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Preparation and development of vocational industrial educators for secondary school level in Taiwan, R.O.C.

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Iowa State University, 1991
Preparation and development of vocational industrial educators for secondary school level in Taiwan, R.O.C.

by

Ming-kung Yang

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

Department: Industrial Education and Technology Major: Industrial Education

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For the Graduate College

Iowa State University
Ames, Iowa
1991
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CHAPTER 1. INTRODUCTION

The development and utilization of a productive workforce is the key contribution that can be made to the society and the economy. A very positive characteristic of the "American system" is the rapid increase in the workforce and educational investment. In Japan, there is currently rapid economic growth resulting from education, accumulated technical experience, and the excellent management of industry and business. It is an efficient way to reach the goals of economic development and national power by developing the laborforce resource through the use of proper educational processes.

Education has been one of the most significant factors contributing enormously to economic achievement in Taiwan during the last four decades. Chen (1981) states that education not only reflects the economic development and social and political progress of the last three decades, but also must be recognized as a potent force in laying a firm foundation for Taiwan's continuing growth and advancement from a developing country to an industrialized and modernized society. Kuo (1983) likewise asserts that education in Taiwan has been effectively geared to economic development. Coupled with this political stability, education under a centralized system has contributed significantly to Taiwan's widely reported economic growth. Since 1953, Taiwan has implemented six four-year economic development plans. The government
understands the importance of workforce resources and has been seriously engaged in the development of education and manpower. Therefore, Taiwan has made great progress in improving the living standard of people, social prosperity, and educational standard.

Vocational education has been one of the most important areas in educational development during the last forty years in Taiwan. It has contributed significantly to the cultivation of technical workers in business and industry during the period of economic development.

Vocational industrial education is a professional field attempting to serve industry through its efforts in solving industrial problems and to achieve the objectives of industrial production, as well as the goals of economic development. Vocational industrial senior high schools are responsible for training the technicians required by the labor market of industry. According to government statistics, in 1989 the number of vocational schools had increased by three times the 1950-1951 figures, and the number of students in the vocational schools had risen to 444,332; all of whom were from senior vocational schools. Of this total, the number of vocational industrial students has been 47.5% higher than that of any other vocational programs student group (Educational Statistics of R.O.C., 1989). In short, vocational industrial education in Taiwan plays a very important role in the total education system today.

Having good teachers will ensure a successful educational system. Teachers are the main ingredient of education. Therefore, the caliber of the teacher is the key factor influencing the learning achievements of students. Excellent teachers can be prepared by proper planning. For ten years, vocational industrial teachers were prepared in short-term teacher training programs because of the expansion of vocational
industrial education and the great demand for vocational industrial schools. This period of teacher preparation is too short, however, to provide the quality of teachers needed in an innovative, modern society. Evans and Herr (1978) indicate that vocational education programs are adversely affected by such short-term programs:

One of the principal reasons for the failure to do more for youth with special needs is the shortage of broad gauge administrators to plan programs and a shortage of teachers and supportive personnel who know what to do. These shortages illustrate a major problem facing vocational education: inadequate emphasis on the preparation and upgrading of educational personnel. (p. 275)

Vocational industrial teachers differ from general education teachers. They not only must have the competency that general education teachers have, but also must have field or workshop experience in industry. Professor Handson (1988) states that professional training should be provided for persons who have entered upon or who are preparing to enter upon the responsibilities of: a) teachers and coordinators of trade and industrial subjects; b) supervisors and teacher trainers of local and state trade and industrial education programs; and c) administrators of local and state school system. In fact, the professional training he indicated is that training program of trade experience or field workshop experience. Particularly, since we live in the changing workplace, the role of the vocational industrial teacher is very important in Taiwan.

Besides having primary professional competency and field workshop experience, vocational industrial teachers should be enabled to understand the nature, extent, and direction that technological change will take. Smith (1988) states that, as purveyors of job preparation, vocational educators need to facilitate this adaptation through the
retraining of individuals who have not yet acquired a marketable skill. This retraining is based on an understanding of the nature of technological change, demographic trends, socioeconomic dynamics, and workforce patterns.

Feiman-Nemser (1983) argue that, without knowing more about what this preparation is like, it is impossible to understand the impact of the pre-service preparation of a teacher on teacher development. According to Sarason and Blatts' (1972) characterization of preservice preparation as "an unstudied problem" remains as true today as it was twenty years ago, despite the literally hundreds of studies that have been conducted on the impact of education course and field experience on teacher development. Generally these studies have not provided much information about the substance of pre-service preparation beyond the descriptions of course titles and credit distributions (Zeichner, 1984), and they have provided even less information about how knowledge, skill, or teaching competencies are communicated to prospective vocational industrial teachers.

The problem of the development of teacher perspectives is one instance of the larger sociological question of the relationship between individuals and institutions or between action and structure (Giddens, 1979). Brim (1966) outlines two fundamental interests in the study of this problem.

One interest is in how individuals adjust to society and how in spite of the influence of society they manage to be creative and to transform the social order into which they have been born. The other interest is in how society socializes the individual - how it transforms the raw material of biological man into a person suitable to perform the activities of society. (pp. 3-4)

Historically, the study of the development of teacher perspectives has followed the latter of these traditions. Following Brim's observation that "the inquiry at all
times is concerned with how society changes the natural man, not how man changes
his society," most of the teacher socialization studies have 1) portrayed teachers as
relatively passive entities, always giving way to institutional forces; 2) have not made
the internalization of institutional norms problematic; and 3) have emphasized a
consensus view of institutions that minimizes the influence of conflicting institutional
pressures on teachers (Lacey, 1977).

Although a variety of factors at the classroom, institutional, and cultural levels,
as well as factors within teachers' biographies, have been shown to be related to
the development of teaching perspectives, teachers have not been viewed as active
participants in determining the course of their development. Tabachnick and Zeicher
(1985) state that on the one hand; teachers are viewed as "prisoners of the past" (of
anticipatory socialization during pre-service training); and on the other hand "as the
prisoners of the present" (of pressures emanating from the workplace of the society).

There is ample evidence that neither of these views is very helpful in under­
standing the development of teaching perspectives; that conformity (to the past or
present) is not the only outcome of socialization; and that even when conformity does
occur, it occurs in different degrees, in different forms, and has different meanings for
different individual teachers within different institutional contexts.

As technologies become more complex, as the knowledge and skill bases in every
subject rapidly change, and as consequently there arises a need to monitor the needs of
educators to maintain effective programs or administrative management in vocational
industrial education, it becomes increasingly important for educators to have frequent
exposure to new development in their fields.

In 1986, Taiwan's Minister of Education amended the vocational industrial ed-
ucation curricular standards. In order to affect change in the economic structure of Taiwan, the new curricula standards were based on the cluster concept rather than on the previously used unit-trade curricula. But many teachers can not adapt to the new curriculum cluster concept and object to it. They doubt the availability of the new instructional material. Some of them even doubt their own competency to teach the new instructional material.

Competency-based instruction has been recommended to vocational industrial educators for many years in Taiwan. Many experts who regard it as an excellent method of improving vocational industrial education, maintain that it should be installed in the industrial vocational school classroom. Many teachers, however, feel that it can not help them achieve the teaching goals. What is the existing problem? Is it true that teachers do not have the competency to apply the new instructional method?

Compulsory education in Taiwan has been extended to 12 years, and it emphasizes vocational education. Vocational industrial education is responsible for educating most of the students. It must influence all educational plans in vocational industrial schools. Bearing in mind the impact of vocational industrial education on the future, it is truly a great challenge to all the educators.

Statement of the Problem

This study was designed to investigate the perceptions of vocational industrial administrators and teachers regarding their needs in various aspects of the preparation and development of vocational personnel. The investigation includes information in four general areas: program description and mission, preparation as a vocational
The study reveals the findings of data collected from the public and private school personnel from four geographic areas (east, north, center, and south) of Taiwan, five occupational areas (mechanical, electrical and electronic, chemical, construction, and industrial art families) and two different primary jobs of educators regarding program description and mission, preparation as a vocational educator, continuing education of vocational educators, as well as certification and licensure along with certain demographic information. This information is used to test 17 null hypotheses for diversified perceptions in regions, occupational areas, schools, and positions.

**Purpose of the Study**

The purposes of the study were as follows:

1. Determine the views and perspectives of vocational industrial educators at the secondary school level in Taiwan on various aspects of the preparation and development of vocational personnel.

2. Examine the congruence of teachers' and administrators' perceptions among school personnel from four geographic areas of Taiwan and between administrators and teachers, as well as the difference between public school and private school personnel.

3. Identify the content of pre-service education and the developing trends of vocational education that are helpful in evaluating teacher education programs or
developing teacher in-service education and training for the vocational industrial educators in Taiwan.

**Hypotheses of the Study**

1. There is no significant difference in respondents’ perceptions regarding vocational industrial program description and mission among school personnel from the different geographic areas.

2. There is no significant difference in respondents’ perceptions regarding vocational industrial program description and mission among occupational areas.

3. There is no significant difference in respondents’ perceptions regarding vocational industrial program description and mission between public school and private school personnel.

4. There is no significant difference in respondents’ perceptions regarding vocational industrial program description and mission between administrators and teachers.

5. There is no significant difference in respondents’ perceptions regarding preparation as a vocational educator among school personnel from the different geographic areas.

6. There is no significant difference in respondents’ perceptions regarding preparation as a vocational educator among occupational areas.

7. There is no significant difference in respondents’ perceptions regarding preparation as a vocational educator between public school and private school per-
8. There is no significant difference in respondents' perceptions regarding preparation as a vocational educator between administrators and teachers.

9. There is no significant difference in respondents' perceptions regarding continuing education of vocational educators among school personnel from the different geographic areas.

10. There is no significant difference in respondents' perceptions regarding continuing education of vocational educators among occupational areas.

11. There is no significant difference in respondents' perceptions regarding continuing education of vocational educators between public school and private school personnel.

12. There is no significant difference in respondents' perceptions regarding continuing education of vocational educators between administrators and teachers.

13. There is no significant difference in respondents' perceptions regarding certification and licensure of vocational educators among school personnel from the different geographic areas.

14. There is no significant difference in respondents' perceptions regarding certification and licensure of vocational educators among occupational areas.

15. There is no significant difference in respondents' perceptions regarding certification and licensure of vocational educators between public school and private school personnel.
16. There is no significant difference in respondents' perceptions regarding certification and licensure of vocational educators between administrators and teachers.

17. It is hypothesized that the perceptions of vocational industrial educators regarding their continuing development cannot be predicted by these factors: 1) type of school, 2) classification of school, 3) geographic area of teaching, 4) their primary position, 5) type of occupational area, 6) their educational level, 7) their length of time in education, 8) their employment in industry, and 9) vocational certification.

Assumptions of the Study

This study was conducted under the following assumptions:

1. The procedure for selecting the research subjects is valid and adequate for making inferences about the general population of educators in related vocational industrial senior high schools.

2. The questions in the survey instrument render a valid measure for collecting information on preparation and development of vocational industrial educators.

3. Respondents interpret the questionnaire items correctly.

4. Respondents make a good-faith attempt to respond to the questionnaire truthfully.
Delimitations of the Study

1. The study was limited to teachers of related courses or skills in an industrial occupational area, including mechanical, electronic and electrical, chemical, construction, or industrial art families; and to the administrators who are responsible for the related teaching jobs in the vocational industrial senior high schools in Taiwan.

2. The schools were limited to the public or private vocational industrial senior high schools that are industrial, industrial and commercial, industrial and agricultural schools, or senior high school affiliated industrial subjects.

3. The study was limited to the collection of data contained in the scope of the questionnaire, and the results of this study are generalizable only to vocational industrial education in Taiwan.

Procedures of the Study

1. Review the related literature to derive information about critical issues from the existing sources related to preparation of teacher education, teacher competency, in-service education, the effectiveness of teacher certification, and the development of vocational educators.

2. Determine the population of the study. To reflect a true cross-section of the educator population and the diversity of their educational background, the educators include teachers of related professional courses in mechanics, electric and electronic, chemistry, construction, and industrial art occupational cluster
families; and also the administrators whose jobs are related to teaching of the above subjects.

3. Select the sample from the population. A multistage cluster sampling technique was employed to select the sample from the population. Then, a random selection was made from the target schools.

4. Develop a survey questionnaire containing basic data, program description and mission, preparation of vocational educators, continuing education of vocational educators, and certification and licensure.

5. Verify the content validity and the appropriateness of questionnaire item construction. By consulting with the researchers' major professor and experts.

6. Revise the questionnaire based on the recommendations of the major professor and experts, and then, translate it into Chinese.

7. Submit the proposal and questionnaire to the Human Subjects Committee for review and approval.

8. Conduct a pilot test. Twenty vocational industrial educators were selected from vocational industrial senior high schools in Taipei, Taiwan. The responses and comments on the pilot test were reviewed, and the reliability of selected items was computed.

9. Create data-base files that were used to collect response data and to store information.
10. Collect data. The survey questionnaires was mailed to each of the research participants. A follow-up to this questionnaire was mailed two weeks after the first mailing.

11. Compile information from the survey instrument, storing in data base files, and then analyzing it using the SAS statistical software package.

12. Use a t-test statistical analysis to determine if there is a significant difference in perceptions of administrators and teachers in term of the public schools and private schools where the participants work. The level of significance for the test was established at the 0.05 level.

13. Use a One-Way ANOVA statistical test to investigate the relation among perceived and desired opinions of the participants regarding the independent variables of this study.

14. Determine if there is any significant difference in perception about description and mission, preparation as a vocational educator, continuing education of vocational educators, and certification and licensure among schools of geographic areas, and occupational areas in which the participants teach.

15. Use multiple regression statistical analysis to investigate the relation of continuing development of vocational educators among educators and teaching years, occupational areas, employment location, school and other independent variables of this study.

16. Draw based on the analysis of collected data.
Definition of Terms

Administrator Individual in a school who has the responsibility for originating and carrying out schools policy and purpose.

Career development Those aspects of the continuous unbroken flow of a person's experience that are relevant to his/her fashioning of an identity at work.

Certification The requirements and approval of a person’s work experience and/or educational preparation to qualify to be form satisfactorily in his positions.

Cluster family Occupations that are logically related to one another through the similarity of task performed, concepts employed, or services provided by persons who function as part of these occupations.

Competency-based instruction The concept of instruction that emphasizes goal-orientation and individualization. Learning goals or objectives can made explicit by and for the learner. The individual then can purpose learn activities and can develop performance skills or competencies in the process.

Continuing education Any extension of opportunities for reading, studying, and training at the higher education level to young persons and adults following their completion of withdrawal from full time school or college programs.

Curriculum standards A standards which include educational purpose, educational objectives, outline of subjects, and credits of subjects announced by Minister of Education, R.O.C.

Industrial arts Those phases of general education which deal with technology -its evolution, utilization, and significance, with industry -its organization, materials, occupations, processes, and products, and with problems and benefits resulting from the technology.
**In-service education** Any one of several methods which the administrator or counselor use in getting teachers to study various topics, such as individual behavior and growth for the purpose of being more effective in working with students.

**Perspective** A coordinated service of ideas and actions a person uses in dealing with some problematic situation.

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

**Related courses** The courses which were announced by the Minister of Education, R.O.C., and which are offered for the students in vocational industrial senior high schools.

**Vocational education** Organized education programs services and activities which are directly related to the preparation of individuals for paid or unpaid employment, or for additional preparation for a career requiring other than a baccalaureate or advanced degree.
CHAPTER 2. LITERATURE REVIEW

This chapter presents the related literature and previous research on the following:

1. The competent teacher;
2. Pre-service education;
3. In-service education;
4. Certification;
5. New model of vocational teacher education; and
6. Summary

The Competent Teacher

Definition of professional teaching

The teacher has been recognized as playing the major role in the teaching and learning process. However, there is still controversy at many levels of education concerning the attributes of a good teacher and what constitutes teaching excellence. Truly excellent teachers are recognized as such by students, colleagues, and the community at large. Cooke (1985) states that the results of teaching excellence can be
identified as changes in students through their achievement of a high level of learning and demonstrated ability to solve complex problems. Norton (1985) defined teacher competency as the knowledge, skill, and attitude necessary to perform a critical teaching task. Bush (1987) also stated that "teacher competencies identify a single level of proficiency or range of proficiencies, determined through theoretical or empirical processes, at which a teacher should perform".

How these changes occur in the learning process differs among teachers. Cooke (1985) says the truly excellent teachers are able to take the science of teaching and turn it into an art. Major aspects of this ability include the relationship teachers have with students, the knack for managing a successful classroom, and the use of varied instructional methods and strategies. Other factors include how do teachers make students feel that they belong in a particular classroom and know how to make them comfortable enough in the classroom to be able to participate actively in the classwork without fear of making a mistake or inviting ridicule by other students.

Scriven (1979) has proposed a definition of professional teaching that if considered and accepted by educators would have significant impact on teacher education programs and certification of teachers. He states that professional teaching must contribute substantial positive gains in the learning either partially or totally of content, skills, and attitudes. He adds that the learning gains from professional teaching should exceed those achieved by reading a book or listening to an audio-tape. Moreover, professional teaching should produce gains that are greater than those produced by a nonprofessional in the same setting. Substituting the word "competent" for "professional" would characterize excellence in teaching.

Bryant (1981) indicates that research studies have consistently shown certain
characteristics of instruction to be correlated with either high or low achievement of students. These are time management by teachers, classroom climate, and quality of instruction.

Medley (1982) opposes the use of "learning gains" as an assessment of teacher competence for purpose of teacher preparation or certification. He believes that if the teacher is regarded as a professional, the use of pupil learning for evaluating teacher performance does not make sense. He argues that one of the essential characteristics of practices of any profession is that they are not expected and are not even permitted to guarantee results. Guyton and Faroki (1987) examined whether successful academic performance assures good teaching. Academic performance variables of teacher education graduates at one large university were correlated with on-the-job performance assessments.

Although teachers have an impact on students learning, it is clearly recognized that other factors also influence it. At times, it may be difficult to isolate the influences of an individual teacher. However, professional teachers must be held accountable for knowing and demonstrating the knowledge and skills required of the profession. Educators can describe and define better what these knowledge and skills are today than they could in the past. Teacher education programs and certification should hold these requirements of the profession to assure a foundation for excellence in teaching.

The effective teacher characteristics

A major review of research studies concerning teacher effectiveness published through 1971 was conducted by Furst (1971). Eleven teacher variables that have
shown promising relationships to pupil gains in cognitive achievement were identified. The first five variables indicated significant strongest correlational support and the last six variables indicated somewhat less correlational support. They are:

1. clarity of presentation;
2. variety of presentation;
3. enthusiasm;
4. task-oriented behavior;
5. student opportunity to learn criterion material;
6. use of student ideas;
7. element of negative criticism;
8. use of structuring comments;
9. cognitive level of questions asked; and
10. level of difficulty of instruction.

Five major types of effective teacher behavior were identified by Manatt (1976) after analyzing 1277 appraisals of 69 elementary and secondary teachers. The appraisers included the teachers' students, peers, administrators, and the teachers themselves. The effective behaviors were: productive teaching techniques (variety, use of probing questions), positive interpersonal relations (respectful, fair, to learner), organized/structured classroom management, intellectual stimulation (exciting, enthusiastic), and desirable out-of-class behaviors (good team worker, utilizes community resources).
These effective teacher characteristics are now being included in a School Improvement Model project (SIM). As a part of the four year project begun in 1980, teachers receive training to improve their effectiveness.

In 1979, the Research Institute for Studies in Education (RISE) at Iowa State University began a comprehensive study of the ISU teacher education program. In association with RISE, James (1982) identified and analyzed six major characteristics that distinguish between effective and less effective teachers, there were identified: class management skills, content knowledge and intelligence, ability, and interpersonal skills. Potential predictors of teaching effectiveness as suggested by Schalock, Howey, and Gardner (1983) include knowledge related to teaching (including content) and skills related to teaching. In particular, Schalock lists variables being considered by Oregon Teacher Preparation Institutions as essential in research on teacher selection and preparation. Many of these characteristics can be categorized into four groups: Planning and delivering instruction, interpersonal relationships, dealing with learning problems, and testing/evaluating students. Porter and Brophy (1988) summarized research on good teaching and presented a picture of effective teachers as semi-autonomous professionals who exhibit skills which also fit into the four groups.

The categories of competent vocational teacher

Medley (1982) distinguished between five categories of professional teacher competencies. They are: knowledge competencies, information-gathering skills, performance or implementation skills, decision-making skills, and professional attitudes. Cotrell (1972) and many others who conducted competency research studies, have identified and confirmed the planning, execution, evaluation, management, and other
pedagogical skills needed by successful teachers in teaching.

Most teacher educators are well aware of the comprehensive set of over 125 performance-based teacher education (PBTE) modules developed and extensively field tested by the National Center for Research in Vocational Education. They address pedagogical competencies in 13 major categories which are: 1) program planning development, and evaluation; 2) instructional planning; 3) instructional execution; 4) instructional evaluation; 5) instructional management; 6) guidance; 7) school-community relations; 8) vocational student organization; 9) professional role and development; 10) coordination of cooperative education; 11) implementing competency-based education (CBE); 12) serving students with special exceptional needs; and 13) assisting students in improving their basic skills. These are being extensively used in pre-service and in-service teacher education programs in the United States and internationally (Norton, 1985).

Evans and Herr (1978) developed a theoretical set of categories and series of desirable competencies which are suitable for the predictable role expectations of all beginning-level vocational teachers. The competencies include:

1. The “Professional” category is divided into training skills and understanding subcategories. The “Training Skills” of a professional consist of those special skills which professional teachers exhibit in their practice. The professional “Understandings” gives recognition to the fact that there are underlying reasons for the existence of public education, vocational education, and the teaching profession.

2. “Subject Matter” deals with the substance to be taught. The “Occupational Area” refers to those competencies directly associated with a particular occu-
pation, occupational cluster, or occupational fields about which the instructor is to teach. “Technical Skills” of the occupational area consist of the cognitive and psychomotor abilities called for by the occupational areas to be taught.

3. “Appreciations” refer to an awareness of the conditions associated with the psycho-social work environment of the relevant occupational area.

4. The “General” competence consists of skills, understandings, and appreciations that provide a foundation for the substance and art of teaching. The general “Appreciations” is the development of a more mature self-concept, a social conscience, sensitivity to and acceptance of the values of others.

5. The fifth major category is “Personal Characteristics” which predict the effectiveness of academic achievement in the teacher education program.

Pre-service Education

The recruitment and retention of vocational teachers

Secondary vocational teachers differ from many teachers as they tend to be underpaid, underprepared, and asked to work in difficult learning environments. An increasing number of the best teachers are learning the profession. Recruitment and retention of all teachers are one of the reasons that all are hampered by low salaries. Raising teachers salaries can significantly make teaching careers more competitive with careers in private industry. However, some authors believe that such an action alone is not sufficient. Wolansky and Fadeyi (1989) indicate:

In industrial technology teacher education, it seems that some combination may be helpful in achieving excellence. There is a need to have
competent and dedicated scholars who can work with and inspire the new generation of industrial technology teachers and equipment with which students can practise their skills and extend their knowledge. There is also a need to recruit talented and academically superior students. Thus there are four ingredients: a) creative leadership; b) quality faculty members; c) responsive academic programmes; and d) superior students, that seem critically essential to excellence. (p. 21)

Greean and Larkin (1982) also state that adverse working conditions such as large classrooms, non-teaching duties, school discipline, long hours, and a long work week must be corrected.

Some mechanism to induct new vocational education teachers is necessary to help them make the increasing adjustments. Alternations in the workplace could be accomplished through the use of support staff working with full-time teachers. The principal must demonstrate leadership ability and direct school programs, in addition handling the discipline of the student body is a major responsibility of the principal or his assistant.

In addition to ensuring the currency of teachers in the field, it is imperative that school systems hire the best of the newly certified teachers and provide the support necessary to allow them to develop into outstanding teachers. Teacher preparation programs vary in strength and rigor. A qualified vocational teacher is required to earn a baccalaureate degree with the three standard components: general education, occupational specialty, and professional teacher education. Additionally, a prescribed period of work experience may be required. However, vocational teachers with baccalaureate degrees have difficulty obtaining sufficient occupational expertise and related work experience. Especially, the variety of course to be taught within any one vocational area and the rapidity of change in the subject areas and workplace
necessitate frequent updating.

Ishler (1984) indicates that students are not challenged to perform academically in major universities. Furthermore, they can complete their degree requirements and enter the teaching profession by maintaining the same low level of achievement.

The vocational teacher training programs

Teacher education programs are important to train a quality teacher. The programs must be changed according to the need of society and economic development. Wolansky (1990) indicated:

Teacher education programs have been undergoing more changes than one might suspect at the outset. Not only were teacher education programs extended from one year to two year to four year and now to five year programs, but also the approaches vary within the U.S. as well as many other countries. (p.1)

Gallegoes (1981) states that in the past years, there has emerged renewed interest in expanding teacher preparation to 5 years. Many reasons have been given for extending programs, including the opinion that the expanded professional knowledge base cannot be accommodated by rearranging the form and content of existing programs. Reducing the general education and subject matter components of the teacher education program would be unacceptable since teachers must be broadly and rigorously prepared. Since the program approval standards used by education agencies influence directly what is included in teacher education programs, a revision of these standards would be required.

Figure 2.1 shows the vocational teacher training programs are conducted by the Institute of Education (National Commission on Secondary Vocational Education).
Figure 2.2 shows the vocational teacher education systems in Taiwan.

To become a qualified pre-vocational teacher one should have training for two years after passing the School Learning Certificate (S.L.C.) examination. This training program includes theoretical studies and practical experiences in pre-vocational subjects. Also included are pedagogical training and academic education.

Those who passed the certificate level examinations or pre-vocational teacher training are given two years training in one of the vocational subjects. The training includes theoretical knowledge, some practical experiences, and pedagogical study in the vocational subjects chosen by the trainees. Successful trainees graduate with a Bachelors degree in Vocational Education and qualify for secondary vocational teaching.

Koehler (1979) presented a program approach in which the teacher is employed and concurrently continues training. This model takes into account the fact that the first 3 years, particularly the first year are critical in teacher development, this approach creates a bridge between pre-service and in-service education, which allows an extension of professional and academic studies and supports the linking of theory with practice.

Colleges and universities can develop linkages with industry, business, and social service agencies to provide job placement for teacher candidates in non-teaching positions. Such employment has attracted prospective teachers to the teaching profession. Major corporations have staff development programs for their employees that could be made available to teacher candidates as field experiences to enrich their teacher preparation programs.
Table 2.1: Vocational Teacher Training Programs

<table>
<thead>
<tr>
<th>Institute of Education</th>
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</thead>
<tbody>
<tr>
<td>General Teacher Training</td>
<td>Vocational Teacher Training</td>
</tr>
<tr>
<td>Master degree in education</td>
<td>Bachelor in Vocational Ed.</td>
</tr>
<tr>
<td>2 years after Bachelor Degree</td>
<td>2 years after certificate level</td>
</tr>
<tr>
<td>Bachelor in Education</td>
<td>(in-service + pre-service)</td>
</tr>
<tr>
<td>(a) 2 years after Certificate level</td>
<td></td>
</tr>
<tr>
<td>(b) Bachelor or degree + 1 year training</td>
<td></td>
</tr>
<tr>
<td>2 year after S.L.C.</td>
<td>2 year after S.L.C.</td>
</tr>
<tr>
<td></td>
<td>(pre-service + in-service)</td>
</tr>
<tr>
<td>Primary teacher training</td>
<td></td>
</tr>
<tr>
<td>one year training after S.L.C. or 4 year after 7th grade.</td>
<td></td>
</tr>
</tbody>
</table>
Table 2.2: Vocational Teacher Education Systems in Taiwan

<table>
<thead>
<tr>
<th>Secondary</th>
<th>12 grades</th>
<th>Normal University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocational School</td>
<td>12 grades</td>
<td>Vocational teacher</td>
</tr>
<tr>
<td>Ordinary University</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-secondary</td>
<td>14 grades</td>
<td></td>
</tr>
</tbody>
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Diagram:
- Secondary (12 grades) connects to Normal University
- Vocational School (12 grades) connects to Vocational teacher
- Ordinary University
- Post-secondary (14 grades)
Lowry et al. (1983) conducted a study of vocational teacher education graduates to determine their preparation for instructing exceptional students. They found that graduates were not uniformly prepared for teaching exceptional students, especially the adult learner and students having little or no proficiency in the English language. Only half of participants had been required to take courses relevant to teaching exceptional persons. Lowry et al. (1983) recommended changes in teacher preparation programs to remedy these deficiencies.

In-service Education

The need of in-service education for vocational education teachers

In-service education has long been recognized as a vital part of the education process for the practicing teachers. Luke (1980) indicated that although a great many teachers expressed dissatisfaction with the quantity and quality of in-service education services available to them, however, when properly conducted, in-service training can make a definite contribution to the school and community service. Wood and Thompson (1980) pointed out that nearly all teachers and administrators saw in-service as crucial to improved school programs and practice. Wolansky (1990) noted that as the professional demands on teachers expanded in-service courses and workshops as well as graduate studies became a common expectation of practicing teachers. Lydecker (1983) also emphasized the need for in-service education, they reported that the need is even stronger for the vocational education teacher who must not only remain current in a subject matter field but must also maintain currency in a technology. From a career aspect, the teacher has personal professional needs in processing of his/her career development. Morand (1981) indicated that there are
four main types of teachers’ needs in career situations; which are induction need, extension needs, refreshment needs and conversion needs.

Luke (1980) interpreted “in-service” to mean “learning-on-the-job”, or “learning-while-earning.” It can take place in a teacher center, in a school’s general purpose room, in the classroom, or at a location entirely away from the school. Kersh (1988) makes the definition of in-service education as following:

In-service education includes those continuing education activities in which members of the teaching profession engage in order to keep current, to advance in their careers, or simply to improve themselves as an individual. (p. 20)

Failure to such currency appears to be one of the more pressing problems facing vocational education today. Luke (1980) also indicated that vocational education teachers must not only seek currency in their subject matter areas, they must also seek renewal and vitalization in their teaching methods and strategies. If teachers holding tenure are not willing to take the additional training, must be devised to circumstance the situation so that the education students receive is current and viable in the marketplace.

The in-service education programs

Ravitch describes an in-service education program for developing teaching methods in her article for her school in New York. The principal has taken the leadership role in determining the teaching methods to be used in the classroom and in re-training teachers to use the developmental lesson or the socialized recitation. The department chairs or the principal trains all teachers in this method. It is a good ex-
ample of one person's determination and leadership ability to establish a good school through good teaching.

A study by Emmer and Evertson (1982) has been useful in increasing the knowledge of successful teaching. The instructional procedures developed for the study are examples that can be used in teacher updating and training. Lydecker (1983) reports support for the development of more prescriptive research on vocational education so that program improvement plans will be based on actual circumstances in the classroom. She proposed that every vocational teacher complete a paid internship in industry every 5 years to remain current in the field and that these teachers should be responsible for teaching other faculty the implications of new technology.

Zigarmi (1977) grouped 21 types of in-service activities in which teachers participated in workshops, college or university classes, faculty meetings observation of assistance from other teachers, and professional reading and writing. Wonacott and Hamilton (1983) identified six delivery techniques to provide technological update to secondary vocational teachers; these are work experience internship; university and college course work; workshops, conference and seminars; industry observation; education and industrial staff exchange; and part-time employment. Holmes (1986) identified research as an effective use of in-service activity. He examines and presents methods for gaining knowledge, transmitting that knowledge into practice, and achieving artistic level of teaching.

Although further training in "how to teach" may be needed by teachers of all students, it is particularly essential for teachers mainstreaming disadvantaged students in vocational classrooms. Consultants from the Pennsylvania Bureau of Vocational Education identified the modifications in curriculum, facilities, and teaching strate-
gies required to help disadvantaged students succeed. Information has been made available to help the vocational teacher identify students with specific disabilities (Lwler et al., 1983). Southern Illinois University has produced curricular materials for the English as a Second Language Program for vocational education students. (Hepburn et al., 1981). The National Center for Research in Vocational Education at The Ohio State University has developed a resource guide for vocational education teachers to serve special needs learners better (Denniston et al., 1980).

These specialized requirements further add to the in-service education requirements of teachers. Such requirements place a heavy burden on the teachers who can only be relieved by careful, efficient use of time. Various steps, including released time, release from non-teaching duties, and smaller class loads will aid in providing the teacher with an opportunity for such required study. Further incentives such as grants-in-aids and salary increments would also assist in persuading more teachers to seek in-service training.

Certification

The certification policy

Certification policy vary among the states in the U.S., and are often historic in nature. Feistritzer (1984) states:

The certification of classroom teachers in the U.S. is a mess. Each state makes its own rules concerning who can be certified and what they can be certified to teach. The numbers of different types of certificates and what is required to get one within a state, much less nationwide, are staggering. (p. 36)
In most cases certification requirements are based on specific subject matter and education courses taken by the teacher candidate. Some states have approved teacher education programs or waiver programs that grant eligibility for certification to students completing these programs. These certification standards, because they are based on minimum standards, do screen out the clearly unacceptable teacher candidates, but they do not ensure that those certified are the most competent to teach.

Galambos (1986) identified three routes toward obtaining a teaching certificate in many states:

- completion of an approved teacher education program;
- completion of a set of prescribed courses for various teaching specialities; and
- alternative certification programs. (p. 15)

Certification in any procession is essentially aimed at protecting the client assuring the qualifications of the professional. In education, programs have been in existence for many years that allowed individuals to enter the classroom without a standard teaching certificate or preparation for teaching. Roth and Lutz (1986) indicate that these temporary solutions to shortages of qualified teachers are typically called emergency, limited, temporary, or nonstandard permits, and are often valid for just one year.

There are numerous examples of persons hired to teach on an emergency certificate who were not certified to teach in the U.S. There have been also the same situations happening in Taiwan because of the shortage of vocational teachers. However, some of them do teach successfully. If there were a more distinct correlation
between certification and competence, schools could utilize to a greater extent uncer-
tified part-time business and industrial personnel as they work toward certification. This could be an advantage in those areas where there is a predicted shortage of teachers but could be counter productive if noncertified teachers were deemed as effective as certified teachers by those outside the educational community.

The credential of vocational teacher

From the beginning of Federally sponsored vocational education programs, voca­
tional educators have recognized the need for a valid and effective system for cre­dentialing vocational teachers. Over the years, State standards for certification of vocational education personnel have been based on tradition, logic, and the law of supply and demand because these standards are imposed in order to insure that "only qualified persons may engage systematically in the formal schooling of young people." Rebell (1980) indicates that the provisions were intended to protect and promote the efficiency and educational influence of the public schools.

Miller (1982) contends that there continues to be a wide range of standards, criteria, and certification practices across the States. However, the States do agree that valid work experience is essential for certification of vocational teachers. The Smith-Hughes Act clearly specified that only persons with practical experience be allowed to teach in Federally reimbursed programs. Occupational experience remains the certification requirement for some vocational service areas in all 50 States.

Wisniewski (1986) has determined that alternate teacher preparation programs that produce quality teachers contain four characteristics, which are considered essential in meeting certification requirements to prepare high-quality teachers. The
four characteristics are:

1. predicated on a strong commitment to academic competence and to rigorous expectations regarding professional performance;

2. based on partners in the selection, preparation, and mentoring of participants;

3. organized to involve both partners in the selection, preparation, and mentoring of participants; and

4. delivered by a blend of rigorous campus preparation and an internship supervised by strong teachers.

According to the survey of the National Association of State Directors of Teacher Education and Certification (Ishler, 1984), all States include a baccalaureate degree as a minimum requirement including student teaching and professional education, general education, field work, special education for secondary teaching certificate. Resnick (1977) emphasized work experience as a requirement for vocational teachers. Courts and Silverman (1985) stated that other recent changes included increased field experience before student teaching and on-the-job experience after student teaching; and demonstrated competence in basic skills, subject matter and teaching skills. Geortz (1986) noted that applicants for certification were being tested in basic skills in twenty-one states, general knowledge in twelve states, professional knowledge in sixteen states and/or knowledge of teacher's specialty area in twenty states. Milanovich (1986) also indicated that work experience(s), mandatory course work, and competency testing are three main components of vocational technical teacher certification.
Standards for vocational education certification are under continual review, and up-to-date competency for recertification is a major area of concern. Documentation of technical competencies is more difficult to ascertain than the completion of a specified number of college credits for renewal of certification. Resnick and Gardner (1979) found a range of 52.4 credits for trade and industrial teacher. In Taiwan, course requirements at all teacher training institutions are identical. Thus, upon completion of the prescribed curriculum, students are automatically certified to teach in the subjects and at the specific grade level for which they are prepared. According the research of Lee (1982) that to be a qualified vocational teacher, you must meet one the following:

1. Graduation from normal university or normal college or ordinary university or college in department especially for training vocational school teachers.

2. Graduation from university, college, or graduate school with a master’s degree majoring in the same subject and having earned more than 20 credits in educational subjects.

New Model in Vocational Teacher Reform

The need of vocational teacher education reform

The new agenda for teacher education reform in Tomorrow’s Teachers (1986) revolved primarily around the need to improve education in schools, rather than the need to compete economically in the world marketplace. Tozer and Nelson (1988) indicate that while the authors recognized that there are a number of arenas for the improvement of schooling, they chose to focus on one important arena: the
education and professional preparation of teachers. Changes in the workplace, the university, and in the general economy have already created serious pressures that threaten the very existence of vocational education. For example, Adams, Pratzner, Anderson, and Zimmer (1987) reported that in the last several years the number of faculty in major vocational teacher education programs has decreased, enrollments and graduates of doctoral programs have decreased, and state and university financial support has decreased.

What are the occupational trends in the future workplace? According to the U.S. Bureau of Labor Statistics, the greatest numbers of new jobs in the next decade will be partly in a few professional areas, such as teaching and top executive positions, none of which are the traditional province of secondary school vocational education programs (Riche, 1988). On the other hand, there will be an even greater increase in the number of very low skilled jobs that provide little opportunity for advancement, such as janitors, retail clerks, and truck drivers. According to the result of Hudson Institute study (Johnston and Packer, 1987) indicate that the kinds of jobs now increasing in number require general computational and communication skills, rather than job-specific skills. They also indicate that low skilled jobs are declining, it is important to note that the occupational areas showing the most growth are those that demand higher levels of education than secondary vocational education programs provide, such as scientists, teachers, engineers, and management. Sixty-one percent of new jobs will still be in the lower half of the skill continuum - yet even in those low-skilled areas, demands for math, language, and reasoning skills are increasing. In response to the needs of the development of future workforce, Wolansky (1973) noted that:
The work of the future will be more knowledge based, then we, as educators, have a commitment to students to help them acquire a knowledge foundation in schools that will enable them to function in this important human activity of work. (p. 39)

Vocational teacher educators are currently addressing the program changes that move away from the traditional model. According to Ryan (1988), educators must be constantly aware of the changing demographics that impact the appropriateness of teacher education course content. Teacher preparation programs will remain ineffective unless pre-service and in-service teacher education programs keep pace with the educational requirements of society. This is apparent in vocational teacher education where the demographics of vocational students include a larger proportion with special needs, including learning disabilities and language barriers. Adult training and retraining responsibilities in a rapidly changing world of technology also create the constant need for program change.

New model in vocational teacher education

Based on this view of vocational education's future, teacher education reforms take on new significance. Vocational educators who can skillfully and insightfully educate through vocations, and not merely for them, will need to: a) be well-educated; b) have an unusual grasp of innovative teaching methods; and c) have grasp of the economics and sociological realities of the world of work.

Tozer and Nelson (1988) stated that the value of preparing such vocational educators will be fourfold. First, they will be uniquely able to engage students in activities that develop intellectual skills and understanding where traditional methods are rejected or unsuccessful. "Second, they will be equipping students with the
communication, interpersonal, and reasoning skills that will give them the greatest flexibility in the uncertain job market of the future. Third, they will be opening doors for these students by making advanced education a real possibility. And fourth, such educators will be exploring the potential of a curricular methods.

To the aims for the vocational education programs of the future, Holmes (1986) describes three key dimensions which relate to the emerging paradigm of vocational education.

1. **General studies**  Liberal education is more important for teachers than for any other professional group because knowledge is the business of teachers. However, the most fundamental reason that teachers should be generally well educated, and not just prepared vocationally, is independent of their future role as teachers. In other words, vocational teacher educators must have a greater role in making liberal arts and sciences faculty more conscious of what a good education requires in terms of the process, and not just the subject matter, of study and intellectual engagement.

Urban Senate Committee on Educational Policy (1987) list the various kinds of understanding and intellectual capacities that college students should be reasonably expected to develop. The content should include the ability to: 1) reason well; 2) read, write, and speak effectively in diverse contexts; 3) employ mathematics effectively; 4) use computers competently in one's academic area; 5) comprehend writing and speech in at least one foreign language; as well as have the knowledge of: 6) the nature of scientific inquiry; 7) the nature and uses of contemporary technology; 8) the histories and cultures of western civilization and non-western society in general; 9) literature and the arts; 10) economic systems and commercial life, nationally and
globally; and 11) social and behavioral sciences and their applications.

2. Academic majors An education that provides only breadth, without significant concentration in a special disciplinary area, runs the risk of being shallow and knowledge dominant. If students are to gain an understanding of how knowledge in generated, how it is criticized, and how it is subject to revision, they must study in some depth to acquire greater insights. Just as for other secondary education teacher candidates, the answer is suggested by the area of the student's teaching specialization. Students in industrial education can avail themselves of exciting programs emerging under the name of Science, Technology, and Society. At their best, these disciplinary specialties challenge students in ways that demand a standard of performance that equals any teaching and learning done in a university.

3. Professional education Pratzner (1985) and others have suggested that the professional education component of teacher certification programs sets the teacher education candidate apart from all other students in the arts and sciences. The three major elements of professional education are: a) foundational studies; b) teaching methods, with increased emphasis in instructional strategies for diverse populations; and c) field experiences in schools and occupational settings.

Vocational education students should have the opportunity to go beyond what other students learn by taking advantage of substantial critical analyses of the workplace and of the relations between schooling and the world of work. As Grubb and Lazerson (1982) and Pincus (1980) have criticized the broken promises of vocational education traditions that have not given students a clear advantage in the world of work but instead have contributed to their accepting workplace inequities.
Vocational educators should be more expert than other teachers in such vocational studies, and this expertise can be supplemented by courses in sociology, labor and industrial relations, history, economics, and other disciplines that address the nature of work and the workplace in modern society. Such course work could be part of either the students' general education, major or minor specialization, or professional teacher preparation.

A proposed experimental program in Technology Teacher Education now being considered at the University of Illinois, Champaign-Urbana, consists of six major components: general education, technology sequence (major), minor, professional education sequence, clinical experiences, and university coordinated experiences (Tozer and Nelson, 1988). This program proposal is described here to illustrate a model that can be applied to technology education and other specialties.

Farmer (1989) states that as a industrial teacher educator, there are twelve vital applications of reform that must occur in the future in order to increase the effectiveness of industrial education programs. The program reforms include:

1. Industrial teachers should have a sound intellectual base including a strong preparation in the liberal studies and academic skills.

2. Differences in the knowledge, skill, and commitment of industrial teachers should be recognized in both work assignment and certification levels.

3. Standards of entry into industrial education teaching should include educational requirements and professional testing that are intellectually changing and relevant to the specific requirements of vocational education teaching.
4. A differentiated staffing pattern of industrial education teachers should be established to include master and lead industrial teachers.

5. The industrial teacher education preparation curriculum should allow industrial students to study the subjects they will teach with instructors who are effective teaching models and who understand the pedagogy related to those subjects.

6. The industrial curriculum should include significant study of the content which will be taught with generic education courses replaced by subject matter oriented studies of teaching and learning.

7. Industrial education teachers should meet the common standards established by a national teacher certification board and the additional specific requirements unique to the profession.

8. Lead teachers in industrial education should provide leadership in teaching and learning for their industrial colleagues within the entire school and their local education regions.

9. Effort to prepare the most qualified persons for industrial teaching should include special attention to recruiting and retraining persons from ethnic and racial minority groups.

10. Provide incentives for industrial teachers based on school-wide student performance measures related to important educational outcomes.

11. Provide a supportive teaching and learning environment including appropriate technology, facilities, services, and support staff essential for industrial faculty and students' productivity.
12. Make the compensation and working conditions of industrial teachers consistent with that of other teachers and competitive with comparable positions for which they are qualified in industry.

Summary

Current trends in secondary vocational education indicate that the teacher will continue to be the critical factor affecting the success of a school program. The literature review suggested that teachers will need new and renewed support in this endeavor. Improvement in the teacher education, both pre-service and in-service will be dependent upon programs that address teaching methodology and provide up-to-date information in the subject matter specialty. Proper compensation for the value help for education must be extended in order to attract and retain the best teachers.

To achieve excellence in vocational education, it is essential that vocational education course work be thoroughly redesigned to incorporate the basic academic skills as an integral part of education. This will require an updating of all vocational education teachers as well as a major restructuring of vocational education pre-service teacher preparation. A basic education consisting of that portion gleaned in grades K through 12 is not sufficient to cope with today’s technological society. Therefore, utilization of currently developed material on teaching the basics through vocational education should be incorporated into teacher preparation programs.

Pre-service education of vocational education teachers will require rigorous examination and revision. Not only must subject matter areas be revised to include the teaching of basics as an integral part, but methods must be instituted to insure that the students entering the vocational education teaching profession are of the
caliber and scholastic ability that provide the basis for excellence in teaching. Rud-duck (1989) indicated that student going in for secondary teaching school hold an "A" level appropriate to their intended main subject. It will be necessary to raise the GPA requirements both for entering the field and for remaining in the program.

Societal changes affecting school education are of such magnitude that attention must be given to strengthening teacher preparation programs. Industrial vocational education is a professional field which attempts to serve society through its industrial manufacturing and problems of the whole society which impinge on the industrial teacher education programs designed for certifying industrial teachers. Therefore, teacher education colleges must provide training opportunities commensurate with the concerns of industries who will be affected by the industrial education program in the schools. Learning experiences within required industrial vocational courses require continuous evaluation and revision in order keep pace with changing societal needs. Determining expressed strengths and weaknesses of pre-service education programs by surveying present teachers should facilitate better use of industrial resources in industrial education departments which are responsible for industrial teacher certification programs.

In-service teacher education in vocational education will also require rigorous examination and revision. All in-service teachers will require work in the teaching of the basics as an integral part of their subject matter. Further, a system of requirements for maintaining currency in the field should be instituted to assure that in-service teachers do in fact remain current in subject matter and teaching methods.

It is desirable for industrial teachers to undergo formal teacher training programs on a full-time or part-time basis. Such in-service training programs may have to be
designed with built-in flexibility to give exemptions or credits in technical subjects and/or industrial practice which they might have received already. In addition to the initial preparation of vocational industrial teachers through pre-service and in-service training program, it is desirable for them to undergo periodically, continuing education programs to cope with increasing knowledge in technical specializations; new machinery, equipment and practices; innovative approaches in the design and development of curricula, new instructional material, methods, and evaluations; and the latest practices in educational management and research.

Teacher certification is a controversial process that will require a complete and thorough overhaul. Certification should not be a reward for completing university course work successfully. Full certification should come only after the neophytes have proven themselves as capable teachers of specific subject matter in classrooms. Furthermore, the certification system must provide a means of tying in-service training or retraining to the certification process. If vocational teachers have the opportunity to provide a postgraduate examination of subject matter and an experience requirement of 3 to 5 years followed by a professional examination, such evidence would be more useful. The institution of a master certification level would provide a means of rewarding truly excellent teachers and might help in solving the detrimental effects that tenure would encounter in establishing such a program. Attainment of such a certification could provide a worthwhile goal for any professional.

The notion of teaching for vocations needs to be reexamined in light of current changes in the workplace as well as in teacher education. The skills students will need to be productive in the workplace are becoming more complex for skilled occupations, while the majority of entry-level positions for high school leavers require minimum
job-specific skills.

These changes require a new type of secondary school vocational educator—a person who can provide instruction through vocations and not merely preparation for vocations. A broad understanding of the world of work, as well as the ability to use generalizable skills, math, reasoning, and communication may be the best vocational preparation for the majority of vocational students at the secondary school level.
CHAPTER 3. METHODOLOGY

This chapter contains an overview and summary of the development, evaluation and utilization of materials and resources that were used to conduct this study. Information concerning the procedures are addressed categorically as follows:

1. Definition of the population and identification of sample.
2. Instrument design and development of questionnaire.
3. Data collection.
4. Data analysis.

Definition of Population and Identification of Sample

The research was designed to study a sample of educators who teach or provide related administrative supervision in vocational industrial senior high school in Taiwan. The sample consists of instructional teachers teaching professional related courses of industry or field workshop courses in the areas of mechanics, electric and electronic, chemistry, construction, industrial arts or directly related administration personnel in the areas. Participants from all groups were selected for this study.

Research sample was chosen from 10% of the population by using a multistage cluster sampling technique. Multistage cluster sampling is a variant of cluster sam-
pling. In essence, it consists of two or more cycles of listing and sampling. In this study, the cluster sampling unit is a school. Seventy vocational industrial high schools (thirty for public, forty for private) served as the target school population. Three of administration personnel and fourteen of instructional teachers were selected randomly from the thirty target public schools, as well as two of administration personnel and eight of instructional teachers were selected randomly from the forty target private schools. However, the chairmen of departments were selected from the population of instructional teachers because their primary work is teaching.

Instrument Design and Development of Questionnaire

The instrument used to gather the data for this study is the Vocational Industrial Education Survey Form, which is included in Appendix A. It is a self-administered questionnaire consisting of four sections. The first section of the questionnaire contains basic data designed to identify type of schools, type of occupational areas, degree of education, length of time in education, the geographic area of teaching, vocational certification, and employed in industry. These basic data served as the independent variables of this study.

The first section of the questionnaire was composed of 5 questions about program description and mission in vocational industrial education. These items were designed to collect the information which was described by the importance and agreement to the definition and the goals of vocational industrial education. These data were necessary for estimating the development of individual abilities for occupational entry and career advancement, the responsibility for continuing the exploration of self and occupation, the satisfaction to the individual and the contribution to industry and
society, as well as the mission of vocational industrial education to the school system, and individual preparation and development.

The second section was composed of a series of 21 questions and 42 items of attitude statements. These were designed to collect the information which was used to describe the preparation of a vocational educator. These items required respondents to answer the importance and the mastery level of the competency of vocational industrial administrators or teachers in the changeable workplace. The data were necessary for estimating the development of an understanding of pedagogical philosophy of vocational industrial education, professional knowledge and skill, instructional technique, occupational guidance, administrating and leadership.

The third section was composed of 8 questions which were used to describe the continuing education activities of vocational educators. These items required respondents to answer the importance and the desirability of each to their continuing education. The data were necessary for estimating the participation in professional development programs that would update their content area and instructional skills, and become familiar with current trends, problems, update their occupational experience in the instructional area, and examine the relationship of vocational industrial education and industry.

The fourth section of the questionnaire was composed of 6 questions requested each respondent to answer the importance and agreement to the requirement needs to be examined regarding the standards, quality, renewal in certification and licensure. The need for teachers to be vocationally certified, and the need for other educators to understand vocational industrial education. A Likert-type scale was employed in order to measure the respondents' perceptions toward the value of items by teachers
and administrators. Each response employed five scales. An individual's score in the scale was the sum of numerically coded reaction to the program description and mission, preparation of vocational educators, continuing education as a vocational educator, or certification and licensure.

The questionnaire was reviewed for content validity, plausibility of items, appropriateness and completeness. The review was conducted by the major professor and selected experts. The questionnaire was revised based on the recommendations of the experts on the campus of Iowa State University and National Taiwan Normal University. In order to determine its usability, the questionnaire was pilot tested in Taipei, Taiwan. Twenty teachers and administrators who teach or work in the vocational industrial senior high schools comprised the pilot sample. The response and comments in the pilot tested questionnaire were reviewed and the reliability was computed. Items with low reliability were revised. Finally, the internal reliability of these items was determined to be 0.79 using the Cronbach's Alpha test of reliability.

Collection of Data

The population of subjects included all the vocational industrial teachers who teach in the field of mechanical, electrical and electronic, chemical, construction and industry arts families and administrators who work in the vocational industrial senior high schools in Taiwan. The number and names of schools were obtained from the Ministry of Education of R.O.C. After the 70 samples were randomly selected, a questionnaire was mailed to each of the research participants on October 25, 1990. Each mailing included a questionnaire (Vocational Industrial Education Survey Form), a cover letter to ask for cooperation, and the explanation of the survey research (see
Appendix B). In addition, each questionnaire was printed with a return address and the postage for direct mailing by type of respondent to the research.

A separate numerical code of three digits was assigned to each instrument for enabling the researcher to follow-up if the respondent didn’t return the questionnaire by November 10. Follow-up telephone calls were made to nonrespondents. Totally, there were 656 questionnaires returned by November 20. Except for 16 unusable returns this represented 72.09% returned instruments which provided the data for analysis in this study.

Data Analysis

The data from the returned questionnaires were written in answer score sheets and be stored in mainframe computers to catalog respondent information.

Programs were written in Statistical Analysis System (SAS) to compile information from raw data files and used to record informative and descriptive statistics. Summary files were created and transposed to research files which were used to conduct statistical analysis. Comparisons were be made as applicable to address the hypothesized questions of this research.

The main concern of the comparison was to identify significant difference of perceptions regarding preparation and development that exists between of administrator and teacher, and among occupational areas. The main concern of the relationship was to investigate the correlation of these multivariates and to find out which factors influenced the perception of educators regarding preparation and development. The basic multiple regression model which was used in this study is briefly stated below:

\[ Y = B_0 + B_1X_1 + B_2X_2 + \ldots + B_9X_9 \]
Where:

$Y$: trend of perception  
$X_1$: type of school  
$X_2$: classification of school  
$X_3$: geographic area of teaching  
$X_4$: primary position  
$X_5$: type of occupational area  
$X_6$: educational level  
$X_7$: length of time in education  
$X_8$: employed in industry  
$X_9$: vocational certification

For the purpose of finding significant difference, the mean of the means, the standard deviation, and the regression model were calculated with the aid of the SAS program. The new derived mean represented each categorical area. This new mean was used for further statistical analysis, i.e.: T-score comparisons (T-test), analysis of variances (ANOVA), stepwise multiple regression were used for purposes of answering the stated research hypotheses.
CHAPTER 4. RESULTS AND FINDINGS

The results and findings of this study are presented in two sections of this chapter. The presentation focuses on (1) the results of data collected from the surveys; (2) the statistical testing of hypotheses.

Survey Response

In this study, 70 industry senior high schools or affiliated industrial related subject senior high schools were chosen as the sample. A survey questionnaire was mailed to 910 participants (740 research samples to teachers and 170 research samples to administrators) on October 20, 1990. There were 502 who responded to the questionnaire by November 5. To increase the return rate of the survey, a follow-up was conducted. Efforts were made by telephone to contact those individuals who had not returned the completed questionnaire by mail. The telephone survey was a great success, as questionnaires began coming in shortly after November 20. Finally, there were totally 640 who provided usable data for this study except 16 responses were partially complete and were not included in the coding of data.

The total response rate for completed instruments is shown in Table 4.1. The analysis of returns by schools and by teachers and administrators are shown in Table 4.2.
Table 4.1: Response rate

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributed</td>
<td>910</td>
<td>100.00</td>
</tr>
<tr>
<td>Returned</td>
<td>656</td>
<td>72.09</td>
</tr>
<tr>
<td>Not Returned</td>
<td>254</td>
<td>27.91</td>
</tr>
<tr>
<td>Returned Completed</td>
<td>621</td>
<td>94.67</td>
</tr>
<tr>
<td>Returned Partially Completed</td>
<td>35</td>
<td>5.33</td>
</tr>
<tr>
<td>Returned Usable</td>
<td>640</td>
<td>97.56</td>
</tr>
<tr>
<td>Returned Unusable</td>
<td>16</td>
<td>2.44</td>
</tr>
</tbody>
</table>

Table 4.2: Analysis of return rate by school, and teacher and administrator

<table>
<thead>
<tr>
<th>School</th>
<th>Mail</th>
<th>Return</th>
<th>%</th>
<th>Position</th>
<th>Mail</th>
<th>Return</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>510</td>
<td>425</td>
<td>83.33</td>
<td>Teacher</td>
<td>740</td>
<td>504</td>
<td>68.11</td>
</tr>
<tr>
<td>Private</td>
<td>400</td>
<td>231</td>
<td>57.75</td>
<td>Administrator</td>
<td>170</td>
<td>152</td>
<td>89.74</td>
</tr>
<tr>
<td>Total</td>
<td>910</td>
<td>656</td>
<td>72.09</td>
<td>Total</td>
<td>910</td>
<td>656</td>
<td>72.09</td>
</tr>
</tbody>
</table>

Table 4.3 reveals the number and percentage of participants who responded by region, field, and school to the survey questionnaire.

Respondents were asked to rate, on a scale of 1 to 5, individual perceptions of importance, agreement, mastery, and desirability of items. Results of these statistical analyses are presented in the response to specific research hypotheses.

Hypotheses Tested

Null hypothesis 1a

There is no significant difference in respondents' perceptions regarding the importance of vocational industrial program description and mission among school personnel from the different geographic areas.
Table 4.3: Analysis of return rate by region and occupational area

<table>
<thead>
<tr>
<th>Region</th>
<th>Mail</th>
<th>Return</th>
<th>%</th>
<th>Occp. Area</th>
<th>Mail</th>
<th>Return</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>380</td>
<td>291</td>
<td>76.58</td>
<td>Mechanics</td>
<td>340</td>
<td>272</td>
<td>80.00</td>
</tr>
<tr>
<td>Center</td>
<td>240</td>
<td>155</td>
<td>64.59</td>
<td>Electr/Elec.</td>
<td>340</td>
<td>233</td>
<td>68.50</td>
</tr>
<tr>
<td>South</td>
<td>240</td>
<td>179</td>
<td>74.58</td>
<td>Chemistry</td>
<td>70</td>
<td>45</td>
<td>64.20</td>
</tr>
<tr>
<td>East</td>
<td>50</td>
<td>31</td>
<td>62.00</td>
<td>Constr.</td>
<td>100</td>
<td>69</td>
<td>69.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ind. Arts</td>
<td>60</td>
<td>32</td>
<td>53.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Others</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>910</td>
<td>656</td>
<td>72.09</td>
<td>Total</td>
<td>910</td>
<td>656</td>
<td>72.09</td>
</tr>
</tbody>
</table>

Based on the analysis of data reported in Table 4.4. There was insufficient evidence to reject null hypothesis 1a at the 0.05 level.

Null hypothesis 1b

There is no significant difference regarding the agreement with vocational industrial program description and mission among school personnel from the different geographic areas.

Table 4.4 shows the results of the number, means, and standard deviations regarding the importance attributed to and the agreement with the vocational industrial program description and mission among school personnel from the different geographic areas. Since no significant differences were found, null hypothesis 1b was accepted.

Null hypothesis 2a

There is no significant difference in respondents’ perceptions regarding the importance of vocational industrial program description and mission among occupational areas.
Table 4.4: Number, means, and standard deviations of importance attributed to and agreement with program description and mission, categorized by geographic area

<table>
<thead>
<tr>
<th>Region</th>
<th>Important</th>
<th>Agreeable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>North</td>
<td>283</td>
<td>4.07</td>
</tr>
<tr>
<td>Center</td>
<td>145</td>
<td>4.01</td>
</tr>
<tr>
<td>South</td>
<td>173</td>
<td>4.09</td>
</tr>
<tr>
<td>East</td>
<td>28</td>
<td>4.01</td>
</tr>
</tbody>
</table>

Table 4.5: Analysis of variance of importance attributed to program description and mission, categorized by occupational area

<table>
<thead>
<tr>
<th>Occp. Area</th>
<th>df</th>
<th>Mean Square</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occp. Area</td>
<td>4</td>
<td>0.68</td>
<td>1.83</td>
<td>0.11</td>
</tr>
<tr>
<td>Residual</td>
<td>615</td>
<td>0.37</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Five questions presented to survey participants teaching in vocational industrial schools were categorized as regarding the importance attributed to the program description and mission. The results of analyses and computations are shown in Tables 4.5 and 4.6.

In responding to the questions on regarding the importance of statements on program description and mission, the industrial art family received a relatively high rating mean ($\bar{x} = 4.19$) and the construction family a relatively low rating mean ($\bar{x} = 3.85$) in the five groups.

Owing to the fact that the number of responses from each group was quite different, a Contrast Statement was used to test further the relation between the two groups. Results of the analysis of data are reported in Table 4.7 related to the importance attributed the program description and mission. Significant differences were
Table 4.6: Number, means, and standard deviations of importance attributed to program description and mission, categorized by occupational area

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanics</td>
<td>257</td>
<td>4.08</td>
<td>0.59</td>
</tr>
<tr>
<td>Elect/Elec.</td>
<td>232</td>
<td>4.04</td>
<td>0.63</td>
</tr>
<tr>
<td>Chemistry</td>
<td>42</td>
<td>4.08</td>
<td>0.64</td>
</tr>
<tr>
<td>Constr.</td>
<td>64</td>
<td>3.85</td>
<td>0.64</td>
</tr>
<tr>
<td>Ind. Arts</td>
<td>25</td>
<td>4.19</td>
<td>0.66</td>
</tr>
</tbody>
</table>

Table 4.7: Analysis of contrast of importance attributed to program description and mission, categorized by occupational area

<table>
<thead>
<tr>
<th>Group</th>
<th>df</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1 v.s G 4</td>
<td>1</td>
<td>5.35</td>
<td>0.02</td>
</tr>
<tr>
<td>G 5 v.s G 4</td>
<td>1</td>
<td>5.29</td>
<td>0.02</td>
</tr>
</tbody>
</table>

found between the mechanical and construction families, and between the industrial art and construction families.

Based on the results of the data analysis presented, there is sufficient evidence to reject the null hypothesis. There is a significant difference among occupational fields regarding the importance attributed to the program description and mission. Therefore, null hypothesis 2a was rejected at the 0.05 level.

Null hypothesis 2b

There is no significant difference in respondents' perceptions regarding the agreement with vocational industrial program description and mission among occupational areas.

Table 4.8 shows the results of the number, means, and standard deviations re-
Table 4.8: Number, means, and standard deviations of agreement with program description and mission, categorized by occupational area

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanics</td>
<td>264</td>
<td>3.95</td>
<td>0.60</td>
</tr>
<tr>
<td>Electr/Elec.</td>
<td>225</td>
<td>3.91</td>
<td>0.65</td>
</tr>
<tr>
<td>Chemistry</td>
<td>41</td>
<td>4.12</td>
<td>0.53</td>
</tr>
<tr>
<td>Constr.</td>
<td>65</td>
<td>3.87</td>
<td>0.65</td>
</tr>
<tr>
<td>Ind. Arts</td>
<td>28</td>
<td>3.85</td>
<td>0.77</td>
</tr>
</tbody>
</table>

Table 4.9: T-test analysis of importance attributed to program description and mission, categorized by school

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>409</td>
<td>4.02</td>
<td>0.63</td>
<td>-1.95</td>
<td>0.05</td>
</tr>
<tr>
<td>Private</td>
<td>216</td>
<td>4.12</td>
<td>0.57</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regarding the agreement with vocational industrial program description and mission among occupational areas. Since no significant differences were found, null hypothesis 2b was accepted.

Null hypothesis 3a

There is no significant difference in respondents' perceptions regarding the importance of vocational industrial program description and mission between public school and private school personnel.

Table 4.9 shows the results of the t-test analysis regarding the importance attributed to the vocational industrial program description and mission between public school and private school personnel. Since no significant differences were found, null hypothesis 3a was accepted.
Table 4.10: T-test analysis of agreement with program description and mission, categorized by school

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>416</td>
<td>3.93</td>
<td>0.61</td>
<td>-0.22</td>
<td>0.83</td>
</tr>
<tr>
<td>Private</td>
<td>219</td>
<td>3.95</td>
<td>0.65</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Null hypothesis 3b

There is no significant difference in respondents' perceptions regarding the agreement with vocational industrial program description and mission between public school and private school personnel.

Table 4.10 shows the results of t-test analysis regarding the agreement with the vocational industrial program description and mission between public school and private school personnel. Since no significant differences were found, null hypothesis 3b was accepted.

Null hypothesis 4a

There is no significant difference in respondents' perceptions regarding the importance of vocational industrial program description and mission between administrators and teachers.

Table 4.11 shows the t-test analysis regarding the importance attributed to the vocational industrial program description and mission between administrators and teachers. Since no significant differences were found, null hypothesis 4a was accepted.
Table 4.11: T-test analysis of importance attributed to program description and mission, categorized by position

<table>
<thead>
<tr>
<th>Position</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>145</td>
<td>4.06</td>
<td>0.57</td>
<td>0.14</td>
<td>0.89</td>
</tr>
<tr>
<td>Teacher</td>
<td>480</td>
<td>4.05</td>
<td>0.63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.12: T-test analysis of agreement with program description and mission, categorized by position

<table>
<thead>
<tr>
<th>Position</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>147</td>
<td>3.96</td>
<td>0.57</td>
<td>0.47</td>
<td>0.64</td>
</tr>
<tr>
<td>Teacher</td>
<td>488</td>
<td>3.93</td>
<td>0.64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Null hypothesis 4b

There is no significant difference in respondents' perceptions regarding their agreement with vocational industrial program description and mission between administrators and teachers.

Table 4.12 shows the results of t-test analysis regarding the agreement with the vocational industrial program description and mission between administrators and teachers. Since no significant differences were found, null hypothesis 4b was accepted.

Null hypothesis 5a

There is no significant difference in respondents' perceptions regarding the importance of preparation as a vocational educator among school personnel from different geographic areas.

Twenty-one questions presented to survey participants teaching in vocational
Table 4.13: Analysis of variance of importance attributed to preparation as a vocational educator, categorized by geographic area

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Mean Square</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog. Area</td>
<td>4</td>
<td>0.73</td>
<td>2.38</td>
<td>0.058</td>
</tr>
<tr>
<td>Residual</td>
<td>633</td>
<td>0.31</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.14: Number, means, and standard deviations of importance attributed to preparation as a vocational educator, categorized by geographic area

<table>
<thead>
<tr>
<th>Region</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>285</td>
<td>3.74</td>
<td>0.58</td>
</tr>
<tr>
<td>Center</td>
<td>149</td>
<td>3.77</td>
<td>0.52</td>
</tr>
<tr>
<td>South</td>
<td>176</td>
<td>3.87</td>
<td>0.55</td>
</tr>
<tr>
<td>East</td>
<td>28</td>
<td>3.86</td>
<td>0.54</td>
</tr>
</tbody>
</table>

industrial schools were categorized as regarding the importance attributed to the preparation as a vocational educator. The results of the analyses and computations are shown in Table 4.13 and 4.14.

In responding to the questions on regarding the importance of statements on preparation as a vocational educator, the southern area received a relatively high rating mean (\(\bar{x} = 3.87\)) and the northern area a relatively low rating mean (\(\bar{x} = 3.74\)) in the five regions.

Owing to the fact that the number of responses from each group was quite different, a Contrast Statement was used to test further the relation between the two groups. Results of the analysis of data reported in Table 4.15 related to the importance attributed to the preparation as a vocational educator. Significant differences were found between the southern and northern areas.

Based on the results of the data analysis presented, there is sufficient evidence
Table 4.15: Analysis of contrast of importance attributed to preparation as a vocational educator, categorized by geographic area

<table>
<thead>
<tr>
<th>Group</th>
<th>df</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1 v.s G 3</td>
<td>1</td>
<td>6.58</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Table 4.16: Analysis of variance of mastery of preparation as a vocational educator, categorized by geographic area

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Mean Square</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog. Area</td>
<td>3</td>
<td>1.23</td>
<td>3.82</td>
<td>0.01</td>
</tr>
<tr>
<td>Residual</td>
<td>634</td>
<td>0.32</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To reject the null hypothesis. There is a significant difference among geographic areas regarding the importance attributed to the preparation as a vocational educator. Therefore, null hypothesis 5a was rejected at the 0.05 level.

Null hypothesis 5b

There is no significant difference in respondents’ perceptions regarding their mastery of preparation as a vocational educator among school personnel from the different geographic areas.

Twenty-one questions presented to survey participants teaching in vocational industrial schools were categorized as regarding their mastery of preparation as a vocational educator. The results of analyses and computations are shown in Table 4.16 and 4.17.

In responding to the questions on regarding the mastery of statements on preparation as a vocational educator, the southern area received a relatively high rating mean (\( \bar{x} = 3.69 \)) and the northern area a relatively low rating mean (\( \bar{x} = 3.53 \)) in
Table 4.17: Number, means, and standard deviations of mastery of preparation as a vocational educator, categorized by geographic area

<table>
<thead>
<tr>
<th>Region</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>288</td>
<td>3.53</td>
<td>0.58</td>
</tr>
<tr>
<td>Center</td>
<td>148</td>
<td>3.67</td>
<td>0.52</td>
</tr>
<tr>
<td>South</td>
<td>174</td>
<td>3.69</td>
<td>0.57</td>
</tr>
<tr>
<td>East</td>
<td>28</td>
<td>3.68</td>
<td>0.68</td>
</tr>
</tbody>
</table>

Table 4.18: Analysis of contrast of mastery of preparation as a vocational educator, categorized by geographic area

<table>
<thead>
<tr>
<th>Group</th>
<th>df</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1 v.s G 2</td>
<td>1</td>
<td>5.81</td>
<td>0.02</td>
</tr>
<tr>
<td>G 1 v.s G 3</td>
<td>1</td>
<td>9.08</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Owing to the fact that the number of responses from each group was quite different, a Contrast Statement was used to test further the relation between the two groups. Results of the analysis of data reported in Table 4.18 related to the mastery of preparation as a vocational educator. Significant differences were found between the central and northern areas, and between the southern and northern areas.

Based on the results of the data analysis presented, there is sufficient evidence to reject the null hypothesis. There is a significant difference among geographic areas regarding the mastery of preparation as a vocational educator. Therefore, null hypothesis 5b was rejected at the 0.05 level.
Table 4.19: Number, means, and standard deviations of importance attributed to and mastery of preparation as a vocational educator, categorized by occupational area

<table>
<thead>
<tr>
<th>Occp. Area</th>
<th>Important</th>
<th>Mastery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>Mechanics</td>
<td>263</td>
<td>3.78</td>
</tr>
<tr>
<td>Electr/Elec.</td>
<td>230</td>
<td>3.79</td>
</tr>
<tr>
<td>Chemistry</td>
<td>42</td>
<td>3.79</td>
</tr>
<tr>
<td>Constr.</td>
<td>66</td>
<td>3.70</td>
</tr>
<tr>
<td>Ind. Arts</td>
<td>26</td>
<td>3.82</td>
</tr>
</tbody>
</table>

Null hypothesis 6a

There is no significant difference in respondents' perceptions regarding the importance of preparation as a vocational educator among occupational areas.

Based on the analysis of data reported in Table 4.19. There was insufficient evidence to reject null hypothesis 6a at the 0.05 level.

Null hypothesis 6b

There is no significant difference in respondents' perceptions regarding their mastery of preparation as a vocational educator among occupational areas.

Table 4.19 shows the results of the number, means, and standard deviations regarding the importance attributed to and mastery of the preparation as a vocational educator among occupational areas. Since no significant differences were found, null hypothesis 6b was accepted.
Table 4.20: T-test analysis of importance attributed to preparation as a vocational educator, categorized by school

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>414</td>
<td>3.76</td>
<td>0.52</td>
<td>-1.39</td>
<td>0.16</td>
</tr>
<tr>
<td>Private</td>
<td>220</td>
<td>3.83</td>
<td>0.61</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Null hypothesis 7a

There is no significant difference in respondents' perceptions regarding the importance of preparation as a vocational educator between public school and private school personnel.

Table 4.20 shows the results of t-test analysis regarding the importance attributed to the preparation as a vocational educator between public school and private school personnel. Since no significant differences were found, null hypothesis 7a was accepted.

Null hypothesis 7b

There is no significant difference in respondents' perceptions regarding their mastery of preparation as a vocational educator between public school and private school personnel.

Table 4.21 shows the results of t-test analysis regarding the mastery of preparation as a vocational educator between public school and private personnel. Since no significant differences were found, null hypothesis 7b was accepted.
Table 4.21: T-test analysis of mastery of preparation as a vocational educator, categorized by school

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>416</td>
<td>3.60</td>
<td>0.55</td>
<td>-0.57</td>
<td>0.57</td>
</tr>
<tr>
<td>Private</td>
<td>218</td>
<td>3.63</td>
<td>0.60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.22: T-test analysis of importance attributed to preparation as a vocational educator, categorized by position

<table>
<thead>
<tr>
<th>Position</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>145</td>
<td>3.82</td>
<td>0.43</td>
<td>1.81</td>
<td>0.04</td>
</tr>
<tr>
<td>Teacher</td>
<td>489</td>
<td>3.78</td>
<td>0.26</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Null hypothesis 8a

There is no significant difference in respondents' perceptions regarding the importance of preparation as a vocational educator between administrators and teachers.

Table 4.22 shows the results of t-test analysis regarding the importance attributed to the preparation as a vocational educator between administrators and teachers. Since no significant differences were found, null hypothesis 8a was accepted.

Null hypothesis 8b

There is no significant difference in respondents' perceptions regarding their mastery of preparation as a vocational educator between administrators and teachers.

Table 4.23 shows the results of t-test analysis regarding the mastery of preparation as a vocational educator between administrators and teachers. Since no significant differences were found, null hypothesis 8b was accepted.
Table 4.23: T-test analysis of mastery of preparation as a vocational educator, categorized by position

<table>
<thead>
<tr>
<th>Position</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb &gt; ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>146</td>
<td>3.65</td>
<td>0.55</td>
<td>0.82</td>
<td>0.41</td>
</tr>
<tr>
<td>Teacher</td>
<td>488</td>
<td>3.60</td>
<td>0.58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.24: Analysis of variance of importance attributed to continuing education of vocational educators, categorized by geographic area

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Mean Square</th>
<th>F-value</th>
<th>Pb &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog. Area</td>
<td>3</td>
<td>1.07</td>
<td>2.86</td>
<td>0.04</td>
</tr>
<tr>
<td>Residual</td>
<td>632</td>
<td>0.37</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Null hypothesis 9a

There is no significant difference in respondents' perceptions regarding the importance of continuing education of vocational educators among school personnel from different geographic areas.

Eight questions presented to survey participants teaching in vocational industrial schools were categorized as regarding the importance attributed to the continuing education of vocational educators. The results of analyses and computations are shown in Table 4.24 and 4.25.

In responding to the questions on regarding the importance of statements on continuing education of vocational educators, the southern area received a relatively high rating mean (\( \bar{x} = 4.11 \)) and the central area a relatively low rating mean (\( \bar{x} = 3.93 \)) in the five regions.

Owing to the fact that the number of responses from each group was quite different, a Contrast Statement was used to test further the relation between the two
Table 4.25: Number, means, and standard deviations of importance attributed to continuing education of vocational educators, categorized by geographic area

<table>
<thead>
<tr>
<th>Region</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>285</td>
<td>3.94</td>
<td>0.61</td>
</tr>
<tr>
<td>Center</td>
<td>147</td>
<td>3.93</td>
<td>0.62</td>
</tr>
<tr>
<td>South</td>
<td>176</td>
<td>4.11</td>
<td>0.60</td>
</tr>
<tr>
<td>East</td>
<td>28</td>
<td>3.94</td>
<td>0.71</td>
</tr>
</tbody>
</table>

Table 4.26: Analysis of contrast of importance attributed to continuing education of vocational educators, categorized by geographic area

<table>
<thead>
<tr>
<th>Group</th>
<th>df</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1 v.s G 3</td>
<td>1</td>
<td>-6.10</td>
<td>0.01</td>
</tr>
<tr>
<td>G 2 v.s G 3</td>
<td>1</td>
<td>6.79</td>
<td>0.009</td>
</tr>
</tbody>
</table>

groups. Results of the analysis of data are reported in Table 4.26 related to the importance attributed to the continuing education of vocational educators. Significant differences were found between the northern and southern areas, and between the central and southern areas.

Based on the results of data analysis presented, there is sufficient evidence to reject the null hypothesis. There is a significant difference among geographic areas regarding the importance of the continuing education of vocational educators. Null hypothesis 9a was rejected at the 0.05 level.

Null hypothesis 9b

There is no significant difference in respondents' perceptions regarding their desire for continuing education among school personnel from different geographic
Table 4.27: Analysis of variance of desire pursue to continuing education of vocational educators, categorized by geographic area

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Mean Square</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog. Area</td>
<td>3</td>
<td>1.05</td>
<td>2.77</td>
<td>0.04</td>
</tr>
<tr>
<td>Residual</td>
<td>631</td>
<td>0.37</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.28: Number, means, and standard deviations of desire pursue to continuing education of vocational educators, categorized by geographic area

<table>
<thead>
<tr>
<th>Region</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>287</td>
<td>3.86</td>
<td>0.62</td>
</tr>
<tr>
<td>Center</td>
<td>145</td>
<td>3.82</td>
<td>0.65</td>
</tr>
<tr>
<td>South</td>
<td>175</td>
<td>4.00</td>
<td>0.57</td>
</tr>
<tr>
<td>East</td>
<td>28</td>
<td>3.87</td>
<td>0.65</td>
</tr>
</tbody>
</table>

Eight questions presented to survey participants teaching in vocational industrial schools were categorized as regarding their desire for continuing education. The results of the analysis and computation are shown in Table 4.27 and 4.28.

In responding to the questions on regarding the desire for statements on continuing education of vocational educators, the southern area received a relatively high rating mean ($\bar{x} = 4.00$) and the central area a relatively low rating mean ($\bar{x} = 3.82$) in the five regions.

Owing to the fact that the number of responses from each group was quite different, a Contrast Statement was used to test further the relation between the two groups. Results of the analysis of data are reported in Table 4.29 related to the desire pursue to the continuing education of vocational educators. Significant differences were found between the the northern and southern areas, and between the central
Table 4.29: Analysis of contrast of desire pursue to continuing education of vocational educators, categorized by geographic area

<table>
<thead>
<tr>
<th>Group</th>
<th>df</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1 v.s G 3</td>
<td>1</td>
<td>5.82</td>
<td>0.01</td>
</tr>
<tr>
<td>G 2 v.s G 3</td>
<td>1</td>
<td>6.87</td>
<td>0.009</td>
</tr>
</tbody>
</table>

and southern areas.

Based on the results of the data analysis presented, there is sufficient evidence to reject the null hypothesis. There is a significant difference among geographic areas regarding the desire pursue to the continuing education of vocational educators. Therefore, null hypothesis 9b was rejected at the 0.05 level.

Null hypothesis 10a

There is no significant difference in respondents' perceptions regarding the importance of continuing education of vocational educators among occupational areas.

Based on the analysis of data reported in Table 4.30. There was insufficient evidence to reject null hypothesis 10a at the 0.05 level.

Null hypothesis 10b

There is no significant difference in respondents' perceptions regarding their desire for continuing education among occupational areas.

Table 4.30 shows the results of the number, means, and standard deviations of desire pursue to the continuing education of vocational educators among occupational areas. Since no significant differences were found, null hypothesis 10b was accepted.
Table 4.30: Number, means, and standard deviations of desire pursue to continuing education of vocational educators, categorized by occupational area

<table>
<thead>
<tr>
<th>Occp. Area</th>
<th>Important</th>
<th></th>
<th></th>
<th>Desirable</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Mechanics</td>
<td>263</td>
<td>4.03</td>
<td>0.57</td>
<td>264</td>
<td>3.92</td>
<td>0.59</td>
</tr>
<tr>
<td>Electr/Elec.</td>
<td>224</td>
<td>3.96</td>
<td>0.66</td>
<td>224</td>
<td>3.87</td>
<td>0.64</td>
</tr>
<tr>
<td>Chemistry</td>
<td>42</td>
<td>4.12</td>
<td>0.56</td>
<td>41</td>
<td>3.88</td>
<td>0.59</td>
</tr>
<tr>
<td>Construction</td>
<td>64</td>
<td>3.87</td>
<td>0.62</td>
<td>61</td>
<td>3.74</td>
<td>0.60</td>
</tr>
<tr>
<td>Ind. Arts</td>
<td>27</td>
<td>3.93</td>
<td>0.63</td>
<td>27</td>
<td>3.79</td>
<td>0.64</td>
</tr>
</tbody>
</table>

Table 4.31: T-test analysis of importance attributed to continuing education of vocational educators, categorized by school

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>412</td>
<td>3.97</td>
<td>0.03</td>
<td>-1.71</td>
<td>0.09</td>
</tr>
<tr>
<td>Private</td>
<td>220</td>
<td>4.05</td>
<td>0.04</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Null hypothesis 11a

There is no significant difference in respondents' perceptions regarding the importance of continuing education between public school and private school personnel.

Table 4.31 shows the results of t-test analysis deviations regarding the importance attributed to the continuing education of vocational educators between public school and private school personnel. Since no significant differences were found, null hypothesis 11a was accepted.

Null hypothesis 11b

There is no significant difference in respondents' perceptions regarding their desire for continuing education between public school and private school personnel.
Table 4.32: T-test analysis of desire pursue to continuing education of vocational educators, categorized by school

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>415</td>
<td>3.87</td>
<td>0.62</td>
<td>-1.52</td>
<td>0.13</td>
</tr>
<tr>
<td>Private</td>
<td>216</td>
<td>3.94</td>
<td>0.62</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.33: T-test analysis of importance attributed to continuing education of vocational educators, categorized by position

<table>
<thead>
<tr>
<th>Position</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>145</td>
<td>3.98</td>
<td>0.59</td>
<td>-0.30</td>
<td>0.76</td>
</tr>
<tr>
<td>Teacher</td>
<td>487</td>
<td>4.00</td>
<td>0.62</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.32 shows the results of t-test analysis regarding the desire pursue to the continuing education of vocational educators between public school and private school personnel. Since no significant differences were found, null hypothesis 11b was accepted.

Null hypothesis 12a

There is no significant difference in respondents’ perceptions regarding the importance of continuing education of vocational educators between administrators and teachers.

Table 4.33 shows the results of t-test analysis regarding the importance attributed to the continuing education of vocational educators between administrators and teachers. Since no significant differences were found, null hypothesis 12a was accepted.
Table 4.34: T-test analysis of desire pursue to continuing education of vocational educators, categorized by position

<table>
<thead>
<tr>
<th>Position</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>145</td>
<td>3.86</td>
<td>0.62</td>
<td>0.80</td>
<td>0.42</td>
</tr>
<tr>
<td>Teacher</td>
<td>468</td>
<td>3.90</td>
<td>0.62</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Null hypothesis 12b

There is no significant difference in respondents’ perceptions regarding their desire for continuing education between administrators and teachers.

Table 4.34 shows the results of t-test analysis regarding the desire pursue to the continuing education of vocational educators between administrators and teachers. Since no significant differences were found, null hypothesis 12b was accepted.

Null hypothesis 13a

There is no significant difference in respondents’ perceptions regarding the importance of certification and licensure among school personnel from different geographic areas.

Six questions presented to survey participants teaching in vocational industrial schools were categorized as regarding the importance attributed to the certification and licensure. The results of the analyses and computations are shown in Table 4.35 and 4.36.

In responding to the questions on regarding the importance of statements on certification and licensure, the southern area received a relatively high rating mean ($\bar{x} = 3.96$) and the central area a relatively low rating mean ($\bar{x} = 3.76$) in the five regions.
Table 4.35: Analysis of variance of importance attributed to certification and licensure, categorized by geographic area

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Mean Square</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog. Area</td>
<td>3</td>
<td>1.50</td>
<td>3.08</td>
<td>0.03</td>
</tr>
<tr>
<td>Residual</td>
<td>629</td>
<td>3.59</td>
<td>0.49</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.36: Number, means, and standard deviations of importance attributed to certification and licensure, categorized by geographic area

<table>
<thead>
<tr>
<th>Region</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>287</td>
<td>3.81</td>
<td>0.72</td>
</tr>
<tr>
<td>Center</td>
<td>147</td>
<td>3.76</td>
<td>0.68</td>
</tr>
<tr>
<td>South</td>
<td>172</td>
<td>3.96</td>
<td>0.66</td>
</tr>
<tr>
<td>East</td>
<td>27</td>
<td>3.79</td>
<td>0.93</td>
</tr>
</tbody>
</table>

Owing to the fact that the number of responses from each group was quite different, a Contrast Statement was used to test further the relation between the two groups. Results of the analysis of data are reported in Table 4.37 related to the importance attributed to the certification and licensure. Significant differences were found between the northern and southern areas, and between the central and southern areas.

Based on the results the data analysis presented, there is sufficient evidence to reject the null hypothesis. There is a significant difference among geographic

Table 4.37: Analysis of contrast of importance attributed to certification and licensure, categorized by geographic area

<table>
<thead>
<tr>
<th>Group</th>
<th>df</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1 v.s G 3</td>
<td>1</td>
<td>5.08</td>
<td>0.02</td>
</tr>
<tr>
<td>G 2 v.s G 3</td>
<td>1</td>
<td>6.55</td>
<td>0.01</td>
</tr>
</tbody>
</table>
Table 4.38: Analysis of variance of agreement with certification and licensure, categorized by geographic area

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Mean Square</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog. Area</td>
<td>3</td>
<td>1.35</td>
<td>2.57</td>
<td>0.05</td>
</tr>
<tr>
<td>Residual</td>
<td>631</td>
<td>3.46</td>
<td>0.53</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.39: Number, means, and standard deviations of agreement with certification and licensure, categorized by geographic area

<table>
<thead>
<tr>
<th>region</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>291</td>
<td>3.68</td>
<td>0.75</td>
</tr>
<tr>
<td>Center</td>
<td>143</td>
<td>3.71</td>
<td>0.68</td>
</tr>
<tr>
<td>South</td>
<td>173</td>
<td>3.85</td>
<td>0.68</td>
</tr>
<tr>
<td>East</td>
<td>28</td>
<td>3.69</td>
<td>1.15</td>
</tr>
</tbody>
</table>

areas regarding the importance attributed to the certification and licensure. Null hypothesis 13a was rejected at the 0.05 level.

Null hypothesis 13b

There is no significant difference in respondents' perceptions regarding the agreement with certification and licensure among school personnel from different geographic areas.

Six questions presented to survey participants teaching in vocational industrial schools were categorized as regarding the agreement with the certification and licensure. The results of analyses and computations are shown in Table 4.38 and 4.39.

In responding to the questions on regarding the agreement of statements on certification and licensure, the southern area received a relatively high rating mean ($\bar{x} = 3.85$) and the central area a relatively low rating mean ($\bar{x} = 3.68$) in the five
Table 4.40: Analysis of contrast of agreement with certification and licensure, categorized by geographic area

<table>
<thead>
<tr>
<th>Group</th>
<th>df</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1 v.s G 3</td>
<td>1</td>
<td>5.49</td>
<td>0.02</td>
</tr>
</tbody>
</table>

regions.

Owing to the fact that the number of responses from each group was quite different, a Contrast Statement was used to test further the relation between the two groups. Results of the analysis of data are reported in Table 4.40 related to the agreement with the certification and licensure. Significant differences were found between the northern and southern areas.

Based on the results of the data analysis presented, there is sufficient evidence to reject the null hypothesis. There is a significant difference among geographic areas regarding the agreement with the certification and licensure. Null hypothesis 13b was rejected at the 0.05 level.

**Null hypothesis 14a**

There is no significant difference in respondents’ perceptions regarding the importance of certification and licensure among occupational areas.

Six questions presented to survey participants teaching in vocational industrial schools were categorized as regarding the importance attributed to the certification and licensure. The results of analyses and computations are shown in Table 4.41 and 4.42.

In responding to the questions on regarding the importance of statements on certification and licensure, the mechanical family received a relatively high rating
Table 4.41: Analysis of variance of importance attributed to certification and licensure, categorized by occupational area

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Mean Square</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog. Area</td>
<td>4</td>
<td>1.14</td>
<td>2.34</td>
<td>0.04</td>
</tr>
<tr>
<td>Residual</td>
<td>611</td>
<td>0.49</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.42: Number, means, and standard deviations of importance attributed to certification and licensure, categorized by occupational area

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanics</td>
<td>267</td>
<td>3.88</td>
<td>0.64</td>
</tr>
<tr>
<td>Electr/Elec.</td>
<td>221</td>
<td>3.74</td>
<td>0.77</td>
</tr>
<tr>
<td>Chemistry</td>
<td>42</td>
<td>3.81</td>
<td>0.65</td>
</tr>
<tr>
<td>Constr.</td>
<td>62</td>
<td>3.83</td>
<td>0.76</td>
</tr>
<tr>
<td>Ind. Arts</td>
<td>24</td>
<td>3.84</td>
<td>0.62</td>
</tr>
</tbody>
</table>

mean ($\bar{x} = 3.88$) and the electrical/electronic family a relatively low rating mean ($\bar{x} = 3.74$) in the five groups.

Owing to the fact that the number of responses from each group was quite different, a Contrast Statement was used to test further the relation between the two groups. Results of the analysis of data reported in Table 4.43 related to the importance attributed to the certification and licensure. Significant differences were found between the mechanical and electrical/electronic families.

Based on the results of the data analysis presented, there is sufficient evidence to

Table 4.43: Analysis of contrast of importance attributed to certification and licensure categorized by occupational area

<table>
<thead>
<tr>
<th>Group</th>
<th>df</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1 v.s G 2</td>
<td>1</td>
<td>4.95</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Table 4.44: Analysis of variance of agreement with certification and licensure, categorized by occupational area

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Mean Square</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog. Area</td>
<td>4</td>
<td>1.33</td>
<td>2.54</td>
<td>0.03</td>
</tr>
<tr>
<td>Residual</td>
<td>602</td>
<td>0.52</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.45: Analysis of variance of agreement with certification and licensure, categorized by occupational area

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanics</td>
<td>260</td>
<td>3.77</td>
<td>0.66</td>
</tr>
<tr>
<td>Elect/Elec.</td>
<td>219</td>
<td>3.65</td>
<td>0.79</td>
</tr>
<tr>
<td>Chemistry</td>
<td>41</td>
<td>3.69</td>
<td>0.66</td>
</tr>
<tr>
<td>Constr.</td>
<td>62</td>
<td>3.66</td>
<td>0.87</td>
</tr>
<tr>
<td>Ind. Arts</td>
<td>25</td>
<td>3.73</td>
<td>0.67</td>
</tr>
</tbody>
</table>

reject the null hypothesis. There is a significant difference among occupational fields regarding the importance attributed to the certification and licensure. Therefore, null hypothesis 14a was rejected at the 0.05 level.

Null hypothesis 14b

There is no significant difference in respondents’ perceptions regarding the agreement with certification and licensure among occupational areas.

Six questions presented to survey participants teaching in vocational industrial schools were categorized as regarding the agreement with the certification and licensure. The results of the analyses and computations are shown in Table 4.44 and 4.45.

In responding to the questions on regarding the agreement of statements on
Table 4.46: Analysis of contrast of agreement with certification and licensure, categorized by occupational area

<table>
<thead>
<tr>
<th>Group</th>
<th>df</th>
<th>F-value</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1 v.s G 2</td>
<td>1</td>
<td>3.82</td>
<td>0.05</td>
</tr>
</tbody>
</table>

certification and licensure, the mechanical family received a relatively high rating mean ($\bar{x} = 3.77$) and the electrical/electronic family a relatively low rating mean ($\bar{x} = 3.65$) in the five groups.

Owing to the fact that the number of responses from each group was quite different, a Contrast Statement was used to test further the relation between the two groups. Results of the analysis of data reported in Table 4.46 related to the agreement with the certification and licensure. Significant differences were found between the mechanical and electrical/electronic families.

Based on the results of the data analysis presented, there is sufficient evidence to reject the null hypothesis. There is a significant difference among occupational fields with regarding the agreement with the certification and licensure. Therefore, null hypothesis 14b was rejected at the 0.05 level.

Null hypothesis 15a

There is no significant difference in respondents' perceptions regarding the importance of certification and licensure between public school and private school personnel.

Six questions presented to survey participants teaching in vocational industrial schools were categorized as regarding the importance attributed to the certification and licensure. The results of the analysis and computation are shown in Table 4.47.
Table 4.47: T-test analysis of importance attributed to certification and licensure, categorized by school

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>408</td>
<td>3.78</td>
<td>0.74</td>
<td>-2.88</td>
<td>0.004</td>
</tr>
<tr>
<td>Private</td>
<td>211</td>
<td>3.94</td>
<td>0.60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.48: T-test analysis of agreement with certification and licensure, categorized by school

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>415</td>
<td>3.68</td>
<td>0.78</td>
<td>-2.90</td>
<td>0.004</td>
</tr>
<tr>
<td>Private</td>
<td>206</td>
<td>3.84</td>
<td>0.61</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the result of the data analysis presented, there is sufficient evidence to reject the null hypothesis. There is a significant difference between public school and private school personnel regarding the importance attributed to the certification and licensure. Therefore, null hypothesis 15a was rejected at the 0.05 level.

Null hypothesis 15b

There is no significant difference in respondents' perceptions regarding the agreement with certification and licensure between public school and private school personnel.

Six questions presented to survey participants teaching in vocational industrial schools were categorized as regarding the agreement with the certification and licensure. The results of the analysis and computation are shown in Table 4.48.

Based on the result of data analysis presented, there is sufficient evidence to reject the null hypothesis. There is a significant difference between public school and
Table 4.49: T-test analysis of importance attributed to the certification and licensure, categorized by position

<table>
<thead>
<tr>
<th>Position</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb&gt;ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>143</td>
<td>3.85</td>
<td>0.67</td>
<td>0.42</td>
<td>0.68</td>
</tr>
<tr>
<td>Teacher</td>
<td>476</td>
<td>3.82</td>
<td>0.71</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

private school personnel regarding the agreement with certification and licensure. Therefore, null hypothesis 15b was rejected at 0.05 level.

Null hypothesis 16a

There is no significant difference regarding in respondents' perceptions of the importance of certification and licensure between administrators and teachers.

Table 4.49 shows the results of t-test analysis regarding the importance attributed to the certification and licensure between administrators and teachers. Since no significant differences were found, null hypothesis 16a was accepted.

Null hypothesis 16b

There is no significant difference in respondents' perceptions regarding the agreement with certification and licensure between administrators and teachers.

Table 4.50 shows the results of t-test analysis regarding the agreement with the certification and licensure between administrators and teachers. Since no significant differences were found, null hypothesis 16b was accepted.

A multiple regression procedure of SAS program was employed to test this hypothesis. The perceptions of educators regarding continuous education of vocational educators as a dependent variable and the demography data of the educators as
Table 4.50: T-test analysis of agreement with certification and licensure, categorized by position

<table>
<thead>
<tr>
<th>Position</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T-value</th>
<th>Pb &gt; ITI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>144</td>
<td>3.70</td>
<td>0.74</td>
<td>-0.60</td>
<td>0.55</td>
</tr>
<tr>
<td>Teacher</td>
<td>477</td>
<td>3.74</td>
<td>0.72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The independent variables were input into a computer to run a stepwise multiple regression program (Forward). This research hypothesis was further divided into two subhypothesis as shown below:

**Null hypothesis 17a**

It is hypothesized that the perceptions of vocational industrial educators regarding the importance of their continuing development cannot be predicted by these factors: 1) type of school, 2) classification of school, 3) the geographic area of teaching, 4) their primary position, 5) type of occupational area, 6) their educational level, 7) their length of time in education, 8) their employment in industry, and 9) vocational certification.

Eight questions presented to survey participants teaching in vocational industrial schools were categorized as regarding the importance of their continuing development. The results of SAS output are shown in Table 4.51.

It was found that when $X_7$ (length of time in education) was entered into the model, the regression coefficient was -0.0625, and the intercept of the model was 4.1876. The $R^2 = 0.1137$. It means that 11.37% of variance account for $X_7$. When the second factor $X_3$ (the geographic area of teaching) was entered into the model, the regression coefficient for $X_7$ was -0.0704, and the regression coefficient for $X_3$. 

Table 4.51: Summary of Forward selection procedure for perceptions of educators regarding the importance of their continuing development

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>B-value</th>
<th>R Square</th>
<th>F</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intercept</td>
<td>4.1876</td>
<td>-0.0625</td>
<td>0.1137</td>
<td>7.24</td>
</tr>
<tr>
<td></td>
<td>X7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Intercept</td>
<td>4.0923</td>
<td></td>
<td>0.2014</td>
<td>5.63</td>
</tr>
<tr>
<td></td>
<td>X3</td>
<td>0.0643</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>X7</td>
<td>-0.0704</td>
<td></td>
<td>9.07</td>
<td></td>
</tr>
</tbody>
</table>

was 0.0643; and the intercept of the model was 4.0923. \( R^2 = 0.2014 \). In other words, 20.14% of the variance account for \( X_3 \) and \( X_7 \). After \( X_3 \) and \( X_7 \) were entered into the multiple regression model, it was found that no other independent factors met the \( \alpha = 0.05 \) significant level for entry into the model. In other words, they have no predictive power over and above that provided by the factors except \( X_3 \) and \( X_7 \). Therefore, null hypothesis 17a was rejected at \( \alpha = 0.05 \) level. It was concluded that it is possible to from predict educators’ perceptions in term of the importance of their continuing development based on the demographic information of educators, but not on other factors after the \( X_3 \) (the geographic area of teaching) and \( X_7 \) (their length of time in education) have been considered.

Null hypothesis 17b

It is hypothesized that the perceptions of vocational industrial educators regarding their desire for continuing development cannot be predicted by these factors: 1) type of school, 2) classification of school, 3) the geographic area of teaching, 4) their primary position, 5) type of occupational area, 6) their educational level, 7) their length of time in education, 8) their employment in industry, and 9) vocational
Table 4.52: Summary of Forward selection procedure for perceptions of educators regarding their desire for continuing development

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>B-value</th>
<th>R Square</th>
<th>F</th>
<th>Pb&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intercept</td>
<td>4.0546</td>
<td>-0.5311</td>
<td>0.0814</td>
<td>5.16</td>
</tr>
<tr>
<td></td>
<td>X_7</td>
<td>-0.5311</td>
<td>0.0814</td>
<td>5.16</td>
<td>0.0234</td>
</tr>
<tr>
<td>2</td>
<td>Intercept</td>
<td>3.9598</td>
<td>0.0639</td>
<td>0.1673</td>
<td>5.49</td>
</tr>
<tr>
<td></td>
<td>X_3</td>
<td>0.0639</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>X_7</td>
<td>-0.0608</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

certification.

Eight questions presented to survey participants teaching in vocational industrial schools were categorized as regarding their desire for continuing development. The results of SAS output are shown in Table 4.52.

It was found that when $X_7$ (length of time in education) was entered into the model, the regression coefficient was -0.5311, and the intercept of the model was 4.0546. The $R^2 = 0.0814$. It means that 8.14% of variance account for $X_7$. When the second factor $X_3$ (the geographic area of teaching) was entered into the model, the regression coefficient for $X_7$ was -0.0608, and the regression coefficient for $X_3$ was 0.0639; and the intercept of the model was 3.9598. $R^2 = 0.1673$. In other words, 16.73% of variance account for $X_3$ and $X_7$. After $X_3$ and $X_7$ were entered into the multiple regression model, it was found that no other independent factors met the $\alpha = 0.05$ significant level for entry into the model. In other words, they have no predictive power over and above that provided by the variables except $X_3$ and $X_7$. Therefore, null hypothesis 17b was rejected at $\alpha = 0.05$ level. It was concluded that it is possible to predict from educators' perceptions regarding their desire for continuing development based on the demographic information of educators, but not
on other factors after the $X_3$ (their geographic area of teaching) and $X_7$ (their length of time in education) have been considered.
CHAPTER 5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The first four chapters of this study presented the introduction and the background, review of literature, methodology, analysis of data, and findings of the study. The purposes of this chapter are to draw conclusions based on the findings and to present certain recommendations.

Summary and Conclusions

This section provides a summary as well as conclusions based on the findings discussed in preceding chapters. Conclusions are based on the hypotheses relating to the preparation and development of vocational industrial educators. The research hypotheses are restated only if there has been sufficient evidence to reject the null hypotheses at the 0.05 level. The whole null hypotheses rejection table was shown in Table 5.1

Restatement of the problem

This study was conducted to investigate and to compare vocational industrial administrators and teachers in terms of their needs in the various aspects of preparation and development of secondary school vocational personnel in the R.O.C. The
investigation primarily concerned four areas: program description and mission, preparation as a vocational educator, continuing education of vocational educators, and certification and licensure.

Restatement of purpose

The purposes of the study were to determine perspectives the vocational industrial educators' views and perspectives at the secondary school R.O.C. on various aspects of the preparation and the development of vocational personnel and to examine the congruence of educators' perceptions among regions, geographic areas, schools, and positions.

Null hypothesis 1

There is no significant difference in respondents' perceptions regarding vocational industrial program description and mission among school personnel from the different geographic areas.

Conclusion 1

The results reported in Table 4.4 indicate that there was no significant difference regarding the importance attributed to and the agreement with the vocational industrial program description and mission among schools from different geographic areas in Taiwan. A One-way ANOVA and a Contrast Statement analysis indicated that null hypothesis 1 was accepted at the 0.05 level. Statistical analysis revealed no significant differences among schools from the northern, central, southern, and eastern parts of Taiwan.
Taiwan is a small island. For this reason, perhaps differences have not been detected in term of perceptions of vocational industrial program description and mission among educators from different geographic areas.

Null hypothesis 2

There is no significant difference in respondents' perceptions regarding vocational industrial program description and mission among occupational areas.

Conclusion 2

The results of the analyses reported in Tables 4.5 through 4.7 demonstrate that there is a significant difference regarding the importance attributed to the vocational industrial program description and mission among occupational areas in Taiwan. Null hypothesis 2a was rejected at the 0.05 level.

Significant differences exist between educators teaching in the construction family and the mechanical family, and the fifth group teaching in the industrial art family regarding the importance attributed to the vocational industrial program description and mission. It was found that the industrial art family, with a mean of 4.19, considered industrial programs and its mission more important than the construction family, with a mean of 3.85. Further analysis using a Contrast Statement revealed that participant responses to these statements were significantly different, thus null hypothesis 2a was rejected at the 0.05 level.

Using the same technique to test null hypothesis 2b, it was found that there was no significant difference regarding the agreement with the program description and mission among occupational areas. According to the results of the analysis
reported in Table 4.8, there is no evidence of significant difference among occupational areas. Therefore, there is a consistency of perception regarding the agreement with vocational industrial program description and mission among occupational areas.

There is a significant difference in perception between educators teaching in the mechanical and the industrial art families regarding the importance attributed to the vocational industrial program description and mission, and those in the construction family but there is no difference regarding the agreement with program description and mission among those teaching in the mechanical, electrical and electronic, chemical, construction, and industrial art families.

Null hypothesis 3

There is no significant difference in respondents' perceptions regarding vocational industrial program description and mission between public school and private school personnel.

Conclusion 3

The results of the analyses reported in Tables 4.9 and 4.10 indicate that there was no significant difference regarding the importance of and the agreement with vocational industrial program description and mission between public school and private school personnel. According to a t-test analysis, null hypothesis 3 was accepted at the 0.05 level.

Five questions related to vocational industrial program description and mission were asked of survey participants. It was found that there was no significant difference between educators teaching in public schools, with means of 4.02 in importance
and of 3.93 in agreement, and those teaching in private schools, with means of 4.12 in importance and of 3.95 in agreement. These figures indicate that a consistent perception exists regarding the vocational industrial program and mission between educators in public school and private school personnel.

Null hypothesis 4

There is no significant difference in respondents' perceptions regarding vocational industrial program description and mission between administrators and teachers.

Conclusion 4

The results of the analyses reported in Tables 4.11 and 4.12 indicate that there was no significant difference regarding the importance attributed to and the agreement with vocational industrial program description and mission between administrators and teachers. According to a t-test analysis, null hypothesis 4 was accepted at the 0.05 level.

Five questions related to vocational industrial program description and mission were presented to survey participants. It was found that there was no significant difference between administrators, with means of 4.06 in importance and of 3.96 in agreement, and teachers, with means of 4.05 in importance and of 3.93 in agreement. These figures indicate that a consistent perception exists regarding the vocational industrial program and mission between administrators and teachers.

It is possible that most administrators have to teach some related professional courses in addition to fulfilling their administrative duties. Another reason for this consistency may be that most administrators graduated from universities just as
Null hypothesis 5

There is no significant difference in respondents' perceptions regarding preparation as a vocational educator among school personnel from different geographic areas.

Conclusion 5

The results of analyses reported in Table 4.13 through 4.15 indicate that there was a significant difference regarding the importance attributed to the preparation as a vocational educator among schools from different geographic areas in Taiwan. Thus, null hypothesis 5a was rejected at the 0.05 level.

A significant difference between the educators teaching in northern area and those teaching in southern area does exist regarding the importance attributed to preparation as a vocational educator. It was found that the southern area, with a mean of 3.87, placed more importance on preparation as a vocational educator than the northern area, with a mean of 3.74. Further analysis through a Contrast Statement revealed that participants' responses to these statements were significantly different, thus null hypothesis 5a was rejected at the 0.05 level.

It is possible, that there are a greater number of large or heavy industry factories located in the southern part of Taiwan than in other areas, and that a greater number of people in the south earn their livings through their industrial skills. Although, there are factories in the northern part of Taiwan, students graduating from industrial high schools can easily find various jobs besides those requiring their professional skills.
Otherwise, most students would prefer to enter colleges to continue their studies after high school graduation. These factors are bound to affect teaching objectives of educators in Taiwan.

Using the same technique to test null hypothesis 5b, it was found that there was a significant difference regarding the mastery of preparation as a vocational educator among schools from different geographic areas. According to the results of the analyses reported in Tables 4.16 through 4.18, there is a significant difference among school personnel from different geographic areas. Thus, null hypothesis 5b was also rejected at the 0.05 level.

A significant difference exists between educators teaching in the northern area and those teaching in southern area regarding the mastery of preparation as a vocational educator. It was found that educators in the south area, with a mean of 3.69, and central area, with a mean of 3.67, both of these means were higher than the northern area, with a mean of 3.53.

It is possible, that educators teaching in the northern part of Taiwan can easily find a part-time job unrelated to their teaching position off campus if they so desire. Therefore, educators have little time available to them in which to study their professional courses.

It is also possible that the mastery of preparation in the northern part of Taiwan is higher than in other areas, and that therefore, attending school is more appealing to the students there. These two factors may have affected the response of educators teaching in the northern part of Taiwan to the question of the mastery of preparation as a vocational educator.
Null hypothesis 6

There is no significant difference in respondents' perceptions regarding preparation as a vocational educator among occupational areas.

Conclusion 6

The results of the analysis reported in Table 4.19 indicate that there was no significant difference regarding the importance attributed to and the agreement with preparation as a vocational educator among the occupational areas in Taiwan. According to a One-way ANOVA and a Contrast Statement, null hypothesis 6 was accepted at the 0.05 level. Statistical analyses revealed no significant differences in this respect among the mechanical, electrical and electronic, chemical, construction, and industrial art families.

Null hypothesis 7

There is no significant difference in respondents' perceptions regarding preparation as a vocational educator between public school and private school personnel.

Conclusion 7

The results of the analyses reported in Tables 4.20 and 4.21 indicate that there was no significant difference regarding the importance attributed to and the agreement with preparation as a vocational educator between public school and private school personnel. According to a t-test analysis, null hypothesis 7 was accepted at the 0.05 level.
Twenty-one questions regarding preparation as a vocational educator were asked of survey participants. It was found that there was no significant difference between educators teaching in public schools, with means of 3.76 in importance, and of 3.60 in mastery, and those teaching in private schools, with means of 3.83 in importance, and of 3.63 in mastery. This reveals that a consistent perception exists regarding the preparation as a vocational educator between the public school and private school personnel in Taiwan.

Null hypothesis 8

There is no significant difference in respondents' perceptions regarding preparation as a vocational educator between administrators and teachers.

Conclusion 8

The results of the analyses reported Tables 4.22, and 4.23 indicate that there was no significant difference regarding the importance attributed to and the agreement with preparation as a vocational educator between administrators and teachers. According to a t-test analysis, null hypothesis 8 was accepted at the 0.05 level.

Twenty-one questions related to preparation as a vocational educator were presented to survey participants. It was found that there was no significant difference between administrators, with means of 3.82 in importance, and of 3.65 in mastery, and teachers, with means of 3.78 in importance, and of 3.60 in mastery. These figures indicate a consistent perception regarding the preparation as a vocational educator between the administrators and teachers in Taiwan.
Null hypothesis 9

There is no significant difference in respondents' perceptions regarding continuing education of vocational educators among school personnel from different geographic areas.

Conclusion 9

The results of the analyses reported in Table 4.24 through 4.29 indicate that there was a significant difference regarding the importance attributed to the continuing education of vocational educators among school personnel from different geographic areas in Taiwan. Null hypothesis 9 was rejected at the 0.05 level.

A significant difference exists between the educators teaching in the northern area or the central area, and those teaching in the southern area regarding the importance attributed to and the desire pursue to continuing education by vocational educators. According to the statistical analyses of the Contrast Statement, participants' responses to these statements were significantly different and thus null hypothesis 9 was rejected at the 0.05 level.

It is possible, that there are two main factors causing these results: 1) Most of the large or heavy industry factories are located in the southern part of Taiwan, and the rate of workers trying to enter these factories after graduating from secondary schools is higher than that of workers in the northern area; 2) In the southern part of Taiwan, there is no real department of teacher training in the university for educating industrial teachers, and educators have no way of obtaining in-service education. There are such an opportunities for individual arts teachers.
Null hypothesis 10

There is no significant difference in respondents' perceptions regarding continuing education of vocational educators among occupational areas.

Conclusion 10

The results of the analysis reported in Table 4.30 indicate that there was no significant difference regarding the importance attributed to and the desire pursue to the continuing education of vocational educators among the occupational areas in Taiwan. According to a One-way ANOVA and a Contrast Statement, null hypothesis 10 was accepted at the 0.05 level. Statistical analysis revealed no significant difference among mechanical, electrical and electronic, chemical, construction, and industrial art families.

Null hypothesis 11

There is no significant difference in respondents' perceptions regarding continuing education of vocational educators between public school and private school personnel.

Conclusion 11

The results of the analyses reported in Table 4.31 and 4.32 indicate that there are no significant differences regarding the importance attributed to and the desire pursue to continuing education by vocational educators between public school and private school personnel. According to a t-test analysis, null hypothesis 11 was accepted at the 0.05 level.
Eight questions related to continuing education of vocational educators were presented to survey participants. It was found that there was no significant difference between educators teaching in public schools, with means of 3.97 in importance, and of 3.87 in desire, and those teaching in private schools, with means of 4.05 in importance, and 3.94 in desire. These figures reveal that a consistent perception exists regarding the continuing education of vocational educators between public school and private school personnel in Taiwan.

Null hypothesis 12

There is no significant difference in respondents' perceptions regarding continuing education of vocational educators between administrators and teachers.

Conclusion 12

The results of the analyses reported in Tables 4.33 and 4.34 indicate that there was no significant difference regarding the importance attributed to and the desire to pursue continuing education of vocational educators between administrators and teachers in Taiwan. According to t-test analysis, null hypothesis 12 was accepted at the 0.05 level.

Eight questions related to continuing education of vocational educators were presented to survey participants. It was found that there was no significant difference between administrators, with means of 3.98 in importance, and of 3.86 in desire, and teachers, with means of 4.00 in importance, and of 3.90 in desire. These figures indicate that a consistent perception exists regarding the continuing education of vocational educators between administrators and teachers in Taiwan.
Null hypothesis 13

There is no significant difference in respondents' perceptions regarding continuing education of vocational educators among school personnel from different geographic areas.

Conclusion 13

The results of the analyses reported in Tables 4.35 through 4.37 indicate that there was a significant difference regarding the importance attributed to the certification and licensure among school personnel from different geographic areas in Taiwan. Null hypothesis 13a was rejected at the 0.05 level.

A significant difference exists between educators teaching in the northern or the central areas, and those in the southern area regarding the importance attributed to certification and licensure. Using the statistical analysis of the Contrast Statement, it was revealed that participants' responses to these statements were significantly different, thus null hypothesis 13a was rejected at the 0.05 level.

A significant difference exists between the educators teaching in the northern area and those in the southern area regarding the importance attributed to certification and licensure. It was found that the southern area, with a mean of 3.96, attributed more importance to certification and licensure than the participants from the northern area, with a mean of 3.81, or the central area, with a mean of 3.76. Further analysis using the Contrast Statement revealed that participants' responses to these statements were significantly different, thus null hypothesis 13b was rejected at the 0.05 level.

Using the same technique to test null hypothesis 13b, it was found that there
was a significant difference regarding the agreement with certification and licensure among school personnel from different geographic areas. According to the results of the analyses reported in Table 4.38 through 4.40, there was a significant difference among school personnel from different geographic areas in Taiwan. Null hypothesis 13b was also rejected at the 0.05 level.

A significant difference exists between educators teaching in the northern area and those in the southern area regarding the agreement with certification and licensure. It was found that the southern area, with a mean of 3.85, was greater than the northern area, with a mean of 3.68.

Null hypothesis 14

There is no significant difference in respondents' perceptions regarding certification and licensure among occupational areas.

Conclusion 14

The results of the analyses reported in Tables 4.41 through 4.46 indicate that there was a significant difference regarding the importance of and agreement with the certification and licensure among occupational areas in Taiwan. Null hypothesis 14 was rejected at the 0.05 level.

A significant difference exists between educators teaching in the mechanical family, and those teaching in the electrical/electronic family regarding the importance attributed to and agreement with certification and licensure. According to the statistical analysis of the Contrast Statement, participants' responses to these statements were significantly different, thus null hypothesis 14a was rejected at the 0.05 level.
It is possible, that there is a difference in curricular characteristics between the mechanical family and the electrical/electronic family. The mechanics curriculum emphasizes the acquiring of skill in the workshop, but the electrical/electronic family regards the need for professional knowledge as the basis on which students should acquire skill. This may be the main factor leading to the difference in response in term of the perception of certification and licensure among educators.

Null hypothesis 15

There is no significant difference in respondents' perceptions regarding certification and licensure between public school and private school personnel.

Conclusion 15

The results of the analyses reported in Tables 4.47 and 4.48 indicate that there was a significant difference regarding the importance attributed to and agreement with the certification and licensure between public schools and private schools in Taiwan. Null hypothesis 15 was rejected at the 0.05 level.

A significant difference exists between educators teaching in public schools and those teaching in the private schools regarding the importance attributed to and the agreement with certification and licensure. According to a t-test analysis, participants' responses to these statements were significantly different, thus null hypothesis 15 was rejected at the 0.05 level.

It may be difficult to obtain a teaching position in public schools because such schools are relatively popular. Educators in private schools come from various levels of society in Taiwan, and only some teachers have teacher certification. Therefore,
they may respond differently with regard to the issue of certification and licensure.

**Null hypothesis 16**

There is no significant difference in respondents' perceptions regarding certification and licensure between administrators and teachers.

**Conclusion 16**

The results of the analyses reported in Tables 4.49 and 4.50 indicate that there are no significant differences regarding the importance attributed to and the agreement with the certification and licensure between administrators and teachers in Taiwan. According to a t-test analysis results, null hypothesis 16 was accepted at the 0.05 level.

Six questions relating to certification and licensure were presented to survey participants. It was found that there was no significant difference between administrators, with means of 3.85 in importance, and of 3.70 in agreement, and teachers with means of 3.82 in importance, and of 3.74 in agreement. This reveals that a consistent perception exists regarding the certification and licensure between administrators and teachers in Taiwan.

**Null hypothesis 17**

It is hypothesized that the perceptions of vocational industrial educators regarding their continuing development cannot be predicted by these factors: 1) type of school, 2) classification of school, 3) the geographic area of teaching, 4) primary position, 5) type of occupational area, 6) educational level, 7) length of time in edu-
cation, 8) employment in industry, and 9) vocational certification.

Conclusion 17

The results of data analyses reported in Tables 4.51 and 4.52 indicate that it was possible to predict the perception of vocational educators regarding their continuing development. The trend of the perception of educators can be predicted based on the geographic area of teaching ($X_3$), and on the length of time in education ($X_7$), but not on the other factors once the geographic area of teaching and the length of time in education have been considered at the $\alpha = 0.05$ level.

The model used for predicting the importance for continuing development of vocational industrial educators is as follows:

$$Y_1 = 4.0923 + 0.0643 \times X_3 - 0.0704 \times X_7$$

The model used for predicting the desire pursue to continuing development of vocational industrial educators is as follows:

$$Y_2 = 3.9598 + 0.0639 \times X_3 - 0.0608 \times X_7$$

Therefore, this null hypothesis 17 was rejected at the $\alpha = 0.05$ level. The results of the testing of the participants' perception aspect of this hypothesis show that it is possible to predict perceptions regarding the continuing development of vocational industrial educators based on educators' geographic area of teaching and length of time in education.

The result of testing indicate that the higher the employee rate of the school geographic area in which students graduate from senior high schools, the higher the perception to the development of vocational educators. In contrast, it also indicates
that the shorter time of the educators in education, the higher their perception toward
the continuing development of vocational educators in Taiwan.

Overview of Research

Based on the statistical analysis presented in the previous section, the researcher
provides an overview of the study’s major findings.

1. It was found that a consistent perception exists among educators regarding
the vocational industrial program description and mission. The goal of the
vocational industrial education for secondary school level is basically accepted.

Table 5.1: Null hypotheses rejection table

<table>
<thead>
<tr>
<th>Hypothesis</th>
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<th>Reject</th>
<th>Hypothesis</th>
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<th>Reject</th>
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<td>1b</td>
<td></td>
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<td>X</td>
<td>2b</td>
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<td>X</td>
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<tr>
<td>3a</td>
<td>X</td>
<td></td>
<td>3b</td>
<td></td>
<td>X</td>
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<tr>
<td>4a</td>
<td>X</td>
<td></td>
<td>4b</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>5a</td>
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<td>5b</td>
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<td></td>
<td>6b</td>
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<td>X</td>
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<tr>
<td>7a</td>
<td>X</td>
<td></td>
<td>7b</td>
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<td>X</td>
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<td>8a</td>
<td>X</td>
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<td>9a</td>
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<td>11a</td>
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<tr>
<td>12a</td>
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<td>13a</td>
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<td>14a</td>
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<td>X</td>
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<tr>
<td>15a</td>
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<tr>
<td>16a</td>
<td>X</td>
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<td>16b</td>
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<tr>
<td>17a</td>
<td>X</td>
<td></td>
<td>17b</td>
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<td>Total</td>
<td>10</td>
<td>7</td>
<td>Total</td>
<td>11</td>
<td>6</td>
</tr>
</tbody>
</table>
2. There is no significant difference regarding the various aspects of the preparation and development of vocational industrial educators between administrators and teachers in Taiwan, R.O.C.

3. There are some statistical data that can not be precisely interpreted from the ANOVA Table because the sample obtained from the eastern schools is too small to compare with that of other areas. Furthermore, the samples of the chemical, construction, and industrial art families are smaller than those of the mechanical and the electrical/electronic families. Further statistical analysis must be performed to obtain reliable results.

4. According to the data analysis, educators teaching in the southern parts of Taiwan have a strong desire to take advantage of in-service education, There is, however, no institution in that area to provide these in-service activities to satisfy their needs.

5. From among all the statements ranked for preparation and development of vocational industrial educators, the statement "Development of an appreciation and commitment to professionalism" was perceived as the most important ($\bar{X} = 4.30$); the one receiving the lowest mean rank was "Understand school organization and operation, including financing and budging" ($\bar{X} = 3.16$) (see Appendix C).

**Recommendations**

1. It is recommended that the Ministry of Education of R.O.C. set up a Technical Vocational Center in the central and southern part of Taiwan to serve the needs
of vocational educators. This center should also provide in-service activities in response to needs assessment of teachers representing various clusters.

2. It is recommended that a similar study be undertaken to cover all other vocational education service areas, and the general areas and that the problem be further studied to determine if an adequate curriculum content for vocational teachers in pre-service or in-service education meets the needs of vocational teachers.

3. It is recommended that the committee of curriculum standards include school administrators, teachers, and guidance counselors coming from public schools and private schools in different geographic areas of Taiwan, in addition to professors, vocational coordinators, enterprise, and educational agency personnel to periodically review curriculum standards.

4. It is recommended that all institutions preparing vocational industrial education personnel take the necessary steps to assure that the concepts, skills, and knowledge enumerated in questions 6 through 26 of this study are adequately addressed in their courses and programs.

5. It is recommended that vocational industrial education be an integral part of every K-12 school system curriculum, according to the program description and mission set forth in this study.

6. It is recommended that the Vocational Industrial Education Association in Taiwan undertake an informational program communicating to administrators, teachers and the general public the importance of a well-planned program of
vocational industrial education as a part of the K-12 curriculum.

7. It is recommended that particular attention and support be given to vocational industrial education teachers during their first four years of teaching in terms of continuing education and professional development needs. Such practices as mentoring coaching buddy system and other collegial support would particularly benefit new teachers.
BIBLIOGRAPHY


Bryant, B. (1981). *A review of the literature in selected area of educational research in adult learners.* Association of Teacher Education.


Columbus: The National Center for Research in Vocational Education.


APPENDIX A. VOCATIONAL INDUSTRIAL EDUCATION
SURVEY FORM
Demographic Information

Direction: In this section please mark " X " in response to each item which best describes your situation.

1. What type of school organization do you teach?
   _____ (1) public
   _____ (2) private

2. What classification of school do you teach?
   _____ (1) Industry
   _____ (2) Industry & Business
   _____ (3) Industry & Agriculture
   _____ (4) Industry affiliated to senior high school

3. In what geographic area do you teach?
   _____ (1) Northern (Hsinchu and north)
   _____ (2) Center (Miaoli, Taichung, Chungha, Nantou, and Yunlin)
   _____ (3) Southern (Chiayi and south)
   _____ (4) East (Hualien, Taitung)

4. What is your primary position?
   _____ (1) Administrator
       Title: ______________
   _____ (2) Instructional teacher

5. What type of occupational area do you teach?
   _____ (1) Mechanics
   _____ (2) Electric & Electronic
   _____ (3) Chemistry
   _____ (4) Construction
   _____ (5) Industrial arts
   _____ (6) Others: __________

6. What is the highest degree you have achieved?
   _____ (1) Master degree plus
   _____ (2) Master degree
   _____ (3) Bachelor degree
(4) Associate degree
(5) High school diploma

7. The length of time you have worked in education.
   (1) First year
   (2) 2 - 5 years
   (3) 6 - 10 years
   (4) 11 - 20 years
   (5) 21 - 30 years
   (6) Over 30 years

8. Have you ever been employed in industry or other non-school employment?
   (1) Never
   (2) Less than 1 year
   (3) 1 - 2 years
   (4) 3 - 5 years
   (5) 6 - 9 years
   (6) 10 - 15 years
   (7) Over 15 years

9. Are you vocationally certified to teach a capstone course?
   (1) Yes
   (2) No
Questionnaire Content

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

"On the left", you are to circle the number which best coincides with your perception of the importance of the item in the field.

"On the right", you proceed to circle the number which reflects your perception of the agreement, mastery, or desirability of the item in the field.

The "first scale" to utilize on the left is:

5 : Very important
4 : Important
3 : Neutral (No opinion)
2 : Unimportant
1 : Very unimportant

The "second scale" to utilize on the left is:

5 : Strongly agree / Complete mastery / Highly desirable
4 : Agree / Mastery / Desirable
3 : Neutral / Neutral / Neutral
2 : Disagree / Poor / Undesirable
1 : Strongly disagree / Very poor / Highly undesirable

I. Program Description and Mission

Important Agreeable

5 4 3 2 1 5 4 3 2 1 1. Vocational industrial education is a organized education program, service and activities which are directly related to
the preparation of individuals for paid or unpaid employment, or for a career requiring less than a baccalaureate or advanced degree.

2. Vocational industrial education is primarily aimed at the development of attitudes, knowledge and skills which develop individual abilities necessary for occupational entry and career advancement.

3. Vocational industrial education has a responsibility for continuing the individual occupational exploration and for cultivating occupational competence which brings satisfaction to the individual and contributes to industry and other influential aspects of society.

4. The mission of vocational industrial education should provide various broad programs for the students who want to learn occupational entry skills or who want to prepare for advanced study, self employment at the secondary school level; in addition, they can achieve the occupational advancement in relation to their talents, interests, and potential.

5. The vocational industrial educator also has a responsibility for recognizing the industrial organization, construction and environment, not only to understand the industrial environment in his/her own country but also to be aware of the industrial developmental situations in other countries.
II. Preparation as a Vocational Educator

Before completion of initial training, each vocational industrial educator should:

<table>
<thead>
<tr>
<th>Important</th>
<th>Mastery</th>
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<tbody>
<tr>
<td>5 4 3 2 1</td>
<td>5 4 3 2 1</td>
</tr>
</tbody>
</table>

6. Understand the historical background, developmental processes and trends, policies, and related laws in vocational industrial education.

7. Develop an understanding of industrial education and the relationships of other vocational education, career development, and general education.

8. Develop an understanding of the philosophy and organization of vocational industrial disciplines.

9. Be aware of emerging technology in their discipline.

10. Develop an understanding of measurement and evaluation of programs and students and their importance to vocational program operation.

11. Acquire in-depth theoretical knowledge and skills of vocational industrial education discipline.

12. Acquire occupational experience in one's field, workshop of school or industry.
13. Have computer literacy and understand application of computers to their discipline and instruction.

14. Understand the research methods directed toward the development of new knowledge and new applications of existing knowledge.

15. Develop plant management, instructional management, time management and organizational management skills.

16. Understand new instructional technology equipment, methods, and procedures.

17. Understand how to analyze curriculum and develop or adapt curriculum planning appropriate to needs of students.

18. Develop an appreciation and commitment to professionalism.

19. Develop an understanding of guiding students' self-awareness, self-learning in their occupations, and development in personal characteristics.

20. Employ instructional techniques to be used with students who have special needs.

21. Develop an understanding of occupational guidance to be conducted for the students' individual needs.

22. Understand abilities of leadership in administration, organizational concepts, and decision making.
23. Develop abilities in public and community relations.

24. Develop abilities necessary to work effectively with advisory committees or co-workers.

25. Develop an understanding of the role and importance of student organizations and their activities.

26. Understand school organization and operation including financing and budgeting.

Comments: 

III. Continuing Education of Vocational Educators

All vocational industrial educators should have an opportunity to:

Important Desirable

27. Regularly participate in appropriate professional development programs that would update them in their content area.

28. Regularly participate in appropriate professional development programs that would update their instructional skills.

29. Establish and participate in a support system for individual teacher concerns.

30. Become familiar with current trends, problems and philosophy of their
discipline.

31. Periodically update their occupational experience in their instructional area.

32. Examine the relationship of vocational industrial education and industry.

33. Participate in advanced study and in-service program that would upgrade their management abilities or administrative leadership.

34. Periodically participate in related professional program or workshop that would lead to other certification or higher degree.

Comments: ________________________
______________________________

IV. Certification and licensure

Certification and licensure requirements needs to be examined regarding:

Important Agreeable

35. The effect on standards and quality of all education.

36. The staffing of comprehensive vocational industrial program.

37. The need for teachers who provide instruction in vocational industrial course to be vocationally certified.

38. Requirement for renewal of license,
including occupational experience.

39. The need for other teachers and school administrators to understand vocational industrial education.

40. Requirement of a certain level of educational degree qualification or equivalent examination.

Comments: ____________________
________________________
APPENDIX B. SAMPLE LETTER
November 3, 1990

Dear Teacher:

I am a graduate student in Industrial Education and Technology of Iowa State University. The topic of my doctoral thesis "Preparation and Development of Vocational Industrial Educators for Secondary school Level in Taiwan, R.O.C." The purpose of the research try to understand the view and perspectives of vocational industrial educators at the secondary school level in Taiwan on various aspects of the preparation and development of vocational personnel. The result of the study will identify the content of pre-service education and the developmental trend of vocational educators that will be helpful in evaluating teacher educator programs or developing teacher in-service education and training for the vocational industrial educators in Taiwan.

You have been identified as one of my participants. I would appreciate it if you would spend about 15 to 20 minutes completing the enclosed questionnaire. Your responses will remain confidential; the number written on the top of survey sheet will be used to link your responses to the survey to some academic information about your teaching school but no one involved with the research, including me, knows who you are.

Please take a few minutes to complete the questionnaire and return it by November 15 in the enclosed addressed envelope. Of course, your participation is voluntary. You will assist in providing useful information regarding the teacher education in Taiwan. If you are interested in seeing the result of my research, write me a letter.

Thanks for your help.

Sincerely yours,

Yang, Ming-Kung
Iowa State University.
APPENDIX C. MEANS AND RANK OF QUESTIONS
1. Program Description and Mission

<table>
<thead>
<tr>
<th>Questions</th>
<th>Means of Importance</th>
<th>Means of Agreement</th>
<th>Rank</th>
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</thead>
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<tr>
<td>1. Vocational industrial education is a organized education program, service and activities which are directly related to the preparation of individuals for paid or unpaid employment, or for a career requiring less than a baccalaureate or advanced degree.</td>
<td>3.88</td>
<td>3.46</td>
<td>4 , 5</td>
</tr>
<tr>
<td>2. Vocational industrial education is primarily aimed at the development of attitudes, knowledge and skills which develop individual abilities necessary for occupational entry and career advancement.</td>
<td>4.22</td>
<td>4.13</td>
<td>1 , 2</td>
</tr>
<tr>
<td>3. Vocational industrial education has a responsibility for continuing the individual occupational exploration and for cultivating occupational competence which brings satisfaction to the individual and contributes to industry and other influential aspects of society.</td>
<td>4.14</td>
<td>4.16</td>
<td>2 , 1</td>
</tr>
<tr>
<td>4. The mission of vocational industrial education should provide various broad programs for the students who want to learn occupational entry skills or who want to prepare for advanced study, self employment at the secondary school level; in addition, they can achieve the occupational advancement in relation to their talents,</td>
<td>4.11</td>
<td>4.03</td>
<td>3 , 3</td>
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</table>
interests, and potential.

5. The vocational industrial educator also has a responsibility for recognizing the industrial organization, construction and environment, not only to understand the industrial environment in his/her own country but also to be aware of the industrial developmental situations in other countries.

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<tr>
<th>Questions</th>
<th>Means of Importance</th>
<th>Means of Mastery</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Understand the historical background, developmental processes and trends, policies, and related laws in vocational industrial education.</td>
<td>3.67</td>
<td>3.45</td>
<td>14, 14</td>
</tr>
<tr>
<td>7. Develop an understanding of industrial education and the relationships of other vocational education, career development, and general education.</td>
<td>3.70</td>
<td>3.56</td>
<td>12, 12</td>
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<tr>
<td>8. Develop an understanding of the philosophy and organization of vocational industrial disciplines.</td>
<td>3.52</td>
<td>3.35</td>
<td>16, 15</td>
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<tr>
<td>9. Be aware of emerging technology in their discipline.</td>
<td>4.11</td>
<td>3.92</td>
<td>4, 4</td>
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<tr>
<td>10. Develop an understanding of measurement and evaluation of programs and students and their</td>
<td>4.03</td>
<td>3.85</td>
<td>6, 5</td>
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</table>
importance to vocational program operation.

11. Acquire in-depth theoretical knowledge and skills of vocational industrial education discipline. 4.23 4.04 2,2

12. Acquire occupational experience in one's field, workshop of school or industry. 4.17 3.94 3,3

13. Have computer literacy and understand application of computers to their discipline and instruction. 4.03 3.82 7,7

14. Understand the research methods directed toward the development of new knowledge and new applications of existing knowledge. 4.08 3.85 5,6

15. Develop plant management, instructional management, time management and organizational management skills. 3.76 3.57 11,11

16. Understand new instructional technology equipment, methods, and procedures. 3.99 3.79 8,9

17. Understand how to analyze curriculum and develop or adapt curriculum planning appropriate to needs of students. 3.97 3.81 9,8

18. Develop an appreciation and commitment to professionalism. 4.30 4.13 1,1

19. Develop an understanding of guiding students' self-awareness, self-learning in their occupations, and development in personal characteristics. 3.68 5.51 13,13
20. Employ instructional techniques 3.52 3.35 17 , 16 to be used with students who have special needs.

21. Develop an understanding of 3.82 3.62 10 , 10 occupational guidance to be conducted for the students' individual needs.

22. Understand abilities of 3.52 3.37 15 , 17 leadership in administration, organizational concepts, and decision making.

23. Develop abilities in public and 3.35 3.24 19 , 19 community relations.

24. Develop abilities necessary to 3.44 3.28 18 , 18 work effectively with advisory committees or co-workers.

25. Develop an understanding of the 3.32 3.19 20 , 20 role and importance of student organizations and their activities.

26. Understand school organization 3.31 3.16 21 , 21 and operation including financing and budgeting.

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<tr>
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<th>Means of Importance</th>
<th>Means of Desire</th>
<th>Rank</th>
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<tbody>
<tr>
<td>27. Regularly participate in 4.14 4.06 3 , 2 appropriate professional development programs that would update them in their content area.</td>
<td></td>
<td></td>
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<tr>
<td>28. Regularly participate in 4.10 3.99 4 , 4</td>
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3. Continuing Education of Vocational Educators
appropriate professional development programs that would update their instructional skills.

29. Establish and participate in a support system for individual teacher concerns.  
   Means of Importance  Means of Agreement  Rank
   3.71  3.63  8, 8

30. Become familiar with current trends, problems and philosophy of their discipline.  
   Means of Importance  Means of Agreement  Rank
   3.78  3.65  7, 7

31. Periodically update their occupational experience in their instructional area.  
   Means of Importance  Means of Agreement  Rank
   4.21  4.06  1, 3

32. Examine the relationship of vocational industrial education and industry.  
   Means of Importance  Means of Agreement  Rank
   3.80  3.69  6, 6

33. Participate in advanced study and in-service program that would upgrade their management abilities or administrative leadership.  
   Means of Importance  Means of Agreement  Rank
   4.05  3.92  5, 5

34. Periodically participate in related professional program or workshop that would lead to other certification or higher degree.  
   Means of Importance  Means of Agreement  Rank
   4.20  4.12  2, 1

4. Certification and Licensure

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<th>Means of Importance</th>
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<tbody>
<tr>
<td>35. The effect on standards and quality of all education.</td>
<td>3.84</td>
<td>3.81</td>
<td>3, 3</td>
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<tr>
<td>36. The staffing of comprehensive vocational industrial program.</td>
<td>3.95</td>
<td>3.84</td>
<td>2, 2</td>
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</table>
v. The need for teachers who provide instruction in vocational industrial course to be vocationally certified.

38. Requirement for renewal of license, including occupational experience.

39. The need for other teachers and school administrators to understand vocational industrial education.

40. Requirement of a certain level of educational degree qualification or equivalent examination.

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4.14 4.06 1,1
3.61 3.43 6,6
3.71 3.60 4,5
3.70 3.63 5,4