Donald E. Pugh.

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Curriculum Diffusion and Innovation.
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INTRODUCTION:

The Research, Development and Diffusion model fails to take account of social interaction theory and tries instead to impose a highly depersonalized technocratic model based on role specialisation, a model which in effect decreases personal contact within and between educational structures, reinforcing existing hierarchies and reducing the teacher to the role of passive, non-contagious receiver of innovation. (McDonald, 1976, p. 20)

This statement of Ernie House’s makes three descriptive and four derogatory comments concerning the research, development and diffusion model. The descriptive statements include 1, the technocratic basis of the model, 2, its stress on role specialisation, and 3, the hierarchical nature of the model. The four derogatory comments, which suggest limitations in the functional value of the R. D. and D. model, refer to its a, impositive nature and failure to use the positive attributes of the social interaction model, b, its depersonalized nature, c, the reduction of the teacher’s role to that of a passive receiver, and d, decreased personal contact within and between educational structures.

How accurate is this description of the R. D. and D. model? To explore the model’s attributes and limitations, and to polarize the model through contrast, a quick look will be taken at the advantages suggested by the Social Interaction model. Finally, an empirical examination is undertaken of the functioning of the R. D. and D model within the United States education department to determine the usefulness of the model in reflecting the reality of the actual working situation.

THEORETICAL MODEL OF R. D. AND D.
Literature on the R. D. and D. model stresses its rational sequence in the evolution and application of the innovation. (Morrish, 1976, p. 113; Havelock, 1971, p. 85.) This evolution in Guba's (1968, p. 32) model ranges from research, development, and diffusion to adoption. In a more detailed model, CERI (1973, p. 54) presents the model as involving 1. problem identification and definition, 2. innovation planning, 3. innovation programming and development, 4. experimentation, 5. evaluation and revision, 6. dissemination and production, and 7. implementation. In both descriptions the sequence appears linear.

A problem is identified from felt needs and relevant, applied validated scientific theories and research from such fields as learning theory, communications and management, as well as data and precedents from practical experience, and data and testimonies from evaluative studies.

Through a process of inquiry, the problem is investigated, data gathered and organized, hypotheses arrived at for the solution. These hypotheses are revised, tested and trialed until found satisfactory. The development stage (Bowman, 1969, p. 1) involves the assessment of relevant research and the invention and design of prototypes or models. The design is engineered into being, field tested, modified if necessary, and evaluated. It is then mass produced and packaged for distribution. Diffusion involves the promoting, informing, demonstrating, training, nurturing and servicing of the package so that it will come into wide spread use. (Guba, 1968, p. 32; Styles, 1973, p. 275.) Finally, adoption follows a linear process beginning with awareness, growing interest, followed by user evaluation, user trialing,
user debugging and modification, user installation and adoption and finally institutionalization. (Morrish, 1976, p. 113)

Both Havelock (1971, p. 85) and McDonald (1976, p. 60) note that the following assumptions are made. 1. There is a rational sequence from beginning to end. 2. There is planning to identify and solve problems, usually on a massive scale over a long period of time. 3. There is a division and coordination of labour to accord with the rational sequence and planning. 4. There is a more or less passive consumer. The empirical-rational view of man as a rational being who will pursue rational self-interest is accepted. It is believed that if the consumer is shown benefits from the change, his reason will be responsible for adopting the change. (Morrish, 1976, p. 118; Bennis, 1969, p. 35; CERI, 1973, p. 43) 5. There is a willingness to accept high initial development costs prior to dissemination because of high anticipated returns from mass audience circulation. 6. The R. D. and D. model is based on the Centre-Periphery strategy in the sense that the innovation emerges from a centre where it has been researched and implemented, and is diffused outward to its ultimate users. (McDonald, 1976, p. 12) Diffusion is centrally managed, with training and provision of resources all emerging from the R. D. and D. center. 7. Leeper (1965, p. 7) notes that the directed change is completely external to the adopting agent. Desired goals and innovations to promote them are assessed and developed externally. Research, program design and field testing
is done by outside forces. Implementation is usually introduced by the administration and pushed through regardless of opposition or apathy by teachers. 7. Lionberger (1965, p. 40) stresses the high interaction between researchers and those in the basic sciences, the highly trained nature of the researchers, the development of cumulative research findings, and the revision of materials based on feedback of problems from the teachers to researchers and publishers.

The technocratic, hierarchical and role specialized nature of R. D. and D. is best exemplified by the following analogy. The word technology conjures up the image of a machine, designed for a definite purpose, built to carry out a definite task, and composed of a large number of subcomponents, each with their own distinct identity and purpose, but interrelated in function to assist in the achievement of the overall purpose of the machine. If this view of a machine is enlarged as a philosophical approach for dealing with social problems, it is necessary to resolve a social need into a problem which can be solved by subdividing it into distinctive components.

The process is hierarchical in the sense that the primary problem may be broken down into a large number of subproblems, all of which, in turn, may again be reduced to further sub-sub-problems. To revert again to the engineering analogy, the classic problem of getting a man to the moon, for example, included such subproblems as the propulsion system, life support system, navigation and communications systems, and re-entry.
5.

Role specialisation is a crucial part of the problem because of the magnitude of difficulties involved in the problem. It is impossible for one person to become an expert in all the fields involved. Consequently, as the major problem is subdivided into tasks, and sub-tasks, people specialize in the solving of the individual tasks which go into the solution of the overall problem.

Similarly, in education, research specialists in the R. D. and D. model may be divided one from another by their separate, specialist disciplines such as psychology, sociology, and philosophy. Research specialists forward the data to the developers who occupy another distinctive, specialized role, that of engineering abstract theory into concrete applied designs and models. These designs or models are then handed on to the third stage, the disseminators, who have been accused of being mere salesmen, skilled at the selling of the products. Finally the teachers adopt and implement the innovations which have passed through a series of discrete stages involving different, highly specialized operations, which have little connection with each other. There is little contact between the personnel of the various stages, each of whom are specialists and have little in common with their compatriots in other stages of the operation. Nor is there much contact between the practitioners and the researchers and developers or disseminators.

Since the innovations are produced externally, they are implemented on a hierarchical basis, by being presented initially to a superintendent of education, who may recommend
recommend the innovations to various principles who, in turn, pass the innovation on down the chain of command to department heads and eventually on to the teachers. The teachers, in turn, have had little input into the research and development of the innovation, and are compelled by power/coercive strategies to adopt the innovation, without much say in its adoption or use.

CRITICISMS OF THE R. D. AND D. MODEL:

Criticisms of the R. D. and D. model as being impersonal, imposed, and lacking in involvement with the teachers, have been put forward by a number of authors. Morrish (1976, pp. 39 and 109) supports the contention that the model "envisages schools as objects to be manipulated" and teachers as passive beings. Morrish adds that many changes and innovations do not occur as end products after a careful process of planning, nor does research have to precede many forms of innovation. He dislikes the paternalistic nature of the model with experts imposing their views upon practitioners without collaborating with them. Herzog (CERI, 1973, p. 37) agrees, criticizing planned change as 1, naively professiono-centric, 2, seeing schools as objects to be manipulated, and 3, failing to recognize that most people are attached to whatever they are currently doing because they believe in the value of it, not because they are resistant to change. Mosher (1969, p. 9) elaborates on the lack of practicality of the R. D. and D. model.
...Educators have been very unrealistic in expecting much help from research as it is currently conducted.... Classroom teachers ... live in a different world from college-based researchers. The researchers point to gross errors in the folk wisdom of the teachers.... The teachers retort that research is usually impractical. Too often it is an investigation of insignificant variables or else variables which are outside the control of the teacher. The problems studied are often too narrow for practical use. The end product for the university researchers is a written report. This might appear to be dissemination of information, but in a way, it is not, because the report is written in esoteric language comprehensive only to researchers. A research project is considered successful if it yields an analysis that stands the critical scrutiny of fellow researchers. The usefulness of the results to the schools appears incidental in most cases.

Guba (1967, p. 7) supports this contention by suggesting that research and development may be characterized as 1, loosely organized, 2, university based, 3, individually directed, 4, theory-oriented, 5, committed to experimentation, 6, psycho-statistical in tradition, 7, parttime in pursuit, and 8, federally funded. Consequently he has found that the pattern of American research "poses particular problems that have prevented research from being a viable partner in the task of planned educational improvement." (Guba, 1967, p. 14) Furthermore, he suggests that there has been little utilization of research by practitioners, that research has not been programmatically oriented, and that major problem areas have not been systematically explored. Research, he adds, is unresponsive to practical educational problems. There has been inadequate diffusion mechanisms to link research to the practitioner, and adequate tools and strategies for carrying out school improvement activities are lacking. (Guba, 1967, p. 17)
Bateman (1973, p. 2) has stated that most dissemination strategies used by R. D. and D. agencies pick up the educational product towards the end of the testing cycle. This is too late in the developmental process to influence the final product. The product disseminator often finds himself in the role of pushing the innovative product upon the potential user who has to be convinced that the product is valuable to him and will solve his problems. There is little feedback by the user to the producer to provide information on how the product may be altered to better fit his needs.

Critics have been summed up by Baldridge (1972, p. 3) as follows: "The R. and D. network is busy spinning academic wheels, publishing useless reports, and doing "basic" research while the educational system cries out for help that it does not receive."

THE SOCIAL INTERACTION MODEL:

Numerous authors (Schmuck, 1972, pp. 1 ff; Deal, 1974, p. 5) have noted that complex social organizations are systems with goals, and numerous systematically interrelated sub-systems working together to achieve these goals. In order to introduce innovations, it is necessary, Deal (1974, p. 5) suggests, to have 1, a comprehensive organizational perspective, 2, familiarity with sound workable strategies, and 3, practical experience with the dynamics of educational change. Consequently, Deal (1974, p. 5) has found that the adoption of innovation is often related to the role of individual leaders in promoting
change. These leaders are responsible for the diffusion of ideas from one system to another, and from one person to another. Diffusion is consequently viewed as being more related to interpersonal networks of informative leadership and personal contacts than to rational processes. Havelock (1971, p. 85) supports this contention with these five generalisations. 1. The individual user or adopter belongs to a network of social relations which largely influences his adoption behaviour. 2. His place in the network is a good predictor of his rate of acceptance of new ideas. 3. The informal personal contact is a vital part of the influence and adoption process. 4. Group membership and reference group identifications are major predictors of individual adoption. 5. The rate of diffusion through a social system follows a predictable curve pattern, very slow rate at the beginning, followed by very rapid diffusion followed by long adopter or laggard period.

Because teachers are firmly enmeshed in the social system of the school, their decisions concerning adoption of new techniques are influenced as much by the attitudes of their fellow teachers and students as by rational components. Schmuck (1972, p. 14) supports this contention with the view that "cognitive strategy is ineffective in changing school organization. Knowledge does not necessarily lead to behavioural change." McDonald (1976, p. 20) and Shaw (1972, p. 4) also note that research has overemphasized the personal characteristics of individuals as being important in the adoption of social inventions,
and believe that more emphasis must be placed on organizational features as affecting innovation process. Hoyle (Hooper, 1975, p. 391) affirms that the group must be seen as a unit of change rather than the individual.

Ernie House (McDonald, 1976, p. 20) argues that the social structure is the dominating force within a school. Since only a few administrators participate in information flow, teachers are restricted in their contact with innovation. To increase innovation, it is necessary to extend the contact networks of teachers to the innovative sources. Information is transmitted through social interaction of group members, and diffusion of innovation depends upon the development of channels of communication within the receiver group. Unlike the R. D. and D. model which suggests the adopter as passive, the Social Interaction model sees the adopter as an active agent who is responsible for seeking out information, and working out change for himself through problem solving techniques. These techniques are as follows. Once in contact with or aware of a new idea, there must be an awareness that the innovation has a positive application to a current problem. This awareness may develop sufficient interest to search for further information. The innovation undergoes an analysis and evaluation by the receiver to decide whether the item is useful to the problem, whether it merits further investigation, and whether a planned strategy should be adopted for implementation. The implementation is trialed, and the innovation adopted as a problem solution, revised for problem solution or rejected.
In outlining methods of organizational development, Schmuck (1972, p. 15) notes that the organizational subsystems for training are working groups rather than individuals. Training for change within the organization focuses on groups and such interaction processes as communication skills, group problem solving, establishing organizational goals, dealing with group conflicts, and making group decisions.

Unlike the Centre-Periphery model, the Social Interaction model would accept the Proliferation of Centres or the Shifting Centres models. In the former model, the primary centre acts as a trainer of trainers established in secondary centers. The secondary centers, which could be change agents within the schools, are actively engaged in the diffusion of innovations through strategies as suggested by the Social Interaction process. (McDonald, 1976, p. 14) The Shifting Centres model has no permanent centre of innovation. Rather, leaders rise, promote innovations and are replaced rapidly by other leaders with new innovations.

The underlying view of man in the Social Interaction Model as opposed to the rational-empirical view of the R. D. and D. model is termed normative re-educative. Concern with interaction methods for developing relationships as exemplified by sensitivity groups. Such methods are used to change attitudes, values and relationships so that forces within the system are activated to support innovation. Since men are social beings guided by culturally funded and communicated meanings, change demands not only rationality but a change in normative culture. (CERI, 1973, p. 46)
In spite of the criticism lobbied at the R. D. and D. model by Ernie House, et al., it appears that the actual R. D. and D. centres, at least in the United States, are not presently functioning as explained by the model. Vivekananthan (1971, p. 1) reports that the R. and D. program was set up "to provide educational agencies with carefully designed and tested products, processes and systems appropriate to their goals and functions." The Office of Education (1968, p. 1) has listed these central aims: 1. To generate operational knowledge about learning in education. 2. to develop validated and economically feasible alternative instructional products for adoption at local choice and initiative. 3. to disseminate information that will enable local schools to be aware of and to implement the new knowledge and techniques. The document stresses that the process is not linear through development and installation. There is a "strong flow backwards as operational problems require development programs which, in turn, reveal the need for certain basic information and theory."

In a 1972 evaluation of the R. D. and D. program, involving eight university based R and D. centers and eleven regional laboratories, Baldridge (1972) had found that research generally focused on solutions of real-world practical problems, through systematic policy research. Lee Cronbach (1969, p. 19) has noted that the audience for policy research is a group of decision makers who
are managing social enterprises and are seeking practical, decision oriented, recommendative input for policy formulation. Because of the stress on P.P.B.S., Baldridge (1972, p. 9) found that the centers were problem oriented, programmatic in orientation, producing programs aimed at actual use. The most important observation of Baldridge (1972, p. 15) is that the R. D. and D. model is not linear as suggested by some writers with unrelated steps leading up to the final product. On the contrary, he found that the research process was really non-linear, consisting of constant feedback from the field to the research effort as needed. People committed to basic and field research were in constant interaction with each other and with practitioners. Indeed, most R. and D. centers insisted that those who developed the original plans should see them through to completion, thus integrating the separate stages of research, development and dissemination. These steps were viewed as integral, and as all part of one enterprise. Dissemination, Baldridge found, was not P.R. work, or the selling of neat little packaged products, but was a vital part of the R. and D. process in the sense that research information from dissemination and implementation was constantly being fed back into the development phases. By having the same people disseminate and view implementation of the projects as had researched and designed the projects, it was possible to eliminate role specialization, increase personal contact between the model stages and between
researchers and practitioners, and to involve the teacher as an active input agent in the formulation and development of educational policies.

Bateman (1973, p. 2) has advocated a marketing approach for the R. D. and D. process which fits in with the present American trend in R. D. and D. His marketing approach begins with the customers' needs and plans, and coordinates a set of products and programs to serve these needs. Marketing research is client oriented, and measures, evaluates and interprets desires, attitudes and behaviours of the client. Products are developed to optimally satisfy the criteria of the adopters through empirical testing and customer feedback. Following dissemination products are continually observed in order to permit future modifications.

In an evaluation on the Grand Rapids Public Schools and Western Michigan University Center for Educational Studies (1973, p. 1) it is apparent that in this case there has been a close relationship between university researchers and school practitioners. This relationship, created by developing a center shared by teachers and researchers, permitted a dual perspective, enabling the recognition of insights offered both by academic research and by teachers. The Center permitted mutual collaboration for sustained cohesive research contacts with the practicing institutions, valuable since the center permitted ongoing, sustained research into more difficult educational problems. The center allowed teachers and researchers to deal with each other directly on a one to one basis, simplified mutual access to resources and permitted friendships to develop.
CONCLUSION:

It is necessary to tie together the mutually supporting roles of R. D. and D. and the Social Interaction Model as well as noting some of the contributions of the American R. D. and D. Centers examined. It is apparent that Social Interaction theory contains valuable contributions neglected by the R. D. and D. model, particularly with its stress on the development of appropriate channels of communication through the system, and the role of leadership. In addition, the normative re-educative strategy has proven successful in its approach of altering values and attitudes in order to affirm, legitimize, and assure the continuance of innovations. It is apparent that the rational-empirical strategy alone is often unsuccessful in its emphasis upon the isolated individual as a productive agent of change. Similarly the central/periphery strategy of diffusion, smacking of authoritarian hierarchical imposition is too often unsuccessful in allowing change to firmly take root and flower.

Nevertheless the Social Interaction model, by itself, contains serious weaknesses. It takes the research and development as assumed and adopts research and development from whatever source happens to be available. There is a lack of systematic, cumulative and validated research efforts behind its innovations. The R. D. and D. model is specifically aimed at originating heuristic research to solve educational problems and to meet educational needs. Consequently it must be seen as a
necessary partner and complement in providing innovative input into the Social Interaction model.

It is recommended that the needs assessment of the R. D. and D. model be specifically related to the individual needs of primary and secondary schools, and that those in development and diffusion of research should be cognizant of organizational developmental theory. Regular evaluative exercises, and constant feedback to the R. D. and D. unit from practitioners, over the entire life cycle of the innovation, is essential. The Social Interaction model, which has traditionally emphasized the communication of research, should also be more heavily involved in the dissemination stage of the R. D. and D. model.

As has been suggested by the review of the American R. D. And D. centers, the model must not be regarded as linear in structure, since most innovations do not take place in this fashion. Rather, successful change occurs through a system's structure with constant feedback, interrelationships, and collaboration between each stage of the research, development, diffusion and adoption process. With pragmatic policy-oriented research mated with a social interaction model, a fruitful marriage will bear successful innovation functionally adopted.

A more detailed analysis of the topic, you balance 'wild' generalizations by some authors about R. D. D. with practical suggestions for making it viable, any UK or Australian examples?
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