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ABSTRACT

Sixth and last in a monograph series on the use of computer technology in the instruction of learning disabled students, this paper analyzes the California Teacher Education and Computer Centers (TECC) program. Five themes influencing the TECC program are identified for discussion: staff development, teacher incentives, local policymaking authority, regional networking, and cooperative planning. Technology as a high-demand area for staff development in various computer skills areas and as a motivational device for staff development in other, more traditional areas is also discussed. Finally, the paper cites implications of the TECC program for the use of computers in schools. Appendices, which comprise the bulk of the document, consists of the Introduction and Executive Summary from the Report on the 1983-84 Evaluation of the Teacher Education and Computer Centers, published in 1985 by the California Department of Education, a transcript of the authorizing legislation for the TECC, and a paper on the TECC's organizational relationships. (JW)

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Promoting Use of Technology in the Schools:

An Organizational Analysis of California's Teacher Education and Computer Centers

Robert Rossi

David Rubin

Thomas Bakke

AMERICAN INSTITUTES FOR RESEARCH IN THE BEHAVIORAL SCIENCES
P.O. Box 1113 • 791 Arastradero Rd. • Palo Alto, Ca. 94302 • 415/493-3550

AMERICAN INSTITUTES FOR RESEARCH
IN THE BEHAVIORAL SCIENCES
P.O. Box 1113, 1791 Arastradero Rd., Palo Alto, Ca. 94302 ● 415/493-3550

CREATE Monograph Series

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I. ANALYSIS

What This Analysis Is Not

This paper is neither an evaluation report nor an endorsement for one approach to integrating technology into the school environment. Staff within the Program Evaluation and Research Division of the California State Department of Education have completed an evaluation of the state's Teacher Education and Computer Centers (TECC) program, and their final report is currently available.* Excerpts of this report are presented here in Appendices A-D. Because of the relative youth of the TECC program, much of the focus of the state evaluation was on processes and on immediate outcomes (e.g., extent of involvement of various constituencies in TECC planning at the regional and local levels, number of training hours provided by type of subject area). The recommendations that are made reflect this formative approach to program assessment, and most suggestions have to do with improving program performance given a "commendable beginning" and increased funding for the current fiscal year (approximately $5 million over the $6.6 million allocation for FY-1983-84). Clearly, it is premature to recommend the TECC program "model" to other states for adoption.

The extent of need for states to plan and carry out programs to increase the uses of technology in elementary and secondary schools cannot be ignored, however. Moreover, the organizational strategies of California's TECC program hold considerable promise for building the state-regional-local partnerships necessary for the success of such statewide initiatives. This analysis of the TECC program examines these strategies and, based on evaluation findings, raises issues for consideration by program planners in other states. The views expressed, while based on findings presented by the California State Department of Education, Program Evaluation and Research Division, are entirely our own.

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* Brandes, B., & Padia, W. Report on the 1983-84 evaluation of the teacher education and computer centers. Sacramento: California Department of Education, 1985.

Dominant TECC Themes

Five themes have influenced organization and operation of the TECC program in California:

- Staff Development
- Teacher Incentives
- Local Policymaking Authority
- Regional Networking
- Cooperative Planning

The overarching aim of the program is to increase capabilities of teachers, instructional aides, and administrators; the use of microcomputer technologies is one area of focus for staff development efforts, and has been the area most in demand. Making computer-related training part of a more inclusive staff development thrust may (1) highlight a wider variety of applications for computers in the classroom, (2) reduce initial anxieties associated with introductory computer-use classes, and (3) stimulate interest in a wider variety of capacity-building activities.

Staff development. The TECC program encompasses staff development efforts formerly conducted by the Federal Teacher Centers, the Professional Development and Program Improvement Centers, and the School Resource Centers. Although many other staff development programs for school personnel operate in California at the state and local levels (e.g., the Special Education Resource Network, the Bilingual Teacher Training Programs), TECC is the only statewide system providing staff development opportunities on a regional basis. The TECC mandate is broad, due both to the diverse objectives of its "parent" programs and to specific concerns in the state for upgrading the mathematics, science, and computer-use skills of teachers. Teaching teachers about computers has so far included awareness-level and beginning programming courses, with more advanced topics planned for future sessions. The use of computers in instruction is also a topic of interest, and the effective use of software for instruction is supported by a central software library and clearinghouse.

The inclusion of technology training within such a broad-based development program makes it possible to explore the full range of ways in which computers may serve the educational process. In addition to learning about how computers work and how software may be used to teach, teachers may learn about computer-based tools that can assist with classroom management and associated paperwork tasks. The collection and analysis by computer of needs assessment data may also be covered in course offerings, and the branching structures and response formats of educational software products may lead to greater awareness and discussion of differences in student learning styles. Reduced anxiety among first-time computer users is also likely to be a benefit of learning about technology in a staff/personal development context. In this context, it is easier to feel that "people come first," and that learning how to use computers is a way of extending one's abilities (e.g., by reducing the time required for performance of routine tasks). Finally, computer training, as part of staff development, may lead to greater interest in courses that do not involve direct use of computers. Science teachers, for example, may be motivated to learn more about test construction once they have understood the principles and procedures associated with computer-based testing.

Motivating interest in computer training, or in staff development generally, usually requires more than indirect encouragement, however. For the TECC program, teacher incentives ranging from educational credits to small project grants have been used with mixed-to-positive results. Notably, the awarding of project grants is closely tied to the capacity-building function of the TECC program.

Teacher incentives. Evaluators have suggested that the TECC program would be improved if a wider variety of incentives were made available to teachers on an individual basis. Educational credits, which teachers may use to qualify for higher salary classifications within their districts, have been tried, but their effect has been questionable. Many teachers earn these credits while working on advanced degrees, and others have already attained higher salary classifications through years of tenured service. With local budgets for teacher salaries as restricted as they usually are, the possibility of adding salary bonuses for computer-use skills to existing wage classifications seems doubtful at best. Clearly, other alternatives must be sought.

For example, release time with pay for staff development in areas relating to computer skills might stimulate greater interest among some teachers; for others, the promise of free software or of monetary rewards for ideas or prototypes for new educational software products might encourage greater development efforts. These and other ideas for individual incentives will be important elements in future planning for staff development activities. For the TECC program, they would effectively complement the ambitious school-based incentives plan placed under program control by the State Department of Education in the 1982-83 school year.

As described more fully in Appendix B, 1983-84 TECC funding for local-school project grants was $3.3 million, with more than 600 schools receiving an average award of $5,273. Seventy-seven percent of these grants were in the computer skills area, and TECC program staff and evaluators report enthusiastic local-level support for the grants competition. Beyond the material support they provide for specific projects, these grants are tangible investments in staff development at the school level. Grantees receive recognition, they are encouraged to share the plans and findings of their projects, and their schools become demonstration sites for neighboring districts. Through the operation of this school-level grants competition, the TECC program has begun development of a "training-of-trainers" strategy for increasing computer-use skills among teachers. In a somewhat similar sense, State Department of Education investment of TECC program control in local-school authorities might have been aimed at developing a stronger, school-based constituency for improving school uses of technology.

Local policymaking authority. TECC program sites are located within general attendance areas of California State University campuses, thereby establishing the potential for close communication between teacher education programs within these colleges and the staff development activities of TECC. This was by design, and in addition to nearby location, TECC policy boards were mandated to include at least one representative from these colleges. More important from the policymaking perspective, however, location of TECC sites in areas not necessarily contiguous with existing LEA designations has provided county school superintendents with considerable discretion in locating administrative responsibilities for the TECC program. Where more than a

single county holds jurisdictional authority over the geographical area to be served by a TECC site, the superintendents have even greater flexibility; they may establish multicounty executive boards to review and resolve TECC program issues. Obviously, the administrative decisions made by these local school officials have profound impacts on the composition and functioning of the TECC policy boards, on the selection of the person to be designated as TECC director at a site, on the relative amounts of funds to be used in support of various development activities, and on the types of programs a site will offer. Because TECC programs are new, policy-boards and LEA and county administrative units have only begun to clarify their respective governance roles (see the discussion in Appendix D).

Whatever the administrative location of the TECC policy board within a service area, teachers constitute the majority of board representation. This too is by design, since it is assumed that teachers are in, perhaps, the best positions to understand (1) the nature of staff development needs at their schools and (2) the practical constraints (e.g., required travel time, conflicting demands of classroom responsibilities) that may militate against active participation in staff development activities. The involvement of teachers from schools throughout the service area, together with the mandated policy board participation of higher education and private sector representatives, makes for an interesting counterweight to the decisionmaking authorities and review responsibilities of school and county administrators. This "built-in tension" makes the planning, management, and political skills of TECC site directors especially important; for local policymaking authority to be perceived as both positive and efficient by the State Department of Education and by the legislature, TECC directors must be able to resolve disputes locally and present the clearest possible signs that local constituents in the program are all pulling together. Ineffective TECC direction at the local level, which might be the result of too close an identification with one or another local constituent group (e.g., teachers versus administrators), could lead to internal bickering and the perception that mandated changes in program structure are necessary.

Regional networking. With effective direction, provided locally by the TECC director and the TECC policy board, and supportive administration, pro-

vided by local, county, and state-level officials, all participants in the TECC program stand to benefit. TECC directors may learn from one another, sharing ideas for programs and strategies for increasing participation. Already there have been formal meetings of these directors, and program evaluators suggest that they continue (see Appendix D). Policy board members may also learn from their counterparts in other regions, finding constructive ways to work with the private sector and improving their planning and program management abilities. Local and county administrators will be able to cite "one more successful program" operating under their jurisdiction, and their direct support may assist in building closer working relationships with local school staffs. Finally, state-level administrators will have developed an effective regional network for educational staff development, one that allows the best program elements to be shared and one that bears accountability to a broader jurisdictional frame of reference than the local or individual county school district. Clearly, the "regionalization" of the TECC program is an important part of its sustenance and value statewide.

The establishment of such a regional network for staff development is particularly important in the areas of computer awareness and computer skills training. In these technical areas, "go-it-alone approaches" are likely to encounter problems due to shortages of qualified trainers, shortages of equipment, and inexperience in preparing for the anxieties, lack of knowledge, and skepticism of program participants, most of whom have no idea how computers work or how they might provide classroom assistance. Sharing information wit program staff, advisors, and administrators in other regions can go far in reducing the incidence of these problems. Skilled personnel and equipment might be shared, for example, and course outlines and evaluation reports of course effectiveness would aid greatly in local TECC program planning. Regionalization is also one step toward broadening the talent base; resource teachers in areas related to computers may be linked to staff development courses in other locations and to computer needs at individual schools by statewide conferences or by electronic mail systems serving more than one TEC site.

The success of regional networking, however, depends on how well the TECC program remains free of perceived State Department of Education control.

The possible reticence of local and county school administrators to share authority with teachers would hardly be comparable to the more active protests that might be associated with perceived state efforts to usurp traditional local staff development initiatives. The key to preserving this delicate balance between local and state authority may well be to engage in a more expansive version of what has been termed in other contexts "cooperative planning."

Cooperative planning. Typically, cooperative planning refers to a mode of joint program design and operation that involves several different agencies at one administrative level. The efforts of TECC policy boards, for example, constitute one form of cooperative planning; teachers from different schools and grade levels, professors from institutions of higher education, and representatives from businesses and industries meet on a regular basis, discuss, and formulate unified plans for providing staff development. "Vertical" cooperation in planning, involving local and state-level jurisdictions, is more often referred to as "top-down" or "bottom-up" planning, to indicate the direction from which plans or planning requirements are expected to flow. In these cases, a state-level authority may either provide the plan according to which local jurisdictions will operate, or expect that the plans submitted by various local-level jurisdictions will be integrated into a statewide plan for service delivery. For the TECC program, it is unlikely that top-down planning would work, and bottom-up planning, without strong program regionalization already in place, might produce more disparity and inefficient redundancy than can be tolerated. The solution may call for a vertical form of cooperative planning.

In its initial years of operation, TECC sites had the benefit of consultation provided within their service areas by state-level staff. More recently, however, these consultants have curtailed their visits so as to avoid being caught in the middle between local program operators and the State Department of Education. The State Department of Education has also been reluctant to become heavily involved in TECC operations due to possible misperceptions regarding program control. The issue of what the state department might do for local TECC sites to support constructive working

relations, however, is only one-half of the issue to be spelled out. How the state department will provide these services, that is, in what organizational capacity, must also be clarified. Re-sending of state consultants, even with new designated functions, will not make them feel any more welcome nor strengthen the organi- zational relationship between the State Department of Education and the local policy boards. What might be more successful is an arrangement where selected state department consultants, in mathematics, science, and computer skills, are allowed to serve on the TECC policy boards, either as voting or as non- voting members. Much like the representatives of private industry and higher education, these state policy board members would have their board roles defined within the group process--there would be no top-down pronouncement or imposed uncertainty as to what their proper roles should be. Instead, these state board members would take on responsibilities they best can meet (e.g., coordinating information resources with the state department to meet local information needs), with the assurance that their taking on of these responsibilities meets with the consent and expectation of the local policy board. From the state perspective, the admission of these consultants to the local boards would effectively underscore the regional nature of the TECC program and serve to reinforce the cooperative authority over TECC program operations.

Role(s) of Technology in TECC

Staff development is the central focus of TECC program operations, and technology enters importantly into the staff development plans of the local TECC policy boards in two ways--as a high-demand area for staff development and as a "hook" for staff development in other areas.

High-demand area for staff development. There is no doubt that the explosion in uses of microcomputer technologies in schools, homes, and businesses has created a vacuum in the numbers of qualified computer users. Teachers with well-developed computer skills may find job offers from private industry too attractive to pass up; the teachers who are left to teach children and youth these skills will need to know how to use and maintain different types of equipment, to select and possibly write programs to enhance

software with educational promise, and to integrate the use of this software into existing course curricula. For many teachers, these abilities will have to be learned for the first time, and for others, these abilities will stretch to the limits what they already know. With these obvious needs for a continuing program of staff development, TECC sites have offered more courses and training sessions in computer skills areas than in any other areas to date. The present and future challenges for TECC sites are to advance beyond computer awareness and elementary programming classes to topics concerned with the selection and use of hardware and software products.

A "hook" for staff development in other areas. As TECC policy boards look to the future and to the steady demands for introductory and intermediate computer-skills courses, they are not losing sight of the needs for staff development training in other, more traditional areas (e.g., student needs assessments). In fact, the availability of technology courses is one of the motivational devices (i.e., "hooks") these boards can count on to increase enrollments in TECC-sponsored mathematics, science, and student management programs. Technology courses are hooks in two ways: (1) they bring TECC offerings generally to the attention of a greater number of teachers, and (2) they introduce teachers to new and more powerful ways of teaching traditional subjects and managing routine classroom chores. Brochures and TECC course bulletins are likely to turn up in a greater number of teacher lounges because of the featured availability of computer-related courses; teachers enrolling in courses to learn what computers can do may be shown excerpts of science-related courseware, promoting increased interest in learning about such products and in how they might be used to more effectively teach specific science topics. Similarly, teachers may see new hardware configurations (e.g., interactive videodisc systems) in TECC awareness classes, be motivated to explore ways in which such systems might be used to teach other subjects, and then enroll in a class covering one of these subjects to carry the exploration further.

The fact that computer-skills offerings are likely to encourage interest in more traditional staff development areas should not be overrated, however. In truth, it may be only a temporary phenomenon, resulting from the present lack of experience of professional educators with computers and software

products. It is more likely that, as experience with new technologies grows, the dividing lines between computer-skills training and subject matter or classroom management training will dissolve. Science classes for teachers will, as a matter of course, include a review of the latest software products available to bolster classroom presentations. And courses on student needs assessments will review how computer-based testing can reduce the time requirement for data collection while increasing the diagnostic power of the data that are gathered.

Implications for School Use of Computers

California's Teacher Education and Computer Centers (TECC) program offers a model for technology training to other states that has considerable promise. Within the state, the TECC program has several implications for the uses of computers in schools.

Helping to overcome anxieties. By incorporating computer-skills training within the broader context of staff development, the TECC program emphasizes that its primary commitment is to help teachers be more effective. Computers are thereby defined as one more set of powerful tools to assist the educational process. We believe that this approach, in concept and in practice from a policy point of view, is most promising for overcoming individual fears of new technologies, fears that might otherwise slow the use of these technologies in classroom settings. As a result of this orientation of the TECC program and of its use of a training-trainers strategy for local capacity-building, we think that the lessening of anxiety concerning computers in classrooms will extend to the building level, promoting easier acquisition of hardware and software products for use in instruction.

What about math and science? By using computer-related courses as "hooks" to promote greater teacher involvement in staff development activities, the TECC program makes it easier for teachers to see the promise of new technologies for traditional subject areas. As experience with these technologies grows, this approach will lead teachers to regard computer hardware and software products from the standpoint of their instructional potential. We believe that this is the way such products must be evaluated if they are to

truly serve educational needs. Moreover, we feel that the integration of computer-related topics into classes covering traditional subject areas, such as mathematics and science, is the best way for TECC to meet its mandated requirements in these areas.

Getting parents involved. The formation of local policy boards, the encouragement of regional networking, and the concern for strengthening state department, county office, and local school working relations, are perhaps the most exciting aspects of the TECC program. We find it difficult to understand, however, why parents were not designated as important candidates for the local policy boards. Computer technologies are as commonplace in the home as in the school, and many parents have computer-related skills that would meaningfully assist school-oriented deliberations. There are many precedents for mandating the participation of parents on local school advisory boards, and we feel that TECC program supervisors should move speedily to review current policies in this area.

APPENDIX A: Title Page and Introduction to the California Teacher Education and Computer Centers

(Brandes, B., & Padia, W. Report on the 1983-84 evaluation of the teacher education and computer centers. Sacramento: California Department of Education, 1985, pp. 1-12.)

REPORT ON THE 1983-84 EVALUATION OF THE

TEACHER EDUCATION AND COMPUTER CENTERS

Prepared by:

Barbara Brandes
William Padia

PROGRAM EVALUATION AND RESEARCH DIVISION

This legislative report, which was prepared by the Program Evaluation and Research Division, California State Department of Education, was published by the Department, 721 Capitol Mall, Sacramento, CA 95814-4785. Any questions regarding the report should be addressed to Barbara Brandes or William Padia in the Program Evaluation and Research Division (phone: [916] 445-0297). The report was distributed under the provisions of the Library Distribution Act and *Government Code* Section 11096.

1985

Education Code Section Requiring This Report

44680.07. The Superintendent of Public Instruction shall do all of the following:

(a) Designate the regions within the state to be served by teacher education and computer centers with the advice of the county superintendents of schools.

(b) Approve the plans of each center for staff development.

(c) Coordinate and facilitate communication among the centers by, among other things, making exemplary program models available to all centers.

(d) Authorize the allocation of funds to centers based on the approved plans. Funds appropriated or apportioned for purposes of this article in any fiscal year, may be expended in subsequent fiscal years.

(e) Report, by April 15 of each year, to the State Board of Education, the Legislature, and the Governor as to the effectiveness of the centers in providing, and assisting in, staff development.

(f) Provide for an educational software library and clearinghouse to assist the centers with software evaluation.

(g) Authorize centers to receive federal funding for any of their functions.

(Added by Stats. 1983, Ch. 498. Effective July 28, 1983. See note following Section 1296.)

I. INTRODUCTION

Authorization of 15 Teacher Education and Computer Centers[1] (TEC Centers, or TECCs) to provide staff development services to teachers and administrators on a regional basis was codified in the Hughes-Hart Educational Reform and Finance Act of 1983 (SB 813, Chapter 498, Statutes of 1983). The TEC Centers are charged with providing staff development resources in all areas of the curriculum, in instructional use of computers, and in instructional methodology and with providing technical assistance to support school-based staff development programs. (See Appendix A for the statutory language.)

The Mission of the TEC Centers

The TEC Centers were created as part of former Governor Jerry Brown's Investment in People Program and were originally established and funded in the Budget Act of 1982-83. Reflecting the focus of the Investment in People Program, the Budget Act required that two-thirds of local TECC funding support improved mathematics and science education. The codified authorization of the TEC Centers in SB 813 removed the stipulation of a specific amount or portion of TECC funds for mathematics and science staff development but retained an emphasis on staff development resources in "mathematics, science, technology, and other curriculum areas for which there are significant shortages of qualified, certificated teachers." In addition to math, science, and computer education, the TEC Centers are charged with providing staff development for teachers and administrators across the curriculum, including reading, writing, humanities, and the arts.

[1] SB 813 authorized "15 or more" TEC Centers to be established so as "to provide staff development resources to all parts of the state." An initial decision was made to establish 19 centers. However, the original 19 TEC Centers were consolidated into 15 by the incorporation of 4 L.A. County TEC Centers into 1.

The emphasis on computer education is integral to the TECC mission. The Investment in People initiative made a strong case for upgrading the computer use skills of California students since future life-styles will be heavily influenced by the computer. Computer literacy training for both teachers and students was identified as a way to meet this need.

The reference to the problem of teacher shortages in certain areas of the curriculum conveys a legislative intent that, in addition to providing resources for professional development, the TEC Centers should also be engaged in retraining of teachers to help solve the problem of teacher shortages in areas such as math and science. This retraining component of the TECC mission requires staff development resources that are much more intensive than those needed to promote professional development of teachers in areas in which they are already qualified.

Each TEC Center was made responsible for the staff development functions formerly addressed by the Professional Development and Program Improvement Centers and the School Resource Centers. These functions include training in elements of effective instruction and provision of resources to build school site capacities for self-sustaining staff development.

The teaching methodology TEC Center function is a major carry-over service from activities of the Professional Development and Program Improvement Centers. Research on instructional strategies associated with improved student achievement is used to design training for teachers in motivation and learning theory, specific strategies for diagnosing student learning needs, prescription of appropriate learning basics, and reinforcing, monitoring, and adjusting of student progress. Central to the TEC Centers' delivery of instructional methodology training is the training-of-trainers concept, whereby trainees later become trainers themselves and provide classroom follow-up to other teachers.

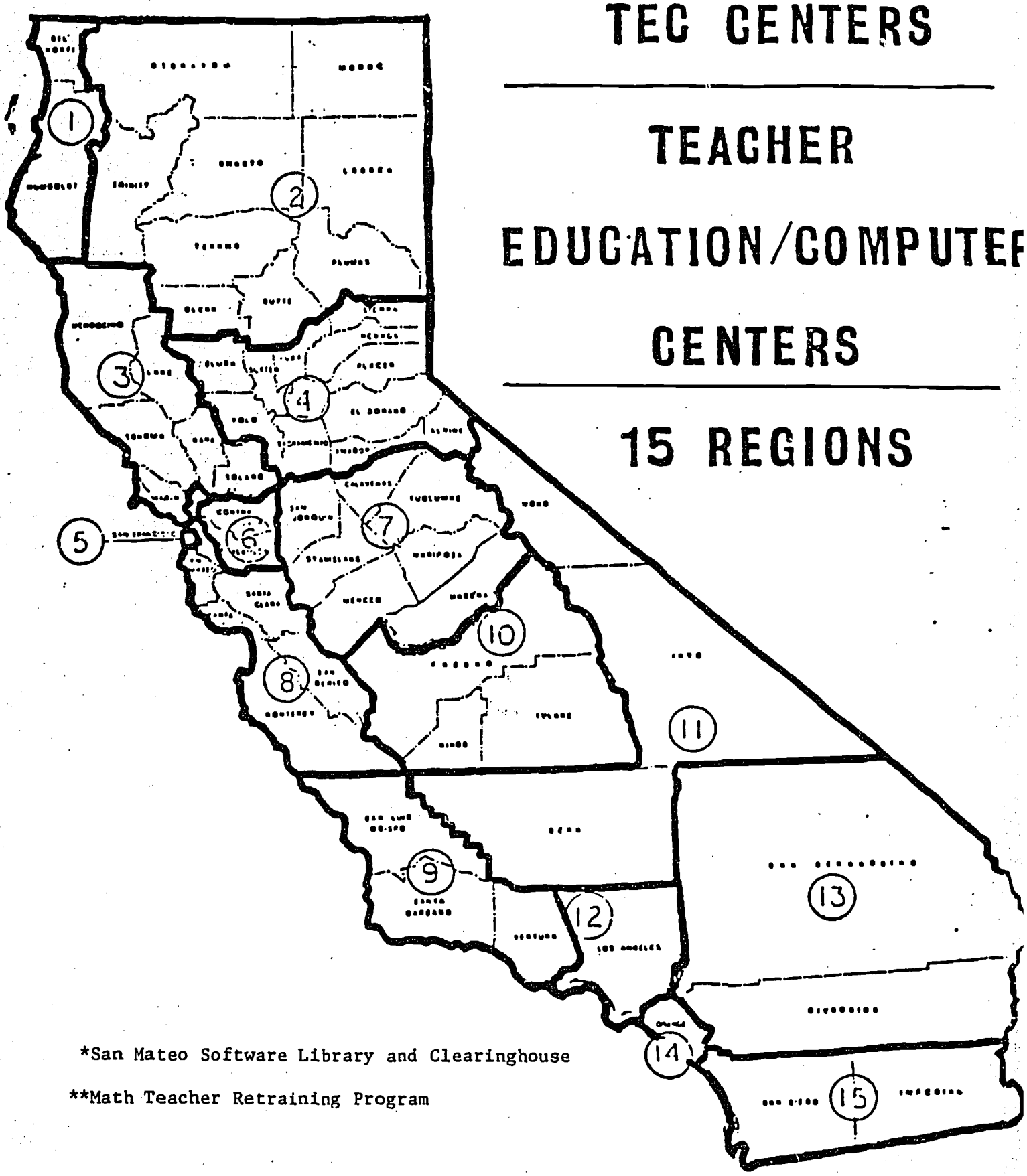
Another aspect of the TECC mission is the integration of the direct training function with a capacity-building function. The TEC Centers must be responsive not only to short-term staff development needs by making appropriate training resources available but also to the long-term need to empower local staff to plan and conduct their own staff development programs. During the past year, the TEC Centers assumed responsibility for the administration of AB 551 programs, the major goal of which is to provide small grants to schools for their own staff development activities. The capacity-building functions of the TEC Centers as set forth in SB 813 include the following:

- Assessment of school staff development needs;
- Development of school staff development plans;
- Cost-effective use of existing resources;
- Evaluation of local programs;
- Awarding of staff development program grants pursuant to Article 1 of AB 551 and evaluation of their use.

The goal of creating partnerships between the TEC Centers and other staff development providers, institutions of higher education (IHEs), and with the private sector is another important part of the TECC mission. SB 813 stipulates that local TEC Center governing boards (policy boards) have at least one representative from IHEs and from business and industry.

In-service training for elementary and secondary teachers has historically been provided though individual enrollment in postsecondary courses in IHEs. Connections to the teaching process and sustained relationships for improved instruction were presumed but rarely played out. The TEC Centers were encouraged from their inception to develop closer cooperative relationships with IHEs. The TEC Centers were located to reflect the general attendance areas of The California State University system (see Figure 1.1).

Figure 1.1--TEC CENTER SITES



*San Mateo Software Library and Clearinghouse

**Math Teacher Retraining Program

The TEC Centers were also encouraged to identify and procure resources--both financial and instructional--from business and industry. Because the private sector is considerably more sophisticated in computer technology and richer in resources than the educational community, the TEC Centers were encouraged to identify and pursue private sector resources.

While the TECC mission is broad and complex, the overall intent is to provide some coherence in the content and delivery of staff development while at the same time allowing for considerable regional flexibility. Decision-making authority over each TEC Center is shared by regional policy boards and executive boards, but the legislation also gives the State Department of Education (SDE) a strong overall leadership role in the TECC program. Each TEC Center is given the charge of coordinating a major portion of all staff development activities within each region and particularly to mobilize and coordinate staff development resources and activities in colleges and universities and in business and industry.

Historical and Current Context of the TEC Centers

A variety of staff development programs have operated concurrently in California over the past 10 to 15 years. Falling under the general rubric of teacher assistance centers, Federal Teacher Centers, School Resource Centers, and Professional Development and Program Improvement Centers have provided a setting and context for teachers and schools to have access to resources, receive training, and build school site capacity for their staff development activities.

Federal Teacher Centers were originally funded under federal legislation (PL 94-842/1976) and subsequently folded into the block grant (Chapter 2 of the Education Consolidation and Improvement Act). In California, seven centers were funded for the 1983-84 school year. The starting point of Federal Teacher

Center staff development activities is teacher needs, rather than training packages or curriculum implementation efforts. Teachers are both clients and providers of training, and the agencies broker other staff development services which they cannot provide themselves.

School Resource Centers, funded under state legislation (Article 2 of AB 551/1977), assisted school personnel with staff development activities designed to improve the instructional process, human development, and counseling skills. Like the Federal Teacher Centers, a collaborative governance structure was adopted to meet general center objectives to assist schools in planning, implementing, and evaluating local staff development programs (initially in Article 1 schools). School Resource Centers helped schools with needs assessment, curriculum, and training of trainers and leadership training in an effort to promote and improve school site staff development activities.

Professional Development and Program Improvement Centers (PDPICs), also funded under state legislation (AB 4151/1968 and AB 920/1974), were designed specifically to strengthen the instructional techniques of classroom teachers. Initially, they served grades K-8 and were later extended to K-12. Operating with the assistance of advisory boards, these centers served teachers, aides, and administrators with teaching and instructional improvement programs in reading and mathematics. Diagnostic and prescriptive instruction, clinical supervision, follow-up, and administrative involvement were key features of the approach.

The TECC initiative was intended to incorporate these earlier programs into a single statewide system for providing staff development on a regional basis. The dominant focus of each approach was folded into the new initiative, and new agencies were built in areas where none existed before. The character of each TEC Center builds on and reflects the staff development legacy within

the region. While most regions historically had been served by some form of staff development center, several regions had not had such agencies; thus, their configuration represents a wholly new organization.

Although the TEC Centers now have a great deal of visibility as well as a very significant role in providing staff development to school personnel, there are a variety of other major statewide staff development programs and many local programs operated at the county, district, and school levels. To keep the TECC effort in perspective, it is instructive to note that TECC staff housed in county offices of education are often greatly outnumbered within their own county offices by other staff development providers with other responsibilities. Major statewide staff development programs other than the TEC Centers include the Special Education Resource Network (SERN), the Bilingual Teacher Training Programs, and the Centers for Educational Improvement Network. Each of these agencies has responsibilities that are relatively distinct from those of the TECC program.

Organization and Governance of the TEC Centers

The TEC Centers are located to reflect the general attendance areas of The California State University campuses, which results in a geographically diverse network spanning county lines. Profiles of the 15 TEC Centers portraying their diversity are shown in Table 1.1. Figure 1.2 depicts the approximate number of teachers within each TECC region. County superintendents in each designated TECC region select one of their county offices as the local education agency (LEA) to house the TECC operations. In regions where there are multiple county offices, the superintendents have the option of establishing an executive board to serve as a forum for resolving problems and reviewing policy issues.

TEC Centers are governed by policy boards, composed of a majority of teachers. Policy boards work with TECC staff to set service priorities and

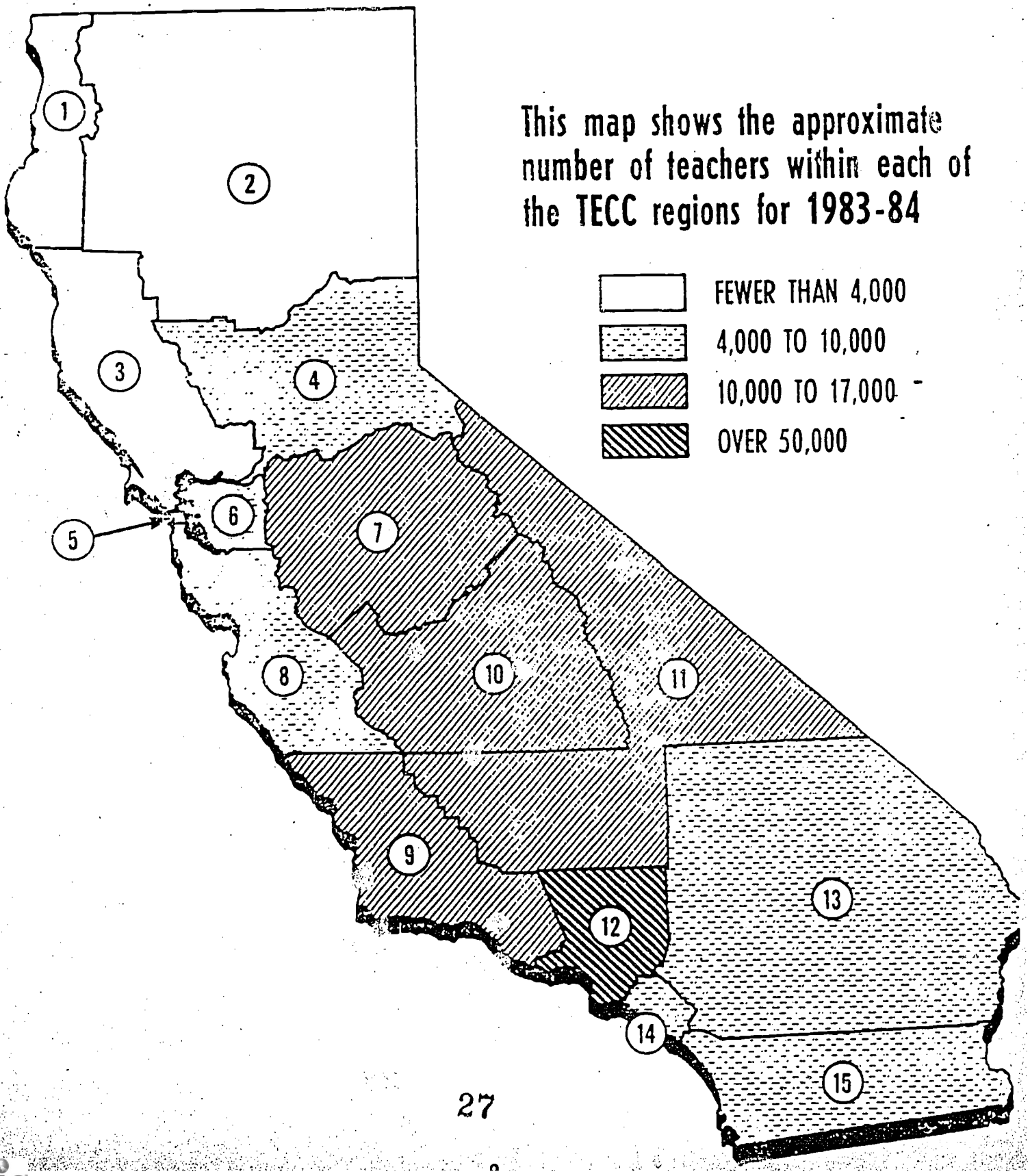
Table 1.1

Profiles of the 15 TEC Centers

TECC county region/LEAs	Number of professional staff (in FTE)	General fund support for 1983-84	Number of counties	Number of teachers (approximate)
1. Humboldt	2.80	$ 227,845	2	1,025
2. Tehama	4.10	331,325	9	3,824
3. Marin	3.00	315,576	6	7,465
4. Sacramento	3.80	332,544	11	10,565
5. San Francisco	2.50	228,046	1	2,580
6. Alameda	3.05	323,279	2	12,257
7. Stanislaus	2.00	312,770	7	8,173
8. Santa Clara	3.00	378,833	5	16,985
9. Ventura	5.58	298,497	3	7,260
10. Kings	4.40	313,475	3	8,019
11. Kern	4.00	308,068	3	4,046
12. Los Angeles	14.40	1,516,642	1	50,925
13. Riverside	4.00	413,578	2	12,769
14. Orange	4.50	352,186	1	13,721
15. San Diego	4.00	390,968	2	14,144

Figure 1.2

APPROXIMATE NUMBER OF TEACHERS IN EACH TECC REGION, 1983-84



coordinate with LEAs to oversee TECC functions. Policy boards also have the responsibility, with the concurrence of the county office of education acting as the LEA, to adopt a center budget and plan and to select center staff.

The Superintendent of Public Instruction has final authority for the TEC Center program. Responsibilities of the Superintendent and the SDE include designation of the TECC regions, with the advice of county superintendents; approving center plans and authorizing allocation of funds to the centers; facilitating communication among the centers; and evaluating the effectiveness of the centers. The SDE has assigned consultants to assist TEC Center personnel and members of policy boards and executive boards. The Superintendent also has the authority to set aside money from the total TECC allocation to fund exemplary projects and support services.

TEC Center funding is based on an average daily attendance (a.d.a.) formula and for 1983-84 included a basic operating budget ($205,000) and regional geographic adjustments based on the percent of total state water and land mass within each region. The purpose of the geographic adjustments is to give consideration to variation in travel costs. The 1983-84 statewide budget for the TECC program was $6.68 million. Of this total, $6.04 million was allocated to the centers. The remainder was reserved to support a software clearinghouse and a math retraining project.

Staff Development Services of the TEC Centers

Staff development services of the TEC Centers cover three major areas:

- Training for classroom teachers and school staff
- Technical assistance to support school-based staff development programs
- Instructional use of computers

The training function of the TEC Centers includes both content (i.e., curriculum) and methodology (i.e., pedagogy). SB 813 stipulates that TECC training should include:

- Activities to promote the principal's ability to support instructional improvement and the teacher's ability to diagnose learning needs
- The development of program content
- The use of multiple instructional approaches
- The use of student assessment data

In the area of assistance to support local staff development programs, the TEC Centers are responsible for awarding and overseeing AB 551 grants to schools within their regions. Technical assistance is also provided for other site-based staff development programs, including school improvement, categorical programs, and district-developed activities. A central goal of these activities is to empower local staff to provide their own training and renewal programs on an ongoing basis. This objective is pursued through direct and referral services to other agencies and consulting services to assist individual school staffs to plan, implement, and evaluate their own programs of staff development.

Each TEC Center was charged with providing a computer demonstration center to support the acquisition of computing skills by teachers and administrators. School staff are trained in:

- Use of computers as teaching aids
- Criteria for school acquisition and use of computer equipment and software
- The evaluation of computer-related materials
- Methods of integrating the use of computers into the routine activities of the classroom

To support TECC computer demonstration center activities, $127,200 was set aside from the total TECC budget for 1983-84 for the San Mateo Software Library and Clearinghouse to provide support to the TEC Centers. TECC staffs are trained in software evaluation, establishment of software evaluation training programs, and methods of integrating software into classroom instruction.

An additional $508,800 was set aside from the TECC budget for 1983-84 to support a math and science teacher retraining project to be coordinated out of Los Angeles County. This project coordinates college and university content training with TECC instructional methodology to facilitate retraining of math and science teachers.

Contents of the Report

This report presents the evaluation of the effectiveness of the TEC Centers, as required in SB 813, for 1983-84. Chapter II presents the methodology of the study, including evaluation issues and questions, the study design, and the instruments and procedures used. Chapter III summarizes the major findings and implications, including suggestions for support and resources needed to meet challenges.

APPENDIX B: Executive Summary, Evaluation of the Teacher Education and Computer Centers 1983-84

(Brandes, B. & Padia, W. Report on the 1983-84 evaluation of the teacher education and computer centers. Sacramento: California Department of Education, 1985, pp. v-xiv.)

EXECUTIVE SUMMARY

Authorization for 15 Teacher Education and Computer Centers (TEC Centers, or TECCs) to provide staff development services to teachers and administrators on a regional basis was codified in the Hughes-Hart Educational Reform and Finance Act of 1983 (SB 813, Chapter 498, Statutes of 1983). The TEC Centers were previously established and funded in the Budget Act of 1982. They are charged with providing staff development resources in all areas of the curriculum, but especially in mathematics, science, technology, and other curriculum areas for which there are significant shortages of qualified, certificated teachers.

The TEC Centers incorporated the staff development functions formerly addressed by the Professional Development and Program Improvement Centers and the School Resource Centers to provide training in elements of effective instruction and to provide resources to build school site capacities for self-sustaining staff development. In addition, each TEC Center was charged with design and implementation of a computer demonstration center to support the acquisition of computing skills by teachers and students. A Software Clearinghouse and a teacher retraining project were also established to provide support for TEC Center activities.

Purpose of the Report

Education Code Section 44680.07 requires an annual evaluation of "the effectiveness of the centers in providing, and assisting in, staff development." This report describes the major accomplishments and challenges of the TEC Centers at this time and suggests the types of additional support and resources that are needed for the centers to meet the challenges. Primary audiences for

the evaluation are the State Board of Education, the Legislature, the Governor, the Superintendent of Public Instruction and the State Department of Education (SDE), and the TEC Centers. SB 813 assigns responsibility for the annual evaluation of the TEC Centers to the Superintendent. This evaluation was conducted by a team from the Special Studies and Evaluation Reports unit in the Program Evaluation and Research Division.

Major Findings and Implications

Total TEC Center Training, 1983-84

During the year, the TEC Centers offered a total of 2,466 courses, representing a total of 28,711 training hours. There were 68,726 participants in this training. The greatest portion of TECC training activity (nearly two-thirds) was devoted to computer use. The area of instruction, or teaching methodology, accounted for the next largest portion (about 18 percent) of total TECC training activity in terms of number of training hours. In contrast, the curriculum area accounted for approximately 10 percent of total training time.

There was considerable variation among the 15 TEC Centers in the level of effort devoted to each training area. For example, one center provided all of its training in the computer area, stating that curriculum and instruction were adequately covered by other staff development providers, especially in the county offices. Two other centers provided more training in instruction than in any other area. And one center divided its training activity approximately evenly among the areas of curriculum, instruction, and computer use.

Computer Training

The TEC Centers provide instruction in computer technology, including training in computer awareness, use of hardware and software, classroom

applications, and programming. During 1983-84 the TEC Centers statewide conducted 1,612 computer training sessions representing a total of 18,100 training hours. There were 43,918 participants in these training activities. Of the computer training workshops offered, 87 percent were at an introductory, or awareness, level; 11 percent were at a comprehensive, or advanced level; and 2 percent were training of trainers courses.

There is no doubt that the TEC Centers have scored a major accomplishment in that they have made great progress toward bringing computer awareness and skills to California teachers. As the showcase for computer activity in California education, the TEC Centers should continue to be state of the art in hardware, software, and training. In order to remain at the forefront in technology training, the TEC Centers should no longer conduct awareness training as their predominant offering in the computer area. The development of a strategic plan for TEC Center involvement in technology would be the beginning of a process to sift out the priorities in the computer area and to balance these with other staff development priorities.

Instruction, or Teaching Methodology, Training

Training in instruction, or teaching methodology, includes pedagogy, instructional techniques, learning styles, and classroom management. The TEC Centers reported offering a total of 295 courses in instructional methodology during the year. These courses included 5,111 training hours for 8,712 participants.

Training in instruction tends to be more intensive in terms of training time than training offered in other areas. The average number of hours per course was 17.3 for instruction, 11.2 for computer use, and 9.7 for curriculum.

Math and Science

One of the most striking findings is the relatively low level of activity in math and science training, not only from TEC Centers but from other education agencies as well.

Between February 1983 and February 1984, the TEC Centers conducted an average of 8.5 math training workshops representing an average of 130 total hours of math training. The median number of individuals participating in math training at each center was 140. During the same period of time, the TEC Centers conducted an average of six science workshops representing an average of 27 total hours of science training. The median number of individuals participating in science training at each center was 84.

These numbers are in contrast to the large number of sessions in the computer area. Center directors' estimates of math training as a percentage of total trainings hovered around 5 percent to 10 percent; in science, the figure was closer to 5 percent, or less. TEC Center directors feel that more staff development in both math and science is needed. In response to a mail survey, 11 out of 14 directors said that there is a need for their centers to provide more math staff development than is currently offered. All 14 directors responding to the survey said that there is a need for their centers to provide more science staff development.

The reasons why the TEC Centers are providing less math and science staff development than is needed include lack of client demand, higher priority in other areas (especially computers), lack of qualified trainers, lack of resources, and insufficient time to develop a plan for math and science staff development. While it is understandable that the TEC Centers have not done more, there is an expectation that they will begin to make a significant

contribution to the overwhelming staff development needs in curriculum, especially math and science.

AB 551 School Staff Development Programs

During 1982-83 the TEC Centers assumed responsibility for administering AB 551 programs, including providing training and assistance in proposal writing, selecting grant recipients, and coordinating local projects. Management of AB 551 programs was previously the responsibility of the SDE. The total allocation for AB 551 during 1983-84 was $3,353,902. The average grant amount was $5,273. Grants were received by a total of 636 schools, of which 179 were elementary and 457 were secondary schools. Most (77.5 percent) AB 551 programs are currently devoted to computer staff development.

In our interviews with TECC staff, we found overwhelming acclamation for the AB 551 program. This expression of support for AB 551 was especially noteworthy from those TECC directors who conceded that they devote relatively little staff time to AB 551. It is currently one of the few incentive programs for staff development at the site level, and it is structured to capture much of the essence of good staff development. Several TEC Centers have established other grant programs modeled in part after AB 551.

Staff Development Strategies and Delivery Models

Staff development services provided by the TEC Centers include direct training and capacity-building services in support of site-based staff development programs. At the present time, a majority (79 percent) of TECC training is offered at an introductory, or awareness, level. Approximately one-half (51 percent) of all TECC training consists of a single session. TECC staff are caught between the pressure to do many things at a relatively superficial level, on the one hand, and a recognition that the only way they can have a major impact is by leveraging their influence in various ways, on the other. Most

centers have already conducted (or plan to conduct in the near future) some type of training-of-trainers activity; and there seems to be a consensus among the directors that this will be a major thrust of future TECC activity. In the long term, the centers will have to rely on trainer cadres and other leveraging activities to meet the needs within their regions.

While a few centers are exemplary in attempting to direct a large portion of their resources toward empowering schools and districts to conduct their own staff development programs, capacity-building is the type of service most in need of augmentation by the TEC Centers overall. From the perspective of a regional staff development network, such as the TEC Centers, the optimal strategy--both in terms of impact and of resource management--is to assist schools and districts in developing staff development plans and linking them to the resources needed to carry out those plans, with the major impetus for staff development coming from the local agencies. For the TEC Centers to exert an optimal influence on school personnel, there must be a corresponding local commitment to staff development.

Organizational Relationships Involving the TEC Centers

The TEC Centers have a complex organizational and governance structure, with various leadership roles and lines of authority shared by regional policy boards and executive boards, local education agencies (i.e., county offices of education designated to administer TEC Center budgets), and the Superintendent of Public Instruction. SB 813 also conveys a legislative intent that the TEC Centers will constitute a statewide staff development network and that within their own regions individual TEC Centers will take an active role in developing partnerships with other staff development providers, institutions of higher education (IHEs), and business and industry.

Most of the organizational relationships involving the TEC Centers were not explored in depth during this evaluation. However, considerable attention was devoted to examining relationships between the TEC Centers and the SDE because this seems to be an especially critical time in the development of their respective roles in the TECC program. To a lesser extent the evaluation included an examination of relationships among the 15 TEC Centers and partnerships with business and industry and with IHEs. The report includes a description and analysis of these relationships.

Formal links between the TEC Centers and both IHEs and business and industry occur as the result of statutory language regarding composition of TEC Center policy boards. A few centers have also launched imaginative efforts to establish relationships with IHEs and with business and industry. The best example of such a partnership with IHEs is that with the California Math Project. However, in general, the link between the TEC Centers and these other sectors is not yet strong.

The SDE has not yet designed a systematic approach to linking the various developmental and policy units of the SDE with the TEC Centers. In general, there is a need for the SDE to provide more organizational leadership of the TECC program. The SDE is uniquely positioned to influence state-level educational policy, and the TEC Centers currently have a stronger opportunity than any other local agency to effect partnerships among all of the regional and local agencies that can contribute to solutions of our staff development needs.

Major Accomplishments and Challenges of the TEC Centers

Two purposes of this evaluation were to summarize the major accomplishments of the TEC Centers to date and to identify the challenges that the TEC Centers must meet. These judgments by the evaluators are based on a synthesis of all the information gathered for the study.

Major accomplishments. In less than two years the TEC Centers have:

- Become an effective regional staff development network
- Adapted to a complex governance structure
- Begun to implement delivery models that use the most effective staff development practices
- Made great progress toward bringing computer awareness and skills to California teachers
- Successfully assumed responsibility for administering AB 551 programs
- Provided training to school staffs in instructional methodology, math, science, and other areas of the curriculum
- Begun to create partnerships with IHEs, business, and industry

Challenges. The major challenges that the TEC Centers must meet are as follows:

- Provide comprehensive staff development services with limited resources.
- Respond to regional and statewide staff development needs over time.
- Provide training that is more intensive and includes follow-up.
- Provide more services in support of site-based staff development programs.
- Remain state of the art in instructional uses of the computer and educational software.
- Provide more computer training that is integrated with curriculum.
- Increase services in math, science, and other areas of the curriculum.
- Increase partnerships with IHEs and with business and industry.

Not surprisingly, some of the significant accomplishments of the TEC Centers are closely related to the challenges that they must now meet. As relatively new agencies the TEC Centers have made a commendable beginning in becoming an effective regional network and in providing many of the staff

development resources and services that are needed to accomplish their broad mission. They are already a high-payoff investment in educational reform. Their challenges for the future are to increase the breadth and depth of their services, to the extent that resources and the state of the art permit, and to strengthen their role as major staff development providers in California.

The educational reform movement in California is currently placing great emphasis on strengthening the curriculum. Through SB 813 and current priorities of Superintendent Honig and the SDE, the TEC Centers are being pressed to become part of this curriculum improvement effort by providing more staff development resources combining content and instructional methodology in all areas of the curriculum. Given the relatively minor role that the TEC Centers have had in curriculum so far, accomplishing this will require a significant change of direction. The recent effort by many TEC Centers to offer more computer training that is integrated with content is a natural bridge to more staff development in curriculum.

Support and Resources Needed to Meet Challenges

In order to meet their challenges, the TEC Centers should consider increasing their efforts in certain areas by redirecting a portion of their total allocation to such activities, especially curriculum and capacity-building services. It was evident during 1983-84 that the TEC Centers needed additional funds to accomplish their mission. The Legislature responded to this need and appropriated an additional $5.1 million for 1984-85, giving the TEC Center program a total allocation of $11.78 million. While the mission is so large that it will always stretch resources to provide comprehensive staff development services to California schools, the new allocation will enable the young TEC Center program to grow substantially. In the judgment of the evaluators, the

following additional support and resources are now needed to enable the TEC Center program to meet current challenges:

- Strengthening of the TEC Center network through:
  - A comprehensive planning process for the network linked to assessment of needs and priorities in each region
  - A closer cooperative relationship between the SDE and the TEC Centers
  - An improved data base to document services and training
- Recognition by the Legislature and others of the danger of overburdening the TEC Centers
- Action by the Legislature and others to increase incentives for staff development

APPENDIX C: Teacher Education and Computer Center
Statutory Authorization: Chapter 498, Article 2
(SB813, Statutes of 1983)

(Brandes, B., & Padia, W. Report on the 1983-84 evaluation of the teacher education and computer centers. Sacramento: California Department of Education, 1985, pp. 83-86.)

44680. As used in this article, "teacher education and computer centers" means those centers established by the Superintendent of Public Instruction to provide those functions previously provided by the state school resource centers and the professional development and program improvement centers.

44680.02. The Superintendent of Public Instruction, with the advice of the county superintendents of schools, shall establish 15 or more teacher education and computer centers in the state in such a manner as to provide staff development resources to all parts of the state.

44680.03. The purpose of the teacher education and computer centers is to provide staff development resources to teachers, administrators, other school personnel, and other persons providing services to schools. These staff development resources shall be provided in all areas of the curriculum, but especially in mathematics, science, technology, and other curriculum areas for which there are significant shortages of qualified, certificated teachers. The centers shall provide these resources in cooperation with institutions of higher education, business, and industry.

44680.04. The teacher education and computer centers shall serve the following functions:

(a) Provide training for classroom teachers and school staffs, including: (1) activities to promote the principal's ability to support instructional improvement and the teacher's ability to diagnose learning needs, (2) the development of program content, (3) the use of multiple instructional approaches, and (4) asssessment of student outcomes.

(b) Provide assistance to school personnel developing site-based staff development programs including: (1) assessment of school staff development needs, (2) development of school staff development plans, (3) training school personnel to train other school personnel, (4) cost-effective use of existing resources, (5) evaluation of local programs, and (6) the awarding of staff development program grants pursuant to Article 1 (commencing with Section 44670) of this chapter, and evaluation of their use.

(c) Provide computer demonstration and training sites where teachers are trained in: (1) the use of computers as teachings aids, (2) the criteria for school acquisition and use of computer equipment and software, and (3) the evaluation of computer-related materials.

44680.05. (a) The county superintendents of schools in each of the 15 regions which serve more than one county designated by the Superintendent of Public Instruction shall jointly designate a single county office of education to act as the local education agency for purposes of administering the regional teacher education and computer center's budget.

(b) The designated local education agency shall:

(1) Approve the center's budget for purposes of receiving and disbursing funds.

(2) Employ staff by contract for purposes of carrying out the center's functions.

44680.06. (a) The county superintendents of schools in each of the 15 regions which serve more than one county designated by the Superintendent of Public Instruction may jointly establish regional executive boards to serve as a forum for resolving problems and reviewing policy issues.

(b) Executive boards shall be composed of all county superintendents of schools within each region which chooses to establish a regional executive board.

(c) Executive boards may change the designation of the county office of education to act as the local education agency for the teacher education and computer center.

44680.07. The Superintendent of Public Instruction shall do all of the following:

(a) Designate the regions within the state to be served by teacher education and computer centers with the advice of the county superintendents of schools.

(b) Approve the plans of each center for staff development.

(c) Coordinate and facilitate communication among the centers by, among other things, making exemplary program models available to all centers.

(d) Authorize the allocation of funds to centers based on the approved plans. Funds appropriated or apportioned for purposes of this article in any fiscal year, may be expended in subsequent fiscal years.

(e) Report, by April 15 of each year, to the State Board of Education, the Legislature, and the Governor as to the effectiveness of the centers in providing, and assisting in, staff development.

(f) Provide for an educational software library and clearinghouse to assist the centers with software evaluation.

(g) Authorize centers to receive federal funding for any of their functions.

44680.08. The State Board of Education, in conjunction with the Superintendent of Public Instruction, shall adopt rules and regulations necessary to implement this article.

44680.09. Each teacher education and computer center shall be governed by a policy board of at least 12 members composed of the following:

(a) A majority of the board shall be composed of classroom teachers selected by teachers. Teacher representatives shall reflect the makeup of elementary and secondary teachers to be served by the center.

(b) Persons designated by the school districts served by the center, including at least one parent of an elementary or secondary pupil and at least one principal.

(c) At least one representative of institutions of higher education which maintain a department of education and which are located in, or adjacent to, the area served by the center selected by these institutions. In the event that more than one representative is selected, the additional representative or representatives shall not represent the same segment of postsecondary education.

(d) At least one representative of a business or industry, who, if feasible, shall be from a business or industry which utilizes, produces, or is otherwise involved with computer equipment and software.

44680.10. (a) Each policy board shall operate pursuant to guidelines established by the local education agency of the region which the teacher education and computer center serves and shall meet as necessary.

(b) Policy boards shall do all of the following:

(1) Determine program emphasis and direct and guide center staff to ensure that staff development services are generally available within the region.

(2) Select center staff, with the concurrence of the superintendent representing the center's local education agency, and contract for other needed services through the county office of education serving as the local education agency for the center.

(3) Offer opportunities for agencies and other parties to be heard at board meetings.

(4) Adopt bylaws to guide board meetings.

(5) Adopt a center budget and plan with the concurrence of the county office of education acting as the local education agency.

(c) Any actions taken by the policy boards shall be subject to all of the limitations imposed by law upon county offices of education.

44680.11. The Superintendent of Public Instruction, pursuant to the purposes set forth in Section 44680.03, may set aside money to fund exemplary projects in teacher education and computer centers which may include any of the following:

(a) Teacher training institutes in math and science, including but not limited to, retraining programs and summer institutes.

(b) Programs to encourage industry and business to exchange personnel and other resources with schools.

(c) Teacher training and parental involvement programs designed to maximize school and home use of educational technology for instructional purposes.

(d) Assistance to school districts located within the region in the development of educational technology plans, computer education plans, or proposals for reading, math, or science projects.

(e) Advice for postsecondary educational institutions located within the region which have received grants for the purpose of meeting the training needs of the region's teachers.

44680.12. Teacher education and computer centers may apply for exemplary project funding through the regular planning and budgeting cycle.

APPENDIX D: Organizational Relationships Involving the Teacher Education and Computer Centers

(Brandes, B., & Padia, W. Report on the 1983-84 evaluation of the teacher education and computer centers. Sacramento: California Department of Education, 1985, pp. 66-75.)

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Organizational Relationships Involving the TEC Centers

The TEC Centers have a complex organizational and governance structure, with various leadership roles and lines of authority shared by regional policy boards and executive boards; local education agencies (i.e., county offices of education designated to administer TEC Center budgets); and the Superintendent of Public Instruction. SB 813 also conveys a legislative intent that the TEC Centers will constitute a statewide staff development network and that within their own regions individual TEC Centers will take an active role in developing partnerships with other staff development providers, IHEs, and business and industry.

In addition to having a complex governance structure and a very ambitious mandate for creating regional staff development networks, the TEC Centers are still quite young. Consistent patterns in their organizational relationships will be more clearly discernible in the next two to three years. It was partly for this reason, as well as the sheer difficulty of the task, that we did not explore most of these relationships in depth during this evaluation. We did, however, devote considerable attention to examining relationships between the TEC Centers and the SDE because this seems to be an especially critical time in the development of their respective roles in the TECC program. To a lesser extent we also studied relationships among the 15 TEC Centers and partnerships with business and industry and with IHEs. This section includes a description and analysis of these relationships.

Several TECC directors and policy board members commented on difficulties in clarifying local governance roles. These difficulties appear to reflect ambiguities or disagreements in the respective authority and responsibilities of policy boards, executive boards, and host LEAs. A few interviewees said that it would be helpful to have regulations to clarify roles, responsibilities, and

authority of the various groups. To some extent the potential for conflict seems to be built into the system, which represents a compromise between a teacher-dominated and an administrator-dominated governance structure. At this time individual TEC Centers seem to be dealing with this complexity with varying degrees of success. In a few regions, we developed the strong impression that the TEC Center is operating as a unit within the host LEA, with a relatively weak role for the local policy board and relatively little identification with the TEC Center network as a whole or a statewide mission. In some other regions the TEC Center has a definite regional orientation and receives most of its direction from the policy board. Clearly, the issue of relationships between TEC Centers and county offices of education is a delicate one. Since the TEC Center network is still relatively new and generally well regarded, some county office staff may fear that the TEC Centers could be the harbinger of some larger regionalization move. Certainly it would be regrettable for the TEC Centers to carry the baggage for this much larger debate.

Relationships with Business and Industry

SB 813 stipulates that TEC Center policy boards have at least one representative from business and industry. The TEC Centers are also encouraged to identify and procure resources--both financial and instructional--from business and industry. Because the private sector is considerably more sophisticated in computer technology and more resource-rich than the educational community, the TEC Centers are encouraged to identify and pursue private sector resources. We did not study in depth the TEC Center efforts to develop these partnerships, but our observations corroborated the findings of the evaluation for 1982-83: TEC Centers were the most successful in building partnerships with the computer industry, while their relationships with other businesses and industries were limited. Only two of the 15 TECC directors described a substantial amount of

activity around developing these partnerships. The most successful of these is housed in a county office which has made partnerships a major officewide commitment. Several TECC directors expressed frustration in this area and are unsure both about the incentives for business and industry to get involved and about how to maintain equality in the partnerships. For the most part, the TEC Centers have not yet devoted a major effort toward forging connections with business and industry. One director commented, "There is something there to be tapped, but it is a low priority."

Relationships with IHEs

The formal link between the TEC Centers and IHEs occurs as the result of SB 813 language regarding composition of the TEC Center policy board: ". . . at least one representative of institutions of higher education which maintain a department of education and which are located in, or adjacent to, the area served by the center selected by these institutions. In the event that more than one representative is selected, the additional representative or representatives shall not represent the same segment of postsecondary education." This linkage, connecting a major staff development delivery system with the teacher training system, was designed to encourage cooperation, to foster sharing of resources, and to tie in university credit for TEC Center trainings.

The best example of coordinated effort between the centers and IHEs occurs with the California Math Project. There is an additional incentive for cooperation, however, in that IHEs are under mandate (SB 424, Chapter 196/1982) to involve the TEC Centers. In a typical project the TEC Centers provide the advertisement, the computer equipment if needed, the physical space if required, and the resources for the teaching methodology component of the training. The IHEs, for their part, provide the curriculum content and instruction for the training. Notwithstanding the above example, we found

that, in general, the link between the TEC Centers and IHEs is rather weak, not so much the result of disinterest but of disjointedness of mission. The TEC Center training is generally designed for "re-tooling" and not retraining, with the exception of the Los Angeles Math and Science Retraining program (see also the section on retraining). Some other factors which relate to the weak link are:

- The TEC Centers are overwhelmed and overburdened in their primary mission and have little time to nurture IHE relationships beyond where they are now.
- Most TEC Centers offer university credit for jointly planned IHE/TECC training; however, university credit, in itself, is not a strong incentive for teacher participation.
- The most successful TECC/IHE activities occur where there is a specific mandate for joint planning and implementation of a program.

While we devoted limited time studying this issue and did not interview IHE representatives, it is clear from our conversations with TEC Center directors that the link with IHEs is limited. A few directors mentioned, and we concur, that more formal incentives along the lines of the California Math Project are needed if additional cooperative effort is desired.

Relationships Among the 15 TEC Centers

Although the 15 TEC Centers vary widely in geographic and other characteristics, they do constitute a regional staff development network. Building a network that is responsive to both regional and statewide staff development needs will require substantial communication and sharing of strategies among the various centers.

Various kinds of informal and formal communication currently go on among the TEC Centers. Several center directors told us that they have frequent

telephone contact with other directors and rely on this network for advice and sharing of ideas. Indeed a number of the TECC directors were previously associated with School Resource Centers or PDPICs and have long-standing collegial relationships that predate TECC. Since these informal contacts are based on familiarity and trust, it is natural that not all directors are equally tied into the network.

During 1983-84 the center directors met as a group approximately once every two months. On the whole the directors seem to feel that these meetings are extremely useful in stimulating the sharing of ideas and strategies as well as in promoting the development of the statewide network. Superintendent Bill Honig met with the directors at their September meeting and urged them to develop a consensual definition of major issues and approaches in staff development. This session stimulated a major effort by the directors to develop a set of concept papers as their statement on the "state of the art" of staff development. Subsequent meetings during the year were devoted in large part to presentation and discussion of the substance and implications of the concept papers, including an open session at the annual Staff Development Conference at Asilomar. The concept papers address the following areas: (1) Strategic Planning; (2) State of the Art of Staff Development; (3) Training of Trainers.

The consensus among those directors involved in developing the concept papers is that the process they have engaged in is at least as important as the products. Given the absolutely overwhelming staff development needs in the state, there is a general expectation that the TEC Centers must be much more than a dissemination network for existing training programs. Indeed the expectation is that the TEC Centers, as part of the larger educational reform movement, will help devise staff development strategies that are substantially more effective than previous strategies. By developing statements on staff

development as they envision it at its best, the directors have set some goals to strive for as well as determining staff development needs for their own staffs.

Overall, the meetings of the TEC Center directors (and occasionally some of their staffs) have been successful in building the effectiveness of the TEC Centers as a regional staff development network. The meetings have promoted group cohesion and identification of the directors with a significant leadership role in staff development for the state. They are a forum for exchanging ideas and practices and airing concerns and are the principal point of contact between the TEC Centers and the SDE at this time.

One implicit purpose served by the directors' meetings is that of quality control. By focusing many of their discussions on the elements of effective staff development the directors are challenged to improve their training and service strategies. It is hoped that this activity will be of particular benefit to those centers that are functioning below the "state of the art." As one director put it, "Within the TECCs we have the same continuum of quality as in the field. Some TECCs say they are different and use this to hide behind--this is the fear reaction to change. The system needs to police itself. Eventually merit becomes an issue. The meetings are helping to bring along those centers which are not doing their job."

Since the meetings of the directors serve such an important function, we believe that the TECC network would benefit from a more comprehensive and systematic approach to the issues addressed as well as attention to the interests and concerns of the centers whose participation has been minimal. Even from those directors who have attended regularly we hear that there is a need for more meetings covering more issues as well as a need for more careful planning of the meetings and advance notice. Although the meetings have gone rather well

this year with an ad hoc leadership and planning effort, we feel that the group should consider formalizing the process, including, perhaps, leadership roles and responsibilities.[4] Clarification of the range of purposes and issues that could be covered by such meetings would also be helpful as well as a process for assessing the needs of directors who may not have "bought in" to the current meeting format and topics.

Our view is that such problems as there may be in the directors' network are more a reflection of the extent of their needs than any deficiencies in the meetings that have been held. In addition to collegial support and discussion of theoretical staff development issues, the directors need to be able to look to the network for ideas or resources that relate to their spectrum of operations. Some of these needs are at the level of sharing approaches to such practical matters as budgets, staffing patterns, and contracted services. Other needs pertain to developing or adapting strategies for accomplishing aspects of their mission that may be especially problematic--training strategies in science, development of partnerships with business and industry, and promotion of site-level staff development plans are a few examples. Clearly these needs go way beyond anything that can be met by occasional meetings of the directors. Perhaps a starting point for the directors would be to discuss or assess their needs from the network, including needs which might require additional state-level resources, such as training resource centers devoted to major portions of the TECC mission.

Role of the State Department of Education in Relation to the TEC Centers

The Superintendent of Public Instruction (and the SDE) had the major role in designating the number and location of TECC regions and has final authority for the TECC program. Education Code Section 44680.08 directs the State Board

[4] In May the directors voted to have a steering committee to act as liaison with the SDE.

of Education, in conjunction with the Superintendent, to adopt any rules and regulations that might be necessary to implement the TECC program. As of this date, no such regulations have been proposed. The SDE also approves plans, allocates state funds to the centers, and evaluates the effectiveness of the centers. In addition to these administrative responsibilities, the SDE has a major statutory role in coordinating and facilitating communication among the centers, making exemplary program models available to all centers, and providing for an educational software library.

The major contact between the SDE and the TEC Centers is through the Staff Development Unit (SDU) (formerly the Office of Staff Development). Consultants within the SDU are assigned to each of the 15 centers and are available to assist TEC Center personnel, executive board members, and policy board members. The SDU also plays a role in convening and facilitating meetings of the TECC directors and providing other information and resources to TECC staff.

Other units within the SDE whose activities relate to the TECC mission and services include the following: (1) Educational Technology; (2) the various curriculum units (especially those for math and science); (3) School Leadership Unit; (4) School Improvement Program; (5) the Program Evaluation and Research Division; and (6) the Office of Regional Services. At the beginning of the 1983-84 school year, Superintendent Bill Honig and representatives of the various SDE units spoke to the TECC directors presumably in order to set the stage for more active cooperative activities between the SDE and the centers.

The TECC program was originally seen as a vehicle for bringing California educators into the "information age." The Honig administration and SB 813, with an emphasis on reform of curriculum and instruction, have recast the TECC mission so that computers become one tool for improving curriculum and

instruction. It understandably takes time for new leadership to put its imprint on a major program and to gain commitment to the new mission in the field. More specifically, it has taken time for the SDE to translate the new mission into strategies for staff development.

At the time that the TEC Centers were planned and established, there was intense involvement in their implementation at the highest levels within the SDE as well as in the Governor's office and the Legislature. There is less practical need for the SDE to be closely involved in procedural matters now that the TECC Centers have been in operation for nearly two years. Some TECC directors interpreted the decreased involvement of the SDE as a loss of interest. As one director put it, "We have gone from being a blood child to a stepchild." The disengagement has taken place on both the SDE and the TECC sides of the relationship and seems to have arisen, at least in part, from the complexities and ambiguities in the governance of the TECC program. In particular, it is unclear how the melding of statewide staff development needs and regional needs is to be accomplished and how the SDE can facilitate linkage between the TEC Centers and other staff development resources. Given this ambiguity and the value which the SDE places on local autonomy, the SDU kept a low profile partly to avoid any hint of interfering with the regional governance structure. The SDU adopted the stance that the TEC Centers are relatively self-sufficient and will ask for help when they need it. Concern about the disengagement was expressed to us by TEC Center directors, policy board chairpersons, and SDE staff. Because interest in and expectations for the TEC Centers remain extremely high, a strong relationship between the centers and the SDE seems important to maximize success of the TECC effort.

The TEC Centers are still quite new, and their relationships to other staff development providers, local educational agencies, and the SDE are still

evolving. There is no doubt that they are already playing a significant role in professional development of school staff, especially in introducing microcomputers into the instructional process. The extent to which the TEC Centers can contribute to addressing the massive professional development and retraining needs in California depends on numerous factors, one of which is a strong cooperative relationship with the SDE. The SDE is, after all, uniquely positioned to influence state-level educational policy; and the TEC Centers currently have a stronger opportunity than any other local agency to effect partnerships among all of the regional and local agencies which can contribute to solutions of our staff development needs.

In general, there is a need for the SDE to provide more direction to the TECC program. We understand the reluctance on both sides to enter into a relationship in which the SDE usurps control or imposes direction in a "top-down" manner. However, this impasse can be sidestepped if the SDE leadership role is construed not in terms of control but in terms of linkage, facilitation, and involvement in cooperative endeavors.

Late in the spring of 1984 the SDE initiated meetings with the TECC directors as a whole and with a smaller steering committee to develop a closer and more cooperative working relationship. Both the SDE and the directors seemed to recognize the importance and timeliness of this endeavor. Both parties now seem more committed to developing stronger ties and to clarifying their respective roles in the TECC program.