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Title: THE IDENTIFICATION OF THE PROCESSES OF _____

VOCATIONAL EDUCATION ADMINISTRATION _____

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Joel Galloway

The Purposes of the Study

The central purposes of this study were to identify the pro-

cesses common to vocational education administration and to:

1. Define operationally, in performance-oriented terms, these

    processes.

2. Arrange these processes hierarchically, moving from the

    simpler to the more complex.

The Procedure

An instrument, containing a listing of processes and their

component operations, was refined through its submission in two

consecutive rounds of data collection to two panels of professional

educators. One panel was composed of process educators, the other

panel was composed of vocational administrator educators. The 12

respondents were asked to indicate the extent of their agreement

(Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree) to each of the operations as components of a process. Likert-type scale values of 5 to 1 were assigned to the responses. Respondents were asked to make changes in the hierarchical order of any process or operation, to make modifications of or additions to the listing of operations, and to make changes or modifications in the listing of the processes and their general definitions.

The data utilized in the study were those of the second round of the data collection. The data were analyzed utilizing the median test and the Fisher exact probability test to determine differences in the responses of the two Delphi Panels. The three quartile deviations were calculated for each operation. The median, Q_2, was used as a measure of the collective opinion of panel members. The inner quartile range, the interval containing the responses between Q_1 and Q_3, was used as a measure of divergence among panel members.

Summary of Findings

The analysis of data revealed the following information relative to the stated purposes of the research:

1. The median test revealed that no significant difference existed between the responses for the process educators and the voca- tional administrator educators to each of the operations as components of the processes of vocational education administra- tion.

2. The 11 processes, arranged hierarchically moving from the simpler to the more complex, identified and confirmed in this study were:

   a) Process 1.0: Defining the Problem or Opportunity Operationally
   b) Process 2.0: Observing
   c) Process 3.0: Analyzing
   d) Process 4.0: Communicating
   e) Process 5.0: Predicting
   f) Process 6.0: Questioning and Hypothesizing
   g) Process 7.0: Interpreting Data
   h) Process 8.0: Encountering
   i) Process 9.0: Creating
   j) Process 10.0: Managing
   k) Process 11.0: Valuing

3. Ninety-seven operations, hierarchically arranged moving from the simpler to the more complex, were identified and confirmed as components of the 11 processes. No more than 12 operations were common to one process.

4. The calculation of the median and the inner quartile ranges for each of the operations as components of the processes showed high group concensus; there were no exceptions.

Summary of Conclusions

As a result of the review of related literature and the collection and analysis of data, the following conclusions were drawn:

1. For each subject area, a group of processes exists and is identifiable. These processes define the unique ways of knowing, doing, acting, and thinking within a subject area.

2. While the reactions of the process educators and vocational administrator educators were alike regarding the processes and their component operations, it was concluded that two diverse groups were necessary in a study of this type due to the procedure of instrument refinement in data collection.

3. The processes and component operations identified and confirmed in this study were concluded to be common to vocational education administration. Some of the total listing of identified processes and operations may be common to other subject areas.

The Identification of the Processes of Vocational
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CHAPTER I

INTRODUCTION

Both the quality and effectiveness of vocational education will be determined by its leadership. The Panel of Consultants on Vocational Education (United States Office of Education, 1963) stated that, in our rapidly changing world, "this leadership must be dynamic and forward-looking and able to adapt its thinking to the constantly changing situation which it faces" (p. 162). Wenrich (1972) emphasizes this concern that the quality of local vocational programs depends "upon competent leadership--persons who have insights, understandings and skills which enable them to identify needs and to bring together and effectively use the school and community resources (both human and physical)" (p. 327). He concludes that, when such leadership is exercised, other qualities of effective programs generally emerge, including "qualified teachers, well-equipped shops and laboratories, adequate financial support and community involvement" (p. 327).

Administrator preparatory programs should be changed to provide future vocational administrators with experiences which will allow them to develop and maintain effective local programs. Previous to the Vocational Education Act of 1963, only minor attention

had been given to vocational leadership development on a national

basis. It was assumed that the demand would be met by vocational

instructors with potential for leadership activities. However, the

need for capable personnel in leadership positions demanded new

catalysts for leadership preparation (United States Office of

Education, 1968).

In the General Report of the Advisory Council on Vocational

Education (United States Office of Education, 1968) the following

recommendations were made to the Secretary of Health, Education and

Welfare:

> . . . among teachers recruited up through the ranks, many
> are very able individuals who rise to leadership positions,
> frequently without the opportunity to acquire an understanding
> of the nature of our society and its needs. They need help in
> gaining an understanding of the total educational enterprise
> and the social and economic conditions of our society. They
> also need to develop the skills of an effective educational
> leader (p. 149).

The demand for increased numbers of vocational administrators

was partially met by special provisions of the 1968 Amendments to the

Vocational Education Act of 1963, through the funding of programs to

develop leadership personnel. Despite the mandates of federal legis-

lation in the development of programs to prepare vocational adminis-

trators, Tennyson (1971) indicates that there is at present a leadership

void in local programs.

Background of the Problem

DeVore (1972), who has suggested a focus in curriculum

development upon the identification of the processes of a discipline,

states that to function effectively today and tomorrow in a continually

changing society, man must be able to apply intelligently his accu-

mulated wisdom to new conditions and to a more humane future. This

state of affairs, he continues, will "require citizens capable of

engaging new problems, of learning new knowledge and of accepting

change as a normal state. Learning must become a perpetual

endeavor" (p. 24). He proposed that "to prepare citizens capable of

these performances will require an educational structure that

emphasizes the intellectual processes of the discipline" (p. 24).

Educators, he continues, are concerned not only with perpetuating the

knowledge base of a subject matter, but also the "development of

individuals capable of discovering new concepts and of functioning in

the processes of the disciplines and their unique ways of knowing,

doing, acting and thinking" (p. 31).

According to DeVore (1972), the distinct function of the

processes of a discipline in the educational situation is to "identify

what the practitioners of the discipline actually do as they pursue

their discipline" (p. 31). The process approach adopts the idea that

novel thought can be encouraged in relation to each of the processes

of the discipline. Gagne (1964) stated that transferable intellectual

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processes can be developed, they must be separately identified and

learned and otherwise nurtured in a highly systematic manner. He

continues that "it is not enough to be creative 'in general'--one must

learn to carry out critical and disciplined thinking in connection with

each of the processes" (p. 4) of the subject area. The process

approach rejects the idea of learning highly specific facts or prin-

ciples; it substitutes the notion of learning generalizable processes

which are behaviorally specific, but which carry the promise of broad

transferability across many subject areas (Gagne, 1964).

Berman (1968) supported this approach to curriculum develop-

ment and stated that

. . . the intent and the substance of the curriculum should be
geared in such a way that it has two major characteristics:
1) Its major concern is with the ongoingness rather than the
staticism of life; 2) the substance of the curriculum is
related to human processes such as perceiving, knowing,
and organizing. . . (p. v).

She continues in saying that the program should be designed so that

the learner not only experience, but that he study these functions in

a systematic way. She defines process-oriented persons as being

. . . on-going, growing, developing beings. . . They see
purposes to the degree of change and movement they plan
for themselves. . . . Process orientation characterizes
persons who are able to handle themselves and the situations
of which they are a part with adequacy and ease (p. 9, 10).

Berman (1968) makes the assumption that all persons are to some

degree process-oriented and they can become more so through

planned experiences. She also supports the belief that it is "good for persons to have some degree of process orientation" (p. 9).

Accompanying this concern of some educators to place emphasis on the processes of a discipline, is the concern of administrator educators over the need to change the focus of administrator preparatory programs. Chase (1969) reported that many of the traditional roles of administrators and teachers have changed to incorporate "new concepts and technologies of data processing, communication, planning, management, and instruction" (p. 2). He states that educational administrators must learn "to function as participants in policy-making process which involves intimately students, teachers" and other community groups; and they must be able to develop communication channels that are sensitive "to distress signals arising outside the traditional reference groups" (p. 3-4). Hirsch (1971) exposed some shortcomings of present leadership development programs and made suggestions for improvement. Some changes she recommended for future administrators include becoming familiar with the range of vital educational issues our nation is facing, learning management tools and techniques, developing their intellectual ability in analyzing problems, experiencing real-life situations where they are in a position of exercising various leadership roles, and deepening their capacity to relate to others--especially young people.

Statement of the Problem

The problem of this study was to identify, define operationally, and arrange hierarchically the processes inherent in and common to vocational education administration.

The major objectives of this study were to:

1. Identify the processes of vocational education administration.

2. Define operationally, in performance-oriented terms, the processes which describe the activities of practitioners in vocational education administration.

3. Arrange hierarchically the processes of vocational administration, moving from the simpler to the more complex.

4. Confirm the identified, defined, and hierarchically arranged processes by submitting them to two panels of consultants utilizing a modification of the Delphi Technique.

The confirmed processes could serve as a base for curriculum development in the preparation of vocational administrators. From the defined processes can be developed behavioral objectives, instructional materials, and teaching strategies. The findings from this study may provide pertinent information for curriculum development for administrators of vocational administration.

Definition of Terms

The following definitions are included in order to standardize

the terms used in the study. Other terms or phrases are considered
to be self-explanatory.

1. <u>Delphi technique</u> - A forecasting method used for the systematic
development of expert opinion concensus. The technique
functions without bringing the panel together in a face-to-face
confrontation; contact with panel members was made through
mailed instruments.

2. <u>Median test</u> - A statistical technique utilizing ordinal (ranked)
data to determine if the independent panels were drawn from the
same population or from populations with equal medians.

3. <u>Processes</u> - The strategies, the behavior capabilities, used by
the individual to deal effectively with the content of a discipline
(Cole, 1969).

4. <u>Operations</u> - Components of processes, they are stated in
performance-oriented terms and describe what the practitioner
is doing when utilizing the processes of the discipline.

5. <u>Process education</u> - A characteristic of each discipline relating
to the method of inquiry, or a strategy for acquiring the knowl-
edge of the discipline (Taba, 1962).

6. <u>Vocational education administrator</u> - A member of the education
staff involved in the performance of the major tasks of organiz-
ing, managing, coordinating, or supervising duties of other
employees and calling for the carrying out of certain

responsibilities in the direction, control, or management

within an educational institution (Good, 1959).

Assumptions

The following assumptions underlie this study:

1. Both content and process are essential to the study of any

    subject area. Through the utilization of the processes and

    their component operations of a subject area, both content and

    process are stressed within the curriculum.

2. Processes are specific to a discipline; processes are dependent

    upon the content of a discipline.

3. The processes of vocational administration are identifiable and

    may be learned; it is reasonable to begin with the simplest and

    move toward the more complex.

4. The data collection instruments were consistent with and

    adequate for the purposes of this study.

5. The opinions of experts in the fields of process education and

    vocational administrator education are a valid source of data

    for this study.

6. The selected panel members were a representative sample

    regarding current thinking and philosophy of process education

    and/or vocational education administration.

7. A procedure of corroboration by the review and reaction by

panel members served to confirm these processes and their

component operations as a basis for curriculum planning.

Summary

Despite impetus from federal legislation to create programs

focused on the preparation of personnel who will hold leadership

positions in vocational education, the need for qualified personnel is

not being met. There is some evidence that effective administration

is exercised by persons with capacities to relate to others, to possess

insights and understandings in the identification of needs, and to be

able to analyze problems. It appears that through the identification

of the processes of the subject area it will be possible to re-focus

administrator preparatory programs so the product, vocational

administrators, will be more able to function in our changing society.

CHAPTER II

THE REVIEW OF RELATED LITERATURE

The review of related literature centered upon five main areas of investigation: process education, the elements of creativity and thinking, process curricula, the competencies of vocational administration, and related methodological studies.

Process Education

Vocational administration is composed of a content factor (knowing as related to facts, ideas, concepts, and generalizations) and a process factor (a method of inquiry). Taba (1962) stated that "throughout the history of curriculum making, one of these two characteristics of a subject has been emphasized to the detriment of the other" (p. 173). She reported that in process education, "one assumes that subjects have the power to discipline the mind" (p. 173). Throughout time, she continued, there has been a change in the theory of mental discipline, that change was:

> In the old school of mental discipline, it was assumed that
> the form of the subject trained the faculties, and these, once
> trained or strengthened, could transfer the power so acquired
> to anything else. The modern concept of mental discipline
> is more analytical and more likely to be concerned with
> scientific or critical thinking, the ability to solve problems,
> and the capacity to understand and pursue the methods of
> inquiry. It also accepts the fact that the nature of the content
> determines what these processes are and how they operate
> (p. 173).

In view of the latter concept of mental discipline, Taba (1962) con-cluded that a relationship does exist "between the cognitive processes and content. There are differences in the thought systems of the various subjects and each has something unique to contribute to a balanced intellectual development" (p. 174).

Gidonese of the United States Office of Education expressed a concern to place more emphasis on process education when he indicated that within special content areas knowledge will continue to be important; however, we cannot always predict what that content will be. Because we can predict the processes for handling informa-tion and responding more effectively to each other, he proposed that more emphasis should be focused on the identification and use of these processes (Borton, 1970b).

Karplus and Thier (1967) substantiated Gidonese in their state-ment that not enough emphasis has been placed on process; process and content should not be separated, because the result of their separation is a sterile point of view. They stated that meaningful learning experiences should emerge from the basic structure, the processes of the scholars, of the subject matter. Cole (1972) stated that process education will not eliminate the traditional emphasis on the instrumental skills of reading, writing, and speaking; rather, the "emphasis in current educational practice on the transmission of knowledge and information to pupils must be decreased" (p. 11).

Some authors, as described above, concluded that the traditional emphasis on content should be lessened and that the focus of the curricula should be the fostering of processes for handling informa- tion. This can be summarized by Cole (1972) who stated that in process education, the objective is the development of "those skills which the learner needs if he is to acquire, organize, generate, and utilize in a satisfying and productive manner the wealth of information available to him" (p. 24). The focus of this paper was like that of Taba (1962) who concluded that the processes are related to the content of the subject area.

Elements of Creativity and Thinking

This section of the review of related literature is divided into two aspects of creativity and thinking: the relationship of the elements of creativity and thinking to process education, and the delineation of the elements of creativity and thinking.

Relationship to Process Education

Cole (1972) emphasized that the processes of a discipline "are known empirically to be essential to inquiry, analytic thinking and problem-solving" (p. 8). He identified a number of research studies in cognitive psychology which confirm this belief. Cole (1970) indicated that while educational theory has continually recognized the

need to develop the creative and adoptive behaviors in learners,
instructional practices have almost exclusively been concerned with
the transmission of knowledge and information. He stated that in
process curricula, the learner is engaged in the creative behaviors
essential to problem solving.

Parnes (1962) reported on research that evaluated whether
creativity could be deliberately developed through instruction and
practice. Results of this study showed that creativity could be so
developed and that creative problem-solving courses can "measurably
improve the ability of students of average intelligence to produce
good ideas, the criteria of quality being uniqueness and usefulness"
(p. 186). Torrence (1967) identified research showing that learners,
both children and adults, "who achieve high scores on tests of
creative thinking develop [more] original ideas in the content area"
(p. 83) of their studies than do their less creative peers.

As indicated above, the elements of creativity and thinking are
basic to process curricula. Research has demonstrated that creative
thinking can be learned and can be increased through instruction.

Delineation of the Elements of
Creativity and Thinking

Helmholtz (Wallas, 1945) sequenced the stages of creativity as
preparation, incubation, and illumination. Wallas (1945) added one

additional stage to this listing, verification. Rossman (1931) ampli-

fied the preparation stage; otherwise, the categories are essentially

the same. Johnson (1955) described the thought processes in terms

of three stages: preparation, production, and judgment. Williams

(1968) identified seven components of productive-divergent thinking

processes, these being fluency, flexibility, elaboration, originality,

curiosity, risk taking, and preference for complexity. Borton (1970b)

classified sensing, transforming, and acting as three basic

information-processing functions.

Taylor (1970) has written of at least five talents "other than

academic, based upon the world-of-work needs that have been

suggested for development in the schools"; these are productive

thinking, decision-making, planning, forecasting, and communicating

(p. 174). Guilford (1970) defined the major intellectual activities or

processes as cognition, memory, divergent production, convergent

production, and evaluation. Klopf (1970) classified four interaction

processes which seem to help change take place; the four processes

are consultation, dialogue, encounter, and confrontation. Torrance

and Myers (1970) have identified the following skills as necessary for

the successful operation of the creative problem-solving process:

making accurate observations, becoming sensitively aware of

surroundings, fully utilizing all senses, shifting points of view,

questioning, making both deliberate and random associations, making

predictions, organizing and reorganizing patterns, taking careful

inventories, manipulating ideas, and making use of analogy. Guilford

(1971) identified the four classifications of creativity as fluency,

flexibility, originality, and elaboration.

The utilization of the elements of creativity and thinking as

a basis of process education was best typified in the writings of

Berman. In her analysis of the thinking process, Berman (1967)

categorized thinking into these three areas: thinking that deals

primarily with the known; thinking that reaches beyond the known;

and thinking that judges, rates, or evaluates a product. These

categories are not mutually exclusive; she has identified components

of each category. Berman reports that a thoughtful person utilizes

components of all three categories as he is an information-seeker,

creative thinker, applier of knowledge, formulator of values, and

decision-maker. Berman (1968) expanded upon her characteristics of

a thoughtful person and defined a process-oriented being as one who

has within "his personality elements of dynamism, motion, and

responsibility which enable him to live as an adequate and a con-

tributing member " (p. 9) of his society. In her classification of

man's activities, she identified these processes: 1) perceiving,

2) communicating, 3) loving, 4) knowing, 5) decision making,

6) patterning, 7) creating, and 8) valuing. These eight process skills

involve the whole of man's activity. The thinking processes, which

she previously categorized, are components of these eight process

skills.

It is possible to isolate the behavioral components of creativity

and thinking. These behavioral components of creativity and thinking

serve as a base from which to begin the identification of the processes

of a subject area.

Process Curricula

This section of the review of related literature is divided into

two areas: curricular examples of process education, and curriculum

development models using processes.

Curricular Examples of
Process Education

Several curricula that are based on the processes of the

discipline have been developed. Most of this work has been focused

at the elementary school level. The selected curricula reviewed in

this section are representative examples of curricula based on the way

the scholars of the discipline work.

In Science--A Process Approach (sponsored by the National

Science Foundation through the American Association for the

Advancement of Science), 14 intellectual skills were identified as

being common to elementary school science. The 14 processes are:

1) observing, 2) classifying, 3) measuring, 4) communicating,

5) inferring, 6) predicting, 7) using space-time relations, 8) comput-

ing, 9) formulating hypotheses, 10) operationally defining, 11) con-

trolling and manipulating variables, 12) experimenting, 13) interpret-

ing data, and 14) formulating models. The processes are arranged

hierarchically; the learning of the latter skills is dependent upon the

learning of the simpler intellectual skills (American Association for

the Advancement of Science, 1965). The content of science has not

been neglected; the thrust has been on the development of skills in

using the science processes. The basis of the program, according

to Gagne (1964), is "that the best route to understanding an apprecia-

tion of science is by a careful and systematic building of increasingly

complex human performances which include and make possible both

flexible and disciplined thinking" (p. 7). Andreas (1970) reported on

the evaluation of Science--A Process Approach. Students were

evaluated on the component behavioral objectives specified for each

process; results of this research showed that 80 percent of the

students responded correctly to the competency measure tasks.

The project "Materials and Activities for Teacher and Child"

(MATCH) emphasizes the development of thinking and feeling skills

learned through direct experiences and events with authentic

materials. The specially designed MATCH units enable elementary

teachers and children to communicate and learn by non-verbal means.
The teacher guides the students in ways of obtaining, organizing, and
utilizing information through simulated experiences (Cole, 1969).
The unit, The City, is designed so that students learn characteristics
about cities; the emphasis is not placed on learning specific facts
about cities.

Crutchfield (1969) shows evidence that the Productive Thinking
Program, a supplementary course for elementary students using no
traditional content, helps students develop the skills of becoming
aware of a problem, of formulating the problem, of organizing the
necessary evidence, of generating many ideas, and of judging the
quality of the solution. In The Massachusetts Institute of Technology's
Artificial Intelligence Laboratory, utilizing the computer, a variety
of projects help the student learn logical thought processes. The
computer works with data, and the student learns the processes for
handling these data (Borton, 1970b). The "Minnesota Mathematics
and Science Teaching Project" stresses such scientific operations as
observation, measurement, experimentation and experimental design,
description, generalization, and deduction; experiences provide
students with the ability to seek out information and to build their
relationship to and understanding of mathematics and science
(Minnemast, n. d.).

In one unit of "Man: A Course of Study, " students utilize an

anthropologist's field notes from which they make observations,

hypotheses, and inferences about studies on non-human animal

interaction; they must apply their understanding to the behavior and

interaction of humans, their social organizations, and their value

systems. Cole (1972) described the experiences through which pupils

and teachers become involved in the "building of knowledge and

generalizations about such topics as adaptation, innate and acquired

behavior, learning, social organization, dominance patterns,

aggression, and culture" (p. 17). The participants soon learn that

the knowledge in these areas is very tentative; they become involved

in the process of creating knowledge. Cole reports that they learn

that the basic resources for creating knowledge are "one's own feel-

ings and experiences coupled with such skills as observation, data

collection, inference, hypothesis formation, and testing" (p. 17).

Many process curricula have been developed, but most of these

curricula are for elementary school students. Limited research on

these curricula has provided evidence that students are learning the

processes of the curricula and are able to transfer these processes

to other situations.

Curriculum Development Models
Using Processes

Three means of utilizing processes in performance-based

curricula are reviewed, these being: task analysis, classifying behavioral objectives, and a plan for total program development.

Processes can serve as a base for curriculum development as one dimension of a two-dimensional matrix from which a task analysis for vocational knowledges and skills can be conducted. The second dimension of the matrix would be the objects of behavior. Altman and Gagne (1964) listed 11 processes and six objects of behavior; the processes are: 1) sensing, 2) detecting, 3) discriminating or identifying, 4) coding, 5) classifying, 6) estimating, 7) chaining or rote sequencing, 8) logical manipulation, 9) rule using, 10) decision making, and 11) problem solving. Using written definitions for each of the 66 cells of the matrix, a task analysis can be completed for specific vocational occupations. Altman (1965), on a follow-up of this study, reported that the structure has clear potential as a basis for developing units of instruction on general vocational capabilities in basic job technology. He stated that these units of instruction are of more value when they are dove-tailed with existing curricular areas and coordinated with units of the world of work, career choice, and career planning.

The Career Education section of the Oregon State Department of Education (1973) has utilized the Altman-Gagne format in the conduct of task analyses for specific vocational jobs. Three processes were added to the 11 of the Altman-Gagne listing and one process was

eliminated. The resulting matrix contained 14 processes and retained

the six objects of the original format; the 14 processes were:

1) sensing, 2) detecting, 3) manipulative sequencing, 4) discriminating

or identifying, 5) coding, 6) classifying, 7) estimating, 8) synthesis,

9) logical manipulation, 10) rule using, 11) decision making,

12) problem solving, 13) measurement, and 14) communication.

In a study similar to that of Altman-Gagne, Tuckman (1970)

defined a three dimensional domain-process-object scheme composed

of 48 cells. Within his 4 x 4 x 3 matrix, Tuckman listed 40 action

verbs to assist in classifying behavioral objectives for each subject

discipline. This work is an advancement of his 25-celled, two-

dimensional matrix used in classifying educational objectives (Tuck-

man, 1968). The three-dimensional domain-process-object matrix

is in the process of being tested on the vocational skills of secretaries

and technicians. Tuckman (1970) stated that his study

> . . . has three important implications for educational
> curriculums. The first is that clusters of occupations
> could be derived based upon psychological concepts. . . .
> The second is to relate integrating academic subjects into
> the vocational curriculum. . . . The third relevant applica-
> tion is that a model such as the one proposed, if validated,
> could become the basis for describing the full range of life-
> relevant behaviors including the occupational, civic, and
> personal-social areas (p. 3).

DeVore (1972) has formulated a plan for total program develop-

ment in a subject area. His plan is based upon several components.

The content reservoir or taxonomy of the subject area is used in the

development of principles and concepts of that subject area. The

processes are used as a screening device to identify and establish

behavioral objectives for the concepts; the processes, in identifying

what the practitioners do, provide a basis for determining the

behavioral characteristics of learners engaged in the study of that

subject area. Performance criteria are established for the stated

behavioral objectives, and teaching-learning units are developed.

Through the combination of teaching-learning units, programs of

study can be established. DeVore (1972, p. 55) lists nine essential

steps to program development, utilizing the taxonometric structure

of the discipline approach. The steps are:

1. Establishment of the content reservoir--taxonomy.

2. Identification of the basic principles and concepts of the
   discipline from the content reservoir, including technical
   and social/cultural elements.

3. Identify and develop principle and concept statements describing
   each principle and concept determined in step 2.

4. Identify and establish the processes of the discipline (modes
   of thinking, performing, and ways of securing, evaluating,
   and using data and information to cumulate knowledge in the
   advance of the discipline) related to each principle and concept.

5. Identify and establish behavioral objectives associated with
   each principle and concept.

6. Establish performance criteria for each behavioral objective.

7. Develop learning hierarchies for each sub-concept for each
   level of instruction. (The nature of the learner and the nature
   of the processes of the discipline are related at this point.)

8. Identify and establish teaching-learning units utilizing information from steps 3 through 7.

9. Establish programs of study through the grouping of logical combinations of teaching-learning units.

DeVore (1972) would have the student learn the content--concepts and principles of the discipline--through process. The combination of the nature of the discipline (the analysis of the content and processes of the discipline) with a knowledge and understanding of "proven practices related to the learner should provide for a combination of content and teaching methodology evidencing a realistic and relevant whole rather than false dichotomies" (p. 56). The programs of study developed in this method would be problem oriented with emphasis on the modes of inquiry of the discipline.

The processes identified for a subject area can be utilized in the development of performance-based curricula. Models have been developed to classify the tasks of vocational occupations by psychological processes. A model has been developed to use in the writing of behavioral objectives for the classification of tasks of vocational occupations. A plan for total curriculum development has been devised using the process of a subject area as screening device for formulating behavioral objectives relating to the content of the subject matter.

Competencies of Vocational Administration

Ward (1970) conducted research relative to the identification

of competencies possessed by leaders in occupational education. In

addition, he explored the methods by which the essential competencies

could be developed. An inventory of 50 items was identified and

validated. The respondents indicated that the best method for pre-

paring an individual for competency in 45 of the 50 tasks was through

a combination of internship and course work.

In a task analysis of leaders in vocational education, Heilman

(1970) identified the tasks performed over a period of five weeks by a

population of 64 individuals from 28 states. This population of

leaders held positions at various levels in local high schools, large

high school districts, vocational-technical schools, community

colleges, state departments and teacher education institutions. These

tasks were assigned to 14 major functional categories. The highest

ranked task categories, when all positions were compared, were

personnel development, researching, planning and supervising. The

lowest ranked task categories were promoting, consulting, budgeting

and financing, policy formulating, and guidance and counseling. Four

kinds of social interaction consumed 66. 8 percent of the time of the

leaders.

Sundstrom (1972) identified and grouped the professional educa-

tion competencies common to administrators of vocational education.

The technique of factor analysis was used in grouping the 70 identified

competencies. The seven factors extracted from the data were:

1) instruction--staff and facilities, 2) personnel--student and staff;

3) program development and demonstration; 4) curriculum development

and evaluation; 5) professional relations--organized groups;

6) management of the educational system; and 7) research projects.

The highest mean ranked item was: Work with others in educational

administration to initiate and maintain occupational education pro-

grams.

In a study by Baltimore (1972), 98 professional education

competencies were identified as basic to public school district voca-

tional education leaders. Five groupings of competencies were

identified, using the technique of factor analysis; these five factors

were: 1) program management; 2) program planning, development

and evaluation; 3) state criteria interpretation; 4) staff management;

and 5) staff relations. A majority of the respondents selected a

combination of formal course work and internship as the preferred

method of preparing vocational education leaders to perform the

competencies identified in the study.

In a companion study to the above study by Baltimore, Martin

(1972) identified 98 professional education competencies needed by

vocational administrators at community colleges. Five groupings of

competencies were identified, using the technique of factor analysis;

these five factors were: 1) administrative organization. . .;
2) instructional processes; 3) research and use of community
resources in program development; 4) financial, facility, and
organizational planning; and 5) information dissemination and
instructional systems. A majority of the respondents selected a
combination of on-the-job experience and formal course work as
the preferred method of competency preparation.

Dedrick (1973) reported on a study to determine the compe-
tencies of the school administrator. Initially, an attempt was made
to identify and classify statements of behaviors of school administra-
tors. The method of classification is that proposed by The University
Council for Educational Administration; the six domains were:
1) initiating and responding to change; 2) decision making; 3) support
for instruction and learning; 4) human relations and morale; 5) evalu-
ating school processes; and 6) responding to problem situations.
The results of this study will appear later in 1973.

In summary, research has determined the professional educa-
tion competencies needed by vocational administrators. The general
recommendations of this research are that the identified competencies
could best be learned through a combination of course work and intern-
ship. Research to date has shown what the administrator does through
the identification of the competencies of vocational administration. It
is the purpose of this paper to show how the administrator performs

as a practitioner through the identification of the processes of

vocational administration.

Related Methodological Studies

The review of literature relative to the identification of the

processes of a discipline indicated the need to draw upon the solicita-

tion of opinions from experts in the field. The Delphi Technique is a

recognized instrument used in obtaining group concensus without

bringing the group members together in a face-to-face confrontation.

The Delphi Technique was originally developed for short-range

forecasting by scientists at the Rand Corporation. Using this

approach it is possible to pool individual opinions to develop fore-

casts that are more accurate than those of any average individual. It

is the contention of Helmer and Rescher (1960) that certain fields of

knowledge commonly require the opinions of an expert; within these

fields, knowledge is "inexact" as absolute answers are not known or

possible to know. The Delphi Technique was designed, state Fusfeld

and Foster (1971), to produce concensus judgments in inexact fields.

Helmer (1966) described the Delphi Technique as "a method for

the systematic solicitation and collating of expert opinion" (p. 1). The

developer of the Delphi Technique stated that "it is applicable when-

ever policies and plans have to be based on informed judgment, and

thus to some extent to virtually any decision-making process" (p. 1).

Brown and Helmer (1966) conducted an experiment on concensus

research using the Delphi Technique. The panel was composed of

members from the Rand research staff. The questionnaire was

composed of 20 questions with known numerical answers. The

respondents, who were not true experts with regard to the questions,

were asked to answer the questions without using any resource

material. Using the standard Delphi Technique, the procedure of

data collection involved the following stages:

> In the first-round questionnaire, each respondent was asked
> to indicate. . . the estimated answer to each question. . . .
>
> In a second questionnaire, each respondent was informed of
> the group median of the first-round responses and of their
> interquartile range. . . . The participants were instructed
> to reconsider each answer, make a revised estimate and, if
> the new answer lay outside the indicated interquartile range,
> briefly state a reason for this opinion.
>
> A third-round questionnaire summarized the reasons thus
> elicited that had influenced respondents' opinions, and the
> subjects were invited to criticize these reasons if they found
> them unconvincing. The medians and quartiles of the second-
> round responses were also included in the feedback informa-
> tion, and the respondents were asked again to give possibly
> revised answers to the twenty questions.
>
> In the final fourth round, in addition to the medians and
> quartiles, the respondents were given a summary of some
> majority and minority responses obtained from the critique
> in Round 3. They had one last opportunity to revise their
> twenty answers (p. 100).

In the above Brown and Helmer study, the true value for each

question was computed. The true value of the question as well as the

computed median and interquartile ranges of the responses were used

in data analysis. In addition to the utilization of the standard proce-
dure of the Delphi Technique, this research demonstrated that the
Delphi Technique "appeared to be a powerful tool for increasing the
reliability of group estimates" (p. 107).

Dunham (1971) used a modification of the Delphi Technique in
the identification of guidelines for planning a preservice preparation
program to encompass the critical issues in community college teacher
education. Two panels were utilized in the study: 12 members were
nationally recognized authorities, the second panel was composed of
12 representatives from Oregon Community Colleges. From a review
of literature, an initial five-point Likert-type response instrument
was sent to panel members. The instrument was revised based upon
panel member responses. On the second round of the Delphi Tech-
nique, panel members were asked to respond to the statements on
the second instrument. A percentage of agreement was calculated
for each panel's responses to the statements; the statements were
analyzed for internal agreement or disagreement on an item by item
basis and on a percentage agreement group basis.

In a study conducted by Halfin (1973) the processes of technology
were identified using a modified Delphi Technique. After an extensive
review of literature on ten technologists, e.g. Edison, Land, Sperry,
he identified an initial set of processes and their component opera-
tions. These identified processes and operations were submitted to a

panel in two successive rounds of data collection. The instrument was based on a five-point Likert-type scale. After the second round of the Delphi Technique, the revised instrument met the established criteria that 60 percent of the responses fall within the two upper limits (4, 5) of the five-point scale. The report of this study was descriptive.

The Delphi Technique has been used in research that necessitates the use of opinions of experts within a field of knowledge in order to obtain solutions to questions or statements for which there are no absolute answers. Through the use of the Delphi Technique, it is possible to base a plan or procedure on the informed judgment of a panel of experts.

CHAPTER III

PROCEDURES

The sections presented in this chapter include: preparation of

the instrument, selection of the sample, the dependent variable,

collection of the data, and the analysis techniques used in this study.

Preparation of the Instrument

The initial step in the development of the instrument used in

this research was a review of literature related to process education

and vocational administrator preparation. Administrative compe-

tencies were identified in studies by Heilman (1971), Martin (1972),

Sundstrom (1972), Baltimore (1973), and Dedrick (1973). In review-

ing literature related to processes, the papers of Gagne (1964), the

American Association for the Advancement of Science (1964),

Berman (1968), Andreas (1970), Tuckman (1970), and Halfin (1973)

were considered in relation to this study. From these sources,

identified in Chapter II, the initial instrument, containing 12 pro-

cesses and 152 operations as components of these processes, was

developed for use in this study. The instrument was so designed that

respondents were presented with the options of accepting, modifying,

or omitting each process and its component operations. Respondents

were asked to make changes in the hierarchical order, moving from

the simple to the complex, of the processes and the component operations of the processes.

The second step in instrument development was to present the instrument to a jury panel for testing purposes which led to instrument clarification and revision. The panel consisted of two representatives from a state department of education and two faculty members of a teacher education institution. The names and positions of members of the jury panel are presented in Appendix A. Each member of the jury panel was asked to complete the instrument and in so doing make recommendations for additions or modifications. As a result, one process was eliminated by being combined with another, and no processes were added; the revised instrument, named the Instrument, Set I, consisted of 11 processes. On the instrument that went to the jury panel there was a total of 152 operations as components of processes. After panel review, 15 operations were modified, 65 operations were eliminated, and 16 were added; the revised instrument, Set I, consisted of 103 operations.

The revised instrument, Set I, used a five-point Likert-type scale; scale choice options included Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1). This instrument, Set I, is presented in Appendix B.

Selection of the Sample

The population used in this study consisted of two Delphi

Panels uniquely different in population. One panel was composed of

process educators; the other panel was composed of vocational

administrator educators. The panel of process educators was

arbitrarily selected from a generated listing of professional educa-

tors with experiences in process education. The panel of vocational

administrator educators was arbitrarily selected from a generated

listing of vocational administrators with experiences in one of the

following: a) doctoral level on-campus program to prepare voca-

tional administrators, specifically, directors of the Educational

Professions Development Act Vocational Fellowship Programs; and

b) a field-based, non-degree, in-service program for persons who

wish to become vocational administrators. Potential candidates for

the Delphi Panels were contacted regarding their willingness to par-

ticipate in the study, and the composition of the two panels was

established at eight members for each panel. See Appendix C for a

copy of the letter used. After the first round of the Delphi Technique

each of the panels was composed of six members, for the following

reasons: the response from one panel member was received too late

to be considered, two panel members did not respond, and one panel

member was eliminated to even out the panels at six respondents each.

See Appendix D for a listing of panel members and their positions.

The Dependent Variable

The respondents, professional educators, were asked to indicate their reaction to each of the 97 operations as components of the 11 processes of vocational administration. Each of the operations was assigned an acceptance level based upon the five-point Likert-type scale identified earlier in this chapter. The dependent variable in the study was a score assigned by respondents to indicate their acceptance level of the operations as components of the processes of vocational administration.

Collection of Data

The purpose of this study was to identify, define operationally, and arrange hierarchically the processes of vocational education administration. A modification of the Delphi Technique was used to obtain group concensus on the identified processes and their component operations. The procedure of the standard Delphi Technique was discussed in Chapter II; the modification used in this study is discussed below. Group concensus would be obtained when 75 percent of the responses fell on or above 3 on the five-point instrument scale. It was felt that a high critical level would indicate high validity; the standard Delphi Technique used a critical level of 50 percent of the responses falling at or above 3 on the five-point instrument scale (Brown and Helmer, 1966).

Three rounds of the modification of the Delphi Technique were planned for use in this study; however, only two rounds were utilized as all data met the established criteria after the completion of the second round of data collection. The description of the third round of data collection is included as a part of the procedure.

Round One of Data Collection

On the Instrument--Set I, each respondent was asked to indicate the extent of his agreement to each of the operations as a component of a process, to make changes in the hierarchical order of any process or operation, to suggest modifications of or additions to the listings of operations, and to make changes or modifications in the listing of the processes and their general definitions. A sample of the letter sent to respondents can be found in Appendix E.

Round Two of Data Collection

After tabulation of the responses from the first round of data collection, the Instrument, Set I, was revised based upon panel members' responses; the revised instrument was named Instrument, Set II. Each respondent was informed of his panel's mean score of the first round responses as well as his individual response to each item. The panel members were asked to respond to the Instrument, Set II, with the same instructions as those for his response in the

first round of data collection. A sample of the letter sent to the

respondents can be found in Appendix F. The Instrument, Set II, is

presented in Appendix G.

Round Three of Data Collection

Median scores and quartile ranges were determined from

responses to each statement on the Instrument, Set II. Each panel

member was informed of the median response to the Instrument,

Set II, as well as his individual response to each item. If the

responses for any statement did not meet the established criteria,

that no more than 25 percent of the scores fall below 3 on the

instrument scale, then those panel members whose responses fell

within this range were asked to either change their response to that

statement or to state their reason(s) for not changing their response.

Analysis Techniques

The data central to this study were those of the second round of

data collection, the responses of the professional educators to the

Instrument, Set II. The population was representative of vocational

education administrators and process educators. The sample of 12

professional educators provided data by responding to the Delphi

Instruments in two successive rounds of data collection. The median

scores of panel responses to the Instrument, Set I, can be found in

Appendix H. The comments of panel members on the Instrument,

Set I, are in Appendix I. The analysis techniques used in this study

were significance testing and quartile deviations.

Significance Testing

An examination of the data collected was made to identify

differences among the process median scores of the particular Delphi

Panels. The hypothesis tested was that there was no significant

difference among the responses of the two Delphi Panels to the

Instrument, Set II. The test statistic used to analyze contrasts

between median scores was the Fisher exact probability test.

The median test (a non-parametric test of significance) is a

procedure for testing whether two independent groups differ in

central tendencies and utilized the Fisher statistic in its computation.

The median test provided information regarding whether it was likely

that two groups were drawn from populations with the same medians.

The median test may be used when the scores of the two groups are

at least of an ordinal scale level. For describing the central ten-

dency of scores in an ordinal scale, the median is the most

appropriate statistic (Siegel, 1956). Information on the entering of

data into the 2 x 2 contingency table can be found in Appendix J.

The Fisher exact probability test was used to find the probability

of the observed values as the two independent samples were small in

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size. The critical region for the null hypothesis was set at $\alpha = .01$.

The Fisher-Yates test of significance in 2 x 2 contingency tables

(Finney, 1948) was used in determining the rejection or retention of

the null hypothesis. The null hypothesis was considered as being

rejected when the 2 x 2 contingency values were not those specified

in the rejection values as determined in the Fisher-Yates tables.

The test was two-tailed. This was considered appropriate because

the significance levels given in the Fisher-Yates table were doubled.

Quartile Deviations

The three quartile deviations were calculated for each operation.

Q_1 is that point on the number scale such that one-fourth of the

observations lie below it, one-half lie below Q_2, and three-quarters

lie below Q_3 (Glass and Stanley, 1970). The formulas for calculating

quartile deviations can be found in Appendix K.

The median (Q_2) was used as a measure of the collective

opinions of panel members. The inner quartile range (the interval

containing the middle 50 percent of responses) was used as a measure

of divergence of opinion among panel members; the inner quartile

range was composed of responses falling between Q_1 and Q_3. Data

were presented by the use of these three measures (Brown and

Helmer, 1966).

CHAPTER IV

FINDINGS

The purpose of this study was to identify and confirm the processes of vocational education administration. These processes were defined operationally and arranged hierarchically, moving from the simpler to the more complex. A modification of the Delphi Technique was utilized in data collection to obtain group concensus on the processes and their component operations. Two rounds of data collection were used to meet the criterion level of group concensus, the procedures used and the specifics of the criterion levels were discussed in Chapter III.

The findings presented in this chapter are those obtained in the last round of the modification of the Delphi Technique. The procedures of this study represented an application of the Delphi Technique; therefore, the data as related to the objectives of this study were those from the second round of data collection. The comments of panel members on the second round of data collection, those comments on Instrument, Set II, can be found in Appendix L.

The data are presented in the following two sections; the results of the median test analysis, and the quartile deviations of the processes.

Results of the Median Test Analysis

The Median Test was used to conduct 97 two-way classification analyses in this study. In each instance, the responses from six process educators and six vocational administrator educators were tested to determine whether the medians of the two independent groups differed significantly, and whether they were drawn from populations with the same median. The testing of the combined median, which cast the data into a 2 x 2 contingency table showed that in all cases, the process educators and vocational administrator educators were alike in their responses. The Median Test indicated that all of the 97 null hypotheses were retained; therefore, there were no significant differences between the responses of the two panels. Due to the above findings, the data reported in this study represent the combined responses of the panel of vocational administrator educators and the panel of process educators.

Quartile Deviations of the Identified Processes

Eleven processes were identified and confirmed in this study as being common to vocational education administration. The respondents in this study made no additions, modifications, or deletions to the processes or their placement in hierarchical level, this hierarchical order being one of simple to complex. Each of the 11 processes

and its component operations is presented separately, these are the

components of this section.

The three quartile deviations were calculated for each of the

operations as components of the processes of vocational administra-

tion, dividing the group of responses into four quarters. Q_1 is that

point on the number scale such that one-fourth of the observations

lie below it, one-half are below Q_2, and three-quarters are below Q_3.

The median (Q_2) was used as a measure of the collective opinions of

panel members. The inner quartile range (the interval containing

the middle 50 percent of responses) was used as a measure of

divergence of opinion among panel members; the inner quartile

range is composed of the responses falling between Q_1 and Q_3.

Process 1.0: Defining the Problem
or Opportunity Operationally

This process was defined as stating or defining a problem which

will enhance investigation leading to an optimal solution. It is

transforming one state of affairs to another desired state.

Nine operations were identified as components of this process.

The medians of these nine operations ranged from 4.000 to 5.000.

The high median, 5.000, of operation 1.1 (Table 1) indicates that all

responses fell at 5 on the five-point ordinal scale. Table 1 contains

the median and inner quartile ranges of the specific operations

common to Process 1.0.

Table 1. Process 1.0 - Defining the Problem or Opportunity Operationally

Number	Operation	Median	Inner Quartile Range
1.1	Recognizing the existance of a problem or opportunity.	5.000	4.750 - 5.250
1.2	Stating the problem or opportunity broadly with a minimum number of constraints.	4.500	3.750 - 5.000
1.3	Gathering, investigating, processing, and screening information in order to determine the specific characteristics of the problem or opportunity.	4.955	4.682 - 5.227
1.4	Estimating the resources needed to solve the problem or opportunity.	4.000	3.500 - 4.750
1.5	Defining priorities in the completion of problem-solving tasks.	4.300	3.700 - 4.900
1.6	Distinguishing between decisions that are and those that are not one's direct responsibility.	4.500	3.167 - 5.000
1.7	Developing plans to involve those persons who will implement the results of a decision in the making of that decision.	4.500	3.750 - 5.000
1.8	Determining the effect the solution may have on the future.	4.643	4.000 - 4.768
1.9	Determining if the resources needed to solve a problem are justified in terms of the solution.	4.300	3.800 - 4.900

The high group concensus as measured by the width of the inner quartile range indicates confirmation of the operations as components of Process 1. 0. The widest range of points Q_1 and Q_3 within this process was 1. 250 for operations 1. 2, 1. 4, and 1. 7. The narrowest inner quartile range of all 97 operations was . 500 for operation 1. 1.

Process 2. 0: Observing

Observing was defined as the process of interacting with the environment by using one's senses to determine the characteristics of a phenomenon, problem, opportunity, element, object, event, system, or point of view. The observer's experiences, values, and associations may influence the results.

Ten operations were identified as being common to this process. The medians of these ten operations ranged from a low of 3. 929 for operations 2. 6 to a high of 4. 833 for operation 2. 10. Table 2 contains the median and inner quartile ranges of the specific operations common to Process 2. 0.

The high group concensus as measured by the width of the inner quartile range indicates confirmation of the ten operations as components of Process 2. 0. The inner quartile range varied from 1. 500 for operation 2. 7 to . 667 for operation 2. 10.

Table 2.   Process 2.0 - Observing

Number	Operation	Median	Inner Quartile Range
2.1	Determining what is relevant or important.	4.750	4.167 - 5.125
2.2	Determining the methods to be used for measuring and/or evaluating the observations.	4.750	4.250 - 5.125
2.3	Making observations.	4.750	4.250 - 5.125
2.4	Recording observations.	4.115	3.786 - 4.750
2.5	Establishing "base line" indexes from which comparisons may be made.	4.500	3.750 - 5.000
2.6	Comparing personal observations with those made by others in similar situations.	3.929	3.500 - 4.358
2.7	Determining characteristics indirectly, inferring one characteristic on the basis of another.	4.500	3.500 - 5.000
2.8	Quantifying observations to provide precision and/or explicitness.	4.167	3.677 - 4.750
2.9	Identifying bias and various points-of-view.	4.500	4.000 - 5.000
2.10	Stating conclusions about observations.	4.833	4.500 - 5.167

Process 3. 0: Analyzing

Analyzing was defined as the process of identifying, isolating,

taking apart, breaking down, or performing similar actions for the

purpose of setting forth or clarifying the basic components of a

phenomenon, problem, opportunity, object, system, or point of view.

Ten operations were identified as being common to this process.

The medians of these ten operations ranged from a low of 3. 875

(Table 3) for operation 3. 6 to a high of 4. 995 for operation 3. 9.   The

median of operation 3. 6 shared with one other operation, the lowest

occurring median of all 97 operations; the median of operation 3. 9

was among the eight highest medians for all 97 operations.   Table 3

contains the median and inner quartile ranges of the specific opera-

tions common to Process 3. 0.

The high group concensus as measured by the width of the inner

quartile range indicates confirmation of the ten operations as

components of Process 3. 0.   The inner quartile range varied from

1. 667 for operation 3. 8 to . 545 for operation 3. 9.   Of particular

interest was the fact that seven of the ten operations of this process

had an inner quartile range of . 750 or less.

Process 4. 0:   Communicating

Communicating was defined as the process of conveying

information or ideas from a source to a receiver.   The media used

Table 3. Process 3.0 - Analyzing

Number	Operation	Median	Inner Quartile Range
3.1	Defining the possible or known cause(s) which require an analysis.	4.900	4.600 - 5.200
3.2	Identifying elements that need to be updated or enhanced or are useless or unneeded.	4.500	3.750 - 5.000
3.3	Defining any restrictions, constraints, or expendables which are basic to the analysis.	4.833	4.500 - 5.167
3.4	Setting the parameters - (or determining the criteria) of the analysis.	4.833	4.500 - 5.167
3.5	Refining or revising the criteria to accommodate varying conditions.	4.750	4.167 - 5.125
3.6	Eliminating information on the basis of predetermined criteria.	3.875	3.500 - 4.250
3.7	Developing a form or model for recording the analysis.	4.167	3.667 - 4.750
3.8	Questioning accepted ideas, explanations, and facts.	4.833	3.500 - 5.167
3.9	Reviewing possible alternatives.	4.955	4.682 - 5.227
3.10	Finding elements that are identical though they appear in different form.	4.250	3.500 - 4.900

may be oral, written, pictorial, symbolical, or any combination of these.

Twelve operations were identified as components of this process. The medians of these 12 operations ranged from a low of 3. 875 (Table 4) for operation 4. 5, to a high of 4. 900 for operations 4. 1 and 4. 12. The median of operation 4. 5 shared with one other operation the lowest occurring median of all 97 operations. Table 4 contains the median and inner quartile ranges of the operations common to Process 4. 0.

The high group concensus as measured by the width of the inner quartile range indicates confirmation of the operations as components of Process 4. 0. The inner quartile range varied from 1. 667 for operations 4. 2 and 4. 11 to . 600 for operations 4. 1 and 4. 12. Four of the 12 operations of this process had an inner quartile range of . 750 or less.

Process 5. 0: Predicting

Predicting was defined as the process of prophesying or fore-telling something in advance, anticipating the future on the basis of special knowledge.

Six operations were identified as being common to this process. The medians of these six operations ranged from a low of 4. 055 for operation 5. 4 (Table 5) to a high of 4. 500 for operation 5. 5. Table 5

Table 4. Process 4.0 - Communicating

Number	Operation	Median	Inner Quartile Range
4.1	Deciding what is to be communicated.	4.900	4.600 - 5.200
4.2	Choosing media.	4.833	3.500 - 5.167
4.3	Conveying the information through the media.	4.500	4.000 - 5.000
4.4	Identifying sources of information.	4.643	4.100 - 4.786
4.5	Reporting procedures in a form that can be replicated by others.	3.875	3.500 - 4.250
4.6	Evaluating the effectiveness of the communication system and then applying the findings to make the system better.	4.115	3.786 - 4.750
4.7	Organizing information so interpretation by others is simplified.	4.500	3.900 - 5.000
4.8	Developing an information system.	4.333	3.500 - 4.600
4.9	Acting as a reliable source of information as perceived by receiver.	4.167	3.833 - 4.833
4.10	Helping others see the need for change.	4.000	3.500 - 4.833
4.11	Listening to others.	4.833	3.500 - 5.167
4.12	Establishing a climate which permits people to express their opinion freely without fear that an idea, or more importantly, an individual will be rejected out of hand.	4.900	4.600 - 5.200

Table 5.   Process 5.0 - Predicting

Number	Operation	Median	Inner Quartile Range
5.1	Clarifying the hyopthetical situation by using graphs, models, forecasting techniques, or similar means.	4.300	3.700 - 4.900
5.2	Estimating intuitively on the basis of Delphis or other similar means.	4.100	3.500 - 4.750
5.3	Using measuring and testing to improve predictions.	4.300	3.800 - 4.900
5.4	Assessing (preferably quantitive) the probability of an event taking place.	4.055	3.722 - 4.389
5.5	Integrating existing information to form an explanation of why things happen or should happen.	4.500	3.900 - 5.000
5.6	Revising predictions using cumulative results.	4.357	3.928 - 4.900

contains the median and inner quartile ranges of the operations

common to Process 5. 0.

The high group concensus as measured by the width of the inner

quartile range indicates confirmation of the operations as components

of Process 5. 0. The inner quartile range varied from 1. 250 for

operation 5. 2 to . 667 for operation 5. 4.

Process 6. 0: Questioning
and Hypothesizing

Questioning was defined as a process of asking, interrogating,

or challenging, or to obtain answers related to a phenomenon, prob-

lem, opportunity, element, object, event, system, or point of view.

Hypothesizing was defined as a process of stating a theory or tentative

relationship between two or more variables to be tested which are

aspects of a phenomenon, problem, opportunity, element, object,

event, system, or point of view.

Seven operations were identified as being common to this

process. The medians of these seven operations ranged from a low

of 4. 167 for operation 6. 7 to a high of 4. 900 for operation 6. 2.

Table 6 contains the median and inner quartile ranges of the opera-

tions common to Process 6. 0.

The high group concensus as measured by the width of the inner

quartile range indicates confirmation of the operations as components

Table 6. Process 6.0 - Questioning and Hypothesizing

Number	Operation	Median	Inner Quartile Range
6.1	Stating questions relative to assumptions that have been made.	4.833	3.500 - 5.167
6.2	Generating hypotheses.	4.900	4.600 - 5.200
6.3	Providing a conceptual model which can form a basis to test future actions.	4.357	3.928 - 4.900
6.4	Stating the parameters to be accepted or rejected.	4.250	3.867 - 4.750
6.5	Examining sets of hypotheses for internal consistency.	4.357	3.928 - 4.900
6.6	Stating hypotheses in forms which suggest the variable to manipulate.	4.500	4.000 - 5.000
6.7	Challenging the validity to investigate a new line of reasoning.	4.167	3.667 - 4.750

of Process 6. 0.   The inner quartile range varied from 1. 667 for

operation 7. 4 to . 667 for operation 7. 3.

Process 7. 0: Interpreting Data

Interpreting data was defined as the process of clarifying,

evaluating, explaining, and translating to provide (or communicate)

the meaning of particular data.

Eleven operations were identified as components of this process.

The medians of these 11 operations ranged from 4. 357 for operation

7. 10 to 4. 833 for operations 7. 3, 7. 4, and 7. 7.   Of particular

interest was the fact that 10 of the 11 medians for the operations of

Process 7. 0 were at or above 4. 500.   Table 7 contains the median

and inner quartile ranges of the operations common to Process 7. 0.

The high group concensus as measured by the width of the inner

quartile range indicates confirmation of the operations as components

of Process 7. 0.   The inner quartile range varied from 1. 667 for

operation 7. 4 to . 667 for operation 7. 3.

Process 8. 0: Encountering

Encountering was defined as a meeting of two or more indivi-

duals who come together to face their real selves as they deal with

a mutual problem.

Table 7. Process 7.0 - Interpreting Data

Number	Operation	Median	Inner Quartile Range
7.1	Utilizing criteria to assess the validity and reliability of the data.	4.750	4.250 - 5.125
7.2	Distinguishing cause-effect relationships from parallel phenomena.	4.500	4.000 - 5.000
7.3	Being aware of one's conceptual biases.	4.833	4.500 - 5.167
7.4	Testing hypotheses by appropriate means in keeping with the nature of the data.	4.833	3.500 - 5.167
7.5	Using inductive logic or method.	4.750	4.250 - 5.125
7.6	Using deductive logic or method.	4.750	4.250 - 5.125
7.7	Determining similarities and differences in data.	4.833	4.500 - 5.167
7.8	Ordering data in a format that will aid interpretation.	4.643	4.000 - 4.786
7.9	Using data to revise theories on which experiments were planned.	4.643	4.000 - 4.786
7.10	Determining "weight" of individual data in assessing its relation to the over-all problem.	4.357	3.928 - 4.900
7.11	Comparing interpretations with others.	4.500	4.000 - 5.000

Eight operations were identified as being common to this process. The medians of these eight operations ranged from 4.115 for operation 8.2 to 4.955 for operations 8.6 and 8.7. Six of the eight medians for this process fell at or above 4.750. Table 8 contains the median and inner quartile ranges of the operations common to Process 8.0

The high group concensus as measured by the width of the inner quartile range indicates confirmation of the operations as components of Process 8.0. The inner quartile range varied from .545 for operations 8.6 and 8.7 to 1.067 for operation 8.3. Seven of the eight operations of this process had an inner quartile range equal to or less than .958.

Process 9.0: Creating

Creating was defined as the process of combining the basic components or ideas of phenomena, objects, events, systems, or points of view in a unique manner which will better satisfy a need, either for the individual or for the outside world.

Six operations were identified as being common to this process. The medians of these six operations ranged from 4.357 for operation 9.4 to 4.833 for operation 9.6. Five of the six operations for this process fell at or above 4.500. Table 9 contains the median and inner quartile ranges of the operations common to Process 9.0.

Table 8.   Process 8.0 - Encountering

Number	Operation	Median	Inner Quartile Range
8.1	Transmitting information to another person.	4.750	4.250 - 5.125
8.2	Paraphrasing the words of another.	4.115	3.786 - 4.750
8.3	Developing commitment	4.333	3.833 - 4.900
8.4	Bridging the gap between the conceptual frameworks of persons in different but related fields.	4.900	4.600 - 5.200
8.5	Establishing a social climate which permits people to express their opinions.	4.900	4.600 - 5.200
8.6	Listening to another with purpose, responding in terms that will help the other person sharpen, prize and find deeper meaning in his own thoughts.	4.955	4.682 - 5.227
8.7	Being sensitive to others.	4.955	4.682 - 5.227
8.8	Sharing openly and with integrity one's self.	4.750	4.167 - 5.125

Table 9. Process 9.0 - Creating

Number	Operation	Median	Inner Quartile Range
9.1	Being able to build upon the idea of another.	4.643	4.000 - 4.786
9.2	Producing as many ideas as possible about the problem or opportunity (for example: using brainstorming techniques, analogies, attribute-listing, etc.)	4.500	3.900 - 5.000
9.3	Deferring judgment until the production of ideas has been exhausted.	4.500	3.900 - 5.000
9.4	Allowing ideas and feelings to incubate (letting the subconscious stay with the problem or opportunity.)	4.357	3.928 - 4.900
9.5	Developing new and far-reaching syntheses.	4.643	4.000 - 4.786
9.6	Being flexible to ideas for change.	4.833	3.500 - 5.167

The high group concensus as measured by the width of the inner quartile range indicates confirmation of the operations as components of Process 9.0. The inner quartile range varied from 1.667 for operation 9.6 to .786 for operations 9.1 and 9.5.

Process 10.0: Managing

Managing was defined as the process of planning, organizing, directing, coordinating, and controlling the inputs and outputs of the system.

Twelve operations were identified as being common to this process. The medians of these 12 operations ranged from a low of 3.917 for operation 10.6 to a high of 4.955 for operations 10.1, 10.4, and 10.5. The medians for eight of the 12 operations for this process fell at or above 4.500. Table 10 contains the medians and inner quartile ranges of the operations common to Process 10.0.

The high group concensus as measured by the width of the inner quartile range indicates confirmation of the operations as components of Process 10.0 The inner quartile range varied from 1.333 for operation 10.6 to .545 for operations 10.1, 10.4, and 10.5. Seven of the 12 operations of this process had an inner quartile range of .786 or less.

Table 10. Process 10.0 - Managing

Number	Operation	Median	Inner Quartile Range
10.1	Determining goals based upon needs.	4.955	4 682 - 5.227
10.2	Establishing priorities among the selected goals.	4.900	4.600 - 5.200
10.3	Determining the short- and long-range objectives.	4.900	4.600 - 5.200
10.4	Generating alternative solutions to accomplish the goals.	4.955	4.682 - 5.227
10.5	Selecting the best alternative solution.	4.955	4.682 - 5.227
10.6	Evaluating the feasibility of the selected solution on the basis of the available resources.	3.917	3.833 - 4.900
10.7	Reviewing the alternative solution to reaffirm or revise the choice of solution.	4.500	3.900 - 5.000
10.8	Acquiring the physical and human resources to act upon the selected solution.	4.500	4.000 - 5.000
10.9	Assigning time schedules and tasks to be accomplished by the various units of the organization.	4.125	3.750 - 4.500
10.10	Supervising and conducting the performance of the various sub-units in the system.	4.643	4.000 - 4.786
10.11	Comparing the actual performance of the system with the planned performance through the feedback mechanism.	4.115	3.786 - 4.750
10.12	Taking corrective action to improve the performance of the system.	4.643	4.000 - 4.786

Process 11.0: Valuing

Valuing was defined as a process in which the persons involved, other factors in the situation, and pervasive principles are critical factors. Most real life situations are such that priorities must be established among conflicting values or goods.

Six operations were identified as components of this process. The medians of these six operations ranged from a low of 4.125 for operation 11.4 to a high of 4.833 for operations 11.2 and 11.3. Four of the six operations for this process occurred at or above 4.750. Table 11 contains the medians and inner quartile ranges of the operations common to Process 11.0.

The high group concensus as measured by the width of the inner quartile range indicates confirmation of the operations as components of Process 11.0. The inner quartile range varied from 1.125 for operation 11.5 to .667 for operations 11.2 and 11.3.

Table 11. Process 11.0 - Valuing

Number	Operation	Median	Inner Quartile Range
11.1	Establishing priorities in ethical view.	4.750	4.167 - 5.125
11.2	Changing priorities based upon changed conditions.	4.833	4.500 - 5.167
11.3	Learning to resolve conflict.	4.833	4.500 - 5.167
11.4	Clarifying the degree to which one holds one's values to determine what one believes.	4.125	3.750 - 4.500
11.5	Being one's self, feeling the freedom to give expression to one's thoughts and feelings.	4.750	4.000 - 5.125
11.6	Acting in a way that will bring about a state of affairs that people will value.	4.357	3.928 - 4.900

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

The Problem Restated

The central purposes of this study were to identify the processes common to vocational education administration and to:

1. Define operationally, in performance-oriented terms, these processes.

2. Arrange these processes hierarchically, moving from the simpler to the more complex.

Summary of the Procedures

An instrument, containing a listing of processes and their component operations, was refined through its submission in two consecutive rounds of data collection to two panels of professional educators. One panel was composed of process educators, the other panel was composed of vocational administrator educators. The 12 respondents were asked to indicate the extent of their agreement (Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree) to each of the operations as components of a process. Likert-type scale values of 5 to 1 were assigned to the responses. Respondents were asked to make changes in the hierarchical order of any process or operation, to make modifications of or additions to the listing of

operations, and to make changes or modifications in the listing of

the processes and their general definitions.

The data utilized in the study were that of the second round of

the data collection. The data were analyzed utilizing the median test

and the Fisher exact probability test to determine differences in the

responses of the two Delphi Panels. The three quartile deviations

were calculated for each operation. The median, Q_2, was used as a

measure of the collective opinion of panel members. The inner

quartile range, the interval containing the responses between Q_1 and

Q_3, was used as a measure of divergence among panel members.

Summary of Findings

The analysis of data revealed the following information relative

to the stated purposes of the research:

1.   The results of the median test revealed that no significant

     difference existed between the responses of the process

     educators and the vocational administrator educators to each of

     the operations as components of the processes of vocational

     education administration.

2.   Eleven processes, hierarchically arranged moving from the

     simpler to the more complex, were identified and confirmed in

     this study. The first three processes were 1) defining a

     problem, 2) obtaining information about this problem through

observation, and 3) the clarification of the problem by the

analysis of its components. The fourth process, 4) communicat-

ing, was the conveyance of information to a receiver. This

process involves the sender of the information and his decisions

in determining that to be communicated, the method of com-

munication, and the establishment of an atmosphere which would

enhance communication. The next three processes were

5) predicting through the clarification and integration of

information, 6) questioning and hypothesizing, and 7) interpret-

ing data. The eighth process was 8) encountering, working with

other individuals in problem solving and maintaining open

communication with others. The ninth process, 9) creating,

involved building upon ideas, producing ideas, and being

flexible to change. The tenth process was 10) managing, the

efficient running of the system through goal determination, the

establishment of priorities, and the control of the inputs and

outputs of the system. Valuing, 11), was the process identified

as the most complex. In valuing, one is continually clarifying

one's value system and acting within that value system.

3. Ninety-seven operations, hierarchically arranged moving from

the simpler to the more complex, were identified and confirmed

as components of the 11 processes. No more than 12 operations

were common to one process and are identified in Chapter IV.

4. The calculation of the median and the inner quartile ranges for each of the operations as components of the processes showed high group concensus; there were no exceptions.

   a) The median, the measure of the collective opinions of panel members, was high for each of the 97 operations. The highest occurring median of 5.000 was for operation 1.1, recognizing the existence of a problem or opportunity. The lowest median of 3.875 was shared by operation 3.6, eliminating information on the basis of predetermined criteria, and operation 4.5, reporting procedures in a form that can be replicated by others.

   b) The inner quartile ranges, the measure of divergence of opinion of panel members, showed close group concensus. The narrowest inner quartile range was for operation 1.1, recognizing the existence of a problem or opportunity. The widest inner quartile range of 1.667 was shared by the following operations: 3.8, questioning accepted ideas, explanations, and facts; 4.2, choosing media; 4.11, listening to others; 7.4, testing hypotheses by appropriate means in keeping with the nature of the data; and 9.6, being flexible to ideas for change.

Conclusions

As a result of the review of related literature and the collection

and analysis of data, the following conclusions were drawn:

1. For each subject area, a group of processes exists and is

    identifiable. These processes define the unique ways of know-

    ing, doing, acting, and thinking within a subject area. This

    conclusion was consistent with that of DeVore (1972) as reviewed

    in Chapter I.

2. While the responses of the process educators and vocational

    administrator educators were alike in this study regarding the

    processes and their component operations, it was concluded that

    the two diverse groups were necessary due to the procedure of

    instrument refinement in data collection.

3. Based upon the agreement of the two panels of professional

    educators on the identified processes and their component opera-

    tions and the high group concensus on the component operations,

    the total listing of processes and operations were concluded to

    be common to vocational education administration. Some of the

    total listing of identified processes and operations may be

    common to other subject areas.

Implications

Based upon the procedures identified, the data analysis, and the subsequent conclusions, the following implications are submitted:

1. The confirmed processes and operations are appropriate to use in curriculum development for in-service and pre-service programs in vocational education administration. Suggested methods of implementation for curriculum development appropriate to the processes of vocational education administration as identified in this study were drawn from the review of related literature, Chapter II, and are as follows:

   a) The identified processes could be utilized as one dimension of a three dimensional, process-domain-object, matrix in the writing of behavioral objectives in vocational education administration (Tuckman, 1970).

   b) The identified processes could be used to state behavioral objectives for each concept or principle of vocational education administration; teaching-learning units could be developed from the behavioral objectives, and these units could be organized into programs of study (DeVore, 1972).

2. The identified processes could serve as one dimension of a two dimensional matrix in a task analysis of a vocational administrator. This recommendation is based upon the work of Altman and Gagne (1964) as reviewed in Chapter II.

Suggestions for Further Study

1. The results of this study could be verified and/or modified by research using traditional task analysis techniques or interview/observation techniques with the identified processes.

2. Experimentation could be conducted with the identified processes to compare the effectiveness of the performance-based method of instruction and the traditional method of instruction.

3. The competencies of vocational administration, as identified by Lindahl, Baltimore, Martin, Heilman, and Sundstrom could be utilized in conjunction with the processes identified in this research as a base for curriculum development for pre-service and in-service programs for vocational administrators. The clustering of competencies identified in those studies would serve as the content of vocational administration; the processes would be used to state the performance objectives for this content area. This procedure of curriculum development is consistent with that of DeVore (1972) as reviewed in Chapter II.

4. Research should be conducted to determine if the processes and operations identified in this study are common to all of educational administration.

5. The method of this study has been sufficiently suggestive to warrant its further use in the identification of the processes of

other subject areas. It is recommended that in such a study the panel members be asked to indicate the extent of their agreement, on a five-point Likert-type scale, to each of the processes and to each of the component operations.

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APPENDICES

APPENDIX A

Members of the Jury Panel

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APPENDIX B

Instrument, Set I

Identifying the Processes of a Vocational Administrator

Please indicate the extent to which you agree with each of the operations as a component part of a process. Please mark <u>EACH OPERATION</u> as Strongly Agree (SA) (5), or Agree (4), or Neutral (3), or Disagree (2), or Strongly Disagree (SD) (1).

Each process and its component operations are arranged hierarchically moving from the simpler to the more complex. You are asked to make changes in the hierarchical order by crossing out and renumbering any process you feel is out of order.

The last page provides space for you to add processes or operations of your own. You need not limit the number of your statements to the space provided.

<u>Process</u>: DEFINING THE PROBLEM OR OPPORTUNITY OPERATIONALLY 1.0

<u>General Definition</u>: The process of stating or defining a problem which will enhance investigation leading to an optimal solution. It is transforming one state of affairs to another desired state.

<u>Operations</u>: (These operations should add meaning to the above process.)

		SA				SD
1.1	Recognizing the existance of a problem or opportunity.	5	4	3	2	1
1.2	Stating the problem or opportunity broadly with a minimum number of constraints.	5	4	3	2	1
1.3	Gathering, investigating, processing, and screening information in order to determine the specific characteristics of the problem or opportunity.	5	4	3	2	1
1.4	Estimating the effort needed to solve the problem or opportunity.	5	4	3	2	1
1.5	Determining the effect the solution may have on the future.	5	4	3	2	1
1.6	Determing if the amount of effort needed to solve a problem is justified in terms of the solution.	5	4	3	2	1

<u>Comments</u>:

<u>Process</u>: OBSERVING 2.0

General Definition: The process of interacting with the environment by using one's senses to determine the characteristics of a phenomenon, problem, opportunity, element, object, event, system, or point-of-view. The observer's experiences, values, and associations may influence the results.

<u>Operations</u>: (These operations should add meaning to the above process.)

2.1	Determining what is relevant or important.	5	4	3	2	1
2.2	Determining the methods to be used for measuring and/or evaluating the observations.	5	4	3	2	1
2.3	Making observations of real or test situations.	5	4	3	2	1
2.4	Recording observations on a predetermined form.	5	4	3	2	1
2.5	Establishing "base line" indexes from which comparisons may be made.	5	4	3	2	1

2.6   Comparing personal observations with those made by others
in similar situations.

SA   SD
5   4   3   2   1

2.7   Determining characteristics indirectly, inferring one characteristic
on the basis of another.

5   4   3   2   1

2.8   Quantifying observations to provide precision and/or explicitness.

5   4   3   2   1

2.9   Identifying bias and various points-of-view.

5   4   3   2   1

Process: ANALYZING 3.0

General Definition: The process of identifying, isolating, taking apart, breaking down, or performing similar actions for the purpose of setting forth or clarifying the basic components of a phenomenon, problem, opportunity, object, system, or point-of-view.

Operations: (These operations add meaning to the above process.)

3.1   Defining the possible or known cause(s) which require an analysis.

5   4   3   2   1

3.2   Defining any restrictions, constraints, or expendables which are
basic to the analysis.

5   4   3   2   1

3.3   Setting the parameters - (or determining the criteria) of the analysis.

5   4   3   2   1

3.4   Refining or revising the criteria to accommodate varying conditions.

5   4   3   2   1

3.5   Eliminating information on the basis of predetermined criteria.

5   4   3   2   1

3.6   Developing a form or model for recording the analysis.

5   4   3   2   1

3.7   Questioning accepted ideas, explanations, and facts.

5   4   3   2   1

3.8   Utilizing data to determine possible solutions.

5   4   3   2   1

3.9   Reviewing possible alternatives.

5   4   3   2   1

3.10 Developing methods for selecting an optimal choice.

5   4   3   2   1

3.11 Finding elements that are identical though they appear in different form.

5   4   3   2   1

3.12 Thinking constructively on a problem for sustained periods of time.

5   4   3   2   1

Comments:

Process: COMMUNICATING 4.0

General Definition: The process of conveying information or ideas from a source to a receiver. The media used may be oral, written, pictorial, symbolical, or any combination of these.

Operations: (These operations should add meaning to the above process.)

4.1   Deciding what is to be communicated.

5   4   3   2   1

4.2   Choosing a media.

5   4   3   2   1

4.3   Conveying the information through the media.

5   4   3   2   1

4.4   Taking notes, recording ideas for one's own use.

5   4   3   2   1

4.5   Identifying sources of information.

5   4   3   2   1

4.6   Reporting procedures in a form that can be replicated by others.

5   4   3   2   1

4.7   Evaluating the effectiveness of the communication system and then
applying the findings to make the system better.

5   4   3   2   1

	SA				SD
4.8 Organizing information so interpretation by others is simplified.	5	4	3	2	1
4.9 Developing an information system.	5	4	3	2	1
4.10 Acting as a reliable source of information as perceived by receiver.	5	4	3	2	1
4.11 Using persuasion to bring about the acceptance of an idea.	5	4	3	2	1
4.12 Affecting the behavior of those addressed.	5	4	3	2	1
4.13 Listening to others.	5	4	3	2	1
4.14 Establishing a climate which permits people to express their opinion freely without fear that an idea, or more importantly, an individual will be rejected out of hand.	5	4	3	2	1

Comments:

Process: PREDICTING 5.0

General Definition: The process of prophesying or foretelling something in advance, anticipating the future on the basis of special knowledge.

Operations: (These operations should add meaning to the above process.)

5.1 Collecting data from a number of observations.	5	4	3	2	1
5.2 Clarifying the hypothetical situation by using graphs, models, or similar means.	5	4	3	2	1
5.3 Using various forecasting techniques.	5	4	3	2	1
5.4 Estimating intuitively on the basis of Delphis and other consensus techniques.	5	4	3	2	1
5.5 Using measuring and testing to improve predictions.	5	4	3	2	1
5.6 Evaluating alternative solutions.	5	4	3	2	1
5.7 Assessing (preferably quantitive) the probability of an event taking place.	5	4	3	2	1
5.8 Revising predictions using cumulative results.	5	4	3	2	1

Comments:

Process: QUESTIONING AND HYPOTHESIZING 6.0

General Definition: Questioning is a process of asking, interrogating, or challenging, or to obtain answers related to a phenomenon, problem, opportunity, element, object, event, system, or point-of-view.

Hypothesizing is a process of stating a theory or tentative relationship between two or more variables to be tested which are aspects of a phenomenon, problem, opportunity, element, object, event, system, or point-of-view.

Operations: (These operations should add meaning to the above process)

6.1 Stating questions relative to assumptions that have been made.	5	4	3	2	1
6.2 Generating hypotheses.	5	4	3	2	1
6.3 Providing a conceptual model which can form a basis to test future actions.	5	4	3	2	1

		SA				SD
6.4	Stating the parameters to be accepted or rejected.	5	4	3	2	1
6.5	Examining sets of hypotheses for internal consistency.	5	4	3	2	1
6.6	Stating hypotheses in forms which suggest the variable to manipulate.	5	4	3	2	1
6.7	Challenging the validity to investigate a new line of reasoning.	5	4	3	2	1

Comments:

Process: INTERPRETING DATA 7.0

General Definition: The process of clarifying, evaluating, explaining, and translating to provide (or communicate) the meaning of particular data.

Operations: (These operations should add meaning to the above process.)

7.1	Constructing additional hypotheses from data.	5	4	3	2	1
7.2	Selecting data pertinent to questions asked or the hypotheses to be tested.	5	4	3	2	1
7.3	Extracting information from tables and graphs.	5	4	3	2	1
7.4	Utilizing criteria to assess the validity and reliability of the data.	5	4	3	2	1
7.5	Distinguishing cause-effect relationships from parallel phenomena.	5	4	3	2	1
7.6	Being aware of one's conceptual biases.	5	4	3	2	1
7.7	Testing hypotheses by appropriate means in keeping with the nature of the data.	5	4	3	2	1
7.8	Using inductive logic or method.	5	4	3	2	1
7.9	Using deductive logic or method.	5	4	3	2	1
7.10	Determining similarities and differences in data.	5	4	3	2	1
7.11	Ordering data in a format that will aid in interpretation.	5	4	3	2	1
7.12	Integrating existing information to form an explanation of why things happen or should happen.	5	4	3	2	1
7.13	Using data to revise theories on which experiments were planned.	5	4	3	2	1
7.14	Determining "weight" of individual data in assessing its relation to the over-all problem.	5	4	3	2	1
7.15	Comparing interpretations with others.	5	4	3	2	1

Comments:

Process: ENCOUNTERING 8.0

General Definition: Encountering is a meeting of two to eight individuals who come together to face their real selves as they deal with a mutual problem.

Operations: (These operations should add meaning to the above process.)

8.1	Transmitting information to another person.	5	4	3	2	1
8.2	Paraphrasing the words of another.	5	4	3	2	1
8.3	Developing commitment.	5	4	3	2	1

8. 4	Bridging the gap between the conceptual frameworks of persons in different but related fields.	SA				SD
		5	4	3	2	1

8. 5   Establishing a social climate which permits people to express
their opinions.   5   4   3   2   1

8. 6   Listening to another with purpose, responding in terms that will help
the other person sharpen, prize and find deeper meaning in his own
thoughts.   5   4   3   2   1

8. 7   Being sensitive to others.   5   4   3   2   1

8. 8   Sharing openly and with integrity one's self.   5   4   3   2   1

Comments:

Process: CREATING 9.0

General Definition: The process of combining the basic components or ideas of phenomena, objects, events, systems, or points-of-view in a unique manner which will better satisfy a need, either for the individual or for the outside world.

Operations: (These operations should add meaning to the above process.)

9. 1   Being able to build upon the idea of another.   5   4   3   2   1

9. 2   Producing as many ideas as possible about the problem or opportunity
(for example: using brainstorming techniques, analogies, attribute-
listing, etc.)   5   4   3   2   1

9. 3   Deferring judgment until the production of ideas has been exhausted.   5   4   3   2   1

9. 4   Allowing ideas and feelings to incubate (letting the subconscious stay
with the problem or opportunity.)   5   4   3   2   1

9. 5   Developing new and far-reaching syntheses.   5   4   3   2   1

9. 6   Being flexible to ideas for change.   5   4   3   2   1

Comments:

Process: MANAGING 10.0

General Definition: The process of planning, organizing, directing, coordinating, and controlling the inputs and outputs of the system.

Operations: (These operations should add meaning to the above process.)

10. 1   Determining goals based upon needs.   5   4   3   2   1

10. 2   Establishing priorities among the selected goals.   5   4   3   2   1

10. 3   Determining the short- and long-range objectives.   5   4   3   2   1

10. 4   Generating alternative solutions to accomplish the goals.   5   4   3   2   1

10. 5   Selecting the best alternative solution.   5   4   3   2   1

10. 6   Evaluating the feasibility of the selected solution on the basis
of the available resources.   5   4   3   2   1

10. 7   Reviewing the alternative solution to reaffirm or revise the choice of
solution.   5   4   3   2   1

10.8	Acquiring the physical and human resources to act upon the selected solution.	SA 5	4	3	2	SD 1
10.9	Assigning time schedules and tasks to be accomplished by the various units of the organization.	5	4	3	2	1
10.10	Supervising and conducting the performance of the various sub-units in the system.	5	4	3	2	1
10.11	Comparing the actual performance of the system with the planned performance through the feedback mechanism.	5	4	3	2	1
10.12	Taking corrective action to improve the performance of the system.	5	4	3	2	1

Comments:

Process: VALUING 11.0

General Definition: Valuing is a process in which the persons involved, other factors in the situation, and pervasive principles are critical factors. Most real life situations are such that priorities must be established among conflicting values or goods.

Operations: (These operations should add meaning to the above process.)

11.1	Establishing priorities in ethical view.	5	4	3	2	1
11.2	Changing priorities based upon changed conditions.	5	4	3	2	1
11.3	Learning to resolve conflict.	5	4	3	2	1
11.4	Clarifying the degree to which he holds his values to determine what he believes.	5	4	3	2	1
11.5	Being one's self, feeling the freedom to give expression to one's thoughts and feelings.	5	4	3	2	1
11.6	Acting in a way that will bring about a state of affairs that people will value.	5	4	3	2	1

Comments:

APPENDIX C

Letter Requesting Participation of Panel Members

November 9, 1972

Dear Dr.

Research is currently underway at Oregon State University to deter-
mine the processes of vocational education administration. It has
been proposed in the field of vocational education administration that
it is just as important for the learner to know the processes of the
administrator as it is to know the content of administration. That is,
a learner should be able to analyze, observe, visualize, and value by
utilizing the content of vocational education administration; by so
doing, he is learning content and process.

Because of your work in the preservice preparation of vocational ad-
ministrators, we are asking if you would be willing to serve on a
Delphi Panel for this project. The Delphi Technique, which is built
on the strength of informed intuitive judgment, is intended to get
expert opinion without bringing the experts together in a face-to-face
confrontation. Your task as a panel member would entail at least
two reviews of a short listing of the processes and operations of a
vocational education administrator. Specifically, you will be asked
to react to the pertinence of statements, to comment, to suggest
wording changes, additions and/or deletions and to return your
reviews to me. A sample process and its component operations is
enclosed. Each review should result in a more refined and usable
set of processes which can be used to develop curriculum for voca-
tional administrators.

We would be most pleased if you would be able to participate. I am
enclosing a self-addressed envelope in which I am asking you to send
the attached response sheet. I am looking forward to hearing from
you.

Sincerely,

Jean Massie
EPDA Awardee
Division of Vocational, Adult,
    and Community College Education

JM:js
Enclosure

APPENDIX D

Members of the Delphi Panels

Process Educators   Vocational Administrator Educators

Dr. Louise M. Berman   Dr. George O'Kelley Jr.
Professor of Education   Head, Department of Vocational Education
University of Maryland   University of Georgia

Dr. Frank Cross   Mrs. Peggy Patrick
Associate Professor of Education   Supervisor, Vocational Education
Oregon State University   Arkansas State Department of Education

Dr. Keith Goldhammer   Dr. Lloyd Phipps
Dean, School of Education   Professor, Department of Education
Michigan State University   University of Illinois

Dr. Harold Halfin   Dr. Robert Reese
Director, Vocational Education   Director, Trade and Industrial Education
Graduate College   Ohio State University
University of Wisconsin-Stout

                                           Dr. Richard Spaziani
Dr. William J. Micheels   Coordinator, Vocational Teacher Education
Distinguished Professor   University of Alaska
University of Wisconsin-Stout

                                           Dr. Lloyd Wiggins
Dr. Richard Willey   Professor, Division of Vocational Education
Dean of Education   Oklahoma State University
Idaho State University

APPENDIX E

Letter Sent to Respondents on
First Round of Modified Delphi Technique

December 13, 1972

Dear Dr.

Thank you for your willingness to participate on the Delphi Panel for the study to identify the processes of vocational education administration. The attached processes and their component operations are presented on an attitude reaction format. Directions for completing the set of materials are at the top of page one.

Processes are the strategies, the behavior capabilities, used by the individual to deal effectively with the content of a discipline. Operations are components of processes, they are stated in performance-oriented terms and describe what the practitioner is doing when utilizing the processes of the discipline. We will appreciate your reaction to each of the items on the list.

After receiving this completed set of materials from you, I will tabulate the data, add statements, and formulate the second set of processes. With the second set of materials you will receive a summary sheet of panel member responses to this first set of processes.

After completing this set of materials, please return it in the enclosed self-addressed envelope.

Thank you for your assistance. I hope to have your completed set of materials as soon as possible.

Sincerely,

Jean Massie
Career Education Division
Oregon State Department of Education

Encl.
JM:jg

APPENDIX F

Letter Sent to Respondents on
Second Round of Modified Delphi Technique

February 16, 1972

Dear Dr.

Thank you for your response to the first instrument for the study to
identify the processes of vocational education administration.
Enclosed is a second instrument, identified as "Set II, " for your
review and reaction. Also enclosed is a copy of the first instrument
showing the mean of panel responses to each operation. This is
provided so that you may see the collected data at this point in the
process. This is not as complete as it will appear in the final
report but does give an indication of the range of opinions on the
various operations.

Your responses to the first instrument are circled in red on the
enclosed copy. This is done so you will know where you responded
in relation to the other panel members.

Your participation and response to this project has been most
gratifying. I hope that it will be possible for you to quickly complete
the Set II instrument and return it to me in the cnlosed self-addressed
envelope.

Again, thank you for your interest and help. It is most sincerely
appreciated.

Cordially,

Jean Massie
Career Education Division
Oregon State Department
of Education

JM:sl
Enclosure

APPENDIX G

Instrument, Set II

Identifying the Processes of a Vocational Administrator

Please indicate the extent to which you agree with each of the operations as a component part of a process. Please mark EACH OPERATION as Strongly Agree (SA) (5), or Agree (4), or Neutral (3), or Disagree (2), or Strongly Disagree (SD) (1).
10

Each process and its compnent operations are arranged hierarchically moving from the simpler to the more complex. You are asked to make changes in the hierarchical order by crossing out and renumbering any process you feel is out of order.

The last page provides space for you to add processes or operations of your own. You need not limit the number of your statements to the space provided.

Process: DEFINING THE PROBLEM OR OPPORTUNITY OPERATIONALLY 1.0

General Definition: The process of stating or defining a problem which will enhance investigation leading to an optimal solution. It is transforming one state of affairs to another desired state.

Operations: (These operations should add meaning to the above process.)

		SA				SD
1.1	Recognizing the existence of a problem or opportunity.	5	4	3	2	1
1.2	Stating the problem or opportunity broadly with a minimum number of constraints.	5	4	3	2	1
1.3	Gathering, investigating, processing, and screening information in order to determine the specific characteristics of the problem or opportunity.	5	4	3	2	1
1.4	Estimating the resources needed to solve the problem or opportunity.	5	4	3	2	1
1.5	Defining priorities in the completion of problem-solving tasks.	5	4	3	2	1
1.6	Distinguishing between decisions that are and those that are not one's direct responsibility.	5	4	3	2	1
1.7	Developing plans to involve those persons who will implement the results of a decision in the making of that decision.	5	4	3	2	1
1.8	Determining the effect the solution may have on the future.	5	4	3	2	1
1.9	Determining if the resources needed to solve a problem are justified in terms of the solution.	5	4	3	2	1

Comments:

Process: OBSERVING 2.0

General Definition: The process of interacting with the environment by using one's senses to determine the characterisitics of a phenomenon, problem, opportunity, element, object, event, system, or point-of-view. The observer's experiences, values, and associations may influence the results.

Operations: (These operations should add meaning to the above process.)

| 2.1 | Determining what is relevant or important. | 5 | 4 | 3 | 2 | 1 |

		SA				SD
2.2	Determining the methods to be used for measuring and/or evaluating the observations.	5	4	3	2	1
2.3	Making observations	5	4	3	2	1
2.4	Recording observations	5	4	3	2	1
2.5	Establishing "base line" indexes from which comparisons may be made.	5	4	3	2	1
2.6	Comparing personal observations with those made by others in similar situations.	5	4	3	2	1
2.7	Determining characteristics indirectly, inferring one characteristic on the basis of another.	5	4	3	2	1
2.8	Quantifying observations to provide precision and/or explicitness.	5	4	3	2	1
2.9	Identifying bias and various points-of-view.	5	4	3	2	1
2.10	Stating conclusions about observations.	5	4	3	2	1

Comments:

Process: ANALYZING 3.0

General Definition: The process of identifying, isolating, taking apart, breaking down, or performing similar actions for the purpose of setting forth or clarifying the basic components of a phenomenon, problem, opportunity, object, system, or point-of-view.

Operations: (These operations should add meaning to the above process.)

3.1	Defining the possible or known cause(s) which require an analysis.	5	4	3	2	1
3.2	Identifying elements that need to be updated or enhanced or are useless or unneeded.	5	4	3	2	1
3.3	Defining any restrictions, constraints, or expendables which are basic to the analysis.	5	4	3	2	1
3.4	Setting the parameters - (or determining the criteria) of the analysis	5	4	3	2	1
3.5	Refining or revising the criteria to accommodate varying conditions.	5	4	3	2	1
3.6	Eliminating information on the basis of predetermined criteria.	5	4	3	2	1
3.7	Developing a form or model for recording the analysis.	5	4	3	2	1
3.8	Questioning accepted ideas, explanations, and facts.	5	4	3	2	1
3.9	Reviewing possible alternatives.	5	4	3	2	1
3.10	Finding elements that are identical though they appear in different form.	5	4	3	2	1

Comments:

Process: COMMUNICATING 4.0

General Definition: The process of conveying information or ideas from a source to a receiver. The media may be oral, written, pictorial, symbolical, or any combination of these.

Operations: (These operations should add meaning to the above process.)

		SA				SD
4.1	Deciding what is to be communicated.	5	4	3	2	1
4.2	Choosing media	5	4	3	2	1
4.3	Conveying the information through the media.	5	4	3	2	1
4.4	Identifying the sources of information.	5	4	3	2	1
4.5	Reporting procedures in a form that could be replicated by others.	5	4	3	2	1
4.6	Evaluating the effectiveness of the communication system and then applying the findings to make the system better.	5	4	3	2	1
4.7	Organizing information so interpretation by others is simplified.	5	4	3	2	1
4.8	Developing an information system.	5	4	3	2	1
4.9	Acting as a reliable source of information as perceived by the receiver.	5	4	3	2	1
4.10	Helping others see the need for change.	5	4	3	2	1
4.11	Listening to others.	5	4	3	2	1
4.12	Establishing a climate which permits people to express their opinion freely without fear that an idea, or more importantly, an individual will be rejected out of hand.	5	4	3	2	1

Comments:

Process: PREDICTING 5.0

General Definition: The process of prophesying or foretelling something in advance, anticipating the future on the basis of special knowledge.

Operations: (These operations should add meaning to the above process.)

5.1	Clarifying the hypothetical situation by using graphs, models, forecasting techniques, or similar means.	5	4	3	2	1
5.2	Estimating intuitively on the basis of Delphis and other consensus techniques.	5	4	3	2	1
5.3	Using measuring and testing to improve predictions.	5	4	3	2	1
5.4	Assessing (preferably quantitive) the probability of an event taking place.	5	4	3	2	1
5.5	Integrating existing information to form an explanation of why things happen or should happen.	5	4	3	2	1
5.6	Revising predictions using cumulative results.	5	4	3	2	1

Comments:

Process: QUESTIONING AND HYPOTHESIZING 6.0

General Definition: Questioning is a process of asking, interrogating, or challenging, or to obtain answers related to a phenomenon, problem, opportunity, element, object, event, system, or point-of-view.

Hypothesizing is a process of stating a theory or tentative relationship between two or more variables

to be tested which are aspects of a phenomenon, problem, opportunity, element, object, event, system, or point-of-view.

Operations: (These operations should add meaning to the above process)

		SA				SD
6.1	Stating questions relative to assumptions that have been made.	5	4	3	2	1
6.2	Generating hypotheses.	5	4	3	2	1
6.3	Providing a conceptual model which can form a basis to test future actions.	5	4	3	2	1
6.4	Stating the parameters to be accepted or rejected.	5	4	3	2	1
6.5	Examining sets of hypotheses for internal consistency.	5	4	3	2	1
6.6	Stating hypotheses in forms which suggest the variable to manipulate.	5	4	3	2	1
6.7	Challenging the validity to investigate a new line of reasoning.	5	4	3	2	1

Comments:

Process: INTERPRETING DATA 7.0

General Definition: The process of clarifying, evaluating, explaining, and translating to provide (or communicate) the meaning of particular data.

Operations: (These operations should add meaning to the above process.)

7.1	Utilizing criteria to assess the validity and reliability of the data.	5	4	3	2	1
7.2	Distinguishing cause-effect relationships from parallel phenomena.	5	4	3	2	1
7.3	Being aware of one's conceptual biases.	5	4	3	2	1
7.4	Testing hypotheses by appropriate means in keeping with the nature of the data.	5	4	3	2	1
7.5	Using inductive logic or method.	5	4	3	2	1
7.6	Using deductive logic or method.	5	4	3	2	1
7.7	Determining similarities and differences in data.	5	4	3	2	1
7.8	Ordering data in a format that will aid interpretation.	5	4	3	2	1
7.9	Using data to revise theories on which experiments were planned.	5	4	3	2	1
7.10	Determining "weight" of individual data in assessing its relation to the over-all problem.	5	4	3	2	1
7.11	Comparing interpretations with others.	5	4	3	2	1

Comments:

Process: ENCOUNTERING 8.0

General Definition: Encountering is a meeting of two or more individuals who come together to face their real selves as they deal with a mutual problem.

Operations: (These operations should add meaning to the above process.)

		SA				SD
8.1	Transmitting information to another person.	5	4	3	2	1
8.2	Paraphrasing the words of another.	5	4	3	2	1
8.3	Developing commitment.	5	4	3	2	1
8.4	Bridging the gap between the conceptual frameworks of persons in different but related fields.	5	4	3	2	1
8.5	Establishing a social climate which permits people to express their opinions.	5	4	3	2	1
8.6	Listening to another with purpose, responding in terms that will help the other person sharpen, prize and find deeper meaning in his own thoughts.	5	4	3	2	1
8.7	Being sensitive to others.	5	4	3	2	1
8.8	Sharing openly and with integrity one's self.	5	4	3	2	1

Comments:

Process: CREATING 9.0

General Definition: The process of combining the basic components or ideas of phenomena, objects, events, systems, or points-of-view in a unique manner which will better satisfy a need, either for the individual or for the outside world.

Operations: (These operations should add meaning to the above process.)

9.1	Being able to build upon the idea of another.	5	4	3	2	1
9.2	Producing as many ideas as possible about the problem or opportunity (for example: using brainstorming techniques, analogies, attribute-listing, etc.)	5	4	3	2	1
9.3	Deferring judgment until the production of ideas has been exhausted.	5	4	3	2	1
9.4	Allowing ideas and feelings to incubate (letting the subconscious stay with the problem or opportunity.)	5	4	3	2	1
9.5	Developing new and far-reaching syntheses.	5	4	3	2	1
9.6	Being flexible to ideas for change.	5	4	3	2	1

Comments:

Process: MANAGING 10.0

General Definition: The process of planning, organizing, directing, coordinating, and controlling the inputs and outputs of the system.

Operations: (These operations should add meaning to the above process.)

10.1	Determining goals based upon needs.	5	4	3	2	1
10.2	Establishing priorities among the selected goals.	5	4	3	2	1

		SA				SD
10.3	Determining the short- and long-range objectives.	5	4	3	2	1
10.4	Generating alternative solutions to accomplish the goals.	5	4	3	2	1
10.5	Selecting the best alternative solution.	5	4	3	2	1
10.6	Evaluating the feasibility of the selected solution on the basis of the available resources.	5	4	3	2	1
10.7	Reviewing the alternative solution to reaffirm or revise the choice of solution.	5	4	3	2	1
10.8	Acquiring the physical and human resources to act upon the selected solution.	5	4	3	2	1
10.9	Assigning time schedules and tasks to be accomplished by the various units of the organization.	5	4	3	2	1
10.10	Supervising and conducting the performance of the various sub-units in the system.	5	4	3	2	1
10.11	Comparing the actual performance of the system with the planned performance through the feedback mechanism.	5	4	3	2	1
10.12	Taking corrective action to improve the performance of the system.	5	4	3	2	1

Comments:

Process: VALUING 11.0

General Definition: Valuing is a process in which the persons involved, other factors in the situation, and pervasive principles are critical factors. Most real life situations are such that priorities must be established among conflicting values or goods.

Operations: (These operations should add meaning to the above process.)

11.1	Establishing priorities in ethical view.	5	4	3	2	1
11.2	Changing priorities based upon changed conditions.	5	4	3	2	1
11.3	Learning to resolve conflict.	5	4	3	2	1
11.4	Clarifying the degree to which he holds his values to determine what he believes.	5	4	3	2	1
11.5	Being one's self, feeling the freedom to give expression to one's thoughts and feelings.	5	4	3	2	1
11.6	Acting in a way that will bring about a state of affairs that people will value.	5	4	3	2	1

Comments:

APPENDIX H

Median Scores of Panel Responses to
Instrument, Set I

Operation	Median	Operation	Median	Operation	Median
1.1	5.000	4.8	4.250	7.15	3.900
1.2	4.500	4.9	4.300	8.1	4.352
1.3	4.900	4.10	4.167	8.2	4.100
1.4	4.000	4.11	3.000	8.3	4.250
1.5	4.643	4.12	4.133	8.4	4.500
1.6	4.000	4.13	4.833	8.5	4.833
2.1	4.643	4.14	4.955	8.6	4.643
2.2	4.000	5.1	4.750	8.7	4.750
2.3	4.643	5.2	4.072	8.8	4.643
2.4	4.072	5.3	4.115	9.1	4.632
2.5	4.000	5.4	3.833	9.2	4.500
2.6	3.000	5.5	4.300	9.3	4.500
2.7	3.100	5.6	4.833	9.4	4.500
2.8	3.900	5.7	4.500	9.5	4.300
2.9	4.167	5.8	4.643	9.6	4.900
3.0	4.500	6.1	4.115	10.1	4.955
3.1	4.167	6.2	4.500	10.2	4.955
3.2	4.115	6.3	4.500	10.3	4.833
3.3	4.750	6.4	4.500	10.4	4.900
3.4	4.167	6.5	4.300	10.5	4.900
3.5	3.929	6.6	4.027	10.6	4.500
3.6	4.005	6.7	4.500	10.7	4.750
3.7	4.500	7.1	4.583	10.8	4.750
3.8	4.500	7.2	4.750	10.9	4.500
3.9	4.833	7.3	4.750	10.10	4.643
3.10	4.500	7.4	4.643	10.11	4.750
3.11	3.929	7.5	4.250	10.12	4.833
3.12	4.167	7.6	4.100	11.1	4.813
4.1	4.750	7.7	4.833	11.2	4.833
4.2	4.643	7.8	4.500	11.3	4.833
4.3	4.500	7.9	4.300	11.4	4.125
4.4	4.000	7.10	4.643	11.5	4.643
4.5	4.843	7.12	4.250	11.6	4.643
4.6	3.833	7.13	4.643		
4.7	4.167	7.14	4.167		

APPENDIX I

Delphi Panel Comments on Instrument, Set I

Process 1.0

Changes in operation ordering: 1.3 to 1.4, 1.4 to 1.6, 1.5 to 1.7, 1.6 to 1.8; 1.5 to 1.4; 1.5 to 1.6 and reverse. Operation 1.3, searching the literature to find out how others have concerned the problem. Operation 1.5, finding other problems to which the problem is related. Operation 1.4, may provide excuses for not attempting to seek solutions. Operation 1.6, does the same and suggests that a good idea of what the solution is going to be prior to starting problem solving. Operation 1.31, consider possible solutions. Operations 1.4 and 1.6, are you equating effort with resources?

Process 2.0

Operation 2.3, what are real or test situations? Operation 2.4, what if I use a form that is not predetermined? Operation 2.7, is this a part of observing? Additions: Stating conclusions about observations.

Process 3.0

Changes in operation ordering: 3.3 to 3.1, 3.1 to 3.2, and 3.2 to 3.3; 3.10 appears to be an activity of 3.3, 3.12 is under the general definition, and 3.11 is under operation 3.6. Change 3.2 to read, finding elements which need to be updated or enhanced or are useless or unneeded; and shift all other processes down. Operation 3.8, is this analysis or interpretation? Operation 3.12, is this how solution really occurs? Operation 3.12, this is important, does it meet criterion for an operation? Operation 3.8, is this a part of this process?

Process 4.0

Changes: Change 4.2 as it suggests "one" rather than multi; couldn't 4.4 be stated for each process? Operation 4.6 - Why? Operation 4.11 - what other means are available; Operation 4.12 - how? Operation 4.8 - this could imply controlling or limiting interpretation by others. Operation 4.11 - seems contrary to "open" communication. These operations seem to be adequate for the vocational administrator. Operations 4.11 and 4.12 may be difficult

to reduce to practice, also to assess, however they are very important in communicating. Operation 4.9 is ideal, but . . . ? Operation 4.4 occurrs under 4.13 as do operations 4.3 and 4.7. Change order, 4.14 to 4.1 and shift all other operations down.

Process 5.0

Combine operations 5.2 and 5.3. Operation 5.4, are Delphis intuitive estimating? Operation 5.2, what about real situations? Operation 5.3, such as . . . ? Operation 5.1 appears to be an observing element; operation 5.6 is the same as operation 3.9. Additional suggestion, bringing about predictable orderly changes in group and group to group situations. A good listing of operations.

Process 6.0

Good ordering of operations. I'm not sure specifically what is meant. Recasting questions and hypotheses into various forms. Using communication as a leadership tool. Managing the apparatus of information gathering and choice.

Process 7.0

How does this apply to administration? Operations 7.1 through 7.3 belong under other processes. Operation 7.1, not always applicable.

Process 8.0

Refer to definition: why set limits on numbers? Changes in operation ordering: 8.1 to 8.5, 8.2 to 8.6, 8.3 to 8.8, 8.4 to 8.7, 8.5 to 8.4, 8.6 to 8.3, 8.7 to 8.1, and 8.8 to 8.2. Additions: developing opportunities that provide for direct involvement in actual administrative situations; building a philosophy of social welfare; providing for voluntary participation by human elements of the institution; facilitating the interacting of local, state, and federal political units responsible for the support and encouragement of educational programs.

Process 9.0

Changes in operation ordering: 9.1 to 9.2, 9.2 to 9.3, 9.3 to 9.5, 9.5 to 9.6, and 9.6 to 9.1. Creating?

Process 10.0

Well done. Refer to definition: so you manage systems or people? Changes in ordering: 10.2 to 10.3 and reverse; 10.6 to 10.5 and reverse. Operation 10.10, change conducting to coordinating. Additions: designing and implementing the administrative organization, designing institutional systems on a statewide and political unit, coordinating associated basic human endeavors toward the accomplishment of objectives, delegation of authority.

Process 11.0

Refer to definition: add this statement, have an affective regard for ideals, beliefs, or customs of a culture; a value may be either positive or negative. Operation 11.1, I am assuming you refer to established priorities based on an accepted and/or practical philosophy? Operation 11.4, who is he, who does clarifying?

APPENDIX J

Entering Data Into the 2 x 2 Contingency Table

	Process Educators		Vocational Administrator Educators		
Operation 1. 1:	Level of Agreement	Responses	Level of Agreement	Responses	Combined Median
	5	4	5	2	4. 500
	4	2	4	2	
	3	-	3	1	
	2	-	2	-	
	1	-	1	1	

STEPS:

1) Determine the median score for the combined Delphi Panel responses;
2) Enter the represetnative number of scores falling below median into cells (a) and (b);
3) Enter the representative number of scores for each panel falling above median into cells (A-a) and (B-b);
4) Enter those scores falling on the median as a block of scores from both panels, this block of scores can be entered to either the left hand or right hand side of the table such that the sum of the scores (a) and (b) are closest to 6 (Thomas, 1973).

Process Educators (PE)

Vocational Adminstrator Educators (VAE)

	a	A-a
	0	
	b	B-b
	2	

n =12

STEP 2

	a	A-a
		4
		B-b
		2

n = 12

STEP 3

	a	A-a
	2	4
		B-b
	4	2

n = 12

STEP 4

APPENDIX K

Calculation of Quartile Deviations
In A Grouped Frequency

Operation 1.1:   Combined Panel Responses

Level of Agreement	Frequency	Cumulative Frequency	Calculation of Median (Q_2)
5	12	12	1) $0.50 \ n = 0.50 \ (12) = 6.$
4	-	0	2) Find real lower limit (L) of score class containing 6th
3-	-	0	score:
2	-	0	$L = 4.500$
1	-	0	3) Subtract cumulative frequency (cum f) up to L from
			6:
n = 12			$6-0 = 6$
			4) Divide the result of Step 3 by the frequency (f) in the interval containing the 6th score:
			$\frac{6}{12} = .500$
			5) Add the result of Step 4 to L:
			$Q_2 = 4.500 + .500 = 5.000$

(Glass and Stanley, 1970)

The general formula for determining the pth
percentile in a group of n scores is as follows:

$$P_p = L + \frac{pn - (cum. \ f)}{f}$$

L = Real lower limit

cum. f = cumulative frequency

f = frequency

APPENDIX L

Delphi Panel Comments on Instrument, Set II

Process 1.0

     Changes in operation ordering: 1.2 to 1.5, 1.5 to 1.6, 1.6 to 1.7, and 1.8 to 1.9; 1.3 to 1.4, 1.4 to 1.5, 1.5 to 1.7, 1.6 to 1.3, 1.7 to 1.8, 1.8 to 1.9, and 1.9 to 1.6. Operations 1.6 and 1.7 seem to be concerned with implementation not definition.

Process 2.0

     Changes in operation ordering: 2.3 to 2.1, 2.1 to 2.2, and 2.2 to 2.3. Operation 2.7 unclear, operation 2.5 seems to state my interpretation of what 2.7 seems to indicate. It is the nature of observation that determines value.

Process 3.0

     Operation 3.10, need an example, unclear. Operation 3.2 seems to be the point of conducting an analysis.

Process 4.0

     Operation 4.10, using communication media to serve as a change agent.

Process 5.0

     Changes in operation ordering: 5.5 to 5.1, 5.1 to 5.2, 5.2 to 5.3, 5.3 to 5.4, and 5.6 to 5.5.

Process 6.0

     No comments.

Process 7.0

     Changes in operation ordering: 7.8 to 7.2, 7.10 to 7.3, 7.3 to 7.5, 7.2 to 7.6, 7.5 to 7.7, 7.6 to 7.8, 7.7 to 7.9, 7.11 to 7.10, 7.9 to 7.11. Operation 7.1, change utilizing criteria to evaluating information source.

Process 8.0

No comments.

Process 9.0

No comments.

Process 10.0

No comments.

Process 11.0

No comments.

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