
© 1983 Sage Publications, Inc.
0164-0259/83/030409-19$2.15

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

interdisciplinary applied research program, has conducted several technology assessments in energy and environmental policy.[2]

Utilization

Concerns about utilization are the driving force of TAs—in order to impact on policymaking, they must be designed and conducted in a manner that will maximize the opportunity for the generation and utilization of knowledge about the costs, risks, and benefits of the technology. Essentially, a TA that is well done technically or scientifically but that "sits on the shelf" may be good research but is not a good TA. While there appears to be general agreement among knowledge producers about the role of utilization in TA, the lack of application of results by potential knowledge users is not encouraging. Little doubt exists that knowledge is underutilized. With a few significant exceptions, the investments made in creating information are not "paid back" in terms of the application of that knowledge to policymaking and decisionmaking.[3] Furthermore, this appears to be true regardless of how the term "utilization is defined."

Many explanations have been offered for underutilization. Table 1 summarizes these explanations by identifying four general categories of barriers: the quality of research,[5] politics,[6] the nature of scientific knowledge in relation to social problems, and the processes of innovation and change. Of these four categories, the first three have been less important to S&PP research strategies. While it is important to produce quality research products, there is little support for the idea that high-quality research will be used while low-quality research will be ignored. The importance of quality to use can be challenged both theoretically in terms of how innovations are adopted (Rogers, 1962) and empirically in terms of both user/producer relationships (Berg et al., 1978) and the importance of political and interpersonal variables (Aaron, 1978; Patton, 1978). Variables related to politics and the nature of scientific knowledge can be important to utilization, but neither offers much encouragement to the applied researcher because both are essentially nonactionable in the short term.

The fourth category of barriers, the process of innovation and change, becomes vitally important because several of these variables are subject to manipulation by the researcher *and* they significantly affect

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

TABLE 1
Barriers to Utilization

General	*Specific Problem*
Quality of the research	Poorly conducted study (failure of methods, data, logic, etc.).
	Equivocal findings.
	Inadequate attention to timeliness of information.
	Inadequate relationship to problem (failure of theory).
Politics	Nonacceptance of social science research due to value differences.
	Restriction of rational decision making due to fragmented government networks.
	Bargaining and compromise are more important than "knowledge."
	Inadequate expression of goals.
	Findings ignored if different from expectations.
Nature of scientific knowledge and social problems	Immature scientific knowledge bases (or disciplines).
	Lack of theory.
	Intractable problems.
	Inadequate research ability because of legal or ethical constraints.
Process of innovation and change	Low motivation to change on the part of the user (including variables related to competence, open-mindedness, values, experience, and threat perception).
	Interpersonal barriers:
	Communication (language, noise, etc.)
	Role perception and definition
	Status discrepancy/ambiguity
	Value differences
	Being out of phase
	Organization barriers:
	Organizational survival
	Relevancy of information to organizational process
	Threat of information to stability
	Preparation and transmission of the message to the user:
	Packaging (language, length, graphics, etc.)
	Dissemination

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

utilization.[7] Primary among these manipulable factors are interpersonal variables, such as language, the relevancy of information to the organization's purpose, and the preparation and transmission of the message to the user. The following section discusses participatory research as an approach to reducing these barriers.

Participatory Research

Themes

The previous discussion has suggested two major points: Utilization is critical to the success of TA, and thus the researcher must take an *active* role in fostering utilization; and, while many barriers exist to utilization, the researcher can influence barriers related to the process of innovation and change. The research perspective taken in our program is that many of these barriers can be reduced by integrating utilization concerns throughout the design, conduct, and dissemination of the research. In essence, participatory research tries to create the best possible relationship between the knowledge producer and the knowledge user in order to influence positively the process of change and innovation.

Participatory research is not a new idea; it has long theoretical and empirical roots related to innovation, decision making, and organizational change.[8] Several specific themes have guided our efforts to do participatory research:[9]

- *Early involvement.* Relationships with sponsors, government agencies, and more general parties-at-interest are established at the earliest possible stages of the project (Ballard et al., 1980; Ballard and Hall, 1981).
- *Ongoing relationships.* Relationships with users are maintained throughout the course of the project in order to understand the dynamics of user needs (Ballard et al., 1980; Ballard and Hall, 1981).
- *Demand orientation.* Research issues and tasks must be responsive to the needs of intended audiences. Thus, research agendas are developed in response to socially defined rather than scientifically defined objectives.
- *Integrated R&D.* Knowledge generation must be linked to knowledge application; thus, all phases of research design, development, and utilization are integrated (Conway et al., 1976).

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

- *Research management.* Researchers must recognize their own role in the process of change. This includes developing substantive expertise, understanding how they intrude on or affect elements of the social context (especially organizational politics), and understanding the factors (such as political variables) that condition the demand for research (Weiss, 1975).
- *Active utilization role.* Understanding user needs and processes of change is necessary but not sufficient for utilization. Thus, the researchers must promote utilization by such activities as dissemination of findings, increasing awareness of and interest in the research, and convincing audiences of its applicability (Ballard et al., 1980).

Strategies[10]

Strategies to carry out these ideas will vary according to the purposes, audiences, and social context of the research. The S&PP program has developed four general strategies that have been used in several research projects to facilitate participation and utilization. One of the most important of them, in terms of establishing early involvement and ongoing relationships, has been the role of an advisory committee. For our Western Energy Study (White et al., 1979),[11] the advisory committee included members representing federal agencies and national interests, regional interests for our particular study area of the western United States, representatives of private interest groups, state and local officials and representatives, a labor union representative, and representatives of the research community. This committee, formed within a few months of the project's beginning, formally met with the research team four times over the course of the three-year project and reviewed work plans, reports, and draft papers on a regular basis. Their input was viewed as an integral part of the design of the project.

A second strategy was to involve a much larger number of experts, stakeholders, and relevant parties-at-interest to enhance the awareness of the study and to improve the quality of its products. For example, most of the Western Energy Study draft reports and/or issue papers were distributed to approximately 500 parties-at-interest both regionally and nationally. This mailing list included the same categories of groups represented in the Advisory Committee. The value of such widespread distribution lies in the diversity of groups represented and in the willingness of the research team to involve relevant participants at the earliest possible stages of research. For example, draft papers were

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

characteristically distributed well before their authors or the team as a whole were satisfied with them. While this procedure may be contrary to commonly held scientific norms, it facilitates participation, because reviewers can have an input before the papers become rigidly defined.

A third mechanism for increasing participation and utilization is through personal interaction. In a broad sense, personal interaction began by the research team learning about "the system"; that is, the people, activities, and institutions that influence the variety of problem areas affected by western resource development. Corresponding to this learning process, the research team gradually interacted in the system by visiting development sites and impacted areas, attending conferences and workshops on environmental and energy topics, and establishing verbal and written contact with other participants in the system.

A fourth participation/utilization strategy focuses on the dissemination of research products. The critical activities here are packaging of research products and presentation of findings to the most directly affected audiences. Although it seems obvious that reports written in an easily readable and understandable form will greatly increase the interest and awareness of potential users, this point often appears to be overlooked, even by those engaged in applied research. While it was necessary to produce and disseminate detailed supporting documents for the subject matter covered by the Western Energy Study, the research team was careful to provide summary documents of reports that were short, written in nontechnical language, and used graphics, maps, charts, and other visual presentation techniques. This point is elaborated in the final section of this article.

Results

As we have noted, it is very difficult if not impossible to determine "utilization"; this is certainly true when attempting to specify the causal significance of the many variables that influence a particular decision. Thus, the evidence supporting the success or failure of participatory research is often anecdotal and speculative. However, the strategies identified above are viewed as successful by the program staff (who have been developing and refining them for a decade). Since participatory research represents a strategy for doing successful TA, it is in the program's interest to be self-critical about its strengths and weaknesses.

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

In addition to self-evaluation, other sources of information suggest these strategies have been successful. The most recent of these is a survey of sixty-five potential users of the *Energy from the West* study (Parker, 1981). Results of this study indicate that the *Energy from the West* TA had multiple uses, ranging from direct application to improving the quality of public discussion (Ballard and Parker, 1980: 16). Regarding participatory research strategies, they appear to be successful at a general or "enlightenment" level of utilization. They are particularly important in promoting user awareness of and interest in TAs—a critical mechanism that triggers the change process. Awareness and interest by the potential user, particularly controllable by the researcher through dissemination activities, were found to be a much more fruitful utilization goal than altering individual and organization barriers (Ballard and Parker, 1980: 17-18).

Additional evidence supporting the success of these strategies can be found in a case study of a TA conducted by the S&PP program on outer continental shelf (OCS) oil and gas operations (Miedema, 1974). The OCS study's final report, *Energy Under the Oceans*, received widespread distribution and was utilized by a large number of government agencies, environmental interest groups, and industry groups. These agencies and groups used the study as background material from which to gain an overall perspective of OCS energy development and as major input for specific policy proposals. The U.S. Senate and House of Representatives found the study useful as a source of data for congressional hearings and in the development of OCS-related legislation. In addition, both environmental interest groups and industries found the report to be credible and to provide a good summary of technologies and a useful review of government management practices in the OCS area.

A number of important factors were identified that facilitated the utilization of the OCS study. First, the timing of the study was important, since it appeared just after the onset of the energy crisis and at a time when the outer continental shelf was being considered as a source of expanded energy supply. Second, the study was user-oriented, and the study team made significant efforts to obtain the maximum participation of a wide variety of vested interests that would be affected by the study's conclusions (such as government, environmental interest groups, and industry). Third, the utilization of the study's findings and recommendations was positively affected by the extensive distribution of the study that resulted from the dissemination strategy employed by the study team.

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

Utilization and Professionalism: Recommendations for Doing TA

The discussion to this point suggests that participatory research is useful in facilitating utilization of TAs. However, the strategies adopted to promote utilization can create concerns about the professional conduct of the research team during the TA process. Table 2 summarizes many of the issues associated with an active utilization approach according to three general phases of research: proposal and design, conduct, and dissemination and utilization activities.[12] Several caveats about this table should be recognized. First, it is not exhaustive but illustrative; other questions common to scientific/professional research could be included. Second, the entries are not necessarily unique to TA, since several concerns are common to policy analysis in general. Third, these three categories are not mutually exclusive; as discussed above, participatory research tries to integrate components of the research process. Thus, the entries in Table 2 are intended to reflect the stage of the research process where each issue is most likely to arise. Fourth, the order of the items in each category is not intended to reflect a ranking of importance.

Proposal and Design

Many of the issues listed under research proposal and design are common to grant/contract research in general and are not necessarily peculiar to participatory research. However, two deserve discussion. Questions of research approaches and methodologies (number 2) are among the most problematic in TA. Reasons for this include (1) that no commonly accepted theories or methodologies exist for doing a TA (White, 1975); (2) that in spite of this, substantial pressure often exists from sponsors to use particular, internally developed models; (3) that substantial incentives exist in the research and bureaucratic communities to use the latest, fanciest, and most quantitative models even though they frequently are inappropriate or are appropriate for only a very limited set of research questions; and (4) that many TAs which deal with forecasts, energy technologies, environmental impacts, and so on are inherently uncertain. It is our experience that many models can help to inform the research if used carefully and with extreme skepticism. The more critical point is that it is often impossible to define appropriate

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

TABLE 2
Issues of Professionalism in the Technology Assessment Process

Research Design and Proposal	*Research Conduct*	*Dissemination and Utilization*
1. Incorporating without adopting the perspectives of the sponsoring agency or powerful bureaucratic interests.	1. Potential for co-optation of the researcher; for example, threats of withdrawing funding if research may be damaging to the sponsoring agency.	1. Failure to make research results available and accessible to all parties-at-interest.
2. Accepting mandated research approaches if they are inferior to other available approaches, or if they cannot do what the research is indended to do.	2. Accepting bureaucratic or nontechnical directives in areas where the researcher has been hired as the expert.	2. Partial release of results that do not accurately reflect total research findings.
3. Accepting research projects under false pretenses, especially to justify decisions already made.	3. Continuing a research project if the design has deteriorated past acceptable limits.	3. Promoting use of results that are of dubious quality.
4. Promising more than is deliverable, such as promising problem solutions that are not likely or beyond the state of the art.	4. Continuing research after the research question has become moot.	4. Releasing progress reports for review and comment without adequately identifying the stage of the research or the limits of the findings.
5. Failure to recognize that the process of research can legitimate a topic as a public problem or alternative, even though it may not necessarily be.	5. Failure to confront or correct false accusations about the conduct of the research.	5. "Holding" results from publication for prolonged periods of time to serve sponsoring agency's goals over those of larger public.
6. Failure to recognize the potential for favoritism in grant/contract awards, particularly in sole source RFPs.	6. Adopting the values, interests, or perspectives of an advisory group when they are not warranted.	6. Imposing the standards or values of the research team on an agency when there is no accountability mechanism.
7. Accepting scarce agency resources that may be better used for clients or other agency priorities.	7. Accepting uncritically the solicited findings of parties-at-interest or failure to judge the quality of findings used in a report.	7. Failure to protect the confidentiality of data/information sources.
8. Basing budgets on financial or entrepreneurial criteria rather than on research/problem criteria.	8. Failure to inform clients or sponsoring agencies of potential negative consequences of the research.	8. Failure to identify completely the assumptions that "drive" the findings.
		9. Reluctance to make recommendations when the weight of the evidence supports them.
		10. Failure to "follow through" with promised assistance to client groups who participated in research process; such as providing technical assistance.

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

models on an a priori basis; models and approaches are often more fruitfully selected *after* the research team has learned enough about the substantive problem, the variety of situational factors, and policy variables. Thus, our first recommendation is:

(1) *Resist the temptation to completely design the research at the proposal stage; incorporate enough flexibility into the design to adapt or even radically alter the conduct of the study.*

The fifth concern listed under proposal and design essentially asks the question, "What are the consequences of *studying* this problem?" and reflects the position that research can, by itself or with other factors, legitimate—that is, raise to the level of public discussion—a question that would not otherwise be raised. This concern is often heard when research is directed at or includes technologies about which there are strongly held, emotional positions. This argument is very problematic because it connotes an absolutism or, at worst, anti-intellectualism. Our experience in TA suggests that virtually nothing about technology development should be taken for granted. In fact, a basic purpose of TA is to challenge "state of society assumptions" (Coates, 1975), which includes questioning conventional wisdom, business-as-usual scenarios, and the like. Thus, a second recommendation is:

(2) *Accept nothing as a given; while always being sensitive to the social consequences of research, creatively challenge the most basic assumptions that influence the research problem.*

Research Conduct

Among the important concerns associated with the conduct of the research is the relationship of the researcher to the sponsoring agency. This concern is often raised regarding entrepreneurial research, presumably because the financial incentives for being co-opted are greater. However, university-based research also can be faced with significant pressures from the sponsoring agency, particularly if research findings are critical of the agency or if they challenge basic legal and regulatory elements of the agency. Perhaps these conflicts are unavoidable, in the sense that in-depth analyses are almost certain to identify weaknesses in any legal/regulatory system. Furthermore, conflicts between the sponsor and the contractor typically involve legitimate differences in perspectives

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

about complex issues. The point to be emphasized about these relationships is that an atmosphere must be created in which these differences can be resolved frankly, that is, by establishing credible, ongoing relations between the contractor and sponsor. Thus, participatory research can help to reduce rather than worsen this potential conflict. A third recommendation is:

(3) *Do not accept the sponsoring agency's perspective if it is not supported by your knowledge of the problem; however, it is the responsibility of the researchers to work to establish relationships with the sponsor that allow frank resolution of conflicts without threatening the integrity or continuation of the research.*

A related issue pertains to the relationships with other parties-at-interest. As discussed above, participatory research in our TAs includes a substantial amount of interaction with a broad range of parties-at-interest, including distribution of draft reports for review and comment at an early stage of development. A potential problem is the extent to which perspectives of parties-at-interest should be included in the report (number 7). We have found this to be a two-edged sword; these comments have proved to be very valuable in both educating the research team and fostering user awareness of and interest in the research; yet, these comments are often one-sided or narrow and, occasionally, of very low quality. We generally have dealt with this issue by structuring our policy reports to distinguish "values and interests" of parties-at-interest from factual evaluation of issues and alternatives. While this occasionally results in the publication of very questionable ideas, they should be properly attributed and formally assessed in the evaluation section of the report. A fourth recommendation is:

(4) Values and interests of various participants should be portrayed in the TA, but it is the responsibility of the researcher to evaluate these ideas critically.

Dissemination and Utilization

Several difficult questions are raised during the dissemination and utilization phase; however, only a few of these issues will be discussed. One of the most difficult is the responsibility to make research results available *and* accessible to parties-at-interest. While research results are

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

often made available through a variety of publication mechanisms, they are much less frequently made readily accessible in an understandable form. Thus, as discussed above, we have used several dissemination strategies to deal with this responsibility. Perhaps the most useful is the executive summary; however, this mechanism almost always causes major disagreements among the members of the research team. While there is seldom a question about the need for an executive summary, many questions are raised about how to present and format the summary. Primarily, these issues relate to its length, level of detail, and the level of documentation. Some of these concerns are natural, given the fact that many of our reports are 500 to 1000 pages long. How can this much information be adequately summarized in an executive summary? The answer is that it cannot be; in fact, the purpose of an executive summary is to present the major findings and to increase awareness of or interest in the project. It is *not* to be used as a primary information base.

The biggest battles (and biggest mistakes) over executive summaries concern their length. The general reason for this is that most researchers cannot accept the idea of only partially explaining a complex problem. As a result, summaries intended to inform directors of state agencies, governors and legislators or their staffs, directors of R&D agencies, and so on often are 40 to 50 pages of single-spaced, detailed material. Substantial evidence and a little common sense suggest this is self-defeating. In short, the executive summary should be clear about what it does not do; but the central point is that the benefits of generating interest in and awareness of a report outweigh the risks of misinterpretation from short, succinct, interesting highlights of a larger study. Thus, a fifth recommendation is:

(5) *Set length limits on executive summaries and follow them religiously. We suggest a maximum length of 15 pages and an optimal length of about half that. When necessary, produce several executive summaries rather than one which is 50 pages long; or produce the 50-page summary* along with *a 2- to 5-page "highlights" section that can be distributed separately.*

Sponsoring agencies often have their own agendas for contract reports; for example, they may want to hold (repress) results until a particular crisis or event is settled or until they can use them to advantage in congressional hearings. While the research team should be sensitive to the needs and agenda of the sponsoring agency, a general

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

timetable for public release and dissemination of the reports should be part of the project work plan and contractual agreements. Some flexibility concerning the timing of dissemination is appropriate; however, in some instances, repressing a report for more than a few weeks may render findings moot. Under no circumstances should the team place itself in a position that would allow the sponsor to completely control dissemination or censor the material that is released. In regard to this, we recommend:

(6) *Dissemination/utilization activities are largely, if not solely, the responsibility of the research team; agencies should be committed to facilitating, not impeding, this responsibility.*

Producing appropriate executive summaries is the responsibility of the researcher; unfortunately, publishing and distributing them is often the responsibility of the sponsoring agency. This stipulation is often a contractual requirement or a financial necessity. We have found few utilization experiences in TA as frustrating as trying to get executive summaries published and distributed in a timely fashion by sponsoring agencies. Typically, our reports have addressed policy issues of "immediate" concern to a variety of audiences; thus, timely distribution of reports and summaries is a *requirement* if the information is to be useful. Unfortunately, the priorities and concerns of our sponsoring agencies seldom have considered these requirements—six- to nine-month turn around time has been typical. Thus, a seventh recommendation related to the timely release of information is:

(7) *Responsibility for producing, printing, and distributing executive summaries should be given to the research group and the costs should be included in the contract budget.*

Another concern related to dissemination activities, promoting use of results that are of dubious quality, might be better termed the "pathology of trust" (Ballard et al., 1980: 955-956). This concern is created by participatory research; specifically, by establishing trust with user communities. In fact, there is theoretical reason to believe that *trust* is the key to utilization, since it is the triggering mechanism for potential users trying and adopting the "innovation" (Rogers, 1962). The problem here is that if participatory research is successful, research products of dubious quality may be as easily accepted by user communities as

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

those of good quality. This flies in the face of numerous (usually frustrated) researchers who argue that "good" research will be used and "bad" research will be ignored. Unfortunately, there is little evidence to suggest that the utilization process is this simple. This does not lead us to recommend production of poor-quality research, but it does suggest that the research team must be critical of its products. More important we recommend:

(8) *External quality-control mechanisms are a necessity in guarding against biased, narrow, or unsupportable findings. Advisory committees, paid consultants, and wide distribution can help to provide this quality control.*

A further concern pertains to the appropriate role of applied research: Should the researcher simply present relevant information, or recommend and advocate particular policies? While this obviously is a complex question, the answer to which largely depends on the particular research problem and relations between the research group and various audiences, our general experience is that policy audiences *want* recommendations. This can be for a variety of "good" reasons (for example, a representative has to vote "yes" or "no" on a bill) or "bad" reasons (a policymaker wants to avoid responsibility). In contrast, there are frequently many pressures on researchers—uncertainties associated with technology development and increased accountability—to *avoid* recommendations. However, our general recommendation is:

(9) *When the evidence warrants, applied researchers should be willing to make substantive recommendations from their work, even when uncertainties exist (which is almost always true). Researchers should accept their "expert" status and the accountability that goes with it.*

A final question is the responsibility of the research team to what might be called "immediate clients"—the people most likely to feel the primary impacts of technology development. Participatory research relies on these people to provide input into the TA process, yet a consistent impression we formed from our experiences is that scores of researchers come to these groups, enlist their confidence, use their time and materials, and are not heard from again. It is no wonder that this phenomenon, sometimes labeled the "we're from Washington, we're here to help" syndrome, results in increasing resentment and increasing unwillingness among local groups to talk to "outsiders."

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

This feeling was expressed to us repeatedly in our presentations and visits with residents and public officials in the small communities impacted by energy development. In one discussion, we asked such a group what one or two things from our study would be most useful to them. Their response was clear and unambiguous: "Help us communicate with the state government and EPA about what our needs are and how *we* would like to deal with them."[13]

The effect of this issue is somewhat insidious—it grows very slowly, subtly, and sometimes imperceptibly, and it is continuously reinforced that "federal" research projects are "here to get," not to help. From the research team's perspective, this can be an important barrier to gaining necessary insights into local issues. However, the barrier can be reduced if the relationships are ongoing and if requests made by local groups for information or assistance are given high priority. The primary responsibility for long-term assistance rests with the sponsoring agency and/or the federal government. Agencies that create literally hundreds of interventions in local communities should recognize the long-term and cumulative impacts of these studies on their "subjects." The long-term effects, it seems to us, include growing resentment of federal agencies. This conclusion should not be interpreted to mean that we favor uniform federal requirements such as those for research on human subjects. However, unless this issue is addressed—and we know of only a few, inadequate ways in which it is—these kinds of regulations seem a logical result. Rather, we recommend:

(10) *Technology assessments and related research projects that intervene in local communities should explicitly include resources for technical assistance in the research funding. While this may be accomplished on a project basis, it may be implemented and better coordinated at a program level.*

Conclusions

We have argued that the degree of participation in technology assessment depends on the *purposes* of the research. We view TA as a form of applied policy analysis that is intended to create opportunities for improved policymaking; thus, participatory research strategies are a necessary component of the TA process. Essentially, we advocate that researchers recognize (not bemoan) the fact that TA inherently involves a range of values and interests. Participatory research helps to get these values and interests specified and facilitates the development of the trust and credibility necessary for balancing competing perspectives.

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

We have recognized a variety of issues related to the design, conduct, and dissemination of technology assessments, and we have suggested strategies for addressing them. The central question is not so much whether the benefits of participatory research outweigh the costs and risks. Rather, since participatory research is viewed as a necessity, the question concerns how to balance participation with other requirements of applied policy research. We hope the recommendations presented will challenge others to develop further guidelines for designing, conducting, and disseminating applied research.

Notes

1. These two labels are not altogether satisfactory, since both kinds of analysis are a part of policy analysis. In this section, policy analyses are those that emphasize the political aspects of the overall applied policy analysis.

2. The approach to TA described here was largely developed by Don E. Kash, former Director of S&PP, and Irvin L. White, former Assistant Director. The policy analysis framework discussed here is an outgrowth of a three-year Technology Assessment of Western Energy Resource Development sponsored by the Environmental Protection Agency, Office of Energy, Minerals, and Industry, contract 68-01-1916. In addition to the Project Directors, Irvin L. White and Michael D. Devine, the authors are grateful to the members of S&PP's interdisciplinary research team: Michael A. Chartock, R. Leon Leonard, Frank J. Calzonetti, Martha W. Gilliland, Edward J. Malecki, Gary D. Miller, and Edward B. Rappaport.

3. The most comprehensive statement of this is by Havelock (1969). For an analysis of the use of policy analysis done by consultants, see Bernstein and Freeman (1975). Regarding underutilization of federally sponsored technology R&D see House and Jones (1977).

4. Utilization typically is defined in narrow terms to mean the *direct* use of knowledge as the deciding factor in decision-making processes. Use of such a narrow definition has contributed to the underestimation of the total effect of applied research (Weiss, 1977: 531-545; Caplan et al., 1975; Ballard and Parker, 1980). Thus, it is more realistic to think of utilization as creating *opportunities* for improved decision making by improving knowledge about any of the variety of factors that affect decisions. While it is virtually impossible to determine the degree to which a particular piece of research affects a decision, there is little evidence to suggest that knowledge is used as much as researchers intend or promise.

5. The most comprehensive examination of research quality in applied research projects was probably the work done by Bernstein and Freeman (1975), who evaluated over 1000 cases of evaluations of federal programs. Although a variety of barriers were identified in this work, emphasis was placed on the need to improve the quality of evaluations.

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

6. See Lindblom and Cohen (1979) for an insightful analysis of the relationship between informational and political variables. For an assessment of the inherent differences between the research and political communities, see Rein and White (1977).

7. For an overview of these variables, primarily those influencing user-producer relationships, see Havelock (1969). For an empirical assessment of how the researcher can reduce the barriers, see Benson (1976).

8. Theoretical background for participatory research is found in the works of Rogers (1962), Lasswell (1971), and Bennis et al. (1977). Use of these and other theoretical perspectives in structuring applied research owes a substantial debt to the ideas and innovations of Phillip M. Burgess. See, for example, Burgess and Higgs (1971) and Burgess (1973a, 1973b). These and other intellectual contributions were translated into numerous successful applied research projects, including the Benchmark Program (see Ballard, 1975) and the Ohio Cities Consortium (see Benson et al., 1977).

9. For an excellent discussion and historical overview of mechanisms to link knowledge users and knowledge producers, see Conway (1976: Ch. 1).

10. The following discussion is taken largely from Ballard and Hall (1981) and Ballard et al. (1980).

11. The Western Energy Study, begun in 1975 and completed in 1979, examined the consequences of the development of six energy resources in eight western states through the year 2000.

12. This categorization scheme was developed by Professor Dwight Davis, now at Texas A&M University. Several of the entries in the first column reflect the work of Dr. Davis.

13. This discussion occurred in a meeting with planners, elected officials, and representatives of the city of Rifle, and the counties of Garfield and Rio Blanco, Colorado, in March 1977.

References

AARON, H. (1978) Politics and the Professors: The Great Society in Perspective. Washington, DC: Brookings.

BALLARD, S. C. (1975) "The Benchmark Program: a self-assessment for the Citizen Involvement Network." Columbus, OH: Academy for Contemporary Problems.

——— and T. A. HALL (1981) "Theory and practice of integrated technology assessment: the case of the Western Energy Study," in F. Rossini et al. (eds.) Integrated Impact Assessment. New York: Elsevier.

BALLARD, S. C. and L. B. PARKER (1980) "Discussing truth with power: the importance of participatory research," presented at the annual meeting of the Western Social Science Association, Albuquerque, New Mexico, April 25-28.

BALLARD, S. C., A. BROSZ, and L. PARKER (1980) "Social science and social policy: roles of the applied researcher." Policy Studies J. (June).

BENNIS, W. et al. [eds.] (1977) The Planning of Change. New York: Holt, Rinehart & Winston.

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

BENSON, J. L. (1976) "The development of knowledge dissemination and utilization strategies: the BENCHMARK Program." Ph.D. dissertation, Ohio State University.

——— R. CONWAY, and T. JAMES (1977) "An overview of the Ohio Innovation Group," presented for the National Science Foundation Innovations in Local Government Conference, San Francisco, March 1977.

BERG, M. R. et al. (1978) Factors Affecting Utilization of Technology Assessment in Policymaking. Ann Arbor: University of Michigan, Institute for Social Research, Center for Research on Utilization of Scientific Knowledge.

BERNSTEIN, I. N. and H. FREEMAN (1975) Academic and Entrepreneurial Research. New York: Russell Sage Foundation.

BURGESS, P. M. (1973a) "On putting our oars in the water: a clinical perspective on the design and analysis of foreign policy," prepared for the Foreign Policy Research Conference, Lake Cumberland, Kentucky, September 19-22.

——— (1973b) "Watch the canary and other admonitions," in E. Azar and J. D. Ben-Dak (eds.) Theory and Practice of Events Research: Studies in International Actions and Interactions. New York: Gordon & Breach.

——— and L. D. HIGGS (1971) "Science, policy, and the utilization of social technology," presented at the 63rd National Governors' Conference, San Juan, Puerto Rico.

CAPLAN, N., A. MORRISON, AND R. J. STAMBAUGH (1975) The Use of Social Science Knowlege in Policy Decisions at the National Level. Ann Arbor: Institute for Social Research, University of Michigan.

COATES, J. F. (1975) "Technology assessment at NSF," in S. Arnstein and A. Christakis (eds.) Perspectives on Technology Assessment. Jerusalem: Science and Technology Publishers.

CONWAY, R. A. (1976) "Innovations for promoting knowledge utilization: the Report Review Committee." Ph.D. dissertation, Ohio State University.

——— et al. (1976) "Promoting knowledge utilization through clinically oriented research: the BENCHMARK Program." Policy Studies J. 4, 3: 264-69.

HAVELOCK, R. G. (1969) Planning for Innovation Through Dissemination and Utilization of Knowledge. Ann Arbor: University of Michigan, Institute for Social Research.

HOUSE, P. W. and D. W. JONES (1977) Getting It Off the Shelf: A Methodology for Implementing Federal Research. Boulder, CO: Westview.

LASSWELL, H. D. (1971) A Pre-View of Policy Sciences. New York: Elsevier.

LINDBLOM, C. E. and D. K. COHEN (1979) Usable Knowledge: Social Science and Social Problem Solving. New Haven, CT: Yale Univ. Press.

MIEDEMA, A. (1974) RANN Utilization Experience: Outer Continental Shelf Oil and Gas Case Study No. 12. Research Triangle park, NC: Research Triangle Institute.

PARKER, L. B. (1981) "Utilization strategies for technology assessment: the case of the Western Energy Study." Ph.D. dissertation, University of Oklahoma.

PATTON, M. (1978) Utilization-Focused Evaluation. Beverly Hills, CA: Sage.

REIN, M. and S. WHITE (1977) "Can policy research help policy?" Public Interest 49 (Fall): 119-136.

ROGERS, E. M. (1962) Diffusion of Innovations. New York: Macmillan.

WEISS, C. H. (1975) "Evaluation research in the political context," pp. 13-26 in E. Struening and M. Guttentag (eds.) Handbook of Evaluation Research, Vol. 1. Beverly Hills, CA: Sage.

——— (1977) "Research for policy sake: the enlightenment function of social science research." Policy Analysis 3, 4: 531-545.

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016

WHITE, I. L. (1975) "Interdisciplinarity," in S. Arnstein and A. Christakis (eds.) Perspectives on Technology Assessment. Jerusalem: Science and Technology Publishers.
—— S. C. BALLARD, and T. A. HALL (1978) "Technology assessment as an energy policy tool." Policy Studies J. 7, 1: 76-83.
——— et al. (1979) Energy from the West: Policy Analysis Report. Washington, DC: Environmental Protection Agency.

STEVEN C. BALLARD is the Assistant Director for the Science and Public Policy Program and Associate Professor of Political Science, University of Oklahoma. His fields of interests are policy analysis, utilization of scientific knowledge, energy policy, and natural resource policy. He is coauthor of Energy From the West: A Technology Assessment of Western Energy Development *(University of Oklahoma Press) and* Water and Western Energy *(Westview Press), and has published contract reports on energy and the environment, and journal articles on energy policy, intergovernmental relations, the knowledge utilization process, and methods of policy analysis. He received his Ph.D. in political science from Ohio State University (1976).*

THOMAS E. JAMES, Jr., is a Research Fellow with the science and Public Policy Program and Assistant Professor of Political Science at the University of Oklahoma. He has authored numerous articles and papers on program evaluation, urban social reporting, the impact of federal manpower programs, and the generation and utilization of scientific knowledge. His current research is an assessment of ground water problems in the Southeast and the development of policy options for dealing with these problems. He received his Ph.D. in political science from the Ohio State University.

Downloaded from scx.sagepub.com at UNIV OF OKLAHOMA LIBRARIES on January 20, 2016