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ABSTRACT

To date, little or no data is available about the effect of intra- or extra-institutional variables on individual or institutional productivity in educational research and development (R & D) settings. The Research on Institutions of Teacher Education (RITE) project was done to study knowledge production (R & D) and knowledge utilization activities in a national population of schools, colleges, and departments of education (SCDEs). Insofar as the indicators of productivity employed in the RITE study reflect important output of the R and D community in education, SCDEs and universities, including university-based R and D centers, are major contributors to the knowledge base in education and to communication with educational practitioners. However, although SCDEs compete well with other educational agencies, individual faculty productivity is disappointing. (In the concluding half of this paper, the author presents a number of contextual factors and conditions in SCDEs explaining some of the individual and institutional variances in R and D productivity. He uses the data to suggest, by analog, factors which might affect productivity in other educational organizations engaged in R and D activity, especially university-based R and D centers. The author's answers to seven questions asked by the audience of vocational education research and development personnel are attached.) (EM)

Occasional Paper No. 41

RESEARCH AND DEVELOPMENT PRODUCTIVITY IN EDUCATIONAL ORGANIZATIONS

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PREFACE

The National Center and the Ohio State University welcomed a presentation by Dr. David L. Clark, professor, College of Education, Indiana University. His lecture, entitled "Research and Development Productivity in Educational Organizations," is timely in light of recent congressional emphasis on research and development in vocational education. Dr. Clark depicts the essential aspects that make R&D organizations and individuals within these organizations productive.

Dr. Clark has a rich and extensive background in educational R&D and administration. A native of Binghamton, New York, he received a B.A. (1951) and M.A. (1952) from New York State College for Teachers, Albany, New York, and the Doctor of Education degree (1954) from Teacher's College, Columbia University. Dr. Clark is presently a professor in the College of Education at Indiana University. He has served as dean of Indiana University's College of Education (1966-1974), and as an administrator at the local, state, university, and federal levels. He began his career as a field representative for the New York State Teachers Association. For the next two years he was assistant to the superintendent of the Garden City Public Schools (N.Y.). From 1958 through 1962 he was director of the USOE Cooperative Research Program. He left government to become associate dean and professor at the Ohio State University where he served until he became dean at Indiana.

Dr. Clark presented a previous graduate lecture at the National Center for Research in Vocational Education entitled "Federal Policy in Educational Research and Development, which is one of his numerous publications.

The Ohio State University and the National Center for Research in Vocational Education are again pleased to present Dr. David L. Clark's presentation, "Research and Development Productivity in Educational Organizations."

Robert E. Taylor
Executive Director
The National Center for Research
in Vocational Education

RESEARCH AND DEVELOPMENT PRODUCTIVITY IN EDUCATIONAL ORGANIZATIONS

Introduction

The productivity of professionals and scientists in organizations has been a popular field of inquiry in business and public administration for years, but until recently little attention has been paid to R and D productivity of individuals and institutions in education. With the establishment of the Dissemination and Resources Group in the National Institute of Education, some normative data have been accumulated about levels of institutional productivity, numbers of producers, and the kind and quantity of products being generated in educational R and D. There are still little or no data available about the effect of intra- or extra-institutional variables on individual or institutional productivity in educational R and D settings.

In this paper, I would like to begin with data on R and D productivity in schools, colleges, and departments of education (SCDEs) which were gathered over the past three years, and move from that empirical base to inferences about how what was learned in SCDEs may have implications for other educational organizations engaged in R and D activity in education, especially university-based R and D centers. Specifically, I will cover three topics:

1. An overview of R and D productivity in SCDEs including some comparative data with other educational organizations.

2. An analysis of contextual factors and conditions in SCDEs which seemed to explain some of the individual and institutional variances in R and D productivity in such organizations; and the suggestion of some analogs from these data which might affect productivity in R and D centers.

3. A tentative exploration of how such factors and conditions might be dealt with by administrators and staff of educational R and D organizations who are attempting to optimize R and D productivity.

Before turning to the first section of the paper, I need to provide some background information on the research project on which the early part of the paper will be based. The Research on Institutions of Teacher Education (RITE) project was funded by the National Institute of Education to study knowledge production (KP, i.e., research and development) and knowledge utilization (KU, i.e., diffusion and utilization) activities in schools, colleges, and departments of education.[1]

The data gathered in that study which are relevant to this paper included:

- An institutional questionnaire completed in 135 SCDEs chosen as representative of the national population of 1,367 such units.

- A faculty questionnaire completed by 1,387 faculty members in 131 of the 135 institutions.

- Site visits to 20 SCDEs of varying types.

- Six productivity studies which utilized secondary sources to provide an objective indication of KPU productivity,[2] i.e.:
  - Contributions to educational journals.
  - Contributions to the Research in Education (RIE) portion of the national Educational Resources Information Center (ERIC) system.
  - Contributions in the form of educational books.
  - Contributions to national convention programs.
  - Contracts and grants received from private foundations.
  - Contracts and grants received from governmental sources, primarily the federal government.

R and D Productivity in Schools of Education

SCDEs as institutions are typically not engaged in R and D productivity. The median level of institutional productivity as assessed by the measures employed in the RITE study was *ZERO!* Of the 1,367 SCDEs, 773, or 56.5 percent, accumulated no credits in the criterion areas used in the study and 1,106, or 80.9 percent, were classified as low producers—a level of production so low that it could be accounted for almost entirely by sporadic and idiosyncratic behavior on the part of an individual faculty member.

This is not to say that SCDEs considered as a class of institutions were non-producers. R and D activities are concentrated within SCDEs of particular types. For example, 97.5 percent of the baccalaureate level institutions offering teacher education programs were non- or low producers. Conversely, this categorization accounted for only 11.1 percent of the doctoral SCDEs. For the most part, SCDEs which do not offer the doctorate in education do not define R and D as a part of their institutional mission, make no provision to support such activity in their institutional budgets, and do not evidence such productivity.

High Producing SCDEs

There is an identifiable set of SCDEs which are distinctly a part of the educational R and D community in the United States. Sixty schools of education were identified in the RITE study as either (a) "R and D Centers" (24) or (b) "Other Outstanding Producers" (36). An additional 39 schools of education were engaged in R and D activity with sufficient regularity to be classified as "R and D Actives." Although directly comparable data are not available for other educational organizations, there is little doubt but that the 24 R and D center schools of education maintain a level of productivity roughly comparable to such organizations as educational laboratories and non-academic research organizations. The 36 "other outstanding producers" are less intense in their R and D activity but are surely competitors from time to time and in particular substantive areas of specialization with other educational R and D organizations.

One independent source of data which affirms the RITE study observations of R and D activity in high producing SCDEs is an NIE study of multiple reports from institutions or agencies accessioned by ERIC in 1973.[3] Exclusive of federal governmental agencies, 27 organizations were noted as the producers of 50 or more ERIC reports. Sixteen of the 27 were universities and 13 of the 16 were also identified as R and D center SCDEs in the RITE study.[4]

SCDEs do not compete with uniform success for all types of federal contract funds in educational R and D. For example, NIE's Field Initiated Studies (FIS) research projects in 1973 were

dominated by college and university faculty (82 percent of the FIS funds). In contrast, a 1971 analysis of DHEW evaluation contracts reported only 21 percent allocated to college and university faculty.[5]

It is not only true that SCDEs do compete with other R and D agencies in education, but they need to compete to remain solvent. The RITE study estimated that about $25 million were being invested annually in SCDEs through grants and contracts for R and D activity.[6] That level of expenditure would support about 1,000 full-time R and D faculty members or approximately one in every 35 SCDE faculty employed in all 1,267 SCDEs in the United States. More dramatically, it would support one in every 13 faculty in doctoral level SCDEs and one in three among the research center SCDEs. For practical purposes, these SCDEs cannot afford to withdraw from their investment in educational R and D and their competition with other educational R and D organizations.

Through the RITE data sources, other than the productivity studies, it is possible to characterize these research center SCDEs in relation to a number of institutional characteristics, i.e.:

- Frequent involvement of faculty (65 to 89 percent) in some form of R and D or D and U activity. This involvement, however, is almost always part-time and usually much less than half-time.
- Significant local budgetary support for R and D activity; faculty time (about 30 percent) released for R and D and D and U involvement; other support mechanisms for R and D activity which bring the total of the operating budget for R and D up to one-third to one-half.
- Strong idiographic organizational structure; these SCDEs are large, bureaucratic units with a historic commitment to collegial governance.
- Frequently maintain external, field-based arrangements with schools.
- Maintain numerous R and D and field service bureaus and centers; typically more than one per SCDE.
- Tie faculty reward structure closely to successful production in R and D and scholarly writing.

Comparative Productivity in SCDEs and Other Educational Organizations

Data were gathered in the RITE study about R and D productivity in other educational organizations. These data are summarized in Table 1. Several observations seem appropriate:

1. SCDEs were clearly significant components of the knowledge production community in education in the United States. They accounted for over half of the publications in the practitioner journals and nearly two-thirds of the publications in the research journals. The 26 journals selected for inclusion in the study were chosen either because they had been identified as "core" journals in an information science study of the growth of the knowledge base in education or because they were high circulation journals to practitioners.
2. In all areas except RIE credits, SCDEs were a major institutional force.

Table 1

PRODUCTIVITY OF SCDEs AND OTHER AGENCIES IN EDUCATIONAL R AND D

Source	Percent Credits						Percent Dollars
	Practitioner Journals	Research Journals	RIE/ERIC	Books in Education*	Conventions*	Foundations*	Public Agencies**
SCDEs	52.9	64.7	6.6	40.4	41.9	44.8	42.8
Other University	6.0	11.6	18.1	42.1	13.2	11.6	57.2
Local Education Agencies	25.9	2.6	7.7	6.1	18.5	6.4	N.A.
State Education Agencies	1.8	.3	4.6	.7	2.7	.3	N.A.
Community/Jr. Colleges	1.2	.5	1.5	.4	.6	.4	N.A.
Non-university R and D Organizations	1.5	5.0	7.0	1.8	6.4	16.5	N.A.
National Educational Professional Assocs.	1.1	.3	2.6	1.1	1.8	1.3	N.A.
Business/Industry	.7	.4	.8	1.8	1.9	.0	N.A.
U.S. Government	1.3	1.0	6.1	.7	3.0	.3	N.A.
Foreign	2.9	9.3	7.1	.7	2.3	.5	N.A.
Other Non-university	4.7	4.3	37.8	4.3	7.8	17.9	N.A.
Total	100.0	100.0	99.9	100.1	100.1	100.0	100.0

*Figures entered for SCDEs and Other University categories are adjusted to allocate the undesignated credits in the same portion between the categories as the known credits.

**These data, obtained through the Smithsonian Science Information Exchange, were computed for college and university sources only. The *1976 Databook* (p. 39), using somewhat different categories and restricting the analysis to OE/NIE funding of education R and D, reported the following for FY '74:

Colleges and universities — 29%
Nonprofit organizations — 54%
For-profit organizations — 6%
State and local governments — 6%
Other — 5%

3. Other university departments and units were attractive to federal funding agencies (57.2 percent of the university total) but outside this area were primarily producers of books—chiefly textbooks. The discrepancy between their project dollars and other productivity measures is accounted for by the fact that (a) a number of the credited projects were KU-oriented local improvement projects operated from administrative offices (e.g., Fund for the Improvement of Post-Secondary Education projects), and (b) the outlets for non-education departmental publications are normally non-educational journals which were not surveyed in the study.

4. Local education agencies were predictably most significant as producers of information for other practitioners through convention presentations and practitioner journals.

5. Non-university R and D organizations, including regional laboratories and private research agencies, are significant forces in RIE (7.0 percent). Their level of productivity was substantially higher in research journals than in practitioner journals. Considering their growing attractiveness to federal funding agencies (e.g., $17.7 million from OE/NIE in FY '75 were invested in regional educational laboratories, 7 and 12 of 43 organizations receiving $500,000 or more in NIE support from FY '73 to FY '75 were private research agencies other than R and D centers and laboratories[8]), one might guess that their failure to be represented at a higher level of productivity in the journal, book, and convention categories reflects the in-house nature of much of the work funded by the federal government in these organizations. As is obvious from Table 1, the non-university credits in RIE were difficult to allocate to specific institutions. It is undoubtedly the case that the non-university R and D organizations are underrepresented in this category at 7.0 percent since RIE would be expected to accession their products from federal contracts.

Summary

Insofar as the indicators of productivity employed in the RITE study reflect important output of the R and D community in education, SCDEs and universities, including university-based R and D centers, are major contributors to the knowledge base in education and to communication with educational practitioners. Outside the university, local education agencies and non-university R and D organizations are the primary institutional contributors.

However, the reader should not infer from this presentation that SCDEs are hotbeds of educational R and D productivity. Although they compete well with other educational agencies, individual faculty productivity is still disappointing. Only slightly over a third of SCDE faculty are located in doctoral level institutions and only 3,189 (9.4 percent) were in the RITE research center SCDEs. A reasonable guess is that about 20 percent of the SCDE faculty are in institutional environments where R and D is a significant institutional emphasis. Even in these locations, as was noted earlier, few faculty devote full-time or a major portion of their time to R and D.

Contextual Factors and Conditions Affecting R and D Productivity

SCDEs varied widely in their R and D productivity from the non-producers to the research centers. The extremes of productivity in the full population of institutions are explained away rather simply. A large proportion of these institutions defined themselves out of this mission area. However, within the doctoral SCDE category almost every institution laid claim to some interest in

and concern about R and D productivity. Yet the 153 institutions distributed themselves across the RITE productivity categories as follows:

Research Centers	— 24
Other outstanding producers	— 32
R and D activities	— 29
Middle range producers	— 51
Low and non-producers	— 17

Some of the reasons for the differences noted were quite obvious. For example, a legislative decision had been made at the state level to invest the primary R and D mission in education within that state in one or two university settings. Institutional history was a factor within and across states. Some SCDEs have been involved in doctoral level programs and R and D activity for a half century or more while others have been involved for only the past ten to fifteen years. The predictable internal factors were observable, i.e,, varying budgetary levels for R and D, differences in faculty time allocated to R and D, varying support systems for R and D—such as R and D centers, etc.

As the RITE project staff began to visit SCDEs they noted recurrent references by interviewees to less obvious factors and conditions internal to the SCDE, or to the institution of higher education of which it was a part, which seemed to explain many of the individual and institutional decisons made within SCDEs about R and D activities. These items were labeled *contextual factors and conditions* to denote them as cultural elements or continuing policies and practices which had become hallmarks of such organizations. For example, it was noted in the preceding section that institutions of higher education competed unevenly for federal contract funds in R and D, capturing 82 percent of the Field Initiated Studies program funds and only 21 percent of the DHEW evaluation contracts. This condition fit two such factors, i.e., the idiographic culture of institutions of higher education and the fact that traditional research studies were more likely to be recognized in the formal reward system of universities than development or evaluation projects.

Similar but distinctive sets of factors and conditions undoubtedly affect other R and D organizations although empirical analyses of such conditions are not available for these agencies as they are for SCDEs. Since these factors and conditions raised issues of concern to SCDEs in attempting to optimize their R and D productivity, I will attempt to infer some of these factors in university-based R and D centers by analogy from what is already known about SCDEs. The reader should be alert to the fact that these conditions are not classifiable simply as facilitating or inhibiting factors. Their effect varies depending upon the type of R and D activity being discussed and the individual institution being considered, e.g., the idiographic culture of SCDEs is facilitative in field initiated studies programs and apparently inhibitive in responding to evaluation requests for proposals. Their power lies in their ability to illuminate the organizational environment for R and D activity in agencies of various types.

The factors and conditions to be discussed will be grouped under five general headings: Institutional missions; organizational size; staff load and utilization; staff rewards, perceptions, and attitudes; and the organizational basis for budgeting.[9]

Institutional Missions

A. SCDEs

1. *R and D productivity is concentrated in SCDEs with a strong sense of mission in that area.* Not only is the mission stated unequivocally in formal terms, but individuals

within the organization know that R and D productivity is expected as part of their professional accomplishments.

2. *Institutional missions in multi-purpose SCDE organizations do not exist equally although they are almost always stated as co-equal in importance.* The "D" portion of educational R and D and diffusion and utilization activities are viewed as low status areas in contrast with research and scholarly writing.

3. *Some SCDEs adopt missions which are not synchronized with their faculty strengths, constituency, base of fiscal support or general university environment.* These mission mismatches almost always lead to low morale and low productivity.

4. *Mission over-reach builds up over time within some SCDEs as pressures increase on the SCDE to take on all the problems confronted by education in a community, region, or state.* The most notable example of over-reach in recent years has been in urban SCDEs which have been pressed to solve the urban community's educational problems with limited staff and fiscal resources.

5. *SCDEs seem to give little time and attention to the trade-offs involved in the assumption of new or expanded missions.* New missions are accepted as good things to do, opportunities not to be lost. The opportunity costs, i.e., what will have to be given up, curtailed, or done less well are rarely or incompletely considered.

B. Analogs

R and D organizations in education, other than SCDEs, undoubtedly confront similar contextual factors in relation to their missions which affect productivity in these settings, e.g.,

1. University-based R and D centers are affected by the differential status accorded development, diffusion, and utilization activities in education. This is of concern not only because the parent institution values such contributions less but because individuals need to be concerned with the development of their professional careers on an extra-institutional basis.

2. External funding pressures on R and D agencies often induce both mission mismatches and mission over-reach. If funding availability is restricted to service, training, dissemination, or evaluation, it is a rare agency which can afford to assert its R and D mission and survive.

3. Many R and D agencies have been drawn inexorably into programs of little interest or payoff to them by the siren song of new missions. Opportunity costs are of even greater concern in such settings because of the reliance of such organizations on external funds for basic staff support.

4. The contextual factors relating to missions in university-based R and D centers undoubtedly have some unique features attributable to their reliance on external R and D support:

a. Mission balance – R and D agencies must search persistently for the balance they can or are willing to maintain between tried and true program elements (what is and has paid off) and new ventures or programs (what has promise for the future). The difficulty of maintaining an appropriate balance is aggravated in the R and D agency since misassessment may affect survival.

b. Mission explicitness – an R and D agency without a hallmark of distinction may be unattractive to potential funding agencies. Conversely, the R and D agency may cut itself off from areas of growth and expansion by becoming too sharply identified with either a substantive or process emphasis.

Organizational Size

A. SCDEs

1. *There is a critical mass of faculty required to maintain the needed levels of socialization and collegiality necessary for R and D productivity.*

2. *R and D productivity was constrained additionally in smaller SCDEs because:*

a. R and D projects normally require staffing flexibility.

b. Small faculties demand generalist skills; most R and D activities require specialization.

c. Small SCDEs typically did not have graduate students functioning as apprentice researchers.

B. Analogs

Although most R and D agencies hardly confront the problem of the very small SCDE (20 or fewer faculty), there is surely a number of size related factors in R and D agencies which affect their health and productivity as institutions, e.g.:

1. The generalist life of the professor in the small SCDE has its analog in the diversity of activity of the R and D center staff member who moves from project to project until he/she begins to lose expertness substantively and/or methodologically.

2. The problem of the lack of apprentice researchers in R and D centers which are cut off from graduate programs is only part of a broader issue of differentiated staffing vs. attracting the best trained and brightest staff members. The former strategy is often best attuned to current operations within the center while the latter maximizes the acquisition of grants and contracts.

3. The difficulties of maintaining collegiality among professional staff in R and D centers are probably tied less to the size of the overall group than to the fact that small separate work groups are required to carry out project activity. Communication and socialization across work groups are frequently difficult and clumsy.

4. R and D centers which are cut off from academic units confront the difficulty of simultaneously maintaining expertness in specialized areas, usually the behavioral sciences, and providing collegiality for such individuals. Is a sociologist, for example, who chooses to work in an educational R and D center likely to become such a consultant-generalist that eventually he/she is, in effect, no longer a sociologist? Few R and D centers, however, are so affluent that they can create a work group of sociologists if their primary concern is educational R and D.

Staff Load and Utilization

A. SCDEs

1. SCDEs are multiple purpose organizations. Teaching assignments constitute the core workload of the organization. Time available for R and D activity is generally referred to as "released" time. *Professors are part-time researchers, and the formally defined level of released time is a strong indicator of R and D productivity in the organization,* i.e., the median teaching load in research center institutions was eight to nine hours per academic term; in all other doctoral institutions, 10—14 hours.

2. *SCDEs which emphasize research missions are organizations with the strongest idiographic organizational cultures,* i.e., they tend to emphasize the self-actualization of the professor rather than the goals of the institution. Their faculty tend to be "cosmopolites" rather than "locals" and derive maximum reinforcement from agents and agencies external to the SCDE.

3. The idiographic culture and cosmopolite orientation of faculty in higher producing SCDEs leads to what might be termed *a "limited draw" available to administrators in such units when they are confronted with the necessity or desirability of redeploying personnel to new institutional emphases, i.e.:*

   a. Newer faculty are most susceptible to manipulation in assignment but the reward system in institutions of higher education is least responsive to such non-traditional activities. The risk to the career of the new faculty member is using major blocks of his/her time on such activities is very high.

   b. Faculty of "star" status represent the skills frequently needed to succeed in new thrusts but they tend to be (1) over-committed, (2) highly idiographic in behavior, (3) oriented to national reference groups, and (4) well-established in conventional productive outlets.

   c. The apparently under-employed faculty who have time to devote to the new thrusts are often "drones," i.e., they are under-employed because they are unproductive. The investment of the time and energy required to raise them to a level of proficiency in a new area is usually disproportionate to their likely productivity in the area.

   d. The locally-oriented "regulars," while competent to assume responsibility for the new thrusts, have been called upon too often in the past and are already over-committed to established line functions. Assigning them to the new thrust

is of limited utility since they must be replaced in the regular function to which they were previously assigned.

e. Since new thrusts typically involve specialized knowledge and skills, a significant group of the faculty are technologically unemployable as a consequence of shifting market demands and mission emphasis.

B. Analogs

Not much imagination is required to search for analogs to these conditions in university-based R and D centers, e.g.:

1. Despite the apparent focus of the R and D center on research, the actual time of the R and D center staff member devoted to research is limited by the demands of external funding agencies and the institution of higher education in which they are located. While the concept of "released" time for research may not be directly applicable to the scientist in the R and D center, it is true that he/she has little opportunity to pursue idiosyncratic research interests. It is equally true that most R and D centers affiliated with universities assume instructional and service obligations to the institution of higher education as well as participating in training, diffusion, and service programs for their funding agencies and for the profession generally. Assume for a moment a 100 percent time allocation for an R and D center staff member and then deduct time devoted to:

   a. Research-related activities, e.g., proposal writing, proposal review and revision, proposal budgeting, etc.

   b. Diffusion and service activities.

   c. Instructional and committee assignments within the institution of higher education.

   d. Instructional, committee, and administrative assignments within the R and D center.

   e. Consultative activities on center projects where the staff member is not a part of the regular project staff.

   f. Report writing to fulfill prudential requirements of funding agencies.

   Perhaps the concept of "released" time for research for staff members in R and D centers is not wholly inappropriate to consideration of the role of a staff member in such an organization.

2. The R and D center, in common with SCDEs, is engaged in a persistent search for the appropriate balance between idiographic and nomothetic emphases. Productive researchers have national constituencies and if they become invisible to this professional reference group their value to the R and D center diminishes. On the other hand, the R and D center requires a nomothetic orientation on the part of its staff to survive as an institution.

3. The limited draw is as familiar to administrators in R and D centers as it is to deans of SCDEs. The actual dilemma confronted by the R and D center rests in the broader staffing strategy employed by the center as it strives to simultaneously meet current obligations and respond to new challenges. In considering staff additions, the R and D center needs to account for:

   a. Permanent vs. temporary staff—what are the relative advantages of staff committed to a long-term research program vs. staff optimized to respond to current and emerging needs and funding opportunities?

   b. Stars vs. regulars—to what extent dare the centers emphasize staff with strong idiographic inclinations in contrast with "good team members?"

   c. Generalized vs. specialized—how can the requirements for expert staff be balanced off against the changing demands imposed by project funding?

   d. Intra-organizational career lines vs. transiency—should the center press to reduce staff turnover by providing career opportunities within the center or at least tolerate high turnover to assure staffing flexibility?

Staff Rewards, Perceptions, Attitudes

A. SCDEs

1. *Among the institution of higher education faculty, SCDE professors can be characterized as being involved in low status institution activities by the nature of their job assignment,* undergraduate instruction, advisement, placement, and service activities with schools.

2. *Rewards granted to faculty for productivity in emergent or low status areas,* which often reflect the nomothetic goals of the SCDE, *are most likely to take the form of salary increments or job perquisites* than promotion or tenure.

3. The disparity between actual SCDE faculty involvement in R and D and their aspirations for involvement are startling. Faculty projections of involvement in publications over the next five years, for example, predicted an increase by a factor of more than three. *SCDE faculty, in general, are dissatisfied with their current level of productivity in, and utilization of time for, R and D.*

4. *SCDE faculty maintain and nurture local myths about the institution which seem demonstrably false to the external observer.* Some are debilitating: they reduce or eliminate the consideration of alternatives, e.g., explaining away low R and D involvement on the basis of teaching overload where such an overload cannot be documented. Others are supportive: they serve to sustain the *espirit de corps* of the organization, e.g., the assertion by faculty in R and D center SCDEs that all the faculty are engaged productively in R and D where such a generalization is applicable to less than half the faculty group.

B. Analogs

Since staff in university-affiliated R and D centers not only share a national reference group with SCDE researchers, but frequently hold faculty appointments at the institutions of higher education, it is not surprising that analogs are available in terms of the conditions noted above, e.g.:

1. R and D centers frequently undertake development, evaluation, service, and dissemination projects. Such activities are less prestigeful within the immediate and general reference groups of R and D center staff than would be more conventional research projects. Center staff share with SCDE faculty the characteristic of being involved in numerous low status activities by the nature of their job assignments.

2. Rewards for many R and D center staff emanate from two sources: the center itself and the institution of higher education of which it is a part. Responsiveness to nomothetic demands from the R and D center, in contrast to pursuing idiographic interests, is likely to be better rewarded within the center than within the institution of higher education. As a matter of fact, R and D centers run the danger of responding so well to nomothetically-oriented staff that they end up with staff whose professional career development has atrophied to the point that they are no longer attractive to funding agencies as senior scientists or researchers on projects which the center wishes to attract.

3. R and D center staff register the same dissatisfactions as SCDE faculty about what they are doing (e.g., writing proposals) and what they wish to do or think they ought to do (e.g., engage in research). A particular problem for R and D center staff which was illustrated by the productivity data in the first section of this paper, is finding time to publish in professional journals and report at professional meetings. Such activities are frequently not encouraged within the R and D center since they do not contribute directly to the project work at hand.

4. R and D center staff foster local mythologies similar to those expressed by SCDE faculty. On the negative side of the ledger, evaluation and site visit data from R and D centers often cite complaints about overwork and the budgetary inflexibility of contract and grant activity which seem to the external observer to be about normal for an R and D organization. R and D center staff often observe enviously that "their time would be their own" if only they were a faculty member in an SCDE. School of education faculty, of course, maintain that they could meet their own aspirations for productivity if they were only assigned to R and D as are center staff. On the positive side, R and D center staff frequently express confidence that they are: (a) among the top two or three rated centers in the country; (b) much more productive in R and D than SCDE or institution of higher education faculty; (c) influential in effecting change in schools, etc. Such assertions, while they may well be true in some instances, are made by staff in all centers. Surely it must be the case that some centers are not among the top two or three in the country.

Organizational Basis for Budgeting

A. SCDEs

1. *Institutions of higher education and SCDEs are bound tightly in their fiscal structure to instructional headcount budgeting.* Even SCDEs with a history of R and D

involvement and productivity find that downward fluctuations in enrollment curtail sharply the allocation of funds to the SCDE, and it is common practice for the institution of higher education to expect its sub-units to "bleed" R and D funds from the allocations made to those units for instructional purposes.

2. *The budgets and resources of SCDEs are labor intensive,* i.e., concentrated heavily on personnel costs in contrast to other cost areas.

B. Analogs

R and D center budgets are also labor intensive and restrictive in the sense that they are bound tightly to externally funded, project-centered activities. Their reliance on external funding, however, suggests some contextual features which are less pressing in SCDEs with their access to local funds, e.g.:

1. R and D center budgets are almost always short on discretionary funds which can be applied to development of new areas, staff development, or organizational improvement activities. With the movement of the federal government away from institutional support toward project support, the R and D center is caught up in fragmenting its budget across so many discrete activities that the center, *qua* center no longer has an institutional budget.

2. This lack of budgetary flexibility and discretion leads to R and D center budgets featuring responsiveness rather than proactivity. The budget of the R and D center becomes an operational plan for surviving the next year rather than a plan to optimize the long-range R and D potential of the center.

3. R and D center budgets which are project-based challenge the center to balance off its responsibility to funders against its broader responsibility to professional reference groups and/or the canons of scientific inquiry. This dilemma arises not only in reporting findings but in deciding what is worthwhile to bid on and at what level of funding a quality job can be performed.

Summary

The RITE project identified a number of contextual factors and conditions in SCDEs that seemed to affect individual and institutional decisions which had an impact upon R and D productivity (as well as other institutional function areas) within these units. In this section, the SCDE data were used to suggest, by analog, contextual factors which might affect productivity in university-based R and D centers.

Conclusions and Recommendations

The RITE project was not by any means the first research endeavor to turn its attention to the question of factors affecting the productivity of staff in research organizations. Nearly fifteen years ago, the *Administrative Science Quarterly* felt that sufficient work had been finished and was in progress on "professionals in organizations" to devote a special theme issue to the topic.[10] In that volume the lead article, by Victor A Thompson, dealt specifically with the general requirements to sustain an institutional environment which would foster professional creativity and stimulate innovativeness, to wit:[11]

1. "First are needed resources for innovation—uncommitted money, time, skills, and good will."

2. "The innovative organization will allow that diversity of inputs needed for the creative generation of ideas. . . . a wide diffusion of uncertainty so that the whole organization is stimulated to search, rather than just a few professional researchers."

3. "The relationship between personal and organizational goals, ideally, would seem to be where individuals perceive the organization as an avenue for professional growth."

4. "Instead of the usual extrinsic rewards . . . satisfactions come from the search process, professional growth, and the esteem of knowledgeable peers . . . ."

5. "The creative atmosphere should be free from external pressure." The creative individual, ". . . needs freedom to innovate. He also needs considerable, but not complete, autonomy and self direction and a large voice in deciding at what he will work."

Thompson's analysis sounds simultaneously right and wrong. On the one hand, the conditions noted have the ring of face validity as *sine qua nons* for an optimum environment for productivity within an organization. On the other hand, they seem so unrealistic for most R and D organizations, including for a certainty most educational R and D organizations, that they have little operational significance for either the administrator or staff members in such a unit. To note to the administrator of an educational R and D center or educational laboratory that he/she should have uncommitted money and time and/or freedom from external pressures is to avoid talking about the world in which such organizations exist.

One might infer, then, that such institutions are so restricted by their organizational environment that they cannot aspire to maximize productivity, creativity, and innovativeness. With that proposition, I would probably concur. That would lead me, then, back to the question of what can be done within the realistic constraints of life in an educational R and D center to optimize productivity, creativity, and innovativeness since I see no possibility that alternative structures will emerge in the foreseeable future which can achieve the characteristics of an innovative organization.

Firstly, I would set aside from consideration external impact factors over which the center has little or no control, i.e., uncommitted money and freedom from external pressures. Secondly, I would re-examine the contextual factors described in the preceding section on the assumption that they are malleable to some extent, i.e., they are at least internal to the organization. It should be noted quickly, however, that they were identified as contextual factors precisely because of their enduring quality so that the extent of their malleability is small. Nonetheless, they are factors which affect professionals in particular types of organizations and, as such, they represent an agenda of common concerns for the administration and staff of such units.

Reviewing the Contextual Factors and Conditions

In the preceding section, a number of contextual factors and conditions affecting university-based R and D centers were inferred from the RITE project data on contextual factors and conditions affecting individual and institutional decision making in SCDEs. With no argument that this list is necessary or sufficient for R and D centers, they included:

1. Differential status accorded research on the one hand and development, diffusion, evaluation and service on the other in education generally and institutions of higher education in particular.
2. Mission mismatches.
3. Mission over-reach.
4. Mission balance.
5. Mission explicitness.
6. Pressures on the R and D center staff member who lives by his/her expertness and specialization to assume generalist roles.
7. Differentiated vs. "star" staffing strategies.
8. Problems of communication across work groups.
9. Collegiality and socialization problems.
10. Activities competing for the staff member's research time.
11. Idiographic-nomothetic balance within the center.
12. Redeployment of personnel to meet changing organizational demands.
13. Rewards appropriate to both nomothetic and idiographic behavior on the part of the staff.
14. Staff freedom to advance professionally and simultaneously meet center expectations.
15. Local mythologies—facilitating and debilitating.
16. Acquisition of discretionary funds for institutional improvement.
17. Maintaining responsive—proactive program balance.
18. Producing for funders and the general scientific community.

A Recommendation

These factors or conditions seem to me to have some common characteristics. They appear in one form or another in most organizations in which professionals live and work. They are not organizational problems susceptible to solutions but rather conditions in regard to which one can imagine trade-offs. They are not static. Even after interim agreements have been arrived at in terms of what seems to be the best current trade-off, they recur as issues for the organization.

Let me pursue this point by selecting the factor of idiographic-nomothetic balance for illustration. This is a classic organizational conundrum. Real life organizations do not solve the conundrum

or the problems arising from it. They strike an appropriate balance. The question of appropriateness moreover varies from time to time. The federally funded R and D centers and regional laboratories, for example, were able to invest heavily in an idiographically skewed organization when they were operating with broad institutional support from the U.S. Office of Education. As they moved to programmatic support, the nomothetic-idiographic balance needed to be readdressed to allow for the attainment of more specified organizational goals. When they were pressed to competition for specific Requests for Proposals (RFPs) a sharp swing toward nomothetic emphases occurred as they strove to survive as organizations. This latter emphasis would have been considered intolerable by the staff and administration in the earlier phase of lab and center development.

My inference, then, is that in most educational R and D organizations we are addressing the appropriate questions and issues but we are doing so within an inappropriate set of outcome expectations. Both administrators and staffs of SCDEs, R and D centers, regional laboratories, etc., seem to expect that if they can identify such "problems" they can solve them—and not just temporarily but once and for all. I would propose that there is a more appropriate reference point from which to deal with such topics, i.e., assume (1) that they are enduring factors and conditions which establish a continuing agenda for discussion and negotiation; (2) that the best resolution will be the trade-off which represents the solution least unsatisfactory to the greatest number of people; (3) that they not only require negotiated solutions but that they are recurring—as agenda items they will require reconsideration and renegotiation.

In looking ahead toward higher productivity in educational R and D organizations, three general recommendations seem to be in order:

1. Extant comparative data on productivity by educational R and D organizations of various types is inadequate for national level planning purposes and local evaluation and assessment programs. A regularized evaluation or productivity by educational R and D units is justified and needed.

2. A systematic study of contextual factors and conditions affecting R and D productivity in educational organizations would allow:

   a. A better assessment of the likely success of federal programs and interventions in organizations of various types.

   b. A sounder basis for local institutional evaluation and planning.

3. Regularized, continuous, and systematic staff-administrative discussion and negotiation of contextual factors in educational R and D organizations would result in:

   a. Better interim resolutions of basic organizational and individual relationships.

   b. Better staff-administrative communication and morale.

   c. Higher individual and institutional productivity.

NOTES

1. The opinions expressed herein do not necessarily reflect the position or policy of the National Institute of Education, and no official endorsement by NIE should be inferred. Readers interested in details about the methodology or results of the study are referred to David L. Clark and Egon G. Guba, *A Study of Teacher Education Institutions as Innovators, Knowledge Producers, and Change Agencies,* May 1977, NIE Project No. 4-0752, available through ERIC-ED 139-805.

2. The measures employed in the productivity studies were more sensitive to KP or R and D products than to KU or D and U activities. In the original study an effort was made to distinguish between KP and KU, e.g., journal publications were tracked in 13 research-oriented and 13 practitioner-oriented journals. No effort will be made in this paper to distinguish between KP and KU credits and the levels of productivity will simply be designated as R and D productivity. Readers interested in distinguishing between KP and KU are referred to the report mentioned in note one.

3. National Institute of Education, *1976 Databook: The Status of Education Research and Development in the United States* (Washington, D.C.: NIE, 1976) p. 44.

4. There is an overlap between university-based R and D centers, sometimes located within and sometimes without the SCDE, in crediting products to SCDEs and universities. Neither the NIE report nor the RITE study were able to distinguish credits between the SCDE and a university-based R and D center as, for example, was possible in crediting products to regional educational laboratories or non-academic research organizations. Even if such a distinction had been possible, it would have been confusing in its own right since in many instances there is shared staffing between the university and the center, and the federal government purportedly took the productivity level of the university and the SCDE into account in establishing the center at the institution.

5. *1976 Databook, op. cit.*, p. 38.

6. This was probably a conservative estimate. The *1976 Databook,* cited earlier, estimated that in FY '74 the funding of education R and D in colleges and universities by OE/NIE alone was $29 million (p. 39). Of this total the *Databook* noted that about 40 percent ($11.3 million) was allocated to university-based R and D centers. Assuming that approximately 50 to 60 percent of OE/NIE funding would accrue to SCDEs rather than other university departments or units, from $14.5 to $17.4 million would be credited to SCDEs without considering grants and contracts from other governmental agencies and private foundations.

7. *1976 Databook, op. cit.*, p. 41.

8. *Ibid.*, p. 40.

9. This is an abbreviated list of the contextual factors and conditions identified for SCDEs. Interested readers are referred to the RITE project report for a full discussion of this topic: Clark and Guba, *op. cit.*, pp. VII-1-VII-33.

10. *Administrative Science Quarterly,* Vol. 10, No. 1, June 1965.

11. Victor A. Thompson, "Bureaucracy and Innovation," *Administrative Science Quarterly* (Vol. 10, No. 1, June 1965) pp. 10-13.

QUESTIONS AND ANSWERS

Question: Did you find variation in productivity among disciplines within SCDEs?

Yes, of two types: one SCDE-based, the other discipline-based. In some SCDEs productivity by a single department or discipline area accounted for a large proportion of all the R and D productivity in that school. Unevenness across departments in R and D production was very common even in the R and D center SCDEs. And, as you might suspect, discipline areas stood out in the productivity studies. Educational research has long been dominated by psychology, and it was no surprise to find that departments of educational psychology were much more productive in R and D than such practitioner-oriented areas as educational administration, adult education, etc.

Question: Are you saying that from the standpoint of the sponsor, using your studies and measures of productivity, the yield from colleges and universities would be higher than from other domestic non-university agencies?

I would have to say that the data from the RITE study leave that question still up for debate. Productivity credits attributed to colleges and universities, for example, included products of the 12 university-based R and D centers being funded by OE/NIE in FY '75. What the sponsor is seeking through a grant or contract would have to be taken into account in answering the question. Most colleges and universities seem to eschew responses to highly specific RFPs. Regardless of their potential capacity to respond, sponsors would probably not receive a high yield from unenthusiastic bidders even if they were to attempt to obtain competitive bids from them. I think the RITE data affirm unequivocally that institutions of higher education in general and SCDEs in particular are significant, major contributors to the growth of the knowledge base in education. I think our field studies and institutional data demonstrate convincingly that sponsors are buying into ongoing research operations with local budgets for research when they contract with SCDEs. I do not think our data are convincing when comparative questions are raised. But I do think such data ought to be gathered with sufficient precision to assist sponsors in allocating funds for specific purposes to appropriate agencies.

Question: During the period of the RITE study, there's been a significant drop in funding R and D in colleges of education. Does that say something about the need to reassess the true indicators of productivity in educational R and D? Are the sponsors right, or is the educational tradition right?

The character of the educational R and D community in the U.S. has changed so much during the past decade that it is probably fair to say that neither the sponsors nor the tradition are "right." Roughly twenty years ago, SCDEs were, for all practical purposes, the only game in town in educational research. There were only two or three private research agencies with a major investment in educational research; no federally sponsored R and D centers or regional laboratories; little consideration of any role for local or state education agencies other than that of the consumer. No one would advocate returning to that narrow conception of an educational R and D community even it if were possible. As the population of the community, and the competition with SCDEs grew, it was inevitable that the percentage of funds invested by agencies in SCDEs would decline. My personal opinion is that the rate of decline has been too sharp. Neither SCDEs nor institutions of higher

education have had or currently have a "good press" in Washington. Funding agencies always have an inclination to invest in new agencies and new programs when they discover that extant programs and agencies don't produce miracles. I think the recent policy statement by the National Council of Educational Research on the support of basic research in education, and the increased interest exhibited by NIE in field initiated studies, are both a recognition that we have passed through a period of over-correction in moving away from the support of R and D in schools of education and colleges and universities. But there will never again be a time nor should there be, when 77 percent of the OE/NIE funding was in colleges and universities as was the case for OE in FY '65.

Question: Is the role of journals less significant than it once was given the development of information systems and other dissemination techniques, and given the emphasis placed by external funding agencies on the "D" portion of R and D? Are universities placing too much stress on "refereed journals" as *the* criterion for promotion and tenure? Aren't there other measures of peer review which universities could use to assess the productivity of faculty?

Surely the role of journals has diminished in importance as new information storage and retrieval techniques have developed. But this question is akin to question three. Journals are no longer the only game in town. They may be vitally important, but their relative importance among information sources has declined. Undoubtedly universities are laggard in adjusting to new forms of productivity and outlets for productivity by their faculty. Recall that RIE/ERIC was the one measure of productivity on which SCDEs showed up poorly. This is probably a good indication of the fact that faculty do not feel such credits will be considered seriously in the personnel reward system. My answer to the last two parts of your question would be "yes," but the evidence from the RITE study is that universities are unlikely to change their formal reward systems markedly in the foreseeable future in response to either development-type productivity or new outlets for products. This is a good example of a contextual feature of these organizations—it is an enduring feature difficult to modify.

Question: If you had the opportunity to conduct a follow-up study or re-do the original design, what additional impact data would (should) you have collected?

The question almost answers itself. We actually collected no impact data. With the resources available to us, we were restricted to an inventory of products, not the impact of the products. We have some indirect impact data about the research journal articles since those publications were tracked in core journals identified through an information science study as the journals most frequently cited by other journals. Impact measures of research contributions would surely take into account the frequency with which a particular study or report was cited in subsequent studies. But even here our measure is very gross since we were unable to pursue the question of citations on an article-by-article basis. We have no impact data on development products—one would have to turn to practitioners for this information. Originally we had intended to accumulate equivalent information on R and D and D and U activities, but our data on D and U are restricted to self-reports by SCDEs which are much less valid than our R and D measures. We need more precise productivity and impact data than are currently available for educational R and D, but such studies are time-consuming and expensive. I think we know how to do it, but do not know who will pay for it.

Question: Based on the results of your study, do you feel that R and D centers and regional laboratories should strive to publish more of the results of their work in professional journals?

Definitely! Journal publication apparently has not been part of the socialization of staff in these organizations. It should be. I realize that most grants and contracts do not pay directly for such publication efforts, and the day-to-day pressures in these units are to complete the final report and get on to the next project. But far too many substantial R and D contributions from labs and centers are relegated to fugitive document status. Researchers in education still use and rely upon professional journals in their work.

Question: In order for colleges and universities to survive in the R and D arena, do you see a requirement for them to become more nomothetic?

I think that adjustments will be made over the next few years by both institutions of higher education and funding agencies. Undoubtedly college and university faculties will attempt to compete for some R and D funds which they have ignored in the past as a result of diminished general fiscal support for institutions of higher education. To do this they will probably have to work out some competitive organizational structures and mechanisms which they have resisted in the past. However, as I indicated earlier, I think funding agencies will also increase their allocations to basic research programs and field initiated studies which fit well with the idiographic culture of institutions of higher education. I would argue strongly against a funding pattern for educational R and D which forced homogenization of the unique contextual features of producing agencies. R and D in education has benefited from the idiographic culture maintained by colleges and universities.