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Vocational professional/technical updating needs of trade and industry/technical postsecondary educators

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Iowa State University, 1990
Vocational professional/technical updating needs of trade and industry/technical post-secondary educators

by

Gary Jon Hoppes

A Dissertation Submitted to the Graduate Faculty in Partial Fulfillment of the Requirements for the Degree of

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Department: Industrial Education and Technology
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For the Graduate College

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Ames, Iowa
1990

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CHAPTER I. INTRODUCTION

Educators have long recognized that the knowledge base in every subject is rapidly changing and that there is a need to monitor the needs of teachers to maintain effective programs. As one educator noted, "We keep abreast of current and anticipated trends and we become discriminating about the quality of the information we ingest and then impart" (White, 1982, p. 25).

With the passage of the Vocational Education Act of 1963, schools at the post-secondary level began to recruit instructors who were educated primarily for industry and not as teachers. Many of the vocational education instructors came directly from careers in industry and some came with little, if any, formal education or training beyond high school. While some earned degrees, few acquired certification or an endorsement as a teacher. As a result, many of the early in-service and training needs were identified in the form of "pedagogical competencies rather than technical competencies" (Roehrich, 1979, p. 10). Staff development concentrated on teaching skills, ie: curriculum development, student evaluation, sex bias, learning disabilities, special needs, and managing budgets and facilities. Therefore, the early emphasis in the area of professional development was directed at the promotion of successful student interaction and survival in the classroom/laboratory setting. Thus, when reviewing the research and related literature for this topic, a great volume of material was found and, as expected, communication with state and local agencies provided information
primarily pedagogical in nature. For example, a summary study for the state of Wisconsin conducted from 1973 to 1984 dealt particularly with service to the Vocational-Technical and Adult Education instructors. Review of this material reinforces the earlier comment expressed by Roehrich (1979) and reflects the trend of in-service activities across the country for Vocational/Technical Adult Education instructors. Consequently, when instructors have been given the opportunity to update technically, the responses have been positive. According to Van Ast (1982, p. 34), "The workshop boosted morale and added a spark to the participants' outlook on teaching."

White (1982) brought to our attention the challenge before us by stating, "Maintaining a perspective on present demands and those anticipated in the future is difficult" (p. 25). She went on to define the term, "copeability." In her words, and reflective also of Alvin Toffler, "copeability" would be, "The challenge to develop (and teach) the knowledge and skills which serve us well in the present, and to cultivate those skills which foster flexibility and adaptability, so that we can accommodate to continual change." Not alone in her thoughts, many others in our profession have a clear vision and image of the unmet needs of the vocational instructor. Swanson, in his article "PROFESSIONALISM: The High Road or the Low?" (1982 p. 22), established definitions of professionalism reflective of the vocational teacher. He stated:

"A Professional:

a. has an unswerving commitment to clients,
b. has a legitimate and demonstrable claim on a specialized body of substantive knowledge or subject matter,
c. possesses and demonstrates a special set of skills for connecting the needs of clients to the specialized body of knowledge,
d. is committed to the goals for elevating the standards of professionalism, and
e. is committed to organizational activity for the achievement of goals which require the collective action of a group."

Storm (1976), Professor Emeritus, Ferris State College, Michigan, addressed a national conference in 1976 concerning post-secondary staff development. Given the task of defining "state of-the-art" in terms of in-service technical upgrading of post-secondary technical instructors, Storm, referring to trade and occupational skill development, stated, "It was found to be the most ignored area of staff development" (Wonacott et al., 1982, p. 2).

Also, in preparation for that conference in 1976, Doty and Gepner (Eds.), after completing an ERIC computer search, were only able to come up with three articles in the subject area. After the conclusion of the conference, they authored a publication, Post-Secondary Personnel Development Vol. 1. In it, they referred to Storm and his observations noting that, "We are not addressing new problems but rather problems that haven't been a primary concern of the majority within education regarding Vocational Technical Education" (p. 237).
In December 1981, Doty, presenting a paper at the annual American Vocational Association Convention with Cappelle, again drew on the observations of Storm:

"As we view the existing pattern of technical upgrading programs for post-secondary vocational/technical instructors, we can't help but look with awe at the wide variety of professional improvement opportunities that exist in most occupational fields. The opportunities are there, but they are not being used to the best advantage" (Doty and Gepner, p. 237).

Two years earlier the same question was aired by McLean (1979) addressing the automotive instructors in his article. He posed the question, "Who will train the mechanics to service these new vehicles?" (p. 15). Waiting for no response, he clearly placed the responsibility on the shoulders of the membership of National Association of College Automotive Teachers (NACAT--the professional organization for automotive instructors). He also noted that manufacturers will play a key role in this process. They must continue to make technical literature, service bulletins and training seminars available. He went on to state that, "... the task of getting up-to-date and staying there will necessarily depend upon the individual instructor" (p. 15). The school has established teaching loads and associated duties to fulfill their workday, making it difficult for them to interact with industry. Equally, the rapid insurgence of technology development just in the last ten years has placed an accelerated burden on vocational and technical instructors with the task of keeping pace with industry. As their tenure on staff as instructors increases, inversely their connections, time, and responsi-
bilities to industry become more withdrawn.

McCart et al. (1985), in her research on learning styles of established professionals, drew on the works of Kolb (1976) and looked at personal professional development at three levels: first, acquisition; second, specialization; and third, integration. It is this last category of learning that most fits the needs of the vocational/technical teacher. As a component of the life long learning process, McCart uses the definition of integration as expressed by Kolb:

"Integration is marked by reassertion and expression of the non-dominant adaptive modes of learning styles. Means of adapting to the world that has been suppressed and lay fallow in favor of the development of a more highly rewarded dominant learning style now find expression in the form of new career interests, changes in lifestyles, and/or innovation and creativity in one's chosen career" (Kolb, 1976, p. 7).

While each step can be identified and associated with other stages in one's career development, each step is marked by an increase in complexity and higher levels of personal ability. "Each is also evidenced by the dominance of certain cognitive abilities with the third stage demonstrating some integration of all of the primary abilities" (McCart, 1985, pp. 7, 8).

To further clarify the issue of learning styles and how trade and industry instructors might be viewed relating to their professional technical development, MaCrae (1984) completed research in the area of psychometric test responses and the strategies observed in young and middle-aged adults. Her findings included, "Older and technically
educated subjects were more likely to adopt nonanalytic strategies, depending on the item type. It was suggested that the age differences may be precursors of later decline in old age, and that technical education which in Australia is vocationally specific, may rely less on abstract cognitive skills" (p. 28).

Another premise that must be dealt with would be the aging of instructional staff and their desire/ability to learn and keep pace with technical change. Much research has been done in this area and findings by Birren et al. (1983) and Schaie (1982) reflect little evidence for declining psychometric abilities until the age of about 60; however, this assumption does require some clarification. First, it is acknowledged that all intelligence is not unitary in that not all abilities show decline, and that decline would not happen at the same rate (Horn and Donaldson, 1976). Second, as Honzik (1984) emphasizes, other factors temper the decline of learning ability, such as initial learning ability, experience, education, occupation and even the stimulation offered in the environment. Each of these areas of discussion tend to surface when vocational/technical instructors are asked to upgrade their skills.

Cohen and Faulkner (1983), after completing research on the elderly, made the following statement, "On the whole, the results suggest that old adults do not adopt different strategies but are less efficient at executing some particular strategies. In both tasks, the pattern of age differences reflects an impairment of processing efficiency that is more evident when older adults fail to adopt the strategies that effectively
reduce the amount of information processing. It must be noted though, that considering the difficulty and unfamiliarity of the tasks, the elderly perform remarkably well" (p. 454). For the interest of the reader, the elderly, as mentioned here, are from the age bracket of sixty-five to seventy. For all practical purposes, it should then be assumed that those people with only a few years to retirement (age sixty or younger) still have the capability to enhance their teaching effectiveness through updating activities. Apparently, the major problem has little to do with age and ability but rather the learning style of the person who is a technician.

Educational priorities and perceptions at the administrative level may not be similar to those of the vocational/technical instructor, nor do accreditation, professional growth requirements, and enumeration tables, here-to-for a standard for education, necessarily adapt to serve the immediate needs of the vocational/technical instructor. While the following comment was made more than five years ago, "Nearly one-half of all post-secondary instructors are considered to be in need of update" (Hamilton et al., 1982, pp. ix-x), no developments have taken place to change the impact or the dilemma which it reflects.

Statement of the Problem

Knowing the concerns of industry and the problems present in the educational community regarding instructor technical competency, this study is designed to investigate the perceptions of post-secondary Trade and Industry instructors, administrators, and responsible state
department staff regarding unmet technical updating needs of post-secondary vocational Trade and Industry/Technical teachers. Investigation will be placed in four general areas: staff development, evaluation, resources and incentives, and provider of services.

Asking the right question in the right way to gather the needed data is crucial. Questions and specific classifications were adopted from earlier research to insure that questions in the survey could be responded to readily. As a result of working with various populations and having a wide dispersion of identifiable training/classifications, questions will be worded to be most amenable to short answer responses.

NOTE: After a review of state funded school policy and negotiated labor/management agreements, previous findings reveal that these three areas categorically serve both the traditional academic and vocational staffs and allow equal access by each. Earlier studies support this precept and contain validated survey questions determined either by jury review or statistical factor analysis.

Therefore, traditional questions posed by staff and administration as to equity for salary advancement, degree credit, college equivalent units (CEU's), technical worth, academic value, etc., may be asked. However, to provide equal access to interpretation by all staff and administration, these three categories appear to be the most useful and most common. Concerns for release time, curriculum revision, technical updating to state-of-the-art, development of training aids, personal cost, etc., will be addressed, but only in the three areas identified earlier. Where preceding bargaining unit agreements exist, the language
tends to hinder special staff requests, ie:

a) concerning the methodology for identifying and providing opportunities for occupational professional growth of trade and industry teacher training to accommodate staff needs.

b) for delivery of technical training for post-secondary trade and industry educators.

c) for support of training activities by agencies such as industry, universities, schools (local and state), and governing agencies (State Department of Education).

d) for adequate interpretation and supportive utilization of legislation, funds, and sources available for technical updating.

Addressing these requests may serve as a key component of the research. If properly handled, many of the barriers in language that normally hamper special consideration for technical updating and staff development may be removed. Hence, an overwhelming problem appears to be not the training, but the equity among staff working under one-and-the-same negotiated agreement. While questions may be asked, they may not always be answered and in some cases, not even addressed. Why? Because they appear to provide preferential treatment to certain teacher populations.

The study will reveal the findings of data collected from five states, five occupational areas and two positions on staff regarding staff development, evaluation, resources and incentives, and provider of
services along with certain demographic information. This information will be used to test twelve null hypotheses for present and future time periods.

Purpose of the Study

This study will examine the congruency of technical update needs among and between five mid-western states, five occupational clusters within Trade and Industry, and two positions, instructors and administrators (local and state). The purpose of this research is to determine the relationship that exists between vocational administrators and post-secondary instructors in Trade and Industry/Technical programs regarding their views on key issues pertaining to technical updating as a component of professional growth and analyze the similarity among states an occupational areas selected for this study.

Questions of the Study

1. Is there a difference in respondents' perceptions when data are categorized by state with respect to the perceived instructional training needs currently being met by existing programs in the area of staff development at present and for the future?

2. Is there a difference in respondents' perceptions when data are categorized by trade occupational area with respect to the perceived instructional training needs currently being met by existing programs in the area of staff development at present and for the future?

3. Is there a difference in respondents' perceptions when data are
categorized by instructor and administrator of these occupational areas with respect to the perceived instructional training needs currently being met by existing programs in the area of staff development at present and for the future?

4. Is there a difference in respondents' perceptions when data are categorized by state with respect to evaluation being used as a component of professional growth and monitoring updating needs at present and for the future?

5. Is there a difference in respondents' perceptions when data are categorized by trade occupational area with respect to evaluation being used as a component of professional growth and monitoring updating needs at present and for the future?

6. Is there a difference in respondents' perceptions when data are categorized by instructor and administrator of these occupational areas with respect to evaluation being used as a component of professional growth and monitoring updating needs at present and for the future?

7. Is there a difference in respondents' perceptions when data are categorized by state with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas at present and for the future?

8. Is there a difference in respondents' perceptions when data are categorized by trade occupational area with respect to the re-
sources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas at present and for the future?

9. Is there a difference in respondents' perceptions when data are categorized by instructor and administrator of these occupational areas with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas at present and for the future?

10. Is there a difference in respondents' perceptions when data are categorized by state with regard to the provider of services at present and for the future?

11. Is there a difference in respondents' perceptions when data are categorized by occupational field with regard to the provider of services at present and for the future?

12. Is there a difference in respondents' perceptions when data are categorized by instructor and administrator with regard to the provider of services at present and for the future?

Assumptions, Limitations, and Delimitations of the Study

Assumptions of the study

This study will be conducted under the following assumptions:

1. The sample population will be identified through the assistance of
state and local administrators who serve Vocational/Technical education for those states and occupational areas that are selected for this study.

2. The questions in the survey instrument will render a valid measure of the perceived and desired professional growth of the respondents; i.e.: staff development, evaluation, and resources and incentives as these areas relate to technical up-date needs of Trade and Industry and Technical instructors. The instrument clusters were analyzed using the Cronback reliability coefficient to determine the clusters as well as the reliability of the entire instrument.

3. Respondents interpret questionnaire items correctly.

4. Respondents will make a good-faith attempt to respond to the questionnaire as truthfully as possible.

Delimitations or scope of investigation

The study will focus on a five-state region of the upper midwest which shares many common factors and add scope to the collection of data. It is hoped that the similarity of environment and diversity of trained labor needs will provide fairly consistent data concerning basic training requirements for those who teach tomorrow's technologist. This study will also be limited to collection of data contained in the scope of the questionnaire.
Sources, Data, Methods, and
Procedures of the Study

1. The purpose of the research is to derive information of critical
issues from existing sources related to professional growth, tech­ni­
cal updating, and staff development for Trade and Industry and
Technical educators.

2. In order to reflect a true cross-section of the instructional
population and the diversity of their training background, the
sample of the study will include the following professionals of
these Trade and Industry and Technical Education areas: Auto­
motive/Diesel, Auto Collision Repair, Electricity/Electronics,
Construction Trades, and Manufacturing/Machine Trades.

3. Letters will be sent to state and regional sources who supervise and
direct the delivery of Vocational/Technical education within the
five states chosen in order to develop a mailing list from which a
sample population can be chosen.

4. Kansas will be selected as a pilot state for this research. The
sample population from which responses are obtained will be iden­
tified by state and regional personnel sources who supervise and
direct the delivery of Vocational/Technical education. Using a
DACUM approach, these individuals will be asked to evaluate and make
recommendations of change as they see fit.

5. A data-base file will be created to store mail information.

6. A data-base file will be created to collect response data.
7. The survey questionnaire will be divided into two segments. Survey questionnaire one will collect demographic information and ask a few key questions to allow participants to express their own personal comments.

8. Survey questionnaire one will be mailed in mid-April of 1989, just prior to the termination of the spring term. A follow-up to this questionnaire will be mailed during the fall term of the 1989-90 academic school year and be sent to a sample of approximately 1011 instructors and administrators in Iowa, Minnesota, Missouri, Nebraska, and Wisconsin.

9. At the same time that survey questionnaire one is mailed in April, a pilot survey will be conducted in the state of Kansas which will contain both survey questionnaire one and survey questionnaire two along with an introductory letter. The letter will request the participants' evaluation of the instrument and encourage comments. A stratified random sample of 45 people representing both administrators and instructors will be selected from a population of 206 individuals and will equally include members of the five occupational clusters: Automotive/Diesel, Auto Collision Repair, Electricity/Electronics, Construction/Building Trades, and Manufacturing/Machine Trades.

10. Demographic data from survey questionnaire one will be collected and then shared with all possible participants with an encouragement to participate in survey questionnaire two.
11. Survey questionnaire two will require the respondents to express their perceived opinions on key issues relating to professional growth, incentives, and technical update activities available to them and personal comments by the participants will again be encouraged.

12. Information obtained in the pilot test conducted in Kansas will be used in the revision of the instrument prior to mailing survey questionnaire two.

13. Survey questionnaire two will then be mailed to all individuals who respond favorably to survey questionnaire one and both questionnaires will be sent to all individuals who did not respond to the first mailing as a follow-up procedure.

14. Information from both survey instruments will be compiled and stored in database files and then be analyzed using SPSSX statistical software package.

15. One aspect of the research is to validate questions that had been used in previous research by Roehrich (1979). A reliability test will be conducted regarding these questions and data will be presented in Chapter IV.

16. T-Test statistical analysis will be used to determine if there is significant difference between staff and administrators. Measurement of F-distribution is an important factor for determining whether a pooled t-Test or separate t-Test should be used when establishing a level of significance. This is commonly referred to
as the F-ratio. In this research the level of significance for the F-ratio and t-Test will be established at the .05 level.

17. ONEWAY ANOVA statistical test will be employed to investigate the relationship among perceived and desired opinions of the participants regarding the independent variables of this study. Tests will be run to determine if there is significant difference of perceptions for staff development, evaluation, resources and incentives, and provider of services with respect to the occupational area and/or the state in which the participant teaches.

18. To draw conclusions based on the analysis of collected data, the probability level, unless otherwise stated in the findings, will be established at the .05 level.

Definition of Terms

Administrator The individual who is held accountable for the delivery of Vocational Educational courses within the structure of state funding and federal funding. This person assumes responsibility for the fiscal management, assignment or endorsement of staff, and support activities for program delivery.

CEU's An acronym standing for "College Equivalent Units" developed for the purpose of maintaining mandatory basics of professional growth in support of instructional activities that have been identified solely for certificate renewal.

Curriculum All the courses of study offered at a university or school which may include both written and visual materials that support
lecture and laboratory activities. These can include concepts of learning delivery such as competency based instruction (CBE), learning activity packets (LAP), etc. Materials identified as curricula may be manuals, mock-up models, software, audio and visual hardware, occupationally identified component parts, etc.

**Evaluation** To find or determine the worth of instructional activities for, or related to, the learning environment of Trade and Industry and/or Technical Education.

**In-service Education** Workshops which incorporate concepts that may include organizational development, consultation, communication, improved coordination techniques, leadership, and evaluation.

**Occupational Areas** The separation of job descriptions by which activities of work performed have similar manipulative, logical, and thought processes. This partitioning results in the creation of what is termed "occupational clusters."

**Professional Development** Activities established to improve and/or enhance an individual's ability respective to their occupational competencies and job position.

**Professional Growth** Recognition and placement within an occupation area relevant to one's entry into and development of expertise as it relates to job performance.

**Provider of Service** Those parties, groups, or service agencies which are within the setting of education or industry and tasked with the orientation, provision, and sponsorship of training activities for
vocational and technical educators.

Technical Pertaining to some particular art, science, or trade; particular to or used in a specialized field of knowledge; of or pertaining to mechanical arts.

Technical Update The development of one's knowledge relevant to current and future application of materials and processes as related to art, science, and trade. One who has completed technical updating is considered to have the most current knowledge within a technical area and is "state-of-the-art" qualified.

Trade and Industry A program of Vocational Education designed to develop manipulative skills, safety judgement, trade ethics, leadership abilities, technical knowledge, and related occupational information which prepares individuals for initial employment, or upgrades or re-trains out-of-school youth and adult workers in trade, technical, and industrial occupations.

Resources and Incentives This term refers to available offerings that may be provided within the confines of a negotiated teacher's contract. All items available to an academic instructor must be available to a vocational instructor of Trade/Industry and Technical Education. Equally important, alternative certification methods provided to vocational instructors of Trade/Industry and Technical must be an option which is available and accessible to all negotiated contract staff.

Staff Development Staff development is the totality of educational and personal experiences that contribute toward an individual's
being more nearly competent and satisfied in an assigned role (Dale, 1982).

**State Department Representative** A designate of the Department of Education, who, at the state level, is responsible for and oversees the delivery of vocational and technical education courses within the boundaries of the state. This individual also has the ability to provide direction, assistance, and, in some cases, funding support.

**Update** To make more modern and/or current, providing the most recent information available for distribution.

**Vocational Instructor** A person who provides instruction to others within specific occupational cluster, of which that person has considerable experience and expertise.

**Workshop** Educational activities that are organized to centrally distribute or transfer knowledge and/or information to a concise population about a predetermined topic.
CHAPTER II. REVIEW OF LITERATURE

This chapter addresses the many varied concerns and premises associated with professional growth, technical updating, and staff development for Trade and Industry and Technical Education instructors. There is a lack of research associated with this problem and it is of sufficient importance to warrant considerable future efforts. Discussion and opinions of various points of view will be expressed to illuminate the frustration and lack of agreement that exist within the area.

Houston and Freiberg (1979) expounded on this very dilemma just ten years ago in an article entitled, "Perpetual Motion, Blindman's Bluff, and In-service Education" and as the title infers, it appeared that no one had a handle on the solutions and answers then and that the confusion continues yet today. Their article did shed light on a few underlying premises, such as: 1) incentives for advanced education and degrees may be important, 2) meager salary increases may be a concern, and 3) the crisis will only increase because little to no attention is being paid to training the trainers. While some issue has been raised to the definition of some nondegree, nonacademic oriented instructors, Houston and Freiberg did manage to pinpoint two strong clarifications that we can agree on. "As professionals, teachers are responsible for their own development--continued development is a mark of a professional" (p. 11). They continue to identify this professional as possibly having an impact on their own future; i.e.:
"Educators must assess their own areas of strength and weakness in broad and specific areas of professional competence, set out a plan for improving current skills, and progress toward those goals" (p. 11).

Somehow these clear and concise comments, definitions, and statements do not seem to clearly differentiate the teacher as a "professional" from the technician, craftsman, scientist, artist, etc. Each of these individuals lives by a similar code and philosophy. Without such personal direction no one can command your attention, seek recognition or gather enumeration, for in the eyes of the consumer, they have little value.

Matthews et al. (1984) and others who conducted staff development research in a rural South Carolina region expressed a concern for an issue that appeared to have direct impact and influence on staff development.

"Morale of faculty is low because media and the many newly released educational reports focus on the negative rather than the positive effects of the American education system. The general attitude appears to be that schools should produce more with less money" (p. 1).

To further color the bleak image, one has only to view the public impression of teachers and/or the educational community from the view of industry, as expressed by Darling-Hammond (1984), in a want-ad of the Rand Corporation:

"WANTED:"

"College graduate with academic major (Master’s Degree preferred). Excellent communication and leadership skills required. Challenging
opportunity to serve 150 clients daily, developing up to five different products each day to meet their needs. This diversified job also allows employee to exercise typing, clerical, law enforcement, and social work skills between and after hours. Adaptability is helpful, since suppliers can not nor always deliver goods and support services on time. Typical work week is 47 hours. Special nature of work precludes fringe benefits such as lunch and coffee breaks, but work has many intrinsic rewards. Starting salary $12,769.00 with a guarantee of $24,000.00 after only 14 years" (p. 47).

In lieu of all this rhetoric, one clearly envisions the position of the teacher as a professional who may not be smart enough to come in out of the cold or capable of drawing a valued income. We have yet to view the role and image of vocational education instructors who have alternative credentials. In the most modest of claims, a simple question is posed, "Are people who enter the field through nontraditional means as qualified as those who follow traditional teacher preparation programs?" (Erekson and Barr, 1985, p. 17).

This system of providing a provisional certification in vocational education has brought with it a two-class system. Credentials that express certification as provisional, probationary, limited, emergency, or temporary, only create and infer a substandard level of training or preparation to serve. Nothing could be further from the truth, yet such labeling has been inferred and used as reasoning for the purpose of creating lower base salaries. A lower level identity for vocational
staff with less than four-year college degrees thus exists in most
negotiated agreements at the post-secondary level.

Work Experience, Educational Background, and
Certification Status of Teachers

The late baseball commissioner, Giamatti, as president of Yale
University in 1983, was quoted by the Washington Post in the article "The
Great Education Panic", "Teachers have taken a battering recently, a
battering all out of proportion to their responsibility" (p. 19). Their
is a heavy responsibility as Venn writes in his forward of the Vocational
Education Bulletin, edition #1 (1966). He identifies eight areas of
effective planning; yet while he does not address definite beliefs
related to prior work experience, educational background, certification,
he does address the skills of a "jack-of-all-trades," master teacher/
industrial professional, and he states the qualities that exist in a
progressive vocational education setting: "(1) employ highly qualified
and efficient personnel, (2) relating the program directly to employment
opportunities and needs of youth and adults for opportunities in voca-
tional education, (3) analyzing occupations as to the bases of specific
course content, (4) providing needed facilities and equipment, (5) al-
lowing sufficient time for instruction to develop skills and judgement
for the accepted levels of performance in the student's chosen occupa-
tion, (6) evaluating and continual revising of the program, (7) engaging
in needed research, and (8) cooperating with interested groups" (1966, p.
vii). For example, in the state of Iowa, a certified vocational
instructor must meet the following requirements:

1) Complete a minimum of 6000 hours employment within a given occupational area for which certification is sought.

2) Possess a teachers certificate with an emphasis in the respective teaching area.

3) Exemplify those personality traits which permit a maximum link between the educational community and the industrial environment.

4) Score respectfully on an occupational test that has been validated at a national level for the chosen occupational area.

In general, educators may profess that each of these traits are visible in their personal vitae sheets, resumes, etc; however, only vocational certified teachers are expected to present documentation of work and trade experience. Administrators and supervisors also have the ability to waive, to some degree, the level of formal education while requiring more specific concentrations of skills which are attained through informal educational methods. Each of these variables reflects the possible differences that exist between vocational/technical teachers and classroom academic staff. Yet the management of staff continues to be dictated by a singular negotiated contract which takes into account little or none of this variation regarding professional identity; ie: professional growth paths and equity of past experience for enumeration.
Trade Experience, Formal and Informal Education, and the Staff Role in Technology Education

Vocational/Technical educators actually begin a slow death of technical competency when they accept a position to teach in the academic setting. They lose their ties with industry and are asked to closely align themselves with academic educators and their policies/practices. Informal training activities are not valued by either their peers or by the salary schedules negotiated between districts and professional staff. As a minority population in most faculty associations, activities directly related to vocational staff gather little concern respective to academic education topics. Business and industry linkages, personal technical development plans, and other criteria set forth at legislative and policy making levels gain little support when seeking equity in the educational community for vocational/technical instructors.

Obsolescence and Technical Updating

In teaching, it's not too uncommon to order parts for a machine that is used every day only to find out that it is out of production and in fact 'Old Technology.' Notice the author didn't say "old and worn-out" equipment. One has to be careful not to throw out the basic premise of design and application simply because state-of-the-art utilization no longer requires rudimentary developmental understanding to produce goods or services. Trade and Industry and Technical teachers must carefully screen curriculum and incorporate technological advancements while maintaining the quality of instruction as it pertains to basic
operational needs of industry. Swanson (1982) writes, "A professional has a legitimate and demonstrable claim on a specialized body of substantive knowledge or subject matter" (p. 22). That is to say, there is no substitute for some aspects of technology knowledge to continue as a core of information deemed vital for the transition of learning to remain as part of curriculum. One should, however, be able to seek out new knowledge within a given field and augment those aspects that provide a continuation of learning which is supportive of new technology applications.

It is not an easy task. Gatewood White (1982) puts the task at hand in perspective, "To grow, we cultivate an inquisitive mind. We ask, "Why?" and we encourage our students and associates to do likewise" (p. 25). Not being aggressive to the situation as professionals, all too often they become stagnant, even stuck-in-a-rut. While they recognize that as teachers they are also learners more so than other occupational segments of their population, too often growth and professional development have limitations and restrictions not commonly found outside the educational setting. For example, in business and industry more knowledge and application of that knowledge can provide instantaneous financial benefits, whereas in education, knowledge seems to provide more of a personal reward rather than a monetary one.

Wenrich et al. (1988) gives insight to update training and professional growth options when he suggests the following:
"Industrial experience or company training courses (as in data processing) may be the major developmental option. Vocational and technical teachers should be given leave of absence and sabbaticals for appropriate work experience to upgrade technical competencies" (p. 171).

Research has allowed experts in the field to strongly suggest three areas of concern based on this premise: failure to provide alternative options for technical/professional growth in the form of retraining will possibly cause the learning environment to suffer the risk of having outdated curricula. Through collaborative effort, administration and instructional staff should continue to seek in-service training for technical faculty in three major areas: "(1) related to their occupational area, to the labor force, and career education problems in general, (2) upgrading specific technical skills to keep faculty current, and (3) teaching skills involved in evaluation, media technology, curriculum development, and student counseling" (Wenrich et al., pp. 171-172).

Many authors profess to have exacting criteria for staff development. Wood, Thompson, and Russell (1981) have given the following assumptions which have been modified to reflect the needs of vocational instructors:

1. All staff need in-service as an ongoing activity throughout their professional careers regardless of occupational emphasis.

2. In-service should focus on improving the quality of programs and the growth of the individual within the program.

3. Educators are motivated to learn new procedures when they have some control over their learning and are free from threat.
4. Significant improvement in educational practice takes considerable time and long-term, in-service programs.

5. Educators themselves vary widely in their professional competencies, readiness, and willingness to learn.

6. Professional growth requires commitment and adjustment to new performance norms.

7. School climate influences the success of a professional development plan.

8. The school is the most appropriate unit or target to affect change in education.

9. Schools have a primary responsibility for providing resources for in-service training.

10. Top administrators are critical to the adoption and provision of practices supporting staff development.

In general it would be safe to state that no policy of staff development is wrong; each has in it the intent to be considerate of the employee and his professional needs. It becomes a local responsibility to determine and implement those activities which have the most favorable impact in the educational community served.

Staff Load and its Impact on Technical Competency

The issue of work load is usually considered a component of resources and incentives. Dealing with actual instructional assignments, counseling activities in support of students, office hours, committee
meetings, and interaction with the community, etc., work load as it is perceived may very well be an underlining cause to greater problems. As a tool to measure productivity and performance, it continually becomes an evaluation variable, one which may be unjust and lead to an even greater negative impact on the vocational instructor. Simply stated, Wenrich et al. (1981) says:

"The problem, particularly at the post-secondary level, is the number of contact hours per week usually required in occupational programs versus the lesser hours taught in nonoccupational programs. It is difficult to get an acceptable agreement about the ratio equivalency of occupational contact hours to academic lecture hours" (pp. 173-174).

This situation places on the vocational/technical instructor a dilemma for which he is not prepared to deal with, and possibly not qualified for, to bring about an adequate resolution. At a level higher than his, someone must seek a solution which takes into account the job mandates of federal/state legislation supporting the instruction of vocational technical education. Accustomed to the contract negotiated for the academic population, administrators at the local and state levels need to make adjustments which allow for release time to complete all tasks in accordance with legislative directives. This concern thus far has been ignored. Many of these activities have had to be completed by instructional staff on their own time outside of the school day and may not be recognized or even considered in the staff development, evaluation, and resources and incentives process.
CHAPTER III. METHODOLOGY

This chapter will contain an overview and summary of the development, evaluation and utilization of materials and resources that will be used to conduct this study. Some materials will be adopted from previous research conducted by others in the field. Acknowledgement of such support will be noted.

Information concerning the procedures will be addressed categorically as follows.

Definition of the Population

The research will be designed to study a sample of technical professionals who teach or provide related administrative supervision. The sample will consist of instructional staff who meet the minimal certification requirements to teach vocational education and supervisory administrative staff who, by job title and description, are identified as having direct impact on hiring, evaluation, and support of Trade and Industry and/or Technical education at the community college level. Further, only individuals identified in the areas of Automotive/Diesel, Auto Collision Repair, Construction/Building Trades, Electrical/Electronics, and Manufacturing/Machine Trades or directly related administration personnel will be selected as participants. Communication to state department representatives and their designates will make it possible to construct a directory of over one thousand individuals from which to gather data in a five state region.
Demographics of the Population

The selection of states involved will require that research activities be limited to a population of similar makeup, thus demographics will be important in the establishment of the survey region. Factors such as manufacturing environment, agricultural setting, metropolitan population areas, rural settings, and social/economic considerations will be of concern in the identification of the sample population to be surveyed. The population from which to gather data will include representatives from six midwestern states having a possible participatory population of over 1600. Estimating that approximately seventy percent will be identified with good mailing addresses, the initial design of the survey should yield a target population of approximately 1100 participants. Of these, it has again been estimated that seventy percent, or approximately 850, will actually participate in the survey. Using Kansas as a pilot survey state will make it possible to select an appropriate number of Trade and Industry/Technical instructors to review the questionnaires and provide feedback.

Identification of the Pilot Sample

A pilot study population of 206 Trade and Industry and Technical instructors and their administrators have been identified in the state of Kansas. This population was chosen because of its similarity of environment, population served, and social economic setting. Information given by the Kansas Department of Education has provided a list of the possible respondents representing the five identified program areas and
corresponding administration. A stratified random sample will be selected by identifying five instructors for each occupational cluster, five administrators, and one state official. An additional two individuals will be selected from each area to insure that the entire state is demographically represented by regional criteria established by the Kansas Department of Education. Survey sample participants will then receive a packet of materials containing a letter requesting participation, survey questionnaire one, and survey questionnaire two (see Appendix p. 110).

Identification of the Sample

The population of this study can be identified as instructors and administrators of Vocational Technical education at the post-secondary level within the five state area. Participants will be individuals on staff for the 1988-89 and/or 1989-90 school year either teaching or administratively related to one or more of five instructional areas: 1) Automotive/Diesel, 2) Auto Collision Repair, 3) Construction/Building Trades, 4) Electricity/Electronics, and 5) Manufacturing/Machine Trades.

Of the five state area (Iowa, Wisconsin, Minnesota, Missouri, and Nebraska), all post-secondary vocational instructors and administrators will be surveyed. The rationale for selection of these five states will center on the following premises:

1) They have similar demographic population diversity.

2) They have a mix of rural agricultural and industrial production/services similar to each other.
3) They represent a service area of educators and population for training that should allow the researcher a reasonably similar sample from which to collect data.

Sample Procedures

At least two mailings will be completed to the sample population for the five state region being surveyed. The purpose of these two mailings will be to gather demographic information, share some of the initial findings, and to allow the researcher a chance to encourage participation for the mailing of the second survey instrument.

Instrument Design and Development

of the Questionnaire

Development of a good questionnaire does not happen by chance. Because of a strong commitment to the quality of the instrument, much effort will be made to review existing "proven" instruments. In doing so, many negative variables can be eliminated. Many of the questions used in the second survey will be derived from what was considered a fairly equitable instrument used in 1979. Dr. Roehrich, then a graduate student at Ohio State University and currently in charge of training at DeVry Institute in Chicago, created and validated an instrument from which 33 survey questions were drawn. These questions were categorized in three groupings: staff development, evaluation, and resources and incentives. Changes to the Roehrick instrument were only to altered in terms of tense to satisfy the two categories of present and future. The
finalized questions appear to be similar to those asked by a number of researchers in the field and a few questions will be added to gather personal opinions from the respondents. Equally important is the validation, design of the instrument, and appropriateness of the questions used in earlier research. Also, by maintaining a degree of continuity between the earlier research instrument and this research, validity will be added to the standardization of criteria that can be used by others. This is also an attempt to expand the base of an existing instrument and work toward the standardization of professional growth and development analysis.

Revision of the Questionnaire

Feedback from the pilot sample will be reviewed. Where necessary, revisions will be made to both survey questionnaire one and survey questionnaire two. Revisions to the first survey instrument will be made prior to the follow-up mailing. Revisions to the second survey will be made prior to the first mailing to the target population. The inclusion of appropriate comments expressed in the pilot mailing and first survey will be shared in the second mailing. Where appropriate, suggestions will be used to enhance the review and validation of the survey instrument. If comments do not pertain directly to the survey instrument and to the questions of the study, they will not be incorporated in the five state survey. While many questions and comments may have value, only comments that may improve the survey instrument will be incorporated into the instrument. However, to expand the reader's appreciation for the
interactive environment that exists within these occupational clusters, much of this data will be recorded. Such information will either be placed in the appendices or addressed in Chapter V in summary of this research.

Collection of Data

As mailings are returned, participant files will be generated to reflect their interest in receiving survey questionnaire two. This information will be stored in a DBASE III+ data bank and updated with address changes, etc. Possible error in data tabulation will be eliminated by transferring information on to test scoring sheets that can be scanned electronically to create a data file for further investigation. To maintain anonymity, all information on these sheets will be reflected by numerical values only. Each respondent will be assigned a separate numerical code of six digits reflecting the state, vocational area, and respondent number. This will be done to accommodate the collection of data from survey questionnaire one and used to update the data file as survey questionnaire two is returned. The original return information will be retained to allow further review of raw data if necessary.

Data Analysis

SPSSX programs will be written to gather descriptive statistics about the population surveyed. Answer score sheets will be optically scanned and data will be stored in mainframe computers to catalog respondent information. Summary files will be created and transposed to
research files which will be used to conduct statistical analysis. Comparisons will be made as applicable to address the hypothesized questions of this research.

Follow-up Procedures
As a follow-up for those who had not responded to the first mailing of survey questionnaire one, a summary report of data already collected will be developed and sent to those who do not respond to the first mailing. A request will be made for them to participate in the second mailing.

Data Analysis Procedures
Programs will be written in SPSSX to compile information from raw data files and used to record informative and descriptive statistics. The main concern of the research will be to identify significant difference that exists among states, occupational areas and between positions of instructor and administrator. For the purpose of finding significant difference, the mean of the means will be calculated with the aid of the SPSSX program. The new derived mean will represent each categorical area. This new mean will be used for further statistical analysis. Where required, other associations of data will be analyzed; i.e.: F-ratios, T-score comparisons, analysis of variances, chi-square tests, etc.
Limitations or Scope of Investigation

The study will focus on a five state region of the upper midwest which shares many common factors and thus add scope to the collection of data. It is hoped that the similarity of environment and diversity of trained labor needs will provide fairly consistent data concerning basic training requirements for those who teach tomorrow’s technologist. This study is also delimited to collection of data contained in the scope of the questionnaires.
CHAPTER IV. RESULTS AND FINDINGS

The results and findings of this study are presented in two sections of this chapter. The first presents the findings and results of data collected for the survey responses in a descriptive tables. The second presents the statistical testing of hypotheses.

Survey Response

Survey questionnaire one was mailed in early May 1989 to 1011 participants. Of these, 347 responded to the questionnaire and another 73 were returned incomplete due to incorrect address, change of employment, or personal request to not participate. A follow-up to the initial survey was then mailed in November to the 591 individuals who did not respond to the first mailing in May. This group was again given survey questionnaire one, survey questionnaire two, a summary of what had been found from the 347 May responses, and a letter of encouragement to participate at this time. The 347 who had responded to the May mailing received only survey questionnaire two, the summary of the May responses, and encouragement to continue their participation. Of the 938 who were mailed to in November, a total of 441 responses were returned and recorded, but of the 441 responses, only 211 (181 instructors, 30 administrators), or 22%, completed survey questionnaire two. The other 230 still only completed and returned survey questionnaire one.

Variations in the sample exist for a number of questions in the study due to the fact that forty responding participants took special
Table 1. Total survey population mailed

<table>
<thead>
<tr>
<th>State</th>
<th>Mailed</th>
<th>Returned Mail 1</th>
<th>%</th>
<th>Returned Mail 2</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA</td>
<td>222</td>
<td>126</td>
<td>56.8</td>
<td>59</td>
<td>26.6</td>
</tr>
<tr>
<td>MN</td>
<td>302</td>
<td>97</td>
<td>32.1</td>
<td>45</td>
<td>14.7</td>
</tr>
<tr>
<td>MO</td>
<td>86</td>
<td>35</td>
<td>40.7</td>
<td>19</td>
<td>22.1</td>
</tr>
<tr>
<td>NE</td>
<td>85</td>
<td>38</td>
<td>44.7</td>
<td>16</td>
<td>18.8</td>
</tr>
<tr>
<td>WI</td>
<td>243</td>
<td>139</td>
<td>57.2</td>
<td>70</td>
<td>28.8</td>
</tr>
<tr>
<td>No ID</td>
<td>9</td>
<td>9</td>
<td>0.1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>938</td>
<td>441</td>
<td></td>
<td>211</td>
<td></td>
</tr>
</tbody>
</table>

effort to remove coding in one form or another from the questionnaires. Where possible, alignment to state, position, and occupational field were made. In all, only three questionnaires were not used due to the removal of data which made it impossible to associate the questionnaires to the categories of the research.

SPSSX reliability test reveals that questions identified for staff development, evaluation, and resources and incentives are valid. These questions can be used to measure a level of perception for professional growth and technical update activities for trade and industry/technical instructors. Data are presented in the Appendix, pp. 120-122. Reliability for questions related to provider of services did not yield a significantly high level of reliability. Because they do represent perceptions of the respondents to questions which are important, provider of services questions were statistically analyzed and results presented.

Table 2 reveals the number of participants who responded by state,
field, and position to survey questionnaire one. This survey provided demographic and general information regarding the respondents.

Table 2. Participants responding to Survey Questionnaire One according to state, occupational area, and position

<table>
<thead>
<tr>
<th>State</th>
<th>n</th>
<th>%</th>
<th>Occ. Area</th>
<th>n</th>
<th>%</th>
<th>Position</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>126</td>
<td>29</td>
<td>Auto/Diesel</td>
<td>109</td>
<td>25</td>
<td>Instr.</td>
<td>389</td>
<td>88</td>
</tr>
<tr>
<td>Minnesota</td>
<td>97</td>
<td>22</td>
<td>Auto Coll</td>
<td>23</td>
<td>05</td>
<td>Admin.</td>
<td>52</td>
<td>12</td>
</tr>
<tr>
<td>Missouri</td>
<td>35</td>
<td>08</td>
<td>Elec/Electr</td>
<td>117</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nebraska</td>
<td>38</td>
<td>09</td>
<td>Constr/BldgTr</td>
<td>49</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wisconsin</td>
<td>139</td>
<td>32</td>
<td>Manuf/MachTr</td>
<td>98</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other Fields</td>
<td>41</td>
<td>09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>01</td>
<td>Admin</td>
<td>1</td>
<td>00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not Given</td>
<td>3</td>
<td>01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>441</td>
<td>100</td>
<td>Total</td>
<td>441</td>
<td>100</td>
<td>Total</td>
<td>411</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3 reveals the number of participants who responded by state, field, and position to survey questionnaire two. This survey provided specific questions that participants were asked to respond to concerning present and desired perception in four areas. A block of seven questions were asked relevant to staff development, fifteen questions were asked pertinent to evaluation, ten questions were asked that reflected resources used and possible incentives available to instructional staff, and four additional questions drew comment in the area of provider of service.

Table 4 describes the sample by race, age, and education. A number of interesting observations can be made. The sample by race was
Table 3. Sample responding to Survey Questionnaire Two according to state, occupational area, and position

<table>
<thead>
<tr>
<th>State</th>
<th>n</th>
<th>%</th>
<th>Occ. Area</th>
<th>n</th>
<th>%</th>
<th>Position</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>59</td>
<td>28</td>
<td>Auto/Diesel</td>
<td>54</td>
<td>29</td>
<td>Instr.</td>
<td>181</td>
<td>86</td>
</tr>
<tr>
<td>Minnesota</td>
<td>45</td>
<td>22</td>
<td>Auto Coll</td>
<td>13</td>
<td>07</td>
<td>Admin.</td>
<td>30</td>
<td>14</td>
</tr>
<tr>
<td>Missouri</td>
<td>19</td>
<td>09</td>
<td>Elect/Elec</td>
<td>20</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nebraska</td>
<td>16</td>
<td>08</td>
<td>Const/BldgTr</td>
<td>60</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wisconsin</td>
<td>70</td>
<td>33</td>
<td>Manuf/MachTr</td>
<td>40</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>209</td>
<td>100</td>
<td></td>
<td>187</td>
<td>100</td>
<td></td>
<td>211</td>
<td>100</td>
</tr>
</tbody>
</table>

predominantly Caucasian. Age distribution was most evenly spread between 31 and 60. Also, of those who responded to the survey, there were 194 individuals (or 46.41%) who work in vocational trade and industry/technical education programs that are teaching with less than a four year college degree. The majority of their preparation comes from industry.

Table 5 provides data which depicts, in general terms, the trade and industry/technical educator. In describing those who replied, the following information characterizes the respondents.

Table 6 indicates the amount of time that an instructor invests in technical update activities and the average amount of program curriculum revision that can be accomplished as a result of time spent in industrial technical update activities.
Table 4. Race, age, and education level of respondents

<table>
<thead>
<tr>
<th>Race</th>
<th>n</th>
<th>%</th>
<th>Age</th>
<th>n</th>
<th>%</th>
<th>Education</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Am. Ind.</td>
<td>2</td>
<td>.5</td>
<td>21-30</td>
<td>12</td>
<td>03</td>
<td>High School diploma</td>
<td>81</td>
<td>18</td>
</tr>
<tr>
<td>Black</td>
<td>4</td>
<td>01</td>
<td>31-40</td>
<td>103</td>
<td>23</td>
<td>Assoc. degree (2 yr)</td>
<td>99</td>
<td>22</td>
</tr>
<tr>
<td>Caucasian</td>
<td>410</td>
<td>93</td>
<td>41-50</td>
<td>161</td>
<td>36</td>
<td>Bachelors degree</td>
<td>112</td>
<td>25</td>
</tr>
<tr>
<td>Asian</td>
<td>3</td>
<td>.5</td>
<td>51-60</td>
<td>126</td>
<td>29</td>
<td>Masters Degree</td>
<td>96</td>
<td>22</td>
</tr>
<tr>
<td>Over 60</td>
<td>18</td>
<td>04</td>
<td></td>
<td></td>
<td></td>
<td>Ed. Specialist</td>
<td>7</td>
<td>02</td>
</tr>
<tr>
<td>Not Given</td>
<td>22</td>
<td>05</td>
<td></td>
<td></td>
<td></td>
<td>Doctoral degree</td>
<td>9</td>
<td>02</td>
</tr>
<tr>
<td>Totals</td>
<td>441</td>
<td>100</td>
<td></td>
<td>441</td>
<td>100</td>
<td>No degree</td>
<td>14</td>
<td>04</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not Given</td>
<td>23</td>
<td>05</td>
</tr>
</tbody>
</table>

Table 5. Number of years taught, time since last technical update, and length of update activity of respondents

<table>
<thead>
<tr>
<th>Years Taught</th>
<th>n</th>
<th>%</th>
<th>Time Since Last Update</th>
<th>n</th>
<th>%</th>
<th>Update Length</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 yr.</td>
<td>12</td>
<td>03</td>
<td>&lt; 1 yr.</td>
<td>308</td>
<td>70</td>
<td>1 or &lt; days</td>
<td>112</td>
<td>25</td>
</tr>
<tr>
<td>1 to &lt;3 yrs.</td>
<td>34</td>
<td>08</td>
<td>1 to &lt;2 yrs.</td>
<td>58</td>
<td>13</td>
<td>2 to 4 days</td>
<td>255</td>
<td>58</td>
</tr>
<tr>
<td>3 to &lt;6 yrs.</td>
<td>37</td>
<td>08</td>
<td>2 to &lt;5 yrs.</td>
<td>32</td>
<td>07</td>
<td>1 to 2 weeks</td>
<td>43</td>
<td>10</td>
</tr>
<tr>
<td>6 to &lt;10 yrs.</td>
<td>87</td>
<td>20</td>
<td>5 to &lt;7 yrs.</td>
<td>6</td>
<td>01</td>
<td>2 to 4 weeks</td>
<td>2</td>
<td>00</td>
</tr>
<tr>
<td>10 plus yrs.</td>
<td>244</td>
<td>55</td>
<td>7 plus yrs.</td>
<td>13</td>
<td>04</td>
<td>Not Given</td>
<td>24</td>
<td>05</td>
</tr>
<tr>
<td>Not Given</td>
<td>27</td>
<td>06</td>
<td></td>
<td></td>
<td></td>
<td>Not Given</td>
<td>29</td>
<td>07</td>
</tr>
<tr>
<td>Totals</td>
<td>441</td>
<td>100</td>
<td></td>
<td>441</td>
<td>100</td>
<td></td>
<td>441</td>
<td>100</td>
</tr>
</tbody>
</table>
### Table 6. Respondents indicating total time invested for updating and incentives for updating

<table>
<thead>
<tr>
<th>Time Spent for Updating</th>
<th>n</th>
<th>%</th>
<th>Incentives for Updating</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; than 1 day</td>
<td>10</td>
<td>02</td>
<td>College Credit</td>
<td>40</td>
<td>09</td>
</tr>
<tr>
<td>1 to 4 days</td>
<td>91</td>
<td>21</td>
<td>Salary Adjustment</td>
<td>113</td>
<td>26</td>
</tr>
<tr>
<td>5 to 10 days</td>
<td>125</td>
<td>28</td>
<td>Retention of Employment</td>
<td>20</td>
<td>05</td>
</tr>
<tr>
<td>11 to 20 days</td>
<td>80</td>
<td>18</td>
<td>Interact with Peers</td>
<td>48</td>
<td>11</td>
</tr>
<tr>
<td>21 to 30 days</td>
<td>27</td>
<td>06</td>
<td>Better Serve Students</td>
<td>173</td>
<td>39</td>
</tr>
<tr>
<td>31 plus days</td>
<td>70</td>
<td>16</td>
<td>Other Reasons</td>
<td>22</td>
<td>06</td>
</tr>
<tr>
<td>None</td>
<td>16</td>
<td>04</td>
<td>Not Given</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Given</td>
<td>22</td>
<td>05</td>
<td>Not Given</td>
<td>25</td>
<td>05</td>
</tr>
<tr>
<td>Total</td>
<td>441</td>
<td>100</td>
<td>Total</td>
<td>441</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 7 indicates the area of certification that instructors have and a response to survey questionnaire one question 14, which states, "By comparison, do you feel that you would be better off working in industry rather than education?"

### Table 7. Respondents indicating area of certification and incentives for updating

<table>
<thead>
<tr>
<th>Area of Certification</th>
<th>n</th>
<th>%</th>
<th>Job Satisfaction</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive/Diesel</td>
<td>104</td>
<td>24</td>
<td>Strongly Agree</td>
<td>40</td>
<td>14</td>
</tr>
<tr>
<td>Auto Collision Repair</td>
<td>24</td>
<td>05</td>
<td>Agree</td>
<td>85</td>
<td>19</td>
</tr>
<tr>
<td>Construction/Bldg Trades</td>
<td>42</td>
<td>10</td>
<td>Disagree</td>
<td>147</td>
<td>33</td>
</tr>
<tr>
<td>Electricity/Electronics</td>
<td>114</td>
<td>26</td>
<td>Strongly Disagree</td>
<td>30</td>
<td>07</td>
</tr>
<tr>
<td>Manuf/Machine Trades</td>
<td>95</td>
<td>22</td>
<td>No Comfortable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area Not Listed</td>
<td>25</td>
<td>06</td>
<td>Response at this time</td>
<td>95</td>
<td>22</td>
</tr>
<tr>
<td>Voc. Cert. Not Required</td>
<td>11</td>
<td>02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Given</td>
<td>26</td>
<td>06</td>
<td>Not Given</td>
<td>24</td>
<td>05</td>
</tr>
<tr>
<td>Total</td>
<td>441</td>
<td>100</td>
<td>Total</td>
<td>441</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 8 displays the methods by which instructors feel they can achieve technical updating and number of curriculum revisions resulting from update activities.

Table 9 reveals the population service area identified by the respondents.

Table 8. Methods for technical updating and number of curriculum revisions resulting from update activities

<table>
<thead>
<tr>
<th>Update Methods</th>
<th>n</th>
<th>%</th>
<th>Curriculum Revisions Resulting From Technical Update</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in Industry</td>
<td>109</td>
<td>25</td>
<td>Not Needed</td>
<td>15</td>
<td>03</td>
</tr>
<tr>
<td>Industry Sponsored Workshop</td>
<td>200</td>
<td>45</td>
<td>1-3 Revisions</td>
<td>185</td>
<td>42</td>
</tr>
<tr>
<td>Tech/Prof Sponsored Workshop</td>
<td>77</td>
<td>17</td>
<td>4+ Revisions</td>
<td>108</td>
<td>25</td>
</tr>
<tr>
<td>Review Publications</td>
<td>15</td>
<td>03</td>
<td>Total Revision</td>
<td>56</td>
<td>13</td>
</tr>
<tr>
<td>College/University Courses</td>
<td>4</td>
<td>01</td>
<td>State of Art Prog.</td>
<td>50</td>
<td>11</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
<td>03</td>
<td>Not Given</td>
<td>27</td>
<td>06</td>
</tr>
<tr>
<td>Not Given</td>
<td>24</td>
<td>06</td>
<td>Total</td>
<td>441</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>441</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9. Population of service area in which respondent works

<table>
<thead>
<tr>
<th>Population Service Area</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 25,000</td>
<td>84</td>
<td>19</td>
</tr>
<tr>
<td>25,001 to 50,000</td>
<td>79</td>
<td>18</td>
</tr>
<tr>
<td>50,001 to 75,000</td>
<td>54</td>
<td>12</td>
</tr>
<tr>
<td>75,001 to 100,000</td>
<td>38</td>
<td>09</td>
</tr>
<tr>
<td>Over 100,000</td>
<td>163</td>
<td>37</td>
</tr>
<tr>
<td>Not Given</td>
<td>23</td>
<td>05</td>
</tr>
<tr>
<td>Total</td>
<td>441</td>
<td>100</td>
</tr>
</tbody>
</table>
Hypotheses Tested

Null hypothesis 1a

There is no difference regarding the instructional in-service training needs of instructors in the area of staff development at present among selected states.

Null hypothesis 1b Rejected at .05 Level

There is no difference among selected states representing the future instructional in-service training needs of instructors in the area of staff development.

Null hypothesis 2a Rejected at .05 Level

There is no difference among selected trade occupational areas with respect to the current instructional training needs being met by existing programs in the area of staff development.

Null hypothesis 2b

There is no difference among selected trade occupational areas with respect to desired instructional training needs being met in the area of staff development and those perceived necessary for the future.

Null hypothesis 3a Rejected at .05 Level

There is no difference between administrators and instructors with respect to instructional training needs currently being met by existing programs in the area of staff development at present.
Null hypothesis 3b

Rejected at .05 Level

There is no difference between administrators and instructors with respect to instructional training needs currently being met by existing programs in the area of staff development and those perceived for the future.

Null hypothesis 4a

There is no difference among selected states with respect to evaluation as a component of professional growth and monitoring technical updating needs at present.

Null hypothesis 4b

There is no difference among selected states with respect to evaluation as a component of professional growth and monitoring technical updating needs for the future.

Null hypothesis 5a

Rejected at the .05 Level

There is no difference among selected trade occupational areas with respect to evaluation as a component of professional growth and monitoring technical updating needs at present.

Null hypothesis 5b

There is no difference among selected trade occupational areas with respect to evaluation as a component of professional growth and monitoring technical updating needs for the future.
**Null hypothesis 6a**

Rejected at the .05 level.

There is no difference between instructors and administrators of these occupational areas with respect to evaluation being used as a component of professional growth and monitoring technical updating needs at present.

**Null hypothesis 6b**

There is no difference between instructors and administrators of these occupational areas with respect to evaluation being used as a component of professional growth and monitoring technical updating needs for the future.

**Null hypothesis 7a**

There is no difference among selected states with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas at present.

**Null hypothesis 7b**

Rejected at the .05 Level

There is no difference among selected states with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas for the future.
Null hypothesis 8a

There is no difference among selected trade occupational areas with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas at present.

Null hypothesis 8b

There is no difference among selected trade occupational areas with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas in the future.

Null hypothesis 9a Rejected at the .05 Level

There is no difference between administrators and instructors of these occupational areas with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas at present.

Null hypothesis 9b

There is no difference between instructors and administrators of these areas with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas in the future.
Null hypothesis 10a
There is no difference among selected states with respect to perceived present provider of service.

Null hypothesis 10b  Rejected at the .05 Level
There is no difference among selected states with respect to perceived desired provider of service.

Null hypothesis 11a
There is no difference among selected occupational areas with respect to perceived present provider of service.

Null hypothesis 11b  Rejected at the .05 Level
There is no difference among selected occupational areas with respect to perceived desired provider of service.

Null hypothesis 12a
There is no difference between selected administrators and instructors with respect to perceived present provider of service.

Null hypothesis 12b
There is no difference between selected administrators and instructors with respect to perceived desired provider of service.

Only the null hypotheses which revealed significant difference will be discussed.
Questions Representing a Significant Level of Difference

The following questions have been statistically analyzed and rejected at the .05 level.

1. Is there a difference in respondents' perceptions when data are categorized by state with respect to the perceived instructional training needs currently being met by existing programs in the area of staff development for the future?

Null hypothesis 1b

There is no difference among selected states representing the future instructional in-service training needs of instructors in the area of staff development.

Seven questions presented to the survey participants were categorically aligned to staff development. Each item was examined for its contribution to the instrument reliability and a new mean was computed to indicate new desired staff development (NDSD). The results of the analysis and computation are presented in Table 10.

Table 10. Analysis of variance of perceptions of desired staff development categorized by state

<table>
<thead>
<tr>
<th>ONEWAY ANOVA by State</th>
<th>Desired Staff Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>df</td>
<td>MEAN SQUARES</td>
</tr>
<tr>
<td>State</td>
<td>4</td>
</tr>
<tr>
<td>Residual</td>
<td>204</td>
</tr>
</tbody>
</table>
There is a significant difference among states with respect to desired staff development. The null hypothesis 1b was rejected at the .05 level. Further analysis using post hoc Scheffé test reveals significant difference between Iowa and Missouri. Information is represented of Table 11.

2. Is there a difference in respondents' perceptions when data are categorized by trade occupational area with respect to the perceived instructional training needs currently being met by existing programs in the area of staff development at present?

Table 11. Means and standard deviation of states for desired staff development

<table>
<thead>
<tr>
<th>State</th>
<th>n</th>
<th>Mean</th>
<th>Std.Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>59</td>
<td>4.28</td>
<td>.53</td>
</tr>
<tr>
<td>Nebraska</td>
<td>16</td>
<td>4.15</td>
<td>.59</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>70</td>
<td>4.13</td>
<td>.63</td>
</tr>
<tr>
<td>Minnesota</td>
<td>45</td>
<td>3.89</td>
<td>1.08</td>
</tr>
<tr>
<td>Missouri</td>
<td>19</td>
<td>3.56</td>
<td>1.40</td>
</tr>
<tr>
<td>Total</td>
<td>209</td>
<td>4.07</td>
<td>.84</td>
</tr>
</tbody>
</table>

Null hypothesis 2a

There is no difference among selected trade occupational areas with respect to the current instructional training needs being met by existing programs in the area of staff development.

Seven questions presented to the survey participants were
categorically aligned to staff development. Each item was examined for its contribution to the instrument reliability and a new mean was computed to indicate new staff development present (NSDP). The results of the analysis and computation are presented in Table 12.

Table 12. Analysis of variance of perception of present staff development categorized by occupational area

<table>
<thead>
<tr>
<th>Occupational Area</th>
<th>Mean Squares</th>
<th>F-Value</th>
<th>F-Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occp Area</td>
<td>2.57</td>
<td>2.70</td>
<td>.03</td>
</tr>
<tr>
<td>Residual</td>
<td>.91</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant difference among occupational areas with respect to desired staff development. The null hypothesis 2a was rejected at the .05 level. Further analysis using post hoc Duncan reveals significant difference between Automotive/Diesel and Construction/Building Trades. Detailed information is represented of Table 13.

3. Is there a difference in respondents' perceptions when data are categorized by instructor and administrator of these occupational areas with respect to the perceived instructional training needs currently being met by existing programs in the area of staff development at present?
Table 13. Means and standard deviation of present staff development by occupational area

<table>
<thead>
<tr>
<th>Occp Area</th>
<th>n</th>
<th>Mean</th>
<th>Std.Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto/Diesel</td>
<td>54</td>
<td>2.69</td>
<td>.97</td>
</tr>
<tr>
<td>Elect/Electronic</td>
<td>20</td>
<td>2.60</td>
<td>.91</td>
</tr>
<tr>
<td>Auto Collision</td>
<td>13</td>
<td>2.33</td>
<td>1.70</td>
</tr>
<tr>
<td>Manuf/Mach. Trades</td>
<td>40</td>
<td>2.33</td>
<td>.95</td>
</tr>
<tr>
<td>Constr/Bldg Trades</td>
<td>60</td>
<td>2.12</td>
<td>.81</td>
</tr>
<tr>
<td>TOTAL</td>
<td>187</td>
<td>2.40</td>
<td>.99</td>
</tr>
</tbody>
</table>

Null hypothesis 3a

There is no difference between administrators and instructors with respect to instructional training needs currently being met by existing programs in the area of staff development at present.

Seven questions presented to the survey participants were categorically aligned to staff development. Each item was examined for its contribution to the instrument reliability and a new mean was computed to indicate new staff development (NSDP). The results of the analysis and computation are presented in Table 14.

Table 14. t-Tests comparison of administrators and instructors for present staff development (separate variance est.)

<table>
<thead>
<tr>
<th>Position</th>
<th>n</th>
<th>MEAN</th>
<th>STD.DEV</th>
<th>t-VALUE</th>
<th>2-Tail Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor</td>
<td>181</td>
<td>2.33</td>
<td>.99</td>
<td>-6.65</td>
<td>.01</td>
</tr>
<tr>
<td>Administrator</td>
<td>30</td>
<td>3.31</td>
<td>.70</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Based on the results of data analysis presented above as obtained from the returned questionnaires, there is significant difference between instructors and administrators regarding their perception of present staff development needs. It was found that administrators, with a mean of 3.31, tend to evaluate the present staff development needs differently from that of instructors, having a mean of 2.33. Therefore, null hypothesis was rejected at the .05 level of significance.

4. Is there a difference in respondents' perceptions when data are categorized by instructor and administrator of these occupational areas with respect to the perceived instructional training needs currently being met by existing programs in the area of staff development for the future?

Null hypothesis 3b

There is no difference between administrators and instructors with respect to instructional training needs currently being met by existing in the area of staff development and those perceived for the future.

Seven questions presented to the survey participants were categorically aligned to staff development. Each item was examined for its contribution to the instrument reliability and a new mean was computed to indicate new desired staff development (NDSD). The results of the analysis and computation are presented in Table 15.

Based on the results of data analysis presented, there is sufficient evidence to reject the null hypothesis. A significant difference between the instructors and the administrators regarding their perception of
Table 15. t-Tests comparison of administrators and instructors for desired staff development (separate variance est.)

<table>
<thead>
<tr>
<th>Position</th>
<th>n</th>
<th>MEAN</th>
<th>STD.DEV</th>
<th>t-VALUE</th>
<th>2-Tail Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor</td>
<td>181</td>
<td>4.03</td>
<td>.86</td>
<td>-2.62</td>
<td>.01</td>
</tr>
<tr>
<td>Administrator</td>
<td>30</td>
<td>4.35</td>
<td>.56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

present staff development was found. The administrators, with a mean of 4.35, tend to evaluate present staff development different from that of instructors, having a mean of 4.03.

5. Is there a difference in respondents' perceptions when data are categorized by trade occupational area with respect to evaluation being used as a component of professional growth and monitoring updating needs at present?

**Null hypothesis 5a**

There is no difference among selected trade occupational areas with respect to evaluation as a component of professional growth and monitoring technical updating needs at present.

Fifteen questions were presented to the survey participants which were categorically aligned to evaluation. Each item was examined for its contribution to the instrument reliability and a new mean was computed to indicate new present evaluation (NEVALP). The results of the analysis and computation are presented in Table 16.
Table 16. Analysis of variance of perception of present evaluation categorized by occupational area

<table>
<thead>
<tr>
<th>OCCUPATIONAL AREA</th>
<th>MEAN SQUARES</th>
<th>F-VALUE</th>
<th>F-PROB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td>2.02</td>
<td>3.06</td>
<td>.02</td>
</tr>
<tr>
<td>Residual</td>
<td>.66</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is significant difference among occupational fields with respect to desired staff development. The null hypothesis 5a was rejected at the .05 level. Further analysis using post hoc Duncan reveals significant difference between Electricity/Electronics and Manufacturing/Machine Trades. Specific information is presented in Table 17.

Table 17. Means and standard deviations of present evaluation by occupational area

<table>
<thead>
<tr>
<th>OCCUPATIONAL AREA</th>
<th>n</th>
<th>MEAN</th>
<th>STD.DEV.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elect/Electronic</td>
<td>20</td>
<td>2.77</td>
<td>.64</td>
</tr>
<tr>
<td>Auto Collision</td>
<td>13</td>
<td>2.55</td>
<td>1.39</td>
</tr>
<tr>
<td>Auto/Diesel</td>
<td>54</td>
<td>2.19</td>
<td>.85</td>
</tr>
<tr>
<td>Constr/Blg Trades</td>
<td>60</td>
<td>2.19</td>
<td>.76</td>
</tr>
<tr>
<td>Manuf/Mach Trades</td>
<td>40</td>
<td>2.09</td>
<td>.66</td>
</tr>
<tr>
<td>Total</td>
<td>187</td>
<td>2.25</td>
<td>.83</td>
</tr>
</tbody>
</table>
6. Is there a difference in respondents’ perceptions when data are categorized by instructor and administrator of these occupational areas with respect to evaluation being used as a component of professional growth and monitoring update needs at present?

**Null hypothesis 6a**

There is no difference between instructors and administrators of these occupational areas with respect to evaluation being used as a component of professional growth and monitoring technical updating needs at present.

Fifteen questions were presented to the survey participants which were categorically aligned to evaluation. Each item was examined for its contribution to the instrument reliability and a new mean was computed to indicate new present evaluation (NEVALP). The results of the analysis and computation are presented in Table 18.

<table>
<thead>
<tr>
<th>Position</th>
<th>n</th>
<th>MEAN</th>
<th>STD.DEV</th>
<th>t-VALUE</th>
<th>2-Tail Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor</td>
<td>181</td>
<td>2.21</td>
<td>.82</td>
<td>-4.27</td>
<td>.01</td>
</tr>
<tr>
<td>Administrator</td>
<td>30</td>
<td>2.88</td>
<td>.64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the data analysis presented above as obtained from the returned questionnaires, there is significant difference between instructors and administrators regarding their perception of present
evaluation. It was found that administrators, with a mean of 2.88 tend to rate the present use of evaluation different from that of instructors, who have a mean of 2.21.

7. Is there a difference in respondents' perceptions when data are categorized by state with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas for the future?

Null hypothesis 7b

There is no difference among selected states with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas for the future.

Eleven questions were presented to the survey participants which were categorically aligned to resources and incentives. Each item was examined for its contribution to the instrument reliability and a new mean was computed to indicate new desired resources and incentives (DRIP). The results of the analysis and computation are presented in Table 19.

Based on the results of data analysis reported in Table 19, there is significant difference among occupational fields with respect to desired resources and incentives. The null hypothesis 7b was rejected at the .05 level. Further analysis using post hoc Duncan revealed a significant difference between Iowa and Missouri. These results are presented in Table 20.
Table 19. Analysis of variance of perceptions of desired resources and incentives categorized by state

<table>
<thead>
<tr>
<th>State</th>
<th>df</th>
<th>Desired Resources and Incentives</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MEAN SQUares</td>
<td>F-Value</td>
<td>F-Prob</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>4</td>
<td>1.32</td>
<td>2.54</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>204</td>
<td>.52</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 20. Means and standard deviation of desired resources and incentives by states

<table>
<thead>
<tr>
<th>State</th>
<th>n</th>
<th>Mean</th>
<th>Std.Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>59</td>
<td>4.24</td>
<td>.46</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>70</td>
<td>4.14</td>
<td>.72</td>
</tr>
<tr>
<td>Minnesota</td>
<td>45</td>
<td>4.01</td>
<td>.63</td>
</tr>
<tr>
<td>Nebraska</td>
<td>16</td>
<td>3.88</td>
<td>.98</td>
</tr>
<tr>
<td>Missouri</td>
<td>19</td>
<td>3.71</td>
<td>1.21</td>
</tr>
<tr>
<td>Total</td>
<td>209</td>
<td>4.08</td>
<td>.73</td>
</tr>
</tbody>
</table>

8. Is there a difference in respondents' perceptions when data are categorized by instructor and administrator of these occupational areas with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas at present?
Null hypothesis 9a

There is no difference between administrators and instructors of these occupational areas with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas at present.

Eleven questions were presented to the survey participants which were categorically aligned to resources and incentives. Each item was examined for its contribution to the instrument reliability and a new mean was computed to indicate new present resources and incentives (RIP). The results of the analysis and computation are presented in Table 21.

Table 21. t-Tests comparison of administrators and instructors for resources and incentives (pooled variance est.)

<table>
<thead>
<tr>
<th>Position</th>
<th>n</th>
<th>MEAN</th>
<th>STD.DEV</th>
<th>t-VALUE</th>
<th>2-Tail Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor</td>
<td>181</td>
<td>2.04</td>
<td>.74</td>
<td>-3.06</td>
<td>.02</td>
</tr>
<tr>
<td>Administrator</td>
<td>30</td>
<td>2.49</td>
<td>.82</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the data analysis presented in Table 21, there is a significant difference between instructors and administrators regarding their perception of present resources and incentives. It was found that administrators tend to rate evaluation different than instructors. Therefore, null hypothesis 9a was rejected.

9. Is there a difference in respondents' perceptions when data are
categorized by state with regard to the provider of services for the future?

Null hypothesis 10b

There is no difference among selected state with respect to perceived desired provider of service.

Four questions were presented to the survey participants which were categorically aligned to provision of services. Each item was examined for its contribution to the instrument reliability and a new mean was computed to indicate new desired provider of service (PROVD). The results of the analysis and computation are presented in Table 22.

Table 22. Analysis of variance of perceptions of desired provider of services categorized by state

<table>
<thead>
<tr>
<th>ONEWAY ANOVA of Desired Provider of Service by State</th>
<th>MEAN SQUARES</th>
<th>F-Value</th>
<th>F-Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>df</td>
<td>4</td>
<td>1.41</td>
<td>2.56</td>
</tr>
<tr>
<td>Residual</td>
<td>204</td>
<td>.55</td>
<td></td>
</tr>
</tbody>
</table>

Based on the results of data analysis reported in Table 22, there is a significant difference among states with respect to desired provider of services. Therefore, null hypothesis 10b was rejected at the .05 level. Further analysis using post hoc Duncan revealed a significant difference between Minnesota and Nebraska. Results are presented in Table 23.
Table 23. Means and standard deviation of desired resources and incentives by states

<table>
<thead>
<tr>
<th>State</th>
<th>n</th>
<th>Mean</th>
<th>Std.Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td>45</td>
<td>3.39</td>
<td>.71</td>
</tr>
<tr>
<td>Missouri</td>
<td>19</td>
<td>3.24</td>
<td>.79</td>
</tr>
<tr>
<td>Iowa</td>
<td>59</td>
<td>3.12</td>
<td>.57</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>70</td>
<td>3.05</td>
<td>.83</td>
</tr>
<tr>
<td>Nebraska</td>
<td>16</td>
<td>2.80</td>
<td>.91</td>
</tr>
<tr>
<td>Total</td>
<td>209</td>
<td>3.14</td>
<td>.83</td>
</tr>
</tbody>
</table>

10. Is there a difference in respondents' perceptions when data are categorized by occupational field with regard to the provider of services for the future?

Null hypothesis 11b

There is no difference among selected occupational areas with respect to perceived desired provider of service.

Four questions were presented to the survey participants which were categorically aligned to provider of services. Each item was examined for its contribution to the instrument reliability and a new mean was computed to indicate a new desired provider of service (PROVD). The results of the analysis and computation are presented in Table 24.

Based on the results of data analysis reported in Table 24, there is a significant difference among occupational fields with respect to desired provider of service. Therefore, null hypothesis 11b was rejected.
Table 24. Analysis of variance of perceptions of desired provider of services categorized by occupational area

<table>
<thead>
<tr>
<th>df</th>
<th>MEAN SQUARES</th>
<th>F-Value</th>
<th>F-Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occp Areas</td>
<td>4</td>
<td>1.42</td>
<td>2.57</td>
</tr>
<tr>
<td>Residual</td>
<td>182</td>
<td>.55</td>
<td></td>
</tr>
</tbody>
</table>

at the .05 level. Further analysis using post hoc Duncan revealed a significant difference between Electricity/Electronics and Auto Collision Repair. Results are presented in Table 25.

Table 25. Means and standard deviations of desired provider of service by occupational area

<table>
<thead>
<tr>
<th>Occp Areas</th>
<th>n</th>
<th>Mean</th>
<th>Std.Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elect/Electronic</td>
<td>20</td>
<td>3.39</td>
<td>.68</td>
</tr>
<tr>
<td>Constr/Bldg Trades</td>
<td>60</td>
<td>3.25</td>
<td>.75</td>
</tr>
<tr>
<td>Auto/Diesel</td>
<td>54</td>
<td>3.16</td>
<td>.65</td>
</tr>
<tr>
<td>Manuf/Mach Trades</td>
<td>40</td>
<td>2.95</td>
<td>.79</td>
</tr>
<tr>
<td>Auto Collision</td>
<td>13</td>
<td>2.73</td>
<td>.98</td>
</tr>
<tr>
<td>Total</td>
<td>187</td>
<td>3.14</td>
<td>.76</td>
</tr>
</tbody>
</table>

In summary, the twenty-four null hypothesis proposed in this study data analysis revealed significant differences at the .05 level for ten null hypothesis. Table 26 provides a reference to those null hypothesis
that were rejected according to the independent variables of the re-
search: staff position, difference of opinion based on occupational area,
and different points of view according to state. Table 27 reports the
null hypothesis which were rejected and classified by the dependent
variable categories: staff development, evaluation, resources and
incentives, and provider of services.
Table 26. Rejected null hypotheses by position, state, and occupational area

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Categorical Identification</th>
<th>Tables</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Position:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3a</td>
<td>Present Staff Development</td>
<td>14</td>
</tr>
<tr>
<td>3b</td>
<td>Desired Staff Development</td>
<td>15</td>
</tr>
<tr>
<td>6a</td>
<td>Present Evaluation</td>
<td>18</td>
</tr>
<tr>
<td>9a</td>
<td>Present Resources and Incentives</td>
<td>21</td>
</tr>
<tr>
<td>By State:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1b</td>
<td>Desired Staff Development</td>
<td>10 &amp; 11</td>
</tr>
<tr>
<td>7b</td>
<td>Desired Resources and Incentives</td>
<td>19 &amp; 20</td>
</tr>
<tr>
<td>10b</td>
<td>Desired Provider of Services</td>
<td>22 &amp; 23</td>
</tr>
<tr>
<td>By Occupational Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2a</td>
<td>Present Staff Development</td>
<td>12 &amp; 13</td>
</tr>
<tr>
<td>5a</td>
<td>Present Evaluation</td>
<td>16 &amp; 17</td>
</tr>
<tr>
<td>11b</td>
<td>Desired Provider of Services</td>
<td>24 &amp; 25</td>
</tr>
</tbody>
</table>
Table 27. Rejected null hypotheses by staff development, evaluation, resources and incentives, and provider of services

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Categorical Identification</th>
<th>Tables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>By Staff Development:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1b</td>
<td>Desired State</td>
<td>10 &amp; 11</td>
</tr>
<tr>
<td>2a</td>
<td>Present Occupational Area</td>
<td>12 &amp; 13</td>
</tr>
<tr>
<td>3a</td>
<td>Present Position</td>
<td>14</td>
</tr>
<tr>
<td>3b</td>
<td>Desired Position</td>
<td>15</td>
</tr>
<tr>
<td><strong>By Evaluation:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a</td>
<td>Present Occupational Area</td>
<td>16 &amp; 17</td>
</tr>
<tr>
<td>6a</td>
<td>Present Position</td>
<td>18</td>
</tr>
<tr>
<td><strong>By Resources and Incentives:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7b</td>
<td>Desired State</td>
<td>19 &amp; 20</td>
</tr>
<tr>
<td>9a</td>
<td>Present Position</td>
<td>21</td>
</tr>
<tr>
<td><strong>By Provider of Services</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10b</td>
<td>Desired State</td>
<td>22 &amp; 23</td>
</tr>
<tr>
<td>11b</td>
<td>Desired Occupational Area</td>
<td>24 &amp; 25</td>
</tr>
</tbody>
</table>
CHAPTER V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The first four chapters of this research study dealt with the introduction and background, review of literature, methodology, analysis of data, and the findings of the study. The purpose of this chapter is to draw conclusions based on the findings and present some recommendations.

Summary and Conclusions

This section provides a summary and the conclusions of the study based upon the findings of the preceding chapters. The conclusions are based on the hypotheses related to the four major categories of professional growth and technical update; i.e.: staff development, evaluation, resources and incentives, and provider of service. Research hypotheses have been restated only if there was a significant difference to reject the null hypothesis at the .05 level. Participants were encouraged to make comments and where applicable such responses and comments have been included regarding the survey questions. These comments may provide insight to possible conflicts or differences of opinion that have existed for more than two decades in the vocational technical area.

Restatement of the problem

There is a need to identify and forecast training needs and budgetary support for Trade and Industry/Technical instructors at the post-secondary level in the form of technical updating or professional growth. This particular situation has a number of premises that either exist at
present or will influence the activity of technical updating in the future due to the professional identity that these people possess.

It will be helpful to the reader to consider the following comments regarding this population, technical updating, and professional growth as the stage is set to review the hypotheses.

The instructor:

1. Instructors who serve vocational education at the post-secondary level for Trade and Industry/Technical education most often come from the labor market rather than the academic sector and know little about how to gain further technical training which is provided within the educational community.

2. While some instructors pursue academic educational advancement, the majority find it more difficult to keep pace with the technology changes within their given technical field.

3. Specific jobs, technology advancements, and process/time management are ergonomic factors that require instructors in these technical areas to improve their talents if they are to effectively instruct young technologists.

The administrator:

School administrative and budgetary guidelines do not include definitive policies to financially and professionally support on-going professional development for Trade and Industry/Technical instructors.
State and Federal Guidance:

While legislation is in place and money is available, no clear vision has been established in recent years to refine the organizational support structure; i.e.:

a) the methodology for providing opportunities for occupational professional growth of Trade and Industry training to accommodate staff needs.

b) the delivery of technical training for post-secondary Trade and Industry/Technical educators.

c) the venture activities of agencies such as industry, universities, schools (local and state), and governing entities (State Department of Education) through effective networking.

The Industrial/Manufacturing/Service Communities:

For years business and industry have gained considerable benefit from the training efforts of post-secondary Trade and Industry/Technical programs. Because of this, possibly greater input and assistance from business and industry can be requested. Linkages with business and industry may need to be enhanced to develop and provide technical update opportunities which have been here-to-fore unavailable to some instructors.

Restatement of the purpose

Of the many varied situations which blend together to form the problems of technical updating and professional growth, only one segment
can be worked on within the structure of the local post-secondary school. Hypotheses which compare instructor and administrator responses have been reviewed in this chapter. Identifying those areas of difference should aid concerned parties in seeking steps to remove resolving barriers that impede successful technical updating activities. It is also perceived that the areas of significant difference could be resolved "in-house" with the least expenditure of tax dollars.

This study examines the congruency of technical update needs among five mid-western states, five occupational clusters within Trade and Industry/Technical education, and between two populations, administrators and instructors. It is believed that one can determine what level of relationship exists between vocational administrators and post-secondary instructors in Trade and Industry/Technical programs regarding their views on key issues pertaining to technical updating as a component of professional growth. After consultation with a number of professionals in the Trade and Industry/Technical education community, several assumptions are noteworthy and may help to define the focus of this summary.

When comparing occupational fields, auto collision repair possibly requires the least amount of academic preparation but a higher level of aesthetic ability as compared to the other occupational areas. Whereas in the areas of automotives, machine trades, construction and most certainly electricity/electronics, one expects to see advanced levels of education and continued academic professional achievement.

Observations regarding occupational updating and professional
development are truly the perogative of the state to administer voca­
tional technical education under their own mandate. Where some states
demand certain levels of professional development, others have minimal
legislative requirements which allow for diversity and to accomodate
differences that are common and acceptable. Thus, the most valuable data
reported may be that of management and employee differences with levels
of significance that direct our attention to refocus on the key issues of
staff development, technical updating, and professional growth.

Table 28. Null hypotheses rejection chart

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Present Accept</th>
<th>Present Reject</th>
<th>Desired Accept</th>
<th>Desired Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>x</td>
<td></td>
<td>1b</td>
<td>x</td>
</tr>
<tr>
<td>2a</td>
<td></td>
<td>x</td>
<td>2b</td>
<td></td>
</tr>
<tr>
<td>3a</td>
<td></td>
<td>x</td>
<td>3b</td>
<td>x</td>
</tr>
<tr>
<td>4a</td>
<td></td>
<td>x</td>
<td>4b</td>
<td>x</td>
</tr>
<tr>
<td>5a</td>
<td></td>
<td>x</td>
<td>5b</td>
<td></td>
</tr>
<tr>
<td>6a</td>
<td></td>
<td>x</td>
<td>6b</td>
<td></td>
</tr>
<tr>
<td>7a</td>
<td></td>
<td>x</td>
<td>7b</td>
<td>x</td>
</tr>
<tr>
<td>8a</td>
<td></td>
<td>x</td>
<td>8b</td>
<td></td>
</tr>
<tr>
<td>9a</td>
<td></td>
<td>x</td>
<td>9b</td>
<td></td>
</tr>
<tr>
<td>10a</td>
<td></td>
<td>x</td>
<td>10b</td>
<td>x</td>
</tr>
<tr>
<td>11a</td>
<td></td>
<td>x</td>
<td>11b</td>
<td></td>
</tr>
<tr>
<td>12a</td>
<td></td>
<td></td>
<td>12b</td>
<td>x</td>
</tr>
<tr>
<td>Totals</td>
<td>Present 7</td>
<td>5</td>
<td>Desired Totals</td>
<td>7</td>
</tr>
</tbody>
</table>
Null hypothesis lb

There is no difference among selected states representing the instructional in-service training needs of instructors in the area of staff development for the future.

Conclusion lb

Based on the results of data analysis reported in Table 10, there is evidence of a significant difference at the .05 level. Therefore, null hypothesis lb was rejected.

A SPSSX chi-square Crosstabs analysis was used to test each of the seven questions presented to the survey participants. Based on the results of data analysis for desired staff development, the following question revealed significant difference at the .05 level to reject null hypothesis lb.

Survey question

1. Providing opportunities for instructors to express individual technical updating needs to administration. (DSD4)

Summary

Survey participants responded to questions which were categorically aligned to desired staff development. Based on the data presented from the returned questionnaires (see Table 11), there is significant difference among states regarding their perception of desired staff development. Iowa, with a mean of 4.28, is significantly higher than Missouri, with a mean of 3.56. Statistical analysis of the seven questions
relating to desired staff development using the SPSSX chi-square Cross-tabs test reveals that participants responded to these statements with significant difference as to reject null hypothesis. One highly significant component of desired staff development (DSD) by state is revealed. If one could place the maximum amount of effort in one area to seek commonality among the states, it would be to solve only one issue. This one issue, as reflected by the survey question above, would be to nurture a two-way communication environment where instructors, no matter what state they live in, would feel equally comfortable in communicating their training needs to administration.

**Null hypothesis 2a**

There is no difference among selected trade occupational areas with respect to instructional training needs currently being met by existing programs in the area of staff development at present.

**Conclusion 2a**

Based on the results of data analysis reported in Table 12, there is evidence of a significant difference at the .05 level. Therefore, null hypothesis 2a was rejected.

Survey participants responded to questions which were categorically aligned to desired staff development. There is a significant difference among occupational areas with respect to desired staff development (see Table 13). Null hypothesis 2a was rejected at the .05 level using a One-way Anova and post hoc Duncan. Statistical analysis reveals a
significant difference between Automotive/Diesel, with a mean of 2.69, and Construction/Building Trades, with a mean of 2.12.

A SPSSX chi-square Crosstabs analysis was used to test each of the seven questions presented to the survey participants. Based on the results of data analysis for present staff development, the following questions revealed significant difference at the .05 level to reject null hypothesis 2a.

Survey questions

1. Monitoring staff development plans which specify technical update needs. (SDP2)
2. Maintaining departmental records to verify participation in technical updating activities. (SDP5)
3. Requiring technical updating when new technology is being used in industry. (SDP7)

Summary

Automotive/Diesel technology is one of the most rapidly changing fields and any invention or design can make a manufacturing or consumer impact in the auto industry. Instructors in this field express the view that "standing still is actually going backwards." Constant training is needed just to maintain state-of-the-art ability as a professional. Administrators seem to have a better rapport and communication with the Automotive/Diesel instructional staff, and monitoring staff development plans, update needs, and record verification of technical update activities were rated significantly higher for that cluster.
At the other extreme, Construction/Building Trades professionals do not feel the same pressure to maintain current state-of-the-art skills. They tend to believe that no matter how much things change, the basics remain the same. Reflecting on comments from both populations, one Automotive/Diesel instructor stated, "Our supervisor works well to serve our needs; he is always in our shop, understands our needs and works to support us." Just the opposite, one individual in Construction/Building Trades made this observation, "Much of our work requires us to work off campus with general construction concepts," while another stated, "There is no regular system; the money and attention go to those who get in line first." In conclusion, administrators may have closer bonds with those occupational areas that they can readily identify with by virtue of personal association.

Null hypothesis 3a

There is no difference between administrators and instructors with respect to instructional training needs currently being met by existing programs in the area of staff development at present.

Conclusion 3a

Based on the results of data analysis reported in Table 14, there is evidence of a significant difference at the .05 level. Therefore, null hypothesis 3a was rejected.

There is significant difference between instructors and administrators regarding their perception of present staff development. It
was found that administrators, with a mean of 3.31, tend to evaluate present staff development higher than instructors, having a mean of 2.33. Further analysis using the SPSSX chi-square Crosstabs test reveals that participants responded to these statements with significant difference as to reject null hypothesis. Five major components of staff development present (SDP) reveal a disparity of communicated appreciation and appropriate acknowledgement of either importance or utilization of these categorical assessments of staff development activities.

Survey questions

1. Conducting annual assessments of staff members' technical competencies to determine needs. (SDP3)
2. Providing opportunities for instructors to express individual technical updating needs to administrators. (SDP4)
3. Maintaining departmental records to verify participation in technical updating activities. (SDP5)
4. Requiring technical updating when new equipment is added to the program. (SDP6)
5. Requiring technical updating when new technology is being used in industry. (SDP7)

Summary

The differences as reported above clearly reveal a need to develop better communication for interaction between administrators and instructors with respect to technical update activities for development.
activities which are somewhat in place and operational today. Moreso, the question would be, "Who is responsible to effectively manage the five staff development activities stated above and how can they be placed into a time management schedule to best serve staff?"

**Null hypothesis 3b**

There is no difference between administrators and instructors with respect to instructional training needs currently being met by existing programs in the area of staff development for the future.

**Conclusion 3b**

Based on the results of data analysis reported in Table 15, there is evidence of a significant difference at the .05 level. Therefore, null hypothesis 3b was rejected.

Significant difference between instructors and administrators exists regarding their perception of desired staff development. It was found that administrators, with a mean of 4.35, tend to evaluate present staff development higher than instructors, having a mean of 4.03. Further analysis using the SPSSX chi-square Crosstabs reveals participants responded to these statements with significant difference, enough difference to reject null hypothesis.

**Survey questions**

1. Reviewing personnel records to identify technical update needs. (DSD1)
2. Conducting annual assessments of staff members technical competencies to determine needs. (DSD3)

3. Providing opportunities for instructors to express individual technical updating needs to administrators. (DSD4)

4. Maintaining departmental records to verify participation in technical updating activities. (DSD5)

Summary

Trade and Industry/Technical staff feel that these practices should be utilized on occasion in the process of determining staff development needs. Administrators feel these activities should always be used to determine desired staff development needs.

Null hypothesis 5a

There is no difference among selected trade occupational areas with respect to evaluation as a component of professional growth and monitoring technical updating needs at present.

Conclusion 5a

Based on the results of data analysis reported in Table 16, there is evidence of a significant difference at the .05 level. Therefore, null hypothesis 5a was rejected.

Fifteen questions were presented to the survey participants that were categorically aligned to evaluation. There is significant difference among occupational fields with respect to present evaluation. Each of these activities are perceived differently among occupational
clusters at the .05 level. The significance was determined using a Oneway Anova post hoc Duncan test. To further clarify the significance, the SPSSX chi-square Crosstabs test was used. This test substantiated the earlier test conducted for the first seven questions. Questions seven through ten were not rejected at the .05 level as a result of the Crosstabs test. However, based on the fact that the Crosstabs test is not as powerful, this condition can be expected.

Survey Questions

1. Requiring annual competency testing to determine technical update needs. (E8)
2. Validating technical competence by competency testing at the time of teacher entry employment. (E9)
3. Providing self-assessment surveys for instructors to measure technical updating needs. (E10)
4. Determining how recently instructors last worked in their technical area outside of present teaching position. (E17)
5. Following recommendations of industrial technical representatives for instructor updating based on technological advancements in industry. (E18)
6. Conducting annual assessment of technical relevancy of curriculum content of individual courses. (E20)
7. Performing job analysis of positions for which graduates will be qualified to determine if current technical practices are being taught. (E21)
8. Planning annual evaluations of technical updating needs conducted by divisional administrators. (E11)

9. Making classroom or laboratory observations by colleagues to assess technical updating needs. (E12)

10. Surveying graduates to determine if technical information received in class was relevant in their jobs. (E15)

**Summary**

Competency testing, self-assessment, recent work in industry, technical relevance of curriculum, and analysis of job positions by students reveal significant difference when asking members of the five occupational areas on how they are perceived as components of evaluation. By the nature of each occupational cluster (see Table 17), the means reveal that a different level of importance is placed on each of the variables of evaluation.

**Null hypothesis 6a**

There is no difference between instructors and administrators in these occupational areas with respect to evaluation being used as a component of professional growth and monitoring technical updating needs at present.

**Conclusion 6a**

Based on the results of data analysis reported in Table 18, there is evidence of a significant difference at the .05 level. Therefore, null hypothesis 6a was rejected.
Based on the data presented from the returned questionnaires, there is significant difference between instructors and administrators regarding their perception of present evaluation. It was found that the administrators, with a mean of 2.88, tend to evaluate present evaluation higher than the instructors, having a mean of 2.21. Further analysis using the SPSSX chi-square Crosstabs test revealed that participants responded to these statements with significant difference, enough to reject the null hypothesis. Nine of the fifteen major components of present evaluation activities (E) reveal a disparity on how frequently the task was utilized as a component of on-going staff evaluation by administration. Attention should be given to these activities to insure that staff are equally cognizant of the administrative procedures of evaluation. It reveals that administrators use the evaluation methods stated below more often than what instructional staff have been apparently aware of and possibly in a manner different from that perceived by the instructor.

Survey questions

1. Requiring annual competency tests to determine technical update needs. (E8)
2. Administering student evaluations of instructor's technical competence in the classroom. (E14)
3. Surveying to determine if technical information received in class was relevant in their jobs. (E15)
4. Evaluating the technical relevancy of an instructor's
full-time work experience to the teaching position at the time of employment. (E16)

5. Determining how recently instructors last worked in their technical area outside of the present teaching position. (E17)

6. Following recommendations of industrial technical representa­tives for instructor updating based on technological advances­ments in industry. (E18)

7. Conducting annual assessments of technical relevancy of the curriculum content of individual courses. (E20)

8. Performing job analysis of positions for which graduates will be qualified to determine if current technical practices are being taught. (E21)

9. Following recommendations of advisory committees in identifying technical updating needs. (E22)

Summary

The differences as reported clearly reveal a need to develop better communication channels for interaction between administrators and instructors with respect to technical update activities for evaluation practices which are currently being used. It might also be questioned if all instructional staff are evaluated by the same criteria for professional growth or whether there is a need to officially recognize a possible dual form for evaluation; one which is fair and equitable for classroom teachers and another that has different criteria and evaluation formulas to work with industrial technical instructors.
Null hypothesis 7b

There is no difference among selected states with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas for the future.

Conclusion 7b

Based on the results of data analysis reported in Table 19, there is evidence of a significant difference at the .05 level. Therefore, null hypothesis 7b was rejected.

Eleven questions were presented to the survey participants which have been categorically aligned to resources and incentives. There is significant difference among occupational areas with respect to desired staff development. Null hypothesis 7b was rejected at the .05 level using Oneway Anova and a post hoc Duncan test (see Table 20). Statistical analysis reveals significant difference between Iowa, with a mean of 4.24, and Missouri, with a mean of 3.71. Using the SPSSX chi-square Crosstabs test revealed that participants responded to these statements with significant difference. As a result the null hypothesis was only rejected regarding question number 33. While question 32 was rejected using a Oneway Anova and a post hoc Duncan at the .05 level, significant difference was not revealed using the SPSSX chi-square Crosstabs test.

Questions 32 and 33 revealed significant difference using Oneway Anova and the post hoc Scheffé procedure. Statistical analysis using the SPSSX chi-square Crosstabs test, which is possibly weaker in design, only
revealed a significant difference at the .05 level for question 33.

Survey questions

1. Reimbursing faculty for all expenses incurred during technical updating activities. (DRI33)

2. Providing compensatory time for technical updating activities undertaken after normal working hours. (DRI32)

Summary

While those instructors in Iowa, Minnesota, Nebraska, and Wisconsin feel that they are fully reimbursed for technical update workshop activities, this is not the case for the state of Missouri. Iowa responded with a mean of 4.24 and Missouri with a mean of 3.71. For question 32 the same situation with approximately the same conditions exists. Staff in Missouri strongly feel that they must donate, without pay, time for vocational updating activities. This leads the researcher to believe that some action should be taken in Missouri to remove this impediment to professional staff development for technical update activities. Organizational structure and policies that have prevailed among the states involved in this survey have in the past and still continue to operate independent of one another yet today. Administrators and instructors in Iowa consider both questions stated above to be commonplace considerations as part of professional staff development and technical update activities, whereas those individuals responding from Missouri do not place such demands on the system.
Null hypothesis 9a

There is no difference between instructors and administrators of these areas with respect to the resources available and incentives provided to enhance instructor participation in technical updating activities within their occupational areas at present.

Conclusion 9a

Based on the results of data analysis reported in Table 21, there is evidence of significant difference at the .05 level. Therefore, null hypothesis 9a was rejected.

Eleven questions were presented to the survey participants which were categorically aligned to resources and incentives. Based on the data that was obtained from the returned questionnaires, there is significant difference between instructors and administrators regarding their perception of present resources and incentives. It was found that administrators, with a mean of 2.49, tend to evaluate present evaluation higher than instructors, having a mean of 2.04. Five of the eleven major components of present resources and incentives (RIP) revealed a significant different point of view, understanding, and appreciation regarding the utilization of resources and incentives as a component supporting professional growth and staff development through activities of technical update. Further analysis using the SPSSX chi-square Crosstabs test revealed a significant difference between the positions of administrator and instructor relevent to their responses. Therefore, null hypothesis 9a was rejected. The difference exists when comparing
the response of instructors to that of administrators regarding the following resource and incentive statements.

Survey Questions

1. Establishing staff development time for instructors to undertake technical updating activities.
2. Granting of sabbatical leave specifically for instructors to engage in technical updating activities.
3. Granting leaves of absence to instructors to engage in technical update activities (without pay).
4. Providing merit points toward promotion for completion of technical update activities.
5. Establishing budget lines specifically for technical updating activities.

Summary

It is clear that disparity exists when looking at conditions and arrangements which support technical update activities. Direct questions relating to time allocation, merit and pay scale recognition, and budget identification represent the differences of opinion. Administrators rated these questions higher than instructors and related to these variables more positively. If these five variables for technical update are to be recognized more favorably by instructors, then better communication, more availability, and access need to be made easier for instructor participation. Further analysis using the SPSSX chi-square
Crosstabs test reveals that participants responded to these statements with significant difference. As a result null hypothesis 9a was rejected. Differences clearly reveal a need to develop better communicative avenues to interact between administrators and instructors with respect to technical update activities for resources and incentives than are currently being used. It might also be questioned if all instructional staff have equal opportunity and access to technical update activities and whether these activities yield equal recognition for academic credit. Does the criteria stated in the bargaining unit contract permit professional growth options which are valid for Trade and Industry/Technical staff that are parallel to academic value for professional growth and advancement? Is there a need to officially recognize a possible dual form for resources and incentives which take into account the needs of technical update for Trade and Industry/Technical staff? This research supports that such considerations be made.

**Null hypothesis 10b**

There is no difference among selected states with respect to perceived desired provider of service.

**Conclusion 10b**

Based on the results of data analysis reported in Table 22, there is evidence of a significant difference at the .05 level. Therefore, null hypothesis 10a was rejected.

Four questions were presented to participants which were
categorically aligned to desired provider of services. Based on the results of data analysis reported in Tables 22 and 23, there is a significant difference among occupational areas with respect to desired provider of services. Therefore, null hypothesis 10b was rejected at the .05 level using a One-way Anova and a post hoc Duncan procedure. Analysis revealed a significant difference between Minnesota, with a mean of 3.39, and Nebraska, with a mean of 2.80. Further statistical analysis using the SPSSX chi-square Crosstabs test failed to reveal difference at a significant level. Referencing the earlier test One-way Anova and a post hoc Scheffé procedure, which is a stronger non-parametric test, this research recognizes the significant difference, enough to reject null hypothesis.

Survey Questions

1. The group that should initiate technical updating activities is: (DSPON)
2. Estimated cost of a one day workshop (including travel, lodging, etc., in your technical area is: (DCOST)
3. The major cost of updating should be absorbed by: (DBILL)
4. The preferable location of the one day workshops is: (DLOCA)

Summary

Alone, each of these considerations for technical update activities has no indication of difference, yet when clustered as a group there is significant difference among states as to how the provision of technical support should be handled in the future. Minnesota strongly looks toward
industry for technical update activities whereas Nebraska considers the task of providing update belongs to the community colleges. Also, individuals in Nebraska see the cost of updating being considerably less than do instructors and administrators in the other four states.

**Null hypothesis 1lb**

There is no difference among selected occupational areas with respect to desired provider of service.

**Conclusion 1lb**

A SPSSX chi-square Crosstabs analysis was used to test each of the seven questions presented to the survey participants. Based on the results of data analysis reported in Table 24, there is significant difference at the .05 level to reject the null hypothesis.

Four questions were presented to the survey participants which have been categorically aligned to the desired provider of services. This cluster of questions was tested for reliability and a new mean was computed to indicate new desired provider of service (PROVD). The results of the analysis were presented in Tables 24 and 25. There is significant difference among occupational fields with respect to desired staff development. Therefore, null hypothesis 1lb was rejected at the .05 level using a Oneway Anova and a post hoc Duncan test. Analysis reveals significant difference between the Electricity/Electronics cluster, with a mean of 3.39, and the Auto Collision Repair cluster, with a mean of 2.73. Further analysis using the SPSSX chi-square Crosstabs
test revealed that participants responded to these statements with significant difference, enough to reject null hypothesis llb.

**Survey Questions**

1. The group that should initiate technical updating activities is: (DSPON)

2. The major cost of updating should be absorbed by: (DBILL)

3. The preferable location of the one day workshops is: (DLOCA)

**Summary**

In compliance with practices established by each individual occupational area, there will continue to be significant differences. Test results revealed that sponsorship, location, and who pays the bill will always be different simply because of the nature of each occupational cluster. The other component, the cost of updating, however, was not rejected as all fields recognize the importance and value respective to their area and occupational cluster. It is also important to note that there was no significant difference between administrator and instructor in general with the present or desired provider of services.

**Researcher's Overview**

While the assumption was made at the outset of the study that the sample drawn would be reasonably homogeneous, it was found that there was considerable variance in the samples from state to state. The most reoccurring significant difference appears when comparing the responses of instructors with that of administrators for staff development,
evaluation, and resources and incentives which indicates that there is a
difference in their present perception of what is being provided. When
comparing the desired future staff development, evaluation, and resources
and incentives, results reveal a significant difference for only the area
of staff development. Yet if we ask who should provide the service of
professional growth and technical update, there is no significant
difference.

When comparing states for perceived future staff development,
resources and incentives, and provider of services, the level of signifi­
cant difference reassures the reader that each state has a right to
operate and function independent of the other states. Other areas of
significant difference are seen when comparing present staff development
and present evaluation by occupational area. According to comments made
by respondents, each occupational area appears to be unique regarding
present methods for application, but they are not different when con­
sidering resources and incentives and provider of services among occupa­
tions.

A number of observations can be made regarding data provided by
respondents in the demographic area. A major concern at this time is to
point out that for minority populations in this particular five state
area, there appears to be an inadequate balance of instructors by race to
provide role models for individuals from other races. An observation of
instructional staff twenty years ago by Wolansky, Riley, and Cheng,
documented that 45% of all Trade and Industry/Technical teachers had less
than a four year degree. This situation still prevails today at approximately the same level. The level of service and direction in support of education for Trade and Industry/Technical instructors has been adequate only to maintain and not increase the overall degree level of this population. With 46% of all respondents indicating that they have less than a four year degree, it is necessary to continue to operate programs with instructors of a two-class system. This problem area needs to be addressed by state department of education and certification boards.

While significant difference among states may never be resolved because of the right of each state to operate independent of each other and occupational areas are by nature different, one concern is clear. The research focuses on the significant differences between instructor and administrator. Housed within the same building and governed by the same board, these two populations should not reflect the level of significant difference that was found in this research. If administrators are doing the job better, apparently the instructors are not made aware of it. If instructors have a lower perception of staff development, evaluation, and resources and incentive than administrators, what can be done to resolve this discrepancy?

In lieu of the findings of this study, it is recommended that:

1. A pro-active management scheme be initiated at the state level to design, monitor, and enhance opportunities for technical update of Industrial Vocational Technical Education instructors.
2. That a similar survey be done in the future using fewer or even singular categories related to technical update staff development, evaluation, resources and incentives, and provider of services to obtain higher return rates of data for analysis.

3. At the state level and possibly university levels, efforts are needed to enhance communications, evaluation, and documentation of technical update needs to ameliorate the differences found in this study between the administrators and instructors.

4. Recognizing occupational technical updating needs, it is recommended that the needs of specific occupational teachers need to be continually surveyed, documented, and administrative strategies provided to meet these needs.

5. Establish a regionalized consortium that can make available an individual who could consult with administrators and school staff to help resolve these differences of perception. Studies should be conducted to analyze more closely the areas of significant difference. Such research would provide an even clearer picture of staff development and professional growth direction and needs.

We must seek to maintain such excellence and remember who our customers are, because, as in any business, to gather the market share, the following precept is important: to gain a market share, one must provide goods and/or services of equal and/or better quality at a fair and equitable price in a timely manner.

Employees need to clearly understand the relationship between
productivity, quality of work, human relations and professional growth as goals are established to best serve the vocational and technical needs of the future. It will continue to be important to make special effort to develop and maintain our technical staff and encourage the most positive conditions for the educational community.
BIBLIOGRAPHY


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Jerry Otting
Jim Otting
Donald "Dude" Reichling
"Punch" Stockham
Dwight Zimmerman
Sample Letter to Vocational Campus Directors

May 5, 1989

St. Cloud Technical Institute
1540 Northway Drive
St. Cloud, MN  56301

Dear Sir:

If I may enlist your help, could you please provide a directory of campus staff who serve in the areas of trade and industry and technical education?

I am involved in research that will evaluate the provision of technical updating activities in the upper midwest area of the United States. My research is focused on community college and vocational technical education centers that serve adult populations. Hopefully, I will be able to identify and provide data supportive of in-service, professional growth, and other staff development activities common to these areas of education.

Thank you for your assistance and support.

Sincerely,

Gary J. Hoppes, Instr.
Industrial Education & Technology
Iowa State University
Ames, Iowa 50011
Professional growth and professional/technical updating will be important and very necessary for staff to maintain excellence in the laboratory and classroom.

This survey has been established to identify instructors and administrative personnel in a six state area who are critical in the provision of vocational trade and industry and technical education at the post-secondary level.

Please answer the enclosed questionnaire and return.

I appreciate this input and look forward to working with you more.
Dear Trade/Industrial and Technical Professional

Vocational instructors and administrators are keenly aware of the rapid pace at which technology continues to change and its impact on our profession. The need to keep in step with technology changes their becoming a challenge that we must face. Over the years each of us has made a special effort to continue this enhancement process. The questions that continue to pose a problem appear in the areas of access, finance, and recognition of training. This survey will gather data pertinent to those topics for instructors at the post-secondary (community college) level of education.

You have been selected because you fall in one of five areas of Trade/Industry and Technical programs; Automotive/Diesel, Auto Collision Repair, Construction Trades, Electrical/Electronics, or Manufacturing/Machine Trades. You also responded favorably to a postcard request to participate. The study will gather data about technical updating needs, access, funding, and professional development.

The information you provide is voluntary and will be treated with strict confidence. Each response form has been numbered to ensure that data will not be duplicated from the same source. Your identity will not be revealed, as only group summary information will be reported.

We appreciate the time you take to share your responses. Please follow the instructions closely to ensure unbiased input. Instructions at the beginning, and at the beginning of each section should be helpful. What you perceive as current use conditions related to the items and what you perceive to be desirable answers to the items are important.

Professional/technical update activities work best when all your needs are met.

Together we can provide answers to questions critical to providing technical updates, staff development, and professional growth for the instructor.

Sincerely,

Gary Hoppes
Instructor

Dr. W. D. Wolansky
Professor

Fold the booklet in half - (long-ways) - and insert into the business reply envelope at your earliest possible convenience.
Your opinion and input is important!

I would like you to provide more information reflecting your personal opinion of present technical updating conditions. What you perceive is important! What you consider to be the best ways to accomplish future technical updating does have value!

This second questionnaire will seek your opinion of presently available updating opportunities and allow you the opportunity to suggest what you think should happen for the provision of update activities.

If you wish to respond to the next questionnaire, please identify the address that you would like it sent to during the month of June.

[ ] Check here, yes, send the next questionnaire

Summer Mailing Address: (for contact during the summer if a change is needed)

Name: __________________________________________
Address: _______________________________________
City, State Zip: _________________________________

Thank you for your assistance.

William D. Wolansky, Phd. Prof.
Industrial Education & Tech.
Iowa State University
Ames, Iowa 50011

Gary J. Hippos, Instr.
Industrial Education & Tech.
Iowa State University
Ames, Iowa 50011

DEMOGRAPHIC INFORMATION

In this section please circle one response to each item which best describes you.

1. What is your **one primary** technical specialty field?
   1. automotive and/or diesel
   2. auto collision repair
   3. construction and/or building trades
   4. electricity and/or electronics
   5. machine trades and/or manufacturing technology

2. What is the highest certificate/degree you have attained?
   1. High School diploma
   2. Associate degree (2 yr)
   3. Bachelor degree
   4. Masters degree
   5. Ed. Specialist
   6. Doctoral degree
   7. No degree

3. What is your age group?
   1. 21 - 30
   2. 31 - 40
   3. 41 - 50
   4. 51 - 60
   5. over 60

4. Please identify your race
   1. American Indian
   2. Black
   3. Caucasian
   4. Asian
   5. Hispanic
   6. other
   7. vocational certification not required.

5. Indicate your Vocational Certification in a Trade and Industry occupational area as listed.
   1. automotive and/or diesel
   2. auto collision repair
   3. construction and/or building trades
   4. electricity and/or electronics
   5. machine trades and/or manufacturing technology
   6. area not listed, please identify
   7. vocational certification not required.
6. How many years have you taught your technical specialty at a two-year college?
   1. Less than one year
   2. More than 1 year but less than 3 years
   3. More than 3 years but less than 5 years
   4. More than 5 years but less than 10 years
   5. More than 10 years

7. How long has it been since you participated in technical updating activities in your area of expertise by interacting with other people in your field? (For example: working in industry or attending an industry sponsored workshop or seminar)
   1. Less than one year ago
   2. More than 1 year but less than 2 years
   3. More than 2 years but less than 5 years
   4. More than 5 years but less than 7 years
   5. More than 7 years ago

8. What is the technical updating method that you most prefer to maintain your technical competence?
   1. Work experience in industry
   2. Industry sponsored workshops and seminars
   3. Technical/professional association sponsored workshops and seminars
   4. Review of technical literature, bulletins, and publications
   5. College or university courses
   6. Other (specify)

9. Most technical update workshops that you have attended were scheduled for how many days?
   1. One day or less
   2. Two to four days
   3. One to two weeks
   4. More than two weeks but less than 4 weeks

10. Approximately how much time have you spent in technical updating activities over the last two years? (Check one)
    1. None
    2. Less than one day
    3. Between one and four days
    4. Between five and ten days
    5. Between eleven and twenty days
    6. Between twenty-one and thirty days
    7. More than a month

11. How many areas of your curricula have had revisions made reflecting industry changes you wish to implement as a result of technical updating information.
    1. No revisions were necessary
    2. One to three topic area revisions
    3. Four or more topic area revisions
    4. A total revision of materials is in process
    5. Our program is state-of-the-art and current with technology

12. What is the approximate population of the largest city within twenty-five miles of your institution?
    1. Below 25,000
    2. 25,001 - 50,000
    3. 50,001 - 75,000
    4. 75,001 - 100,000
    5. Over 100,000

Please respond to the following assuming you were given the chance to design a technical updating activity. Circle your one choice.

13. The best incentive for technical updating offerings
    1. College credit
    2. Salary adjustment
    3. Retention for continued promotion employment
    4. Interaction with professional peers
    5. To be better equipped to interact with students on a more professional level
    6. Other (specify)

14. By comparison, do you feel that you would be better off working in industry rather than in education?
    a. strongly agree
    b. agree
    c. disagree
    d. strongly disagree
    e. I can not make a comfortable response

You are assured of anonymity; if you desire a summary of this information it can be provided upon request.
Professional/Technical Update
and
Staff Development
for
Post-Secondary Vocational/Technical Instructors

Professional growth and professional/technical updating will be important and very necessary for staff to maintain excellence in the laboratory and classroom.

This survey has been established to identify instructors and administrative personnel in a six state area who are critical in the provision of vocational trade and industry and technical education at the post-secondary level.

Please answer the enclosed questionnaire and return.

I appreciate this input and look forward to working with you more.
Dear Local or State Trade/Industrial and Technical Administrator

Vocational instructors and administrators are keenly aware of the rapid pace at which technology continues to change thus impacting our profession. The need to keep in step with technology changes thus becoming a challenge that we must face. Over the years each of us have made special efforts to continue this enhancement process. The questions that continue to pose a problem appear in the area of access, finance, and recognition of training. This survey will gather data pertinent to these topics for instructors at the post-secondary (community college) level of education.

You have been selected because of your position and responsibility to serve any or all of these five areas of Trade/Industry and Technical programs, Automotive/Diesel, Auto Collision Repair, Construction Trades, Electrical/Electronics, or Manufacturing/Machine Trades. The study will gather data about technical updating needs, access, funding, and professional development both presently used and perceived for future use.

The information you provide is voluntary and will be treated with strict confidence. Each response form has been numbered to ensure that data will not be duplicated from the same source. Your identity will not be revealed, as only group summary information will be reported.

We appreciate the time you take to share your responses. Please follow the instructions closely to ensure unbiased input. Instruction at the beginning and at the start of each section should be helpful. What you perceive as current use conditions related to the items and what you perceive to be desirable answers to the items are important.

Professional/technical update activities work best when all your needs are met.

Together we can provide answers to questions critical to providing technical updates, staff development, and professional growth for the instructor.

Sincerely,

Gary Hopper
Instructor

Dr. W. D. Wolansky
Professor

Please insure that you've answered all questions! - and insert into the business reply envelope at your earliest possible convenience.
Methods Used To Determine Technical Updating Needs of Trade/Industry and Technical Post Secondary Instructors

Directions: Each of the thirty-seven questions in this section of the instrument will require you to make two separate responses.

On the left, (in front of each statement) you are to mark the number which best coincides with your perception of the current use of the item in the field.

After you have marked all thirty-three items on the left (in front) reflecting your perception of current use, proceed to mark each item a second time, on the right, (behind) the item. This response reflects your perception of the desirability of performing the item in the field.

The scale to utilize on the left is:

5. Always used (90% and above)
4. Often used (65-89%)
3. Sometimes used (35-64%)
2. Not often used (1-34%)
1. Not used (0%)
0. Don't have a perception

The column on the right will represent your desired response to the item with respect to future need or use as perceived by you, ie:

5. Highly desirable
4. Desirable
3. Neutral (no strong feeling either way)
2. Undesirable
1. Highly undesirable
0. Don't have a perception

If you have any questions concerning the instrument or question, please contact me during the weekday or evenings at the numbers listed on the attached calling card.

Be sure to mark all questions one through thirty-three on the left first. After marking all on the left return to the beginning and mark all of them on the right.
<table>
<thead>
<tr>
<th>Current Use</th>
<th>Activity</th>
<th>Desirability</th>
</tr>
</thead>
<tbody>
<tr>
<td>543210 1.</td>
<td>Reviewing personnel records to identify technical update needs.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 2.</td>
<td>Monitoring staff development plans which specify technical update needs.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 3.</td>
<td>Conducting annual assessment of staff member's technical competencies to determine needs.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 4.</td>
<td>Providing opportunities for instructors to express individual technical updating needs to administrators.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 5.</td>
<td>Maintaining departmental records to verify participation in technical updating activities.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 6.</td>
<td>Requiring technical updating when new equipment is added to the program.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 7.</td>
<td>Requiring technical updating when new technology is being used in the industry.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 8.</td>
<td>Requiring annual competency test to determine technical updating needs.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 9.</td>
<td>Validating technical competence by competency testing at the time of teacher entry employment</td>
<td>543210</td>
</tr>
<tr>
<td>543210 10.</td>
<td>Providing Self-assessment surveys for instructors to measure technical updating needs.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 11.</td>
<td>Planning annual evaluations of technical updating needs conducted by divisional administrators.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 12.</td>
<td>Making classroom or laboratory observations by colleagues to assess technical updating needs.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 13.</td>
<td>Conducting periodic evaluations of current technical literature to identify technical updating needs.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 14.</td>
<td>Administering student evaluations of instructor's technical competence in the classroom or laboratory.</td>
<td>543210</td>
</tr>
</tbody>
</table>

Please make your own comments and state your opinion!
Please use this space to provide other input you feel is important. Any additional comments or suggestions about this instrument or the process of technical updating is appreciated.

543210 15. Surveying graduates to determine if technical information received in class was relevant in their jobs.

543210 16. Evaluating the technical relevancy of an instructor's full-time work experience to the teaching position at the time of employment.

543210 17. Determining how recently instructors last worked in their technical area outside of the present teaching position.

543210 18. Following recommendations of industrial technical representatives for instructor updating based on technological advancements in the industry.

543210 19. Evaluating of performance levels required of technicians in the occupational area to determine technical updating needs of instructors.

543210 20. Conducting annual assessment of technical relevancy of the curriculum content of individual courses.

543210 21. Performing job analyses of positions for which graduates will be qualified to determine if current technical practices are being taught.

543210 22. Following recommendations of advisory committees in identifying technical updating needs.

RESOURCES AND INCENTIVES
Activities include:

<table>
<thead>
<tr>
<th>Current</th>
<th>Desirability</th>
</tr>
</thead>
<tbody>
<tr>
<td>543210 23. Establishment of staff development time for instructors to undertake technical updating activities.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 24. Granting of sabbatical leaves especially for instructors to engage in technical updating activities.</td>
<td>543210</td>
</tr>
<tr>
<td>543210 25. Granting of leaves of absence to instructors to engage in technical updating activities. (Without pay)</td>
<td>543210</td>
</tr>
<tr>
<td>543210 26. Establishment of cooperative exchanges with business and industry for technical updating.</td>
<td>543210</td>
</tr>
</tbody>
</table>
27. Pay full salary during participation in technical updating activities off-campus during normal working hours.

28. Providing merit salary increases for completion of technical updating activities.

29. Providing merit points toward promotion for completion of technical updating activities.

30. Establishment of budget lines specifically for technical updating activities.

31. Providing tuition reimbursement or waivers for college or university courses which are taken and considered to be technical updating.

32. Providing compensatory time for technical updating activities undertaken after normal working hours.

33. Reimbursing faculty for all expenses incurred during technical updating activities.

SECTION II

Direction:

For the following four (4) questions 34 thru 38 please indicate your item choice (what you perceive to be) present policy or condition on the left side (in front) and then return and indicate what you feel would be the best situation in the future on the right (behind) the item.

<table>
<thead>
<tr>
<th>Present Use</th>
<th>Desirability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present CHOICE</td>
<td>34. The group that should initiate technical updating activities is:</td>
</tr>
<tr>
<td>(____) 1. State Department of Education</td>
<td>(____) 2. State 4 year Colleges and Universities</td>
</tr>
<tr>
<td>3. Regional Education Agencies</td>
<td>4. Area Community Colleges</td>
</tr>
<tr>
<td>5. Industry</td>
<td>6. Technical and Professional Organizations</td>
</tr>
<tr>
<td>7. Other</td>
<td></td>
</tr>
</tbody>
</table>

35. Estimated cost of a one day workshop (including travel, lodging, etc. in your technical area is:

<table>
<thead>
<tr>
<th>Present CHOICE</th>
<th>Future CHOICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(____) 1. Over $501.00 per day</td>
<td>(____) 2. $251.00 to $500.00</td>
</tr>
<tr>
<td>3. $101.00 to $250.00</td>
<td>4. $51.00 to $100.00</td>
</tr>
<tr>
<td>5. $26.00 to $50.00</td>
<td>6. $1.00 to $25.00</td>
</tr>
<tr>
<td>7. No Cost</td>
<td></td>
</tr>
</tbody>
</table>

36. The major cost of updating should be absorbed by:

<table>
<thead>
<tr>
<th>Present CHOICE</th>
<th>Future CHOICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(____) 1. Individual staff member</td>
<td>(____) 2. Local institution (employer)</td>
</tr>
<tr>
<td>3. State Department of Education</td>
<td>4. Technical and professional organizations</td>
</tr>
<tr>
<td>5. Respective industries who benefit from our program</td>
<td>6. Shared jointly between the staff member and employer</td>
</tr>
<tr>
<td>7. Shared jointly between the staff member and the state</td>
<td></td>
</tr>
</tbody>
</table>

37. The preferable location of the one day workshops is:

<table>
<thead>
<tr>
<th>Present CHOICE</th>
<th>Future CHOICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(____) 1. On this community college campus</td>
<td>(____) 2. At a industrial location</td>
</tr>
<tr>
<td>3. At a college/university</td>
<td>4. At technical and professional state conventions</td>
</tr>
<tr>
<td>5. At technical and professional national conventions</td>
<td></td>
</tr>
</tbody>
</table>

Thank you for your assistance.

William D. Wolansky Phd. Prof.
Industrial Education & Tech.
Iowa State University
Ames, Iowa 50011

Gary J. Hoppes Instr.
Industrial Education & Tech.
Iowa State University
Ames, Iowa 50011

You are assured of anonymity! If you desire a summary of this research, it can be provided. Please insure that your return address is correct. If you would like these findings shared with other individuals, please provide a mailing address and name to the person to whom it should be sent.
Professional Growth / Technical Up-date
To Bring you up to date!
After doing initial research of professional staff development and technical update needs, I would like to share some of my findings and encourage your participation.

PLEASE
RESPOND
BY
December 22nd

Enclosed is a second mailing of the first questionnaire just in case you haven't returned the first one. If for some reason you would like to respond again feel free to do so. I will collect data from your most current response. This is the first and only mailing of the second questionnaire. Please respond by answering the questions and returning the forms before Christmas. Have the very best that the season brings and thank you for your cooperation to make this project a success.
Who provided information:

1. 270 automotive/diesel instructors were surveyed, 31.85% responded.
2. 51 auto collision repair instructors were surveyed, 37.25% responded.
3. 135 Construction and Building Trades instructors were surveyed, 28.14% responded.
4. 252 Electrical/Electronics instructors were surveyed, 42.85% responded.
5. 189 Machine Trades/Manufacturing Tech. instructors were surveyed, 42.85% responded.
6. 137 supervisory administrative staff who oversee these programs were surveyed.

Ninety-six percent of those responding to the survey were Caucasian.

Approximately forty percent of those responding represent population service areas of more than 100,000 people. Thirty percent of those responding were from service areas of less than 50,000 population.

What can I tell you thus far?

Approximately 40% of those responding have less than a four year degree. Their expertise comes from experience in the field and technical training which is occupationally oriented.

Approximately half of those surveyed have a four or five year degree and ten percent have beyond a masters degree.

Eighty-six percent hold a technical certification within an occupational cluster identified in the survey.

Seventy-six percent have been teaching for more than five years.

Eighty-five percent indicated that they have received technical updating within the last twenty-four months.

Seventy-one percent indicate that they have in the past and would prefer continued using industry as a source for technical update training.

What time frame for training is needed?

Seventy-five percent believe a technical up-date activity should be four days or less. However, most admit that technical updating requires more than just four days.

Seventy-one percent admit that technical up-dating requires more than just four days. In fact, forty-three percent spend more than two weeks for professional technical updating. Seventeen percent admit that more than a month is required for up-dating to keep pace with technical change.

The value placed on training/technical up-date activities.

Eighty-two percent felt that technical update activities allowed them to make needed curriculum changes.

Fifty-seven percent said that the main reason for technical updating was to provide better interaction with students and peers as a professional.

A Frustration, Maybe a Concern!

One-third of those surveyed could not respond favorably when asked if they made the right decision; "leaving industry to become a vocational/technical teacher".

Have the very best that the season brings and thank you for your cooperation to make this project a success.
Human Subjects' Approval
INFORMATION ON THE USE OF HUMAN SUBJECTS IN RESEARCH
IOWA STATE UNIVERSITY
(Please follow the accompanying instructions for completing this form.)

1. Title of project (please type): VOCATIONAL PROFESSIONAL/TECHNICAL UPDATING NEEDS OF TRADE AND INDUSTRY/TECHNICAL POST-SECONDARY EDUCATORS

2. I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are properly protected. Additions to or changes in procedures affecting the subjects after the project has been approved will be submitted to the committee for review.

GARY L. HOPPE
Typed Name of Principal Investigator

Date Signature of Principal Investigator

I ED. & T Building 1
Campus Address 4-7262
Campus Telephone

3. Signatures of others (if any). Date Relationship to Principal Investigator

W D. Wasken

3-28 Advisor

4. ATTACH an additional page(s) (A) describing your proposed research and (B) the subjects to be used, (C) indicating any risks or discomforts to the subjects, and (D) covering any topics checked below. CHECK all boxes applicable.

☐ Medical clearance necessary before subjects can participate
☐ Samples (blood, tissue, etc.) from subjects
☐ Administration of substances (foods, drugs, etc.) to subjects
☐ Physical exercise or conditioning for subjects
☐ Deception of subjects
☐ Subjects under 14 years of age and/or ☐ Subjects 14-17 years of age
☐ Subjects in institutions
☐ Research must be approved by another institution or agency

5. ATTACH an example of the material to be used to obtain informed consent and CHECK which type will be used.

☐ Signed informed consent will be obtained.
☒ Modified informed consent will be obtained.

6. Anticipated date on which subjects will be first contacted: Month Day Year

4 1 89

Anticipated date for last contact with subjects:

5 15 89

7. If Applicable: Anticipated date on which audio or visual tapes will be erased and/or identifiers will be removed from completed survey instruments:

Month Day Year

8. Signature of Head or Chairperson Date Department or Administrative Unit

TREVOR L. STEWART, Ed. D, FED. & TECHNOLOGY

9. Decision of the University Committee on the Use of Human Subjects in Research:

☐ Project Approved ☐ Project not approved ☐ No action required

Patricia M. Keith
Name of Committee Chairperson Date Signature of Committee Chairperson
Authorization to Use Roehrich's Instrument

Robert R. Roehrich

Dear Barry,

Attached is the copy of my dissertation as you requested. I hope you find it useful. Please feel free to copy whatever you need from it in support of your research.

I remind that you package it appropriately and return it via UPS when you are finished with it.

Thanks,

Bob Roehrich
Survey Questionnaire Two--Reliability Table

Staff Development

Table 29. Reliability test of measurement instrument for staff development questions for present and desired response

<table>
<thead>
<tr>
<th>Staff Development</th>
<th>Cronbach Alpha</th>
<th>Cronbach Alpha</th>
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<tbody>
<tr>
<td></td>
<td>New Present</td>
<td>New Desired</td>
</tr>
<tr>
<td>SDP1</td>
<td>.81</td>
<td>.84</td>
</tr>
<tr>
<td>SDP2</td>
<td>.81</td>
<td>.83</td>
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<td>SDP3</td>
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<td>SDP4</td>
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<td>SDP5</td>
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<td>SDP6</td>
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<tr>
<td>SDP7</td>
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<td>.84</td>
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</table>
Survey Questionnaire Two--Reliability Table

Evaluation

Table 30. Reliability test of measurement instrument for evaluation questions for present and desired response

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Cronbach Alpha</th>
<th>Desired</th>
<th>Cronbach Alpha</th>
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<tbody>
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<td>Present</td>
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<td>.89</td>
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<tr>
<td>E22</td>
<td>.88</td>
<td></td>
<td></td>
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</tbody>
</table>
Survey Questionnaire Two--Reliability Table

Resources and Incentives and Provider of Services

Table 31. Reliability test of measurement instrument for resources and incentives questions for present and desired response

<table>
<thead>
<tr>
<th>Resources and Incentives</th>
<th>Cronbach Alpha</th>
<th>Present .75</th>
<th>Desired .82</th>
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</thead>
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<tr>
<td></td>
<td></td>
<td>RI23 .70</td>
<td>DRI23 .80</td>
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<td>RI24 .72</td>
<td>DRI24 .80</td>
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<td>RI25 .72</td>
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<td>DRI27 .81</td>
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<td>RI28 .74</td>
<td>DRI28 .81</td>
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<td>DRI29 .80</td>
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<td>RI30 .71</td>
<td>DRI30 .80</td>
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<td>DRI31 .80</td>
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<td>DRI32 .81</td>
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<tr>
<td></td>
<td></td>
<td>RI33 .71</td>
<td>DRI33 .80</td>
</tr>
</tbody>
</table>
Respondent Comments

Iowa MT/MT

It would be nice to have more than 12 hours a week to prepare for 28 hours of student contact.

Iowa C/BT

Financial support for going back to industry to maintain standard of living and legislative action to create administrative support for back to work.

Wis. E/E

Each of the past two years our college president brought in a guest speaker to give a 1 hour presentation on "quality." The fee paid to each one of these individuals was more than half of the total budget set aside for upgrade training in the entire trades and industry department.

Minn. E/E

I'm not willing to update without being paid. Once you're out of contact coverage, they want your to work for $5.00 an hour.

Minn. E/E 221105

Too many times the administration is not aware of industry changes, so program changes are slow and hard to accomplish.

225115 MN MT/MT

Technical instructors should have a minimum of 5 years experience in their trades of on job experience. Updating should be work experience or industry workshops.

225150 MN MT/MT

Internships (about 3 weeks) for credit are probably best with pay equalizer sponsored by the state as in Minn. Minimum amount of paperwork works best.

224012 MN E/E

I teach electronics and I feel there's a lot of frustration among my peers. We need more directives as to what to or not to teach. We only have so much time to teach more and more material.
I am required to update from at least three different areas (work, college credit, and workshops) each five years by our local district.

I feel technical updating should be required and sponsored by schools and industry every five years. Instructors must be up to date if we are to be good.

I like teaching; it's important to feel good. On pay, if I found a teaching job in industry I'd go.

Pay incentive would be a great help. Colleges need to find and encourage more seminars for instructors.

Need time made available for updating.

I feel technical updating is critical to maintaining a worthwhile curriculum.

I teach in "Basic Electricity" for the students' first 6 months. There is not a lot of need for me to be "technically updated", but I feel the need to be professionally updated, especially since I see a trend toward less prepared students.

Salaries in vocational areas have not kept pace at all the last 10 years. If something is not done soon, I can't imagine anyone staying in education.

Constant revision required to keep pace with industry. From an instructor's viewpoint this can drive you crazy. You get the feeling that administrators don't realize what your problems are.
It appears that top management (as in industry) is a problem to achieve needed changes.

In industry I could increase my pay 50% or more. I'm seriously thinking of leaving teaching.

I like one week seminars held at a college for credit with a large portion of the class taught by people working in industry.

In general, updating activities aren't well targeted--half the people are bored stiff and the other half are snowed. Somewhat like typical classes, I guess! Too much is from the "top down", i.e.: what noneducationalists have planned "for us" rather than what we really need.

Technical instructors are falling behind on the pay scale.

We have an update training program now running for both in industry and H.S. people. It has been very successful.

Money wise I'd be better off, but working with people is more my style.

I feel technical updating should be required and take the place of current continuing education requirements such as methods, curriculum and evaluation in order to maintain teaching certificates.

Are administrative and certification requirements the prime director for what instructors attend? ASKS: What means have been most available for you to participate in technical updates? What means have been most promoted for your participation? ABOUT QUESTIONS ON THE SURVEY.
121015 IA Aut/Die

Based on tech updates sponsored in part by the university as of the past 2 years, it's time someone else gets the state money to do the job. I have offered assistance many times, but without interest.....

121504 IA Aut/Die

The biggest concern that I have is staying current with latest industry advances and having the time to update curriculum and get update training.

121072 IA Aut/Die

We have an excellent school, however, our students needs are being overlooked by our administration's need to overload our classrooms. Return class reorganization of curriculum to instructors - why not get involved in questions pertaining to these problems. Many instructors are not allowed to attend updates due to cost and "specialty areas."

121003 IA Aut/Die

This could be an excellent method to start a practice of updating and training. With only three years of teaching experience, I find myself already removed from the world of work and its experiences.

125006 IA MT/MT

Educators hold bad workshops. Most of them aren't worth going to. Industry or industry based people do a much better job.

121014 IA Aut/Die

One thing that must be addressed is the cost of quality substitute instructors to allow instructors to participate in technical updating. These costs are rarely addressed in these surveys. I find that my courses and students suffer when I am not on campus.

121017 IA Aut/Die

In the automotives area we currently have a lot of training available. It is hard to break away from class to go to these sessions. It would be nice if we could work a deal with industry during the summer for on the job updating.

324056 MO E/E

Our institution needs to update the laboratory.
We badly need industry state of the art exposure seminars—they are available; however, they are very expensive (prohibitive) for educators. Business can write these expenses off. As educators we have no such options.

There are too many educators in educational administrative levels. We need good industrial people at this level that have been industrial supervisors and managers.

We (WI Tech Coll) have been falling behind in pay and update training.

I was hired for my technical skills. Attention should be paid to learning how to teach. I feel my profession is teaching, teaching my area of experience.

Will be going on an industry internship program in June. Will know more after that time.

Money needs to be set aside at the state level and allocated to community colleges for staff development purposes. Certification should be tied closer to technical updating.

Technical updating can only be effective if you have technically updated equipment. Because of the cost factor, industry must support schools with current level equipment. This is not happening in the Machine Trades area.

A technical field like electronics is very broad and reviewing new items that should be taught is good but many times new items can not be brought into the curriculum because of time problems. You can not throw out a basic item for something new.
Good technical seminars that are reasonably priced are very hard to find. Rather than hearing someone’s view of or future prediction, it would be refreshing to get technician level training on real systems and situations. Information that would be incorporated into the class to benefit students.

You’ll have to excuse the skew in this survey. You have to understand that we have a dictator administration and instructors that work as farm hands. Neither have been in industry for 10 years. It is essential that instructors stay updated continually. It is however hard when the majority of the cost has to be handled by the instructor.

I have heard of some schools that provide very good opportunities for technical updating, while others do not. Therefore, it is my assumption that the schools all have their own individual policies. These policies are made by non-technical people who do not understand the changes in industry. So the problem lies with uniformed people being in charge. My particular school will reimburse me for college tuition, but not books, travel, etc. I think this is a fair policy, but I don’t think there should be a limit to the number of credits that will be reimbursed.

Staff Development: We are to keep pace with industry on our own time and often own expense. The department’s budgets do not allow for tech. updating. The allotment for 89-90 was $125 for two instructors.

Management is too busy with credit course conversion and keeping the adm’s up to consider instructor upgrading.

I must praise a state sponsored internship program which has allowed us a 3-4 week opportunity during summer months.

Evaluation: Extremely important for instructors out of the trade for any length of time to need mandatory actual hands-on updating. Not just trade seminars or text materials. Many of the materials being taught from are out-dated but used by instructors because they are comfortable with it.

Content was currently reviewed by state curriculum committee. Not all instructors actually use new curriculum.
Most advisory meetings are canned presentations. Not much change comes from their suggestions. Instructors do as they wish.

523024 WI E/E

It has been my perception that certification credit needs to be given for the appropriate technical updating. This incentive would encourage teaching faculty to get the updates.

Most teachers use "education" type course work to maintain certification as well as rising on pay scale "steps".

Technical update "credit" should affect one's pay in the same way that other course work does.

A system of "college" credit for technical updating is required or else many good instructors will go back to industry after teaching for only 3-5 years.

It's hard to go to technical update meetings because it's hard to get teaching "subs". Classes need to be cancelled and getting time off is very hard. Even in-service time is short and aside from the "required" meetings that time is best used in preparing for classes.

Almost all the time, we use our own time off the job to learn new technical information or learn about new test equipment, etc.

I really enjoy teaching, but it was a lot easier to stay technically current when working in industry.

127502 IA Asst. Dean

Technical updating is vital to the success of industrial education at the post-secondary level. It is a complex issue that is too large to be addressed by a single entity. What is necessary is a coalition of all the various organizations you listed in question 34 with some kind of coordination built into a process.

A second issue is that tech updates need to be addressed in such a great number of fields that a single group would have difficulty identifying the required expertise.

Third, the curriculum updates of recent years have been good, but we also need to address technical knowledge and skills in the subject matter areas.
I would like to see our state board of VTAE take the initiative in planning and sponsoring a continuing series of high quality tech updating for all tech areas. Our own technical college faculty in cooperation with industry could provide some excellent updating. Facilities are available and location could be rotated.

In addition I would like to release one instructor for one semester each year for extensive technical and/or industrial updating. Sources for this updating may be difficult to locate. An option such as this if sponsored by an educational unit could have national or world wide appeal. Both technical educators and industrial personnel could benefit from such a program. Fast paced, high quality, technically current, professionally delivered content would be essential.

If I had to consider the possibility of hiring a new instructor, the one area I would be interested in would be "Does he own his own business in the field that he is hired to teach and is he engaged in operating this business while he is teaching students?" Too often teaching becomes secondary and profit of business primary. Conflict of interest arises.

We have gone through a total state-wide restructuring of courses in MN and because of this tensions have arisen. Going to a college format for a trade school is lacking concern for the students and the respect and quality of technicians for industry. I personally find more time to prepare but less class time to communicate the essentials needed by a technician in the field of electronics.

I feel the change was caused for legislative appeasing with little or no concern to find out if the current system is working for industry. All the politicians and higher ed. board were looking at our entrance numbers. Also now that a plan was established at a cost of millions of dollars they are afraid to admit the plan is failing,. I know I'm just an instructor and no higher ed. board member would be willing to listen, but industry will soon make them listen because the graduates aren't going to be as good as in the past anymore.

All of the updating and revising of course workbooks/texts/manuals have been either during prep time or at home. Coming out of electrical construction and knowing that the codes are revised every 3 years, creates a lot of unnecessary pressure to keep all of the material up to
date. The VTAE district that I teach at produces most of its own manuals for 75% of my program courses. Many of the manuals are years behind because either I am not able to revise them from a time standpoint or the instructor that teaches those courses has not had time to do so. The state doesn't pay for revision for courses related to apprentice training where the budget permits. The state district provides very little for revision/updating adult or associate degree courses.

225118 MN MT/MT

Advisory committee input has very little effect on any actual changes within the program. Their comments should go to the school board and hopefully carry some weight.

There should be some requirements on the teaching abilities of instructors aside from trade knowledge.

All schools are very top heavy with administration and yet most responsibilities and work fall on the instructor.

We have so many things to do. There is very little time to teach, to say nothing about going out for technical updating.

It's very hard to find substitute teachers when going out for training or anything else.

When students have a high school diploma, they should know how to read, write, and do basic math. This is not the case.

121015 IA Aut/Die

Requiring technical updating brings people to a training session who don't want to be there anyway--disruptive to those who want training -- should be voluntary.

Local advisory committees should be in tune with needs of program technical information and offerings. Industry contacts are much better than "educational experts".

Tech updates at the state level have been totally mismanaged recently. Someone is using the dollars to finance their administration or division budgets and not offering the training to instructors. It's been a half-hearted effort to make it look good--your previous survey proves the need.

State dollars should be routed to local community colleges for tech update and staff development use. Local control will allow tailoring of needs better than an average group need.
Instructor organizations can better determine group needs and organize offerings with greater efficiency. Also they have better contacts. Need the finances to do it.

525040 WI MT/MT

If you would like a subject for a one to two week seminar at your location, I am prepared to offer a 3-D cad/cam seminar on MASTERCAM 3-D mill and lather software. I did this last summer for the instructors in the Wisconsin VTAE system. There were 16 instructors at the seminar, each instructor brought a computer from his school, and we installed MASTERCAM software on each computer. The seminar was one week long. The Wisconsin state dept. of VTAE funded the cost of the software and instructor with a grant. A special price was negotiated with MASTERCAM for the 16 sets of industrial grade software. If you are interested in this, please give me a call. The software became the property of each respective school of the participants.

121504 IA Aut/Die

Technical updating is a very complex undertaking. First of all, I believe that most vo/tech instructors, especially those who have worked in the field of their expertise, are well qualified to evaluate their own needs of updating. I think those needs once identified are best met by industry based training. Training by personnel who know their product, not some seminars developed at the state level. There are a lot of administrators who make the opportunity for training available but in reality it is the instructor who must find the desired training, schedule the time, arrange for a competent substitute instructor, if one is available, and then execute the plan. Sometimes it is just easier to forego the training.

524401 WI C/BT

I work for an excellent school which budgets generously for professional growth and conducts educational audits of vocational programs every 5 years. The advise of the advisory committee is taken very seriously and acted upon. My own program, wood techniques, focuses on cabinetmaking millwork, has benefited greatly from this. However, the money and attention go to those who get in line first and there is no regular system for annual evaluation of either program content on instructional competency. I'm aggressive and have garnished more than my share of money for technical update but I feel that I have a much better situation would result if the school would require a regular review of current technology in each subject area and plan for specific updating for all instructors. I am currently required to get 6 credits every 5 years but content is not specified. The content of your questions seems to have indicated that you are leaning in the same direction as I am thinking. I
hope so and I hope something results from your efforts. There is no question in my mind that the best technical updating experience comes from the industry site off campus training. Lowest value is received at professional conventions. "sectionals". If we are going to compete head to head with Japan and West Block Countries, dollars must be regularly budgeted to train the trainers.

523017 WI E/E

For me, time is the important factor, not money. In a positive work environment much of this could be good for the teacher and the curriculum. In my particular situation, staff and administrators are not ethical in their use of the preceding approaches. They use students to fight battles with each other and therefore I distrust student involvement in the evaluation process. None of my previous jobs including 4 years Marine Corps, has seen such vindictive, shallow, unethical, unprofessional behavior as amongst teachers and administrators each equally at fault. Money is not the answer and the union may very well be a part of the problem. I don't know. I am a registered prof. engineer. I have an MA in voc. ed.. I was a tech for 8 yrs. before getting my engineering degree. I have worked 3 years in research, 3 years in industry and 17 years teaching. I truly wish I had not made the change to education under the conditions I am presently employed. I do enjoy teaching but do not like the people who have been hired into our department since I began teaching, and I do not feel administrators are properly trained to do their job.