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ABSTRACT

This paper discusses the perceived effects of nationally posited and state-mandated reforms in teacher education upon vocational teacher education and charts some future direction for vocational teacher education within this overall context of educational reform. The paper discusses the salient features of reform in teacher education as mandated by policy groups in at least 46 states. Some of the philosophical underpinnings of vocational teacher education are presented, and their uniqueness within teacher preparation is discussed. The paper addresses issues in vocational teacher education with regard to reform in initial state certification requirements, teacher testing, and program or curriculum changes. Some data on teacher education and vocational teacher education are included. A proposed framework for determining the knowledge base of vocational teacher education and three alternative, testable models for its delivery are offered. Among the specific recommendations are the following: (1) establish a national commission to examine and study vocational teacher education within a context of education reform; (2) collect data on vocational teacher education; (3) validate the philosophy undergirding vocational teacher education; (4) determine more specifically the effects of mandated reforms on vocational teacher education; (5) determine the knowledge bases for vocational teacher education; and (6) experiment with varying models for delivering vocational teacher education. The paper includes 37 references. (KC)

VOCATIONAL TEACHER EDUCATION: A CONTEXT FOR THE FUTURE

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EXECUTIVE SUMMARY

Significant policy changes affecting teacher education are no longer suppositions; they are fact. Some form of policy reform affecting the way in which elementary and secondary teachers are educated, tested, credentialed, certified, inducted, compensated, evaluated, and/or recertified has occurred in virtually every state. Little is known about the effects of such policy reforms upon vocational teacher education; in fact, not much is known about vocational teacher education at all.

This paper discusses the perceived effects of nationally-posited and state-mandated reforms in teacher education upon vocational teacher education and charts some future direction for vocational teacher education within this overall context of educational reform. The paper discusses the salient features of reform in teacher education as mandated by policy groups in at least forty-six states. Some of the philosophical underpinnings of vocational teacher education are presented, and their uniqueness within teacher preparation is discussed. The paper addresses issues in vocational teacher education with regard to reform in initial state certification requirements, teacher testing, and program or curriculum changes. Some data on teacher education and vocational teacher education is included. A proposed framework for determining the knowledge base of vocational teacher education and three alternative, testable models for its delivery are offered.

It is proposed that systematic, disciplined inquiry guide reform in vocational teacher education. Among the specific recommendations are the following: (1) establish a national commission to examine and study vocational teacher education within a context of education reform, (2) collect data on vocational teacher education, (3) validate the philosophy undergirding vocational teacher education, (4) determine more specifically the effects of mandated reforms on vocational teacher education, (5) determine the knowledge bases for vocational teacher education, and (6) experiment with varying models for delivering vocational teacher education.

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This paper represents a synthesis of the writings and presentations of many people who have addressed the overall framework and specific elements identified with teacher education reform in general and vocational teacher education in particular. We acknowledge the contributions of the authors whose work is cited throughout the document, many of whom graciously provided additional thoughts and reflections in personal or telephone interviews.

Participants in two conferences on vocational teacher education were especially helpful in conceptualizing this paper: the Rupert N. Evans Symposium on Vocational Teacher Education and the Holmes Group-related discussions sponsored by the Department of Vocational and Technical Education at the University of Illinois-Champaign in May, 1988, and a conference on vocational teacher education sponsored by the Virginia Polytechnic Institute and State University and the University of Illinois-Champaign Offices of the National Center for Research in Vocational Education, University of California at Berkeley, in December, 1988.

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INTRODUCTION

Significant policy changes affecting teacher education are no longer suppositions; they are fact. Some form of policy reform affecting the way in which elementary and secondary teachers in this country are educated, tested, credentialed, certified, inducted, compensated, evaluated, and/or recertified has occurred in virtually every state. A major underlying theme behind the mandated changes seems to be that an increase in quantifiable standards will result in a better teaching force which, in turn, will result in better public schools which will result in high school graduates better prepared for college as well as a myriad of adult roles and responsibilities. Some advocates of reform within education also suggest, congruently, that an increase in standards will result in a true professionalization of the teaching force.

The present or forthcoming changes in teacher education have not emerged from any one document, individual, policy group, or association. Nor are they necessarily grounded in scholarly, disciplined inquiry. Rather, the changes seem to have accumulated from a variety of influences—many appropriately categorized as political—including state policy boards; national commission or study-group reports (e.g., National Commission on Excellence in Teacher Education, Southern Regional Education Board, the Holmes Group, National Governors Association, and Carnegie Forum); dissatisfied products of teacher education and/or the public school system; public disclosure of dreadful teacher education programs, professors, and products; and public opinion as reflected in the media.

Although perhaps oversimplified, there seem to be eight general themes undergirding most of the proposals for change in the preparation of beginning teachers. The first seven of these themes form the foundation for major policy changes affecting teacher education in our nation's colleges and universities. The eight themes are as follows:

1. The preparation of teachers should be as intellectually demanding as the preparation of other professionals. Thus, various measures of intellectual capability, academic achievement, and performance potential should be used to control entry into teacher education and teaching so as to increase the quality of the teaching force.

2. Curricular redesign of teacher education should be modeled after those programs designed to prepare other professionals, particularly those which require rigorous pre- and postbaccalaureate preparation (e.g., law, medicine, and architecture).

3. Prospective teachers should have extensive preparation in the liberal arts and should have substantial coursework in the subjects they will teach. In several of the reform reports, this has meant that, operationally, all prospective teachers should major in an academic subject or professional discipline outside of education.

4. Professional education courses need a massive overhaul. Pedagogical preparation can be more effective and efficient, so the content of professional education courses must be based on current research and knowledge from pedagogical sciences and supporting disciplines.

5. Teacher education programs must include extensive clinical field experiences and other collaborative efforts with public schools. Teacher educators (including subject matter specialists) should supervise clinical experiences jointly with public school personnel. An extensive induction period (i.e., a fifth or even a sixth year clinically supervised program) should be a part of the curricular design.

6. Classroom teachers should be involved in advising and governing teacher education. It is teachers (through boards, advisory committees, and teacher organizations) who should influence and possibly direct efforts to improve standards for entry into teacher preparation, curriculum, licensing, testing, evaluation, and national certification.

7. Alternative programs should be developed to recruit, prepare, and certify qualified individuals who—for a multitude of reasons—have not completed or cannot participate in a conventional teacher education program.

8. Extensive efforts must be launched to recruit highly qualified and talented individuals into the teaching force. Moreover, systems must be established to help ensure their success in teacher education and in teaching. Special recruiting and retention efforts must be aimed toward ethnic and other minority groups that are currently underrepresented in the teaching force.

The actual and perceived manifestation of policies imbedded in some of these themes may pose unique challenges for vocational teacher education. Vocational educators have had little if any input into the discussion leading to the formation of policy recommendations and their resulting implementation. And, there is no indication in any of the reform

reports that the significance of vocational education for our nation's youth and adults in elementary, secondary, and postsecondary institutions or the nature of vocational teacher education itself were considered in the formulation of recommendations for the education of teachers. The redesign of vocational teacher education will be a concomitant result of the current emphasis on the reform of education in which vocational educators have been non-participants. While there have been strategies and models proposed and implemented for restructuring teacher education in general, little attention has been given to vocational teacher education.

It is thus the purpose of this paper to discuss the perceived effects of nationally posited and state-mandated reforms in teacher education upon vocational teacher education and to chart some future direction for vocational teacher education within this overall context of reform. Closely related, the paper attempts to bring the results of research, philosophical underpinnings, data, and recommendations relative to vocational teacher education to the attention of national and state education policymakers. Specifically, the paper first examines some of the basic beliefs that undergird practice in vocational teacher education. The intent of this section is to inform policymakers of the philosophy upon which practice in vocational teacher education has been developed and to highlight its distinguishing elements.

The policy recommendations which have seemingly been most troublesome for vocational teacher education can be classified into three major categories: (1) initial certification requirements, (2) teacher testing, and (3) state-mandated programmatic requirements. Each is examined and their perceived (or actual, where known) effects on vocational teacher education are discussed.

In several places, the literature implies that little is known about vocational teacher education. In fact, almost no data was available about teacher education in general until national databases were initiated about four years ago (Imig, 1987). The current data that is available about teacher education and some limited data on vocational teacher education is presented for perusal by policymakers whose decisions impact on vocational teacher education.

The actual content of vocational teacher education, that is, the pedagogy identified with vocational teacher education, needs constant and penetrating study to determine congruency with the knowledge base regarded as essential for the preparation of all teachers.

Thus, the framework for current research on the knowledge base for teaching and the implications for vocational teacher education are presented.

Considerable discussion is also warranted on the plural nature of delivery models for vocational teacher education. Several of the reports on the reform of teacher education imply that only one model is appropriate for the preparation of teachers, which is a professional studies component—generally a fifth year—building upon a baccalaureate degree in a subject identified with the arts and sciences. Such a singular model may be the least desirable for vocational teacher education. Three alternative models that seem to be appropriate for vocational education are presented and discussed.

In the final section of the paper, initial recommendations for vocational teacher education resulting from an examination of state policy reforms, discussion at vocational teacher education conferences, and extant literature are presented. It is hoped that these recommendations will be used as a basis for further research on and discussion of policy issues in vocational teacher education in the future.

PHILOSOPHY

The basic beliefs—the philosophy—undergirding vocational education and vocational teacher education regularly need to be examined to ensure that they remain viable in complex, dynamic educational and societal contexts. The literature is replete with debate on the role of vocational education within public education and historic, contemporary, and futuristically based postulates can be extracted for their use in philosophy studies. The basic beliefs should then serve as the foundation for further research, policy, and subsequent practice in vocational teacher education.

By beliefs, we include those concepts, ideas, and notions that are used to describe and fix in thought and language what vocational teacher education is and what it does. As with most disciplines, they emanate more from the perceived ideal, stated opinion, and common experience rather than solely from hard data or empirical research. Nevertheless, it is the philosophy or basic beliefs that undergird practice.

As a starting point for discussion about contemporary beliefs relative to vocational teacher education, we draw upon the report of an intensive three-year study conducted at Virginia Polytechnic Institute and State University. One outcome of this study was the delineation of ten beliefs that seem to undergird curriculum and practice in vocational teacher education. They are as follows:

1. Education for employability, broadly conceived and for the long term and as generally and specifically provided through vocational education, is in the purview of public education at secondary, postsecondary, and adult levels.

2. Pedagogy is important in the preparation of vocational education teachers.

3. The design for vocational teacher education programs must be intellectually well-grounded, including strong components in subject matter content, liberal studies, pedagogy, and clinical experiences.

4. Vocational teaching, and, thus, vocational teacher education, should be client specific, but relevant to the changing nature of work, changes in the workplace, new and emerging technology, and the needs of the employment community.

5. Learning to teach is a long term, developmental process.

6. Teaching and learning to teach should be done within a context of inquiry.

7. Vocational teacher education should be conducted in collaboration with public schools, community colleges, and vocational and technical schools.

8. The public schools, community colleges, and vocational and technical schools can accommodate instructors with varying levels of occupational and educational preparation and experiences. Professional recognition and remuneration should be based on demonstrated effectiveness in teaching students and managing activities related to the effective operation of a vocational education program; for example, sponsoring student organizations, administering adult vocational programs, managing instructional laboratories, and supervising business or industry internships.

9. Vocational education classrooms should be staffed with teachers from a broad array of clientele appropriate to the subject matter to be taught and congruent with the egalitarian goals of society.

10. There is no single "best" method or delivery system with which to initially prepare and credential a vocational education teacher. (Lynch, 1988b; Lynch, Finch, Laporte, & Stewart, 1987)

Some of the above tenets are indeed appropriate for all of teacher education and are philosophically grounded in beliefs about the way in which the preparation of all teachers should occur. A few, however, are unique to vocational education. For example, a central concept to vocational education is employability. The general versus specific goals and outcomes of vocational education are often debated in the professional literature—especially as relevant at the secondary level—but the twentieth century mission statements and related goals for public education have nearly always included an employability goal. From the early writings of Dewey and his discussion of a practical education and on to the contemporary purposes of schooling as discussed by Goodlad and others, it appears as though vocational education is well embedded in the mission of our nation's public schools: "Almost every skilled, technical, and professional occupation inducts at least part of its workers through formal school programs offered in high schools [and] community colleges . . ." (Evans & Herr, 1978, p. 11). And students do enroll in vocational courses. According to the National Assessment of Vocational Education (Wirt, Muraskin, Goodwin, & Meyer, 1989), enrollment in secondary vocational education is nearly universal: ninety-seven percent of the 1982 high school graduates enrolled in at least one vocational education course during grades nine through twelve. Transcript analysis showed that approximately twenty-one percent of their credits, 4.38 out of a total of 20.86, were earned from vocational education courses. The number of credits earned from vocational education courses declined somewhat for the class of 1987. This class earned an average of 22.84 credits, 4.21 of which were classified as vocational education (p. 52). It has further been estimated that approximately sixty percent of all community colleges and about eighty percent of all enrollments in publicly sponsored adult education programs can be described as vocational. The specific functions and the form of vocational education in the schools—that is, the breadth and the depth offered—may vary, but judging from the review of the historical and contemporary goals of public education and the continued interest in enrolling in vocationally oriented courses, it is assumed that the schools will continue to assume a major role in

preparing students for the world of work. Thus, in addition to establishing reform policy for the preparation of teachers in general, policymakers must be concerned with preparing vocational education teachers to enhance the employability of their students.

Closely related to the employability goal of vocational education and its unique impact on the preparation of teachers is that vocational teaching, and thus vocational teacher education, must not only be responsive to the learners' needs and characteristics, but must also be relevant to the changing nature of work, changes in the workplace, new and emerging technology, and the needs of the employment community. This belief speaks to the challenge of educating the learner—regardless of his or her academic, sociological, cultural, or economic situation—for meaningful employment acceptable within the infrastructure of the contemporary workplace. Vocational education serves widely diverse students. Teachers must be prepared to respond to this diversity with programs and services that enhance the employability of all students.

Another tenet of vocational teacher education that appears not to have been considered in the various education reform reports is the preparation of teachers for vocational schools, technical institutes, and community colleges. For each of these unique institutions, the establishment of clinical experiences for prospective teachers to integrate research with practice and to update the employability and pedagogical skills of inservice teachers and professors is essential to achieve the educational goals envisioned in the various reform efforts.

A final, perhaps unique, philosophical tenet of vocational teacher education is recognition of the need for and value of alternative delivery systems to prepare teachers of vocational education. Vocational education classrooms have historically and successfully been staffed by persons with substantive experience in business, industry, agriculture, the trades, and medicine. Alternative models to prepare, credential, evaluate, and license these teachers has long been a purview of vocational teacher education. The extant research and literature simply do not support a single, superior delivery model for vocational teacher education.

STATE EDUCATION REFORM POLICIES AND THEIR EFFECTS ON VOCATIONAL TEACHER EDUCATION

An unprecedented volume of state legislation and related policies affecting teacher education has occurred in the past five years. Some mandates have yet to be implemented; the details and operational procedures are still being debated. The report card assessing any significant change resulting from these reform initiatives has yet to be issued. Furthermore, there appears to be little data or substantive knowledge on the macro (i.e., national) effects of any teacher education reform efforts on vocational teacher education. The purpose of this section is to present and discuss contemporary policy in three major categories: initial certification requirements, including alternatives to certification; teacher testing; and state-mandated programmatic requirements in teacher education. Where appropriate, the perceived (and actual, if possible) effects on vocational teacher education are discussed.

Initial Certification Requirements

All states require that regularly employed teachers in the public schools hold certificates in accordance with the rules of certification prescribed by that state's governing board of education. This certification authority reflects the beliefs that the education of children and youth should be safeguarded by requirements governing qualifications of applicants who want to teach in the public schools and that licensure of teachers is indeed in the purview of the public good.

The requirements have historically been relatively minimal. Typically, state teacher certification regulations included a few general requirements (e.g., good health, sound mind, good personality, and United States citizenship); a college degree (but not always, depending usually on supply and demand factors); general education requirements (e.g., college preparation in the liberal arts and sciences); professional requirements (e.g., preparation in curriculum and methods courses, educational psychology, and philosophy of education); and subject specific requirements. Certification requirements were often nebulous enough to allow widely diverse interpretation by either the agency evaluating and issuing certificates and/or the colleges or universities authorized to prepare teachers. Miller (1982) pointed out that a sample of just a few states yielded the following types of certificates:

"Life, Permanent, Professional, Continuing, Regular, General, Provisional, Probationary, Temporary, Limited, Emergency, and (certainly the most ego-shattering), the Sub-Standard" (p. 27).

State certification regulations have historically been especially flexible for vocational teachers. Beginning with the 1917 Smith-Hughes Act and continuing to the present time, nearly all states allow a special category for certifying trade and industrial (T&I) or other vocational teacher applicants—usually substituting years of work experience in a trade, medical field, or business for academic preparation. In fact, only Hawaii and Wisconsin require a baccalaureate degree for initial certification as a T&I teacher. Only seven states require baccalaureate degree completion for full certification as a T&I teacher; an additional five states require an associate (i.e., two-year) degree for full certification (Duenk, 1989). Typically, some form of inservice education was and continues to be required for T&I and other nondegreed vocational teachers, usually in the form of state-mandated clock hours of curriculum and methods courses provided by the state department of education, a college or university, or the school system itself.

Major, significant changes in state-required teacher certification began occurring in the early 1980s. Various data sets and surveys indicate that virtually every state reformed its teacher certification policies. In nearly half of the states, reforms were mandated through state legislative action (over one thousand pieces); in others, the primary impetus for reform emanated from that state's board of education. In virtually all states, the certification changes came through the political process and never reflected a consensual view either within the profession or across the states of what a prospective teacher ought to know and be able to do (Darling-Hammond & Berry, 1988).

The following is a synthesis of the major changes in state certification requirements, since 1983, that have affected teacher education in general and probably have or will affect vocational teacher education in our nation's colleges and universities:

1. Documented evidence is available that forty-six states have mandated changes in teacher education commensurate with the rash of education reform movements published in the last decade (Darling-Hammond & Berry, 1988).

2. Twenty-six states require prospective teachers to pass a test in basic education skills, subject matter, and/or professional knowledge to gain certification

(Letherman, 1988). In 1985-86, twenty-three states required a basic skills competency test as a part of their requirements for certification of vocational teachers (Pratzner, 1988). Duenk (1989) reports that twenty-five states require some type of basic skills test for nondegreed teacher-applicants prior to their employment as vocational education teachers.

3. Twenty-six states mandated that their colleges and universities stiffen the requirements for admission into teacher education programs (Letherman, 1988). There is little consistency in the increased requirements among states except that at least seventeen of these states now require passage of a basic skills test prior to admission into teacher education. A few have increased the minimum grade point requirement for admission. At least three have abolished most undergraduate degree programs in education thereby allowing very limited undergraduate coursework in education or requiring a fifth or more year of study.

4. At least thirty-two states have mandated curriculum changes for students who plan to become teachers. Again, there is little consistency in this curriculum reform among the states (Letherman, 1988). Some states increased the liberal arts requirements, some increased subject matter requirements, some increased pedagogy, and some increased field experiences.

5. Since the mid 1980s, twenty-one states have embraced the notion of alternative certification. From comparable databases, the implicit standards for an alternative certificate are three: (1) an earned baccalaureate degree, (2) an acceptable score on a certification test, and (3) participation in an internship or teacher training (i.e., as contrasted with teacher education) program (McKibbin, 1988).

6. Forty-six states allow emergency certification in subject areas where there is a deemed shortage of certified teachers; thirty of these states permit renewal of the certificate with additional university coursework.

7. Teachers are increasingly becoming involved significantly in policy decisions affecting teacher certification and teacher preparation. The legislatures of at least four states (California, Minnesota, Nevada, and Oregon) have created teacher-laden autonomous boards which are involved in evaluating and improving standards for teacher certification, setting standards for entrance into the profession, and

prescribing preservice teacher education programs (Cruickshank & Cruz, 1989). In other states, teachers wield considerable policy influence on teacher certification by serving in an advisory capacity to the state's board of education. In some states, teachers influence policy through teacher associations or collective bargaining agreements.

8. All fifty states apparently offer alternative certification programs for full-time teachers of at least some segments of vocational education at the secondary level (e.g., trade and industrial education). Forty-three states require part-time secondary vocational instructors to be certified by the state department of education (Milanovich, 1986). These alternative requirements have elements which are general for all vocational teachers and then some specific requirements for the vocational subject matter areas in which the teachers are employed. The terminology used and the specific requirements for the various certificates are extremely varied among the states and among the vocational subject areas (Struck, 1986). The common element seems to be to allow occupational experience as a substitute for academic preparation.

9. Twenty states require certification for instructors of postsecondary vocational programs and sixteen require certification for teachers at the adult level (Struck, 1986).

10. In 1985-86, twenty-six states required occupational competency testing as an initial certification requirement for vocational teachers (Pratzner, 1988). Although not evident from Pratzner's report, it is assumed that this occupational testing requirement was in existence prior to 1983. According to Duenk (1989), there are eight different types of competency assessment in use among the states. The most common type of assessment is state licensure in occupations such as in various health fields, cosmetology, plumbing, and auto mechanics.

11. For vocational teacher certification, most states require from three to six or more years of work experience in the occupation to be taught (Pratzner, 1988, p. 66).

Teacher Testing

Perhaps the fastest-moving change in the whole arena of teacher reform has been in the area of teacher testing. Virtually every state now requires that its teachers be tested either through a basic skills test, a subject matter knowledge test, and/or on professional knowledge. As early as the mid-1970s, only Georgia and Louisiana mandated competency examinations as a criterion for teacher certification; ten years later, forty-six states had done so (Sandefur, 1986; Darling-Hammond & Berry, 1988).

The specific tests that are used and when they are used varies from state to state. The most comprehensive data, provided by Sandefur (1986), indicates that forty-four states require a test of basic skills, thirty-two require a test of professional knowledge, thirty-one a test on subject-matter knowledge, and fourteen require testing on the job. Twenty-five states require some form of testing at the admissions level into teacher education and forty-one states require testing prior to initial certification. About half the states apparently use all or parts of the National Teachers Exam (NTE); others use state customized tests, the Scholastic Aptitude Test, those provided by the American College Testing program, and/or the California Achievement Test. At the present time, nearly all teacher tests are paper-and-pencil, multiple-choice type examinations designed primarily to measure facts, analogies, fundamental processes, and the type of knowledge generally expected from a study of the liberal arts, educational foundations, educational psychology, and subject matter. A few states are experimenting with performance testing and with on-the-job evaluation of competencies for nontenured teachers mostly through classroom observations of institution and class management.

Needless to say, regardless of their substance, format, or the time at which administered in the teacher's professional career, teacher testing is extremely controversial. The issues surrounding it are numerous but probably can best be categorized into three fundamental problematic areas germane to all of teaching and one specific to teachers of vocational subjects:

1. The tests appear to discriminate significantly against certain minorities. Studies consistently show that a disproportionate number of ethnic minorities, especially Blacks, Hispanics, and American Indians, fail to meet established standards on teacher exams. As a result, Educational Testing Service (ETS) research reports indicate that the percentage of ethnic minorities in the teaching force in the United

States could be reduced by as much as fifty percent—to less than five percent of the total teaching force—by the year 2000 if teacher preparation fails to enhance their ability to pass teacher exams (Fields, 1988).

2. The tests do not measure what is important to know and be able to do to demonstrate effective teaching. The education profession itself has yet to agree on a reasonable codification of teachers' professional knowledge. Thus, existing tests, especially state-developed tests, appear to draw their professional knowledge items almost exclusively from the field of educational psychology (Melnick & Pullin, 1988). Although important to effective teaching, generally no educator agrees that a knowledge of psychology is all that is important. There is a much larger body of knowledge that must be learned to teach effectively. Furthermore, say the critics of teacher tests, no standardized test can accurately measure such essential qualities as dedication, motivation, perseverance, caring, and sensitivity. Thus, teachers, administrators, and researchers who have examined currently-used teacher tests do not consider them to be valid measures of potential nor of actual teaching effectiveness.

3. A third major broad issue is associated with various process questions; for example, who is to be tested, at what point in their careers are they to be tested, and at what price? (At least two states are requiring that all teachers—even those who have been certified and teaching successfully for years—be required to pass a functional academic skills or literacy test periodically in order to retain their teaching certificates.) Should all teachers be required to pass a test, including teachers with vocational, emergency, alternative, or one of the other certification options listed earlier? Who pays for the tests? And what effect does all of the hassle, anxiety, and cost have on the supply of prospective teachers especially as segmented by minority groups, those with other career options, the financially disadvantaged, and those for whom testing is a major barrier?

In regards to testing being a major barrier, several authors have expressed concerns that extensive teacher testing may preclude many occupationally experienced and skilled craftspeople from entering vocational teaching. Pratzner (1988) speculated that "raising basic skills test requirements for vocational teachers could discourage competent craft persons and technicians from high school teaching, push them out of the teaching profession altogether, or push them toward teaching in the private sector . . ." (p. 71). Duenk

commented that many T&I teachers were in an age bracket where pursuit of a degree and its inherent testing requirements were "impractical from a time and money standpoint" (p. 22). Adams, Pratzner, Anderson, and Zimmerer (1987) noted that prospective vocational teachers from colleges, the military, or business and industry are "likely to reconsider their career options . . . [and] shift their employment preference toward [that] in the private sector where entry requirements are less imposing and remuneration is more attractive" (p. 25).

Despite the many limitations of teacher testing, no one seriously expects to see its elimination within the near future. Many of the tests are undergoing revision, and it is expected that new forms of testing will soon be available.

Programmatic Requirements for Teacher Education

A third significant nationwide reform in the education of beginning teachers has been in the programmatic requirements imposed on colleges and universities by state policy boards. The most common change has been to require an increase in the standards for entry into college and university teacher education programs. At a minimum, this typically involves requiring a formal application into professional teacher education; a satisfactory score on some form of a standardized test (e.g., ACT/SAT) or the Pre-Professional Skills Test (PPST) provided by the Educational Testing Service; and a 2.5 grade point average on a prescribed number of credit hours.

From thereon, the state policy decrees for programmatic requirements in the preparation of teachers have varied significantly throughout the country. Thus far, thirty-two states have mandated that curricular changes be made, and a few have actually dictated the specific curriculum for teacher education students.

Although national data specifically mapping curriculum changes are apparently unavailable, four definite trends are noted in the literature. First, there is a definite and strong trend to require increased preparation in the liberal arts. Secondly, the courses in the subject matter to be taught by prospective secondary teachers are being increased. Third, institutions have been mandated to increase the involvement of the public schools in the preparation of teachers; most apparently by increasing the number of field-based education courses students must take. Fourth, teachers and other public school practitioners are increasingly being involved in determining the curriculum for prospective teachers; in fact,

teachers (through teacher organizations) are now represented in major numbers in the National Council for Accreditation of Teacher Education (NCATE), the agency which accredits professional education units at colleges and universities.

These trends are especially apparent in the colleges and universities in the fifteen states which are members of the Southern Regional Education Board (SREB). According to Hawley, Austin, and Goldman (1988), about two-thirds of the colleges and universities in SREB states now require students seeking certification in secondary schools to major in a subject other than education. Few require an academic major other than education for elementary, middle school, or special education teachers; however, the trend may be for them to do so. For example, "North Carolina, Tennessee, Texas, and Virginia have enacted such policies; other [SREB] states have this requirement under consideration" (p. 12). Concurrently, sixty-four percent of the responding institutions in Hawley et al.'s survey reported an increase in field experience requirements. The authors concluded, "Most of the impetus for increased emphasis on field experiences in education courses and more time spent in practice teaching seems to be coming from state legislatures and classroom teachers" (p. 5).

Regardless of the college which controls the degree (i.e., education vs. liberal arts vs. subject matter), the result of state policy changes in programmatic requirements for teacher education is a general decline in the number of formal professional education courses. According to Darling-Hammond and Berry (1988),

> improving teacher preparation seems to mean reducing the amount of time devoted to traditional teacher education. To the extent that there is a conception of teaching underlying these [policy] moves, it is a view that liberally educated students require little more than guided practical experience to learn how to teach effectively. The claims to a specialized knowledge base that undergird the development of a profession fall on deaf ears. (p. 17)

These changes in programmatic requirements may be the most troublesome of all for vocational teacher education nationwide. The data from Pratzner's (1987) survey was collected from the chief vocational education program administrators at sixty-nine colleges and universities and from seven hundred and forty beginning vocational teachers representing twenty-four states in eight regions. This data reveals the following:

- With the exception of more frequent use of the NTE, there had been little or no change in the type or rigor of program or admission requirements into or graduation from vocational teacher education since the early 1980s.

- Twenty-six percent of the vocational teachers surveyed had not completed a baccalaureate degree; however, when segmented, seventy-three percent of the trade and industrial teachers, fifty percent of the health occupations teachers, and fifty percent of the technical teachers did not have baccalaureate degrees. As noted earlier in this paper, only two states currently require a baccalaureate degree for T&I initial teacher certification (Duenk, 1989).

- The number of credit hours taken in mathematics by vocational education teachers was about the same as the average number taken by either teachers of academic subjects or by arts and science majors; in English, the number of credits taken by vocational teachers was slightly less than the other two groups.

- In each of the other three academic areas (social science, humanities, and science), the credits taken by teachers of academic subjects and arts and science majors greatly exceeded those taken by vocational teachers.

- Nearly fifty-two percent of the vocational administrators surveyed said they had no plans to increase the number of credit hours required in the liberal arts.

- "Nothing in [this] study would lead one to conclude that in general, the quality of students or the quality or rigor of the undergraduate [vocational teacher education] program has increased since the early 1980s" (Pratzner, 1988, p. 70).

It should be noted that there were differences in several programmatic requirements in vocational education units affiliated with the University Council on Vocational Education (UCVE). According to Anderson (1986), "pre-student teaching competency testing and increased GPA requirements, both at entry into educational studies and at graduation, were noted as trends in [UCVE-affiliated] undergraduate education" (p. 141) and "the quality of students admitted to [UCVE-affiliated] undergraduate programs has increased" (p. 9).

The accumulative effects of all of the reform movements on vocational teacher education and, for that matter, vocational education are as yet unknown. There is some evidence from the Pratzner study (1987) that vocational teacher education hasn't been affected very much and, indeed, hasn't changed much in relation to the major themes or tenets of the teacher education reform movements. In general, the few universities that noted significant changes congruent with teacher education reform were those affiliated with the UCVE.

For the most part, policy changes involve highly specifiable variables such as years of educational preparation or experience, degrees, scores on tests, and numbers of academic and professional credits. On the one hand, this may reflect a bureaucratic tendency to verifiable oversight. On the other hand, it may suggest a lack of information on which

policy decisions can be based. Evans (1988) noted that colleges of education rarely support substantial programs of research on teacher education. It was not until 1984 that the American Educational Research Association included a section addressing teacher education. Adamsky and Cotrell concluded in 1979 that vocational teacher education is considered "an ancillary activity" within vocational education research. Kelly (1988) and Schultz (1988) found nearly ten years later that the major research thrust in vocational teacher education (at least as judged by publication in refereed journals) is to identify teacher occupational competencies, primarily through task analysis methods. Research designed to answer crucial questions about vocational teaching, teacher testing, teacher education, and certification is essential in order to provide information for policymakers and other decision makers.

RELEVANT DATA ON TEACHER EDUCATION

It is important to note at the outset that there does not seem to be at this time any valid, reliable, reasonably comprehensive data collected on the nature, scope, and condition of vocational teacher education. It is known that there are approximately four hundred and thirty-five colleges and universities that purport to have one or more of the traditional vocational teacher education programs. Some colleges or universities have just one of the programs; some offer teacher education in all of the traditional vocational education program areas, including a program to prepare vocational teachers for special populations. The various directories published by the federal Department of Education, the American Vocational Association, or program area teacher groups indicate that there are ninety-two teacher education programs in agriculture, two hundred and thirty-seven in business education, thirty-one in health education, two hundred and sixty-seven in home economics, one hundred and seventy-six in technology education (industrial arts), eighty-nine in marketing education, one hundred and twenty in trade and industrial education, and ninety-nine in special needs.

For the most part, what is known about vocational teacher education has to be assumed as a part of or extrapolated from data collected by researchers in other teacher education subject areas. Thus, in this section of the paper, some of the national databases and research studies on the general composition of teacher education programs are presented.

Where appropriate, the specific data that are known about vocational teacher education are identified and presented.

The majority of the research findings reported herein emerge from research supported by the American Association of Colleges for Teacher Education (AACTE). Research About Teacher Education (RATE) and Teacher Education Pipeline (TEP) represent two of the most recent attempts to establish a reliable data bank of basic information about teacher education. RATE is devoted to collecting information about colleges and universities that engage in teacher education, as well as teacher education programs, faculties, and students. This project has been envisioned as an ongoing attempt to obtain accurate and reliable data on programs of teacher education.

The presentation of research findings is organized according to the heuristic used by Lanier and Little (1986) in their review of research conducted on teacher education. The organizational framework centers on Those Who Teach Teachers, Students of Teaching, The Curriculum of Teaching, and The Milieu of Teacher Education.

Those Who Teach Teachers

The following data has been taken from research done by the AACTE (1987, pp. 22-31):

Current Demographics

- The education professorate is about ninety-three percent White, nearly three percent Black, and about three percent Hispanic. Asians and Pacific Islanders represent about one percent of the professorate, while American Indians, Alaskan Natives and "other" minorities contribute only a trace. Overall, about seventy percent of education faculty are White males.

- The professorate is over seventy-five percent tenured.

- The average age for professors is fifty-three years old; for associate professors, forty-seven years old; and for assistant professors, forty-two years old.

- Nearly forty-five percent of the professorate have achieved the rank of professor, and approximately half of these are more than fifty-three years old.

- About ninety percent of both the professors and associate professors hold doctoral degrees. That number drops to about two-thirds for assistant professors.

- More than ninety percent of secondary methods faculty reported experience in other levels of education institutions, primarily as elementary and secondary teachers and/or administrators. Only seven percent reported having no experience in schools. Faculty averaged almost nine years of experience in schools, and almost all of them reported having had classroom teaching experience.

The Future Professorate

- Men dominate the rank of professor, but women comprise the majority at the assistant professor rank. Whereas more than four-fifths of the faculty who held the rank of professor are male, only two-thirds of the associate professors and less than half of the assistant professors are male. One can project that more women are likely to be promoted to the rank of professor in the future.

- The composition of the doctoral candidates enrolled in the institutions represented in the RATE study show that women dominate doctoral programs in education fifty-seven percent to forty-three percent.

Academic Activities

- Sixty percent of a teacher educator's time is devoted to teaching, twenty-two percent for service, and fifteen percent for scholarship.

- Faculty in institutions awarding the Bachelors reported that they teach the equivalent of about 7.5 courses, while Doctoral institution faculty teach slightly over five courses.

- The largest percentages of faculty from institutions supervise student teachers; more than a third supervise early field experiences.

- Slightly more than half the faculty at institutions awarding the Masters or Doctorate conduct workshops for teachers, compared with a quarter of the faculty at institutions granting the Bachelors.

- Of the Doctoral institution faculty surveyed, twenty-one percent devote time to research in K-12 schools; however, only nine percent of faculty in institutions awarding the Masters and three percent in institutions awarding the Bachelors devote time to this activity.

Students of Teaching

It has been widely chronicled that students entering teacher education programs do so with weak academic backgrounds and maintain poor academic records throughout their college careers. Much of the myth and misrepresentation about what is known about prospective teachers has been perpetuated by the popular press. It is distressing that little is done to counteract these perceptions. Lanier and Little (1986) state that "the research on students of teaching over the past decade tends to be desultory in nature, poorly synthesized, and weakly criticized" (p. 535). The recent databases support few of the commonly negative perceptions about students of teaching. The data presented below is divided into four categories: Student Demographics, Quality of Education Students, Reasons for Becoming a Teacher, and Career Plans.

Student Demographics

- The average age of junior and senior students enrolled in undergraduate teacher preparation programs is about twenty-three years. The average age upon graduation will be between twenty-four and twenty-five (AACTE, 1987, p. 37). The average age for beginning vocational education teachers is thirty-three, with a range of twenty-two to sixty-six years of age (Pratzner, 1988).

- About ten percent of the students enrolled in teacher preparation programs are postbaccalaureate students. The postbaccalaureate students are older with an average age of thirty-four years. Slightly more than three quarters of both undergraduate and postbaccalaureate teacher education students are women (AACTE, 1987, p. 37).

- The ethnic composition of students is eighty-nine percent White, five percent Black, three percent Hispanic, and three percent divided among Asians, Pacific Islanders, Native Americans, and Alaskan Natives. The data shows that the overwhelming majority of students are White women (AACTE, 1987, p. 37).

- More than one million K-12 students are classified as limited English proficient (LEP); however, less than one percent of prospective teachers are specializing in bilingual education (AACTE, 1988, p. 12).

- The proportion of Black, Hispanic, Asian, and American Indian/Alaskan Native elementary and secondary students is far greater than that of the future teaching force (AACTE, 1988, p. 11).

- The teacher education students can be characterized as "nonurban"; this is true of ethnic minority as well as White students. Only about five percent of the students came from urban centers of half a million people or more.

Approximately two-fifths came from suburban communities and another two-fifths identified themselves as coming from rural areas (AACTE, 1987, p. 41).

Quality of Education Students

- Students enrolled in teacher education programs are average or slightly above average in academic performance compared with undergraduate students in general. Education students can be described accurately as "a solid B" with cumulative grade point averages in the 3.0 range, including a 3.0 average in their general liberal arts courses (AACTE, 1987, p. 41).

- The average SAT math scores of education majors range from 475 to 509 and SAT verbal scores of 451 to 476, slightly above the average for college-bound students (AACTE, 1987, p. 43).

- The typical teacher education student is in the top third of his or her high school graduating class (AACTE, 1987, p. 43).

Career Plans

- Nearly half of the education majors believe their teaching careers will span ten or more years, and twenty-seven percent project more than twenty-year teaching careers. Only thirteen percent of the students believe that they will spend less than five years as teachers (AACTE, 1987, p. 45).

- Eighty-two percent of the students indicated that they prefer to teach in rural or suburban environments. Only eighteen percent, given the choice, would opt for urban areas, and most of those would prefer cities under five hundred thousand (AACTE, 1987, p. 45).

- Teacher education students want a "traditional classroom" in a "traditional school" in "a middle-income neighborhood" with "children of average ability." Three-fourths of the students opted for these characteristics (AACTE, 1987, p. 44).

- The teacher education student respondents showed little interest in teaching handicapped children, low income children, and children of low ability (AACTE, 1987, p. 44).

The Curriculum of Teaching

Varying among institutions and within disciplines, there is a broad assortment of approaches to the education of teachers. Typically, what can be found are programs consisting of two years of general studies before admission into professional studies;

coursework in educational foundations; coursework in methods and curriculum specific to a discipline area; field-based experiences, which are usually a part of either the foundations or methods courses or both; and a culminating student teaching experience. Although standard program requirements dominate the structure of teacher education, the ways to satisfy these requirements are numerous as evidenced by the multitude of ways in which teachers can be certified to teach.

The following data is illustrative of what is known about the anatomy of teacher education programs. This data provides a general description of the curriculum utilized in a typical teacher education program. The data is largely representative of elementary and secondary teacher education programs. With some exceptions, much of what is presented is thought to be similar in nature to the general composition of college- or university-based preservice vocational teacher education programs. The data compiled by the AACTE (1987, pp. 13-19) is organized into the following categories: General Program Requirements, Secondary Methods Courses, and Quality of Teacher Education Programs.

General Program Requirements

- Secondary teacher education students complete an average of one hundred and thirty-five semester credits to graduate within a four-year span as follows: general studies, fifty-two hours; academic major, thirty-nine hours; academic minor, eighteen hours; education methods, seven hours; education foundations, nine hours; and student teaching, ten hours.

- Typically, students spend one or two days per week observing or tutoring in schools for approximately twelve weeks, often during the initial phases of the teacher education program.

- On the average, ten credit hours are awarded for the student teaching experience, which typically lasts for twelve weeks.

- The university supervisor in an institution awarding the Bachelors averages seven visits to a student teacher during the semester, while supervisors at institutions granting the Masters and Doctoral degrees average six visits.

- Overall, tenure-track faculty supervise approximately seventy-five percent of the student teachers. Graduate assistants provide on the average less than thirty percent of the student teacher supervision in institutions offering the Doctorate.

Secondary Methods Courses

- In general, secondary education faculty and students depict their methods courses as focused, well-designed, and having considerable instructional variety. Students perceive their secondary methods courses to be helpful in pursuing their goals.

- Fifty percent of the faculty require students to work in schools as a component of the methods courses. These field-based activities usually come after the early field experience but before student teaching. Four school-based activities are typically assigned to students in methods courses.

- When asked to name which individual had been most helpful in modeling teaching styles and strategies worth emulating in their teaching, the students cited as follows: education professors, twenty-nine percent; other professors, eighteen percent; other teacher education students, two percent; and others, five percent. Cooperating teachers (twenty-six percent) and their own elementary or secondary teachers (twenty percent) were the remaining role models.

- A majority of the students believe their teacher education programs contribute significantly to their academic, intellectual, and creative abilities.

Quality of Teacher Education Programs

- The majority of faculty and students reported perceptions that education courses are "as rigorous" or more so than noneducation courses. A third of the students cited "more rigorous," while the largest percentage of faculty (forty percent) cited "as rigorous."

- About half of both the students and the faculty responding believe that education courses require more time than noneducation courses.

The Milieu of Teacher Education

The data presented below (AACTE, 1987, pp. 6-7) represents a very narrow perspective of the milieu of teacher education. The data suggests that the education major offers an important contribution to institutions of higher education which house teacher education programs.

- Full-time undergraduate students in education comprise twelve percent of the full-time undergraduate students in institutions offering the Bachelors, thirteen percent in institutions offering the Masters, and eight percent in institutions offering the Doctorate.

- Part-time education students comprise twelve to fifteen percent of the undergraduate part-time student body.
- In institutions awarding the Masters, education students comprise one-third of the full-time graduate student body and more than one-third of the part-time graduate students.
- In Doctoral institutions, education graduate students make up fourteen percent of the full-time graduate student body and more than one-fourth of the total part-time graduate student enrollment.
- On the average, an institution offers eight to twelve distinct teacher education programs.
- Historically Black Institutions (HBIs) represent only five percent of the institutions of higher education. However, these institutions have produced sixty-six percent of the Black teachers in the United States (SREB, 1986).

Implications for Vocational Education

The data that has been collected by the AACTE (American Association of Colleges for Teacher Education) portrays teacher education in a generally favorable light. The education professor holds a doctoral degree; is an experienced teacher or administrator; spends the majority of his or her time teaching, supervising student teachers, and writing journal articles; and is professionally involved. Education students are slightly above average, feel good about their teacher education program, and are interested in a career in teaching in a traditional classroom. The teacher education curriculum is considered focused and well designed, rigorous, balanced, and is felt to contribute in important ways to the goals of the students. Education students comprise a significant portion of the total enrollment at colleges and universities, and sixty-six percent of the Black teachers in the United States have been prepared at HBIs. Information from additional databases on teacher education currently being developed should also provide important information to help establish policy and set standards for teacher education programs.

However, before policy decisions for vocational teacher education are finalized, it is hoped that additional data and information will be collected and provided to policymakers. It is simply unknown at this time if vocational teacher education professors, students, or curriculum parameters are similar to those profiled through the various databases. Empirical evidence provided by vocational educators at various conferences and that has

appeared in the professional literature would indicate that some of the data provided herein is not typical for vocational education and that data relevant to vocational teacher education may not have been included in the database. This observation is based on factors unique to vocational education such as the following:

- The certification of some vocational education teachers requires considerable occupational experience in business and industry.
- The subject matter knowledge base for vocational education teachers is not usually found in disciplines typically located in the arts and sciences or sometimes not even within a university.
- For significant numbers of vocational education teachers, the major fields of college study are not administered in either an education unit or in the arts and sciences.
- Vocational teachers teach a wide range of students from diverse environmental backgrounds in middle schools, high schools, skills centers, vocational-technical institutes, community colleges, and adult education centers.
- Nearly all vocational education teachers sponsor and advise a co-curricular student organization. These organizations are an integral part of the students' vocational education curriculum.
- Many vocational education teachers are not prepared through a college or university teacher education program.

As in general teacher education, there is a great need for research to be conducted on vocational teacher education. Among the major purposes for establishing a database on vocational teacher education programs is (1) to provide accurate, reliable data for making informed decisions and (2) to challenge those who are making headlines with their negative assertions regarding the worth, quality, and need for programs of teacher preparation. While it is not guaranteed that the results of this research will portray vocational teacher education programs in an entirely positive light, now is the time to carefully study and reflect on the quality and substance of these programs. Critically analyzing this data will provide a better understanding of the overall structure, substance, and quality of current teacher education programs. This data will also provide insight into future needs of vocational teachers and to the direction of vocational education in general.

Reform should be nurtured from a desire to understand rather than from a perceived need to renovate. Establishing a national database of information on vocational teacher education programs should be a first step toward improving vocational teacher education.

KNOWLEDGE BASE FOR VOCATIONAL TEACHER EDUCATION

Programs of vocational teacher education need research specifying the knowledge base underlying teacher preparation. What is the appropriate knowledge base on which to build vocational teacher education programs? This is indeed a controversial question, and inadequate answers have resulted in considerable policy inconsistency throughout the country.

Several reform groups have focused strictly on the subject matter and/or the arts and sciences component of teacher preparation. A consistent recommendation has been to require teachers to have a degree in the arts and sciences or—if modified to include vocational education—a degree in the subject matter to be taught. Thus, the Holmes Group (1986) states, "Teachers must have greater command of academic subjects" (p. 4) and "should teach only subjects they both know well and can teach well" (p. 15). The Carnegie Forum on Education and the Economy (1986) says that ". . . a bachelors degree in the arts and sciences [should be required] as a prerequisite for the professional study of teaching" (p. 3). Some policymakers in some states have carried these reform recommendations to the extreme and have implied, through their actions, that it is *only* a degree in the arts and sciences or in the subject matter that is important to effective teaching. They allow for very limited preparation in other aspects of the knowledge base for teacher preparation such as in professional education studies.

It is not in the purview of this paper to recommend or not to recommend restructuring of any vocational teacher education program to mandate a degree in the arts and sciences nor even in the subject matter appropriate for vocational education programs (e.g., agriculture, business, engineering, or home economics). Having a degree in the subject area does not necessarily ensure competence in the vocational subjects being taught. Nor, in many instances, is there one appropriate arts and sciences or subject matter major to accommodate a particular vocational education program area. For example, what does one major in at a university to become a welding teacher, a secretarial or office practice teacher, a technology education teacher? While we acknowledge that vocational teachers need to know and to understand well the content they teach, we must seek further empirical data to enable us to make more informed decisions about the depth and breadth of the knowledge required, the best way(s) in which to acquire that knowledge, and the best delivery systems to organize and sequence the knowledge and pedagogy needed by prospective vocational teachers.

Education professors and researchers who are advocates of reform in teacher education base their arguments on the belief that there does exist a knowledge base for teaching that, according to Shulman (1987), "consists of a codified or codifiable aggregation of knowledge, skill, understanding, and technology, of ethics and dispositions, of collective responsibility—as well as a means for representing and communicating it" (p. 4). Historically, the knowledge base for teachers has been represented in the "professional component" category of teacher education, typically through educational psychology and foundations courses and subject-specific curriculum and methods courses. It is this professional component that, according to Jones (1988), has not produced a wide research base to support its significance in the teacher education curriculum. Many critics share Gage's (1984) belief that teacher education students have been given inadequate grounding in how to organize a course, how to plan a lesson, how to manage a class, how to give an explanation, how to arouse interest and motivation, how to ask various kinds of questions, how to react to students' responses, how to give helpful correction and feedback, how to avoid unfair biases in interacting with students—in short, how to teach (p. 92).

National studies of the competencies needed by vocational education teachers have been conducted. Using results from these studies, many vocational education teacher preparation programs have used a competency-based approach in order to avoid the weaknesses noted by Gage. It isn't just a competency- or skill-based approach that is necessary for effective teaching, however. According to Sykes (1983), teachers need to know how to identify, frame, and solve problems. They need to be able to reflect on their practice and conduct action research on the peculiar circumstances of their own teaching. In addition, Shulman (1987) said teachers need to be able to transform their action research, understandings, desired attitudes, and values into pedagogical representations and action or, more simply stated, use good methodology. Both Sykes and Shulman believe that special knowledge is required of teachers to enable them to do these things. They express considerable value in the "professional" component of teacher education, and both are actively involved in research on the professional knowledge base for teachers.

Shulman, Grossman, Richert, and their colleagues at Stanford University are actively engaged in the study of the knowledge growth of teachers. Shulman's work (1987) has enabled him to identify the following categories of the knowledge base for teaching:

- Content knowledge.

- General pedagogical knowledge, with special reference to those broad principles and strategies of classroom management and organization that appear to transcend subject matter.
- Curriculum knowledge, with particular grasp of the materials and programs that serve as "tools of the trade" for teachers.
- Pedagogical content knowledge, that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding.
- Knowledge of learners and their characteristics.
- Knowledge of educational contexts, ranging from the workings of the group or classroom, the governance and financing of school districts, to the character of communities and cultures.
- Knowledge of educational ends, purposes, and values and their philosophical and historical grounds. (ρ. 8)

Adapting Shulman's parameters for the knowledge base of teaching to vocational education rests on two fundamental assumptions: (1) vocational teachers will acquire a thorough grounding in the content or subject matter to be taught, and (2) teachers will become well grounded in the judgments and standards for choosing the content and delivery systems appropriate for the client groups (e.g., students and employers) they are serving. According to Shulman (1987):

> The key to distinguishing the knowledge base of teaching lies at the intersection of content and pedagogy, in the capacity of a teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful and yet adaptive to the variations in ability and background presented by students. (p. 8)

In adapting Shulman's knowledge base categories, Lynch (1988) concluded that research on the knowledge base and, therefore, the program design for vocational teacher education should come from the program areas or subject matter disciplines identified with vocational education (e.g., business, marketing, agriculture, and technology); studies of knowledge, ethos, and structure of the workplace; unique vocational subject matter curricula and their interrelated pedagogical knowledge or tools of the trade for teachers; empirical studies of teaching; information on the institutions in which vocational education is offered (including, for example, middle school, secondary, and postsecondary institutions, industry-based programs, and proprietary schools); learning theory and applicable motivation

techniques; knowledge of education ends, purposes, and values and their philosophical and historical underpinnings; and demonstrated practices of effective vocational teachers.

MODELS FOR THE DELIVERY OF VOCATIONAL TEACHER EDUCATION

Historically, vocational teacher education has operated cooperatively but uniquely with other teacher education programs. The uniqueness resulted from factors such as differing certification requirements; the emphasis on technical preparation and business or industry work experience; the number of people entering vocational education teaching and teacher education programs through nontraditional routes; faculty and programs often being administered in an academic unit other than education; supplemental funding from state departments of education; and the frequent use of inservice components for delivery of vocational teacher education.

The historic emphasis on inservice education has been significant in defining the delivery of vocational teacher education. Vocational teachers have often been employed in schools directly from industry without first completing a teacher preparation program and, in some cases, without any collegiate preparation, except, perhaps, a technical degree or a diploma from a postsecondary institution. A provisional certificate to teach was issued until they completed a set of prescribed education courses. Those courses were typically offered by vocational teacher educators, often using nontraditional field-based delivery systems.

Because the practice of employing persons from business or industry was widespread as vocational programs expanded in the public schools, meaningful university-state department of education-local education agency collaborations were established. Many teacher educators were itinerant teachers who spent the majority of their time "on the road" delivering courses and providing a broad range of professional services to provisionally certified teachers. They had only limited additional faculty responsibilities at their employing institution. Some teacher education programs were actually offered through state departments of education rather than from a college or university.

Federal legislation for vocational education and its inherent funding requirements have also had a direct impact on the development and delivery of vocational teacher

education and the roles and responsibilities of vocational teacher educators. That legislation has influenced the development of competency-based curriculum, the provision of inservice education for vocational educators, the emphasis on providing vocational education for students with special educational needs, the attention to program evaluation and follow-up of vocational education students, and other major vocational education initiatives. The legislative priorities have typically been incorporated into vocational teacher education courses, curricula, and program designs and have directly influenced the research and development activities of vocational teacher education.

Vocational teacher education has a history of experience with program models which contain elements recommended in current reform reports. Those components include competency-based instruction, field-based learning, alternative recruitment strategies, and an emphasis on technical preparation for teachers. That experience can be valuable in the design and assessment of teacher education models.

Without clear evidence to support one best strategy for the delivery of vocational teacher education, restructuring efforts should be based on the critical philosophy of the profession as well as the best evidence of effective practice. It should be directed toward achieving the important outcomes of education as effectively and efficiently as possible. Then, with the implementation of new models, research and evaluation must be undertaken to determine the appropriateness and effectiveness of each. As research results become available, additional refinement and strengthening of models can occur.

Based on that concept of reform, this paper presents the structure for three alternative delivery models for vocational teacher education. The three models are (1) a postbaccalaureate model, (2) a restructured baccalaureate model, and (3) a field-based model for recruiting and infusing nontraditional vocational teachers. The models are proposed as general structures which appear to be consistent with the current directions for change occurring in vocational teacher education programs. They can accommodate the goals of reform and can be realistically implemented using available resources in vocational education and vocational teacher education.

Undergirding the development of vocational teacher education program models are the essential elements of reform and the foundations of vocational teacher education. They include the following:

1. Vocational teacher education encompasses a number of teacher preparation programs with unique subject-matter content requirements, but with the common focus of preparing teachers skilled in the design and delivery of vocational education as it is and should be offered in public schools, vocational and technical institutions, and community colleges.

2. There are unique qualities and requirements for vocational education personnel and an identifiable knowledge base for vocational teacher education that should be included in any delivery model.

3. There is a need for flexibility and variation in the delivery of vocational teacher education that allows response to state, institutional, and student characteristics and needs. Particular attention should be given to the development of models which will meet the demand for vocational education teachers and use qualified personnel prepared through college and university vocational teacher education programs in doing so.

4. The design of vocational teacher education models should draw on the experience of the profession with competency-based education, alternative delivery systems, field-based teacher education, and broad-based recruitment strategies.

5. Vocational teacher education delivery systems should be designed to attract and retain potentially successful teachers from a variety of sources with particular emphasis given to the identification of ethnic minority candidates and persons with recent business or industry experience.

6. Vocational education teachers and teacher educators must demonstrate competence through appropriate testing in academic and basic skills, pedagogy, the planning and managing of vocational education, and relevant technical skills.

7. The delivery of effective vocational education requires a complex set of knowledge and skills which cannot be mastered in a short time. A differentiated staffing pattern in vocational education should allow the participation of people with specific skills and the opportunity for them to advance professionally as they increase their knowledge and skills as vocational educators.

Effective program models for the delivery of vocational teacher education can retain the essential identity and philosophy of vocational education while achieving the key goals of educational reform. That includes (1) a broad-based curriculum containing an appropriate balance of liberal studies, pedagogy, and subject matter preparation; (2) continued exposure to and experience with effective practices in the many types of schools where vocational education is offered and in business and industry; (3) meeting or exceeding standards as established by all agencies with accrediting jurisdiction for the curriculum; and (4) a curriculum designed and managed by persons who are qualified academically for appointment to the college or university faculty. Instruction should be provided as appropriate by teacher education faculty, faculty from academic units responsible for liberal studies, faculty from relevant subject matter and professional education studies, and current practitioners who serve as "clinical professors."

Successful completion of any vocational teacher education curriculum should, at a minimum, qualify the graduate for a baccalaureate degree and for full certification as a probationary teacher. Structures for vocational teacher education should be most responsive to achieving appropriate education and vocational education outcomes rather than to the goals of any specific educational reform report.

A Postbaccalaureate Model

The basic structure of a postbaccalaureate model for vocational teacher preparation is generally consistent with the philosophy of the Holmes Group (1986). Teacher preparation will be provided to persons who have completed a baccalaureate degree in the academic area in which they are preparing to teach. The teacher education program will be administered at the postbaccalaureate level and will consist of an intensive study of teaching combined with significant, reflective practice.

Prior to acceptance into a vocational teacher education curriculum, the student will have completed a baccalaureate degree with an existing subject matter or specially designed major related to a vocational education certification area. Admissions standards, including testing, will be used to evaluate the quality of academic preparation, technical competence, and qualification for graduate study.

The postbaccalaureate curriculum will support an intensive, rigorous study of the philosophy and principles of education and vocational education, pedagogy, and the relationship of pedagogy to the subject matter to be taught. Rather than concentrating exclusively on the development of specific pedagogical knowledge and competencies, the concentrated teacher education curriculum will support the study of teaching/learning processes and models related to vocational education and to the technical subject matter. The goal is to prepare professional educators who can create more effective forms of vocational instruction rather than to develop teachers with a specific set of instructional skills.

The teacher education program is managed through a college or university committed to vocational teacher education with extensive involvement of the faculty of schools offering comprehensive, quality vocational education programs. The curriculum will be planned and instruction and supervision will be provided through cooperative efforts involving teacher educators, subject matter specialists from the college or university, expert vocational education teachers, school administrators, and business people.

With successful completion of postbaccalaureate requirements and certification in a vocational education subject area, the teacher will be prepared to move through a shortened probationary period into a tenured teaching position.

A Restructured Baccalaureate Model

Currently, most teachers enter vocational education with a baccalaureate degree with some (particularly in the trade and industrial and health occupations areas) beginning to teach without a four-year degree. Most vocational teacher education programs and resources are concentrated at the undergraduate level and certification requirements for beginning teachers traditionally require the baccalaureate degree for most beginning vocational teachers. Given that status and the continuing debate regarding the need for postbaccalaureate preparation for the probationary teacher, a restructured four-year program is an appropriate, testable model for the delivery of vocational teacher education.

To meet the challenges of reform and to maintain a four-year program, several structural changes will be necessary that may be considerably different from current practice. A strong commitment will be needed from the college or university to prepare

vocational education teachers through an effective, integrated four-year program. Students should be selected based on carefully developed admission standards at, or shortly after, the beginning of the four-year program and continually monitored throughout the program to insure the academic capabilities and subject matter underpinnings to master the knowledge and skills required of the professional vocational educator.

A restructured curriculum will include mastery of liberal studies through a coherent, sequenced program (rather than from a collection of independent courses) and a comprehensive, technical preparation in the subject matter which the vocational educator is preparing to teach. That curriculum will require cooperative planning and scheduling between vocational teacher education faculty and the faculty of the other disciplines.

A restructured education curriculum should integrate the study of pedagogical and vocational philosophy and methodology with subject matter specialization and field-based experiences. Such restructuring will require a careful assessment of the critical pedagogical requirements of the beginning vocational education teacher and the design of an integrated, efficient education curriculum. Carefully designed, supervised, and sequenced observations and practicums in public schools, vocational-technical centers, and community colleges will extend from the beginning of the curriculum through its conclusion and will be coordinated with the study of pedagogy. This will allow the prospective teacher continuing opportunities for application, evaluation, and reflection as knowledge and skills develop. A culminating teaching internship in a vocational education program should be jointly planned, implemented, and supervised by the teacher education institution and the school. The student will intern with a master teacher who has effective mentoring skills and who is an active participant in the vocational teacher education program as a clinical professor.

A unique element of vocational teacher preparation is practical job experience. Extended part-time work experiences or intensive internships in business or industry should be part of the curriculum design to enable students to apply technical skills and to refine a philosophy of work and vocational education. Innovative, more efficient methods of attaining that work experience will be required in a four-year teacher preparation program.

Upon completion of the baccalaureate program, the student will be credentialed as a probationary teacher. The employing school will be responsible for administering a

comprehensive program to successfully induct the beginning vocational teacher into his or her professional responsibilities.

A Field-Based Model

The field-based model is designed for prospective teachers who begin to teach in vocational education without completing a teacher education program. Typically, beginning teachers will have at least a baccalaureate degree and extensive occupational experience. However, particularly in trade and industrial education and health occupations programs, a large percentage have historically entered teaching without a baccalaureate degree. The field-based program will allow people with specific skills and extensive occupational experience, which will qualify them for probationary teaching appointments, to develop the pedagogical skills necessary to achieve full certification and tenure.

..sign of the field-based program is critical to its success. It requires an extensive and continuing commitment to professional development from a teacher education program and the employing school. Content, instructional resources, delivery of instruction, mentoring, and evaluation are critical to the successful development of the probationary teacher.

The employing school must provide the structure, time, and resources for a clinical environment. The teacher education program must develop administrative structures, curriculum, instructional technology, supervision, and evaluation strategies. An instructional team of vocational teacher education faculty and master teachers serving as clinical professors will be required to cooperatively plan and implement a field-based teacher education program.

Admissions requirements into the field-based program would include (1) probationary employment as a vocational education teacher; (2) documentation of significant employment experience and successful completion of an appropriate technical competency test; and (3) completion of an appropriate baccalaureate degree or (when appropriate) completion of matriculation requirements into a vocational teacher education program.

The curriculum for the field-based model must respond to the immediate as well as the long term needs of the probationary teacher. Critical pedagogical skills needed by the

beginning teacher must be developed through an initial core curriculum. According to McKibbin (1988), several states, including New Jersey, Texas, Georgia, and California, that are using an alternative certification strategy have identified basic elements of the core curriculum. The core focuses on competencies related to (1) teaching and learning processes, classroom management, behavior control, and student diagnosis; (2) curriculum development and instructional techniques; (3) planning the classroom environment; (4) working with parents; (5) language development; and (6) multicultural education. After completing the core curriculum, the probationary teacher will be given a formal evaluation to certify competence in basic pedagogical knowledge and skills.

Prior to completing the core curriculum, the probationary teacher should be used in noninstructional roles or complete only limited instruction under the direct supervision of a master teacher. Upon verification of core competencies, the probationary teacher can assume a broader set of instructional responsibilities while completing the advanced teacher education curriculum as delineated from the researched knowledge base. As the probationary teacher progresses beyond the core, continuing supervision and support of teacher educators and clinical professors will be an integral part of the program. Opportunity must be provided for the nondegreed vocational teacher to obtain a baccalaureate degree within an appropriate timeframe.

Finally, an appropriate and objectively administered education procedure is necessary to verify the effectiveness of a field-based delivery model for vocational teacher education.

CONCLUDING RECOMMENDATIONS

It was the purpose of this paper to discuss the perceived effects of nationally posited and state-mandated reforms in teacher education upon vocational teacher education and to chart some future direction for vocational teacher education within this overall context of reform. The paper discusses the salient features of reform in teacher education as mandated by policy groups in at least forty-six states. Some of the philosophical underpinnings of vocational teacher education are presented, and their uniqueness within teacher preparation is discussed. The paper addresses the issues in vocational teacher education

with regard to reform in initial state certification requirements, teacher testing, and program or curriculum changes. Where available, data on teacher education and vocational teacher education is presented. A proposed framework for determining the knowledge base of vocational teacher education and three alternative, testable models for its delivery are presented.

It can be concluded that not much is generally known about vocational teacher education. There are about four hundred and thirty-five colleges and universities that purport to offer one or more programs of vocational teacher education; however, generalizable information about the program designs, administrative structures, curricular content, faculty, and student census is not known. There is some evidence that vocational teacher education, at least in relatively smaller state colleges or state regional universities, may not have been affected much by reform in teacher education. However, several of the nineteen universities affiliated with the University Council on Vocational Teacher Education have responded somewhat to nationally posited, state-mandated, or university-initiated teacher education reform.

It is proposed that systematic, disciplined inquiry begin to guide reform in vocational teacher education. We simply need to know more about it such as its effects on achieving the important outcomes of education in general and vocational education specifically. Reform should be nurtured from a desire to understand and to improve rather than from a perceived need to renovate. To that end, the following recommendations are offered:

1. A national commission should be established to examine and study vocational teacher education within a context of educational reform, the goals of public education, the philosophy of vocational education, and the knowledge bases for teaching. The commissioners should represent a broad base of researchers, policymakers, and practitioners within and external to vocational education and teacher education. Their essential mission would be to guide the research and development of knowledge and systems necessary to reform effectively vocational teacher education.

2. Data is needed about vocational teacher education: Its scope, administrative structure, design, curriculum, standards, faculty, students, and—perhaps, most importantly—its actual and perceived (in)effectiveness. Accurate data is essential for making informed decisions and launching further informed and enlightened studies.

Perhaps, as a minimum, institutions purporting to offer vocational teacher education need to be surveyed to determine the nature of their programs, faculty, and students. The instruments used by the American Association of Colleges of Teacher Education (AACTE), the National Council for Accreditation of Teacher Education (NCATE), and the National Center for Educational Statistics (NCES) might also be modified to provide better data relative to the needs of vocational education and vocational teacher education.

3. The basic beliefs—the philosophy—undergirding vocational education and vocational teacher education need to be examined and disseminated to ensure that they are accurately reflected in teacher education reform movements. Vocational education and, by inference, vocational teacher education must be kept current, relevant, and responsive to the needs of its client groups, the international workplace, its colleagues in training and education systems, new research, and reform and renewal movements. Vocational education must be an integral part of national education and employment policies. To maintain a comprehensive, viable system of vocational education and vocational teacher education requires a constant reevaluation of our fundamental beliefs and then the utilization of our beliefs to shape future policy and practices.

4. The entire system for controlling entry into and exit from vocational teacher preparation programs needs to be carefully studied for its effects upon all current and prospective members of the vocational teaching force. This speaks to many of the essential elements of teacher education reform; for example, standardized testing prior to admission and upon exit from teacher education, curriculum and degree requirements needed for state certification, and education field-based experience requirements. Some of the requirements unique to vocational teacher education such as occupational experience and occupational competency testing also need to be examined. Such studies should be conducted within a context of the goals and outcomes of education and vocational education and the professionalization of the teaching force. Furthermore, any impact of specific requirements on teacher recruitment, especially from among ethnic minorities and people in the workplace, needs to be identified and assessed.

5. The knowledge bases for teacher education in general, vocational teacher education, and specific vocational subject areas need to be determined in light of the needs of

the workplace and of students. Research on the knowledge base and therefore the program designs for vocational teacher education should come from the subject matter areas identified with vocational education; studies of the knowledge, ethos, and structure of the workplace; unique vocational subject matter curricula and their interrelated pedagogical knowledge; empirical studies of teaching; information on the institutions in which vocational education is offered; learning theory and applicable motivation techniques; knowledge of education ends, purposes, and values and their philosophical and historical underpinnings; and demonstrated practices of effective vocational teachers.

6. Experimentation is needed with varying models of delivery for vocational teacher education. No one delivery model is recommended at this time. Rather three models—a postbaccalaureate model, a restructured four-year model, and a field-based model for "nontraditional" prospective teachers—are initially recommended for further planning, implementation, and evaluation. Certain elements deemed essential in the preparation of vocational education teachers and germane to the outcomes of vocational education should be common in all models; other elements would be cast into an experimental mode and their effects carefully analyzed.

Finally, the authors feel it necessary to state clearly that reform in teacher education is only one component in the overall reform of public education as called for in national studies and implemented through state-mandated reforms. Many of the problems mentioned by the Holmes Group (1986) and others are the result of societal changes and conditions in the public schools, not the quality of teacher education. It is interesting to note that few studies cite poor quality or ineffective teacher education as reasons for teachers' defection or the cause of their low morale. In fact, there are four major reasons why teachers, including those with outstanding college grades and high test scores and liberal arts and science graduates, leave teaching: (1) they don't feel they are successful at it—the intrinsic rewards are simply not present; (2) low pay; (3) overly bureaucratic school structures; and (4) the lack of career advancement. Former vocational education teachers cite two additional reasons for leaving teaching: (1) poor image of vocational education, and (2) low quality students (Lynch, 1986). Thus, poor working conditions in schools have drastically affected teacher retention and limited the pool of people who will consider careers as teachers. Reform in the curriculum and instruction for teacher education will not solve these problems.

REFERENCES

Adams, D. A., Pratzner, F. C., Anderson, B. H., & Zimmerer, M. E. (1987). Vocational teacher education in an era of change. *Vocational Education Journal*, 62(4), 25-27.

Adamsky, R. A., & Cotrell, C. J. (1979). *Vocational teacher education: A review of the research.* Columbus: National Center for Research in Vocational Education, Ohio State University.

American Association of Colleges for Teacher Education. (1987). *Teaching teachers: Facts and figures; research about teacher education project.* Washington, DC: AACTE Publications.

American Association of Colleges for Teacher Education. (1988). *Teacher education pipeline: Schools, colleges, and departments of education enrollments by race and ethnicity.* Washington, DC: AACTE Publications.

Anderson, B. H. (1986). *The status of vocational teacher education in University Council for Vocational Education member institutions.* Fort Collins: Colorado State University, School of Occupational and Educational Studies.

Carnegie Forum on Education and the Economy. (1986). *A nation prepared: Teachers for the 21st century.* New York: Carnegie Corporation.

Cruickshank, D. R., & Cruz, J., Jr. (1988). Trends in teacher preparation. *Journal of Teacher Education*, *40*(3), 49-56.

Darling-Hammond, L., & Berry, B. (1988). *The evolution of teacher policy.* Washington, DC: The RAND Corporation.

Duenk, L. G. (1988). *Trade and industrial education requirements in the United States and territories.* Blacksburg: Virginia Polytechnic Institute and State University, Division of Vocational & Technical Education.

Evans, R. N. (1988). *The history of NAITTE.* Bloomington, IL: National Association of Industrial and Technical Teacher Educators Press.

Evans, R. N., & Herr, E. L. (1978). *Foundations of vocational education.* Columbus, OH: Charles E. Merrill Publishing Co.

Fields, C. M. (1988). Poor test scores bar many minority students from teacher training. *The Chronicle of Higher Education, 35*(10), 1, 32.

Gage, N. L. (1984). What do we know about teaching effectiveness? *Phi Delta Kappan, 66*(2), 87-93.

Hawley, W. D., Austin, A. E., & Goldman, E. S. (1988). *Changing the education of teachers.* Atlanta, GA: Southern Regional Education Board.

Holmes Group, Inc. (1986). *Tomorrow's teachers: A report of the Holmes Group.* East Lansing, MI: Author.

Imig, D. G. (1987). On the knowledge base for beginning teachers. *AACTE Briefs, 8*(9-10), 3.

Jones, D. W. (1988). Assessing the knowledge base in teacher education: A fundamental and necessary task. *Teacher Education Quarterly, 15*(2), 21-31.

Kelly, M. E. (1988, April). *Published vocational education research: Past, present, and future.* Paper presented at the annual meeting of the American Education Research Association, New Orleans, LA.

Lanier, J. L., & Little, J. W. (1986). Research on teacher education. In M. C. Wittrock (Ed.), *Handbook of Research on Teaching* (pp. 527-569). New York: MacMillan Press.

Letherman, C. (1988). Reforms in education of schoolteachers face tough new challenges. *The Chronicle of Higher Education, 34*(32), 1, 30.

Lynch, R. L. (1986). Recruitment and retention of vocational education teachers. In *Achieving excellence in vocational teacher education* (U. S. Department of Education Contract #500-85-137, pp. 1-46). New York: Institute for Research and Development in Occupational Education, City University of New York.

Lynch, R. L. (1988a). Influencing vocational teacher education policy through research. In University Council for Vocational Education (Ed.), *Beyond the debate: Perspectives on the preparation of vocational education teachers*. Macomb, IL: Curriculum Publications Clearinghouse.

Lynch, R. L. (1988b). Vocational teacher education: A research agenda. In M. B. Griggs, R. Jones, & A. Slocum (Eds.), *Vocational teacher education and the Holmes Group*. Champaign: University of Illinois.

Lynch, R. L., Finch, C. R., Laporte, J. E., & Stewart, D. L. (1987, May). *Vocational teacher education task force report*. Unpublished manuscript. Blacksburg: Virginia Polytechnic Institute & State University, Division of Vocational and Technical Education.

McKibben, M. D. (1988). Alternative teacher certification programs. *Educational Leadership*, *46*(3), 32-35.

Miller, A. J. (1982). Certification: A question of validity. *Vocational Education Journal*, *57*(2), 27-29.

Melnick, S. L., & Pullin, D. (1988). Implications of the use of teacher competency tests. *The Education Digest*, *1*, 10-13.

Milanovich, N. J. (1986). Vocational-technical teacher certification—where are we? And where are we going? In *Achieving excellence in vocational teacher education* (U.S. Department of Education Contract #500-85-137). New York: Institute for Research and Development in Occupational Education, City University of New York.

Pratzner, F. C. (1987). *Vocational teacher education: A survey of preservice and inservice preparation*. Columbus: National Center for Research in Vocational Education, Ohio State University.

Pratzner, F. C. (1988). Vocational teacher education and the Holmes Group: Selected highlights from a survey of preservice and inservice preparation. In M. B. Griggs, R. Jones, & A. Slocum (Eds.), *Vocational teacher education and the Holmes Group*. Champaign: University of Illinois, Department of Vocational Education.

Sandefur, J. T. (1986). State assessment trends. *AACTE Briefs*, *7*(6), 12-14.

Schultz, J. L. (1988, April). *Published vocational education research: Past, present, and future.* Paper presented at the annual meeting of the American Education Research Association, New Orleans, LA.

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, *57*(1), 1-22.

Southern Regional Education Board. (1986). Serious shortage of science and mathematics teachers: What SREB states are doing. *Regional Spotlight*, *15*(2), 1-8.

Struck, J. W. (1986). *State requirements for offering specific vocational education programs by states; final report.* Washington, DC: National Center for Educational Statistics, U.S. Department of Education.

Sykes, G. (1983). Contradictions, ironies, and promises unfulfilled: A contemporary account of the station of teaching. *Phi Delta Kappan*, *65*(2), 87-93.

Wirt, J. G., Muraskin, L. D., Goodwin, D. A., & Meyer, R. H. (1989). *Final report, summary of findings and recommendations, Volume I.* Washington, DC: National Assessment of Vocational Education, U.S. Department of Education.