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ABSTRACT

This report presents the results of a four-year effort to develop a valid and reliable inservice needs assessment instrument. (The instrument was designed to identify competencies that should be the focus of inservice training for vocational educators who teach or provide services to special needs learners.) Chapter I is an introduction. Chapter II reviews new research on instruction and evaluation and describes how these issues have been included in the revised needs assessment survey. A description of the methodology/research design used in the development and field testing of the Special Needs Inservice Survey is provided in chapter III. This includes the survey's instrumentation, population, sampling plan, data collection methods, and data analysis techniques. Chapter IV presents data collected with the current version of the instrument. These data describe vocational educators' self-perceptions of their competencies in both general and specific instructional techniques related to special needs learners, as well as their preferences regarding the format, time, and delivery personnel needed for such inservice experiences. Chapter V reports the reliability and validity of the survey instrument. Chapter VI contains conclusions, a summary, and recommendations. A list of references precedes appendixes, including the instrument, sampling plan, and data tables. (YLB)

An Analysis and Validation of Vocational Special Needs Inservice Issues

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An Analysis and Validation Vocational Special Needs Inservice Issues

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DEDICATION

This report is dedicated to the memory of our friend, the late Brandon B. Smith, who died January 1, 1985. Brandon was the Director of the Minnesota Research and Development Center during the period in which this research study was conducted. Dr. Smith contributed greatly to the design of the study's methodology. His professional advice and his personal friendship are greatly missed.

ABSTRACT

This report provides information on the following topics: (a) the development of an instrument to collect information describing the inservice needs of vocational educators with regard to the provision of services to special needs students, (b) data concerning the reliability and validity of information collected with the instrument, (c) results of a state-wide survey with that instrument, and (d) the sampling method used to obtain highly generalizable results.

The systematic development of an inservice needs survey instrument is described. That instrument is based on a model of instruction covering both those general competencies instructors should possess and specialized competencies for the instruction of special needs populations. The instrument is shown to have satisfactory validity and reliability. Results show that the surveyed sample's highest needs for inservice were related to the use of students, parents, guardians, and community resources to supplement instructional efforts, as well as the adaptation of instructional activities and materials. Vocational educators indicated that they preferred that inservice be presented during professional days by persons with expertise in both vocational and special education. The sampling technique provides a method of predetermining the confidence level of research results. Additionally, these results can be presented in a common and easily understood manner.

ACKNOWLEDGEMENTS

The authors wish to thank the many people who contributed officially and unofficially to this research project. Hundreds of vocational educators and industrial arts teachers contributed their time to answer the survey questionnaires. Many others have helped by responding to various prior pilot-test versions of the instruments. Also, David Kingsbury at Bemidji State University, as well as Stanley Knox and David Johnson at St. Cloud State University, helped by distributing the questionnaires within their institutions' service regions. Special thanks are given to Hal Birkland and Lloyd Petrie at the Vocational-Technical Division of the Minesota Department of Education; their support and assistance made this long-term effort possible. In addition, the authors wish to thank Brandon Smith and Gary Leske who guided and supported this effort through the Minnesota Research and Development Center to enable this report to become a reality, not just a bunch of data in a back room file. Finally, we are thankful for the patience and word processing skills of LaRayne Kuehl, Merri Fromm, Karen Schuller, and Mary Gupta, who created this report, as well as the many-many prior drafts!

Table of Contents

Table of Contents

Table of Contents

Table of Contents

List of Figures

List of Tables

Table of Contents

List of Tables, Continued

Table of Contents

List of Tables, Continued

CHAPTER ONE

INTRODUCTION

This report presents the results of a four year effort to develop a valid and reliable inservice needs assessment instrument. This instrument was designed to identify competencies which should be the focus of inservice training for vocational educators who are, or will be, teaching or providing services to special needs learners. The report builds on the earlier effort by Peak and Brown (1980) which developed and pilot-tested a needs assessment instrument based on a conceptual model derived from a review of the professional literature. That report focused on those skills vocational educators should achieve in order to effectively educate special needs learners.

The first section of this report discusses issues related to the identification and assessment of competencies needed by educators to instruct special needs learners and also examines issues related to inservice training. The report includes a review of new research on instruction and evaluation and describes how these issues have been included in the revised needs assessment survey. The second half of the report presents data collected with the current version of the instrument. These data describe vocational educators' self-perceptions of their competencies in both general and specific instructional techniques related to special needs learners, as well as to their preferences regarding the format, time, and delivery personnel for such inservice experiences. The design of effective inservice training for vocational educators will be facilitated by the use of this information.

This report also supplies data on the validity and reliability of the revised needs assessment survey. The literature contains virtually no comparible information on the validity and reliability of prior needs assessment instrumentation. Information such as this enables planners to generalize survey results to specific local populations.

Statement of the Problem

In Minnesota, as is many states, vocational teachers, teacher educators, and state department of education personnel are continuing to develop, promote, and/or deliver inservice activities in the hope that such activities will improve participants' abilities to educate special needs learners. In order to assure developers of inservice activities that they have offered information and skills that are truly needed by educators, reliable and valid needs assessment instruments are needed. Further, such instruments must reflect the state-of-the-art in regard to educator competencies. Last, the needs-related data should be collected from a sample that is truly representative of the population of vocational educators. The goals of this research report address these problems. They are:

1. Update the literature review to incorporate new developments in concepts and methods of instruction and evaluation;
2. Revision of the needs assessment instrument to reflect the above;
3. Determine the validity and reliability of the instrument;
4. Design and use a sampling technique which will assure that respondents are representative of the actual population.
5. Collect data describing Minnesota's vocational educators' special needs-related skills;

6. Determine the competency areas in which these educators indicate they need professional development; and
7. Determine which inservice delivery formats, times, and providers are most acceptable to potential participants.

Definition of Terms

A number of key terms will be used throughout this report. Some of these have been used extensively in the literature, but without well-established, widely-accepted definitions. Also included are definitions of special contructs or concepts used in this report.

Special Needs Students: Individuals with characteristics that prevent them from succeeding in regular vocational education programs without additional or special assistance.

Educators: Educational personnel such as teachers, work experience coordinators, program supervisors/managers, and administrators in vocational and special education who have a potential impact on vocational special needs students.

Competency: Refers to those skills, understandings, and attitudes necessary to perform an activity successfully.

Phase: Steps in the process of providing educational services. These steps are:

1. Assessment: Identifying and measuring needs that exist related to the education of special needs students.

2. Planning: Specifying and developing procedures and steps for identifying and meeting students' needs.

3. Implementation: Providing services and activities to meet students' educational needs.

4. Evaluation: Determining the adequacy, quality, and/or effect of the goals, objectives, inputs, procedures, and outcomes of the educational activities which have been planned and implemented.

CHAPTER TWO

LITERATURE REVIEW

Need for Improvements in Inservice Needs Assessment

Lilly (1982) noted that the mere existance of public laws (e.g., P.L. 94-142 and P.L. 94-482) is no longer the only justification for improving vocational education programs for special needs students. Factors other than laws now drive this improvement process. Prominent among these factors are: (a) changing economic conditions, (b) the increasing emphasis on equity issues, (c) recent changes in the scope and content of vocational education which are needed to keep pace with developments in our increasingly technological society, and (d) developments in theories and practices of instruction and evaluation. The impact of these factors on vocational education will be discussed.

Economic Conditions

As many governmental agencies encounter diminishing resources, the funds allocated by those agencies to educational programs also diminish. This is occuring at a time when other society changes are bringing greater proportions of the special needs student population into vocational education programs. These students' educational needs often cannot be met without additional or special assistance. If educational institutions are to continue to deliver and to improve their services to such students, educators' abilities to instruct a broad range of students will become pivotal to the educational survival of special needs learners.

It is believed that providing appropriate preservice and inservice professional development experiences will accomplish the needed gains in educators' knowledge and skills, and that there will be a resulting improvement in their students' educational accomplishments. Essential to the provision of appropriate professional development experiences is the need for those who plan such experiences to have knowledge of what competencies the targeted educators need. In addition, the educators themselves should participate in the essential process of identifying their needs.

It can be seen that accurate and efficient needs assessments are a necessary part of efforts to improve the educational process. Further, the provision of ongoing professional learning experiences for educators is essential when diminishing program resources place greater demands on educational agencies attempting to serve an ever broader range of students.

Achieving Equity by Assessment of Needs

Equity is the term used to describe the provision of equal opportunity for every individual. Much of the current emphasis on equity in vocational education can be traced to P.L. 94-482 which encourages equal opportunity for vocational students regardless of gender. This can be broadened to address a general consideration of equity (Plihal, 1983).

Several inservice issues seem to be clearly related to the equity concept. Special needs students have individual needs which limit their ability to benefit from regular vocational education. In order to assure equal opportunities, special services and/or adapted instruction should be provided to meet those needs. Instructors serving these students should possess general teaching competencies, as well as competencies that are specific to adaptations for special needs learners. Most instructors differ in terms of their individual competencies which should be addressed through inservice training. It is,

therefore, appropriate to validly and reliably assess these inservice needs. Additionally, instructors' efforts to implement skills aquired through inservice and their effects on students should be evaluated. It can be seen that when individual instructors' abilities to appropriately educate special needs learners have been developed through inservice, then equity will tend to have been enhanced for these educators as well as their students.

The Changing Scope and Content of Vocational Education

Brown and Scribner (1981) noted six characteristics of vocational education programs that will be important during the 1980s:

1. The expanding number of vocational education program offerings;
2. The expanding cross-section of types of students enrolled;
3. The proportionately greater numbers of students identified as having special needs;
4. The changing job market;
5. The continuing trend of rapid technological and other scientific advances; and
6. The maturation of the area vocational school concept.

These six factors continue to increase the pedagogical complexity of teaching and tend to encourage educators to continuously update their skills. New teaching and learning technologies need to be added to educators' existing repertoires related to their content area and teaching skills. There are also several interrelated issues that have focused increased attention on all inservice teacher education efforts:

1. Declining enrollments in preservice teacher preparation programs;
2. School programs' tendencies to become stagnent when they fail to receive yearly injections of new personnel with their fresh thinking and vibrant interest in program and personnel development;
3. Teachers' concerns about their professional renewal; and
4. The public's concern that America's educational system be upgraded.

All of these issues have been widely discussed and the latter has been demonstrated in the political and legislative arena (Davis & Quino, 1975). Together these factors also provide strong support for the argument that vocational educators should improve their methods for assessing the needs for professional inservice activities, particularly with regard to the education of special needs learners.

Need for Special Needs Training

Continuing renewal through professional development has been a major teacher activity for decades. However, current vocational educators are experiencing an even more pressing need for renewal, specifically to meet the demand to attain skills required to serve special needs populations (Tunick & Holcomb, 1980). Jensen and Schaefer (1978) noted that a 1974 Government Accounting Office report found only 500 of 266,000 vocational educators in America were adequately trained to educate special needs students. They also discussed a Rutgers University study which reported that in 1976 82% of New

Jersey's vocational teachers surveyed felt that special needs training would be valuable but only 20% had received such training.

In their efforts to develop a special needs-related survey of teachers' inservice needs, Peak and Brown (1980) surveyed a sample of 110 Minnesota vocational educators examining their training needs related to the assessment, planning, implementation and evaluation phases of educating special needs learners. They found that in all competency phases at least twice as many respondents rated their inservice needs as "moderate" or greater as did those who rated their inservice needs below moderate. The list of competencies below states the proportion of respondents who rated their need for training as being moderate or greater in relation to each competency.

- Utilizing the community to supplement education, 76%
- Developing the interpersonal abilities of students, 71%
- Knowledge of legislation and funding, 67%
- Meeting the educational needs of students, 66%
- Creating and or implementing IEPs, 65%
- Utilizing special needs support services, 61%
- Establishing course curriculum, 58%
- Using instructional materials, 56%
- Altering the classroom physical environment, 52%
- Maintaining social aspects of the learning environment, 48%
- Involving parents, 45%

The placement of special needs students in classes with regular educators as instructors and the integration of these students with others in the program is generally called mainstreaming. This practice is encouraged by federal legislation. However, the success of these placements has been severely hampered by the skill limitations of many vocational educators. Mainstreaming efforts must provide educators, as well as students, with the appropriate training, equipment, and specialized support services needed to do their work effectively (Dahl, Appleby, & Lippe, 1978). It is imperative that vocational educators be provided with more special needs inservice training in order for them to comprehend and address the unique educational requirements of special needs students.

Developments in Instruction

In addition to changes in factors that can be categorized as issues of economics, equity, and the scope of vocational education, there have been significant developments in the formulation of an instructional model which can be applied to the training of special needs students.

An Alternative Instructional Model

Smith, Brown, and Kayser (1982) described the psychological elements of a broad general model for learning and instruction. Their discussion related these elements to the education of special needs learners in order to: (a) provide new insights into the problem of delivering instruction to special needs learners, (b) encourage the modification of current instructional practices, and (c) establish a new perspective for the conduct of special needs-related research. Because of the model's importance to the establishment and assessment of vocational educators' competencies, the Smith et al. model will be described in some detail.

The teaching/learning process. The instructional model developed by Smith et al. describes general concepts/processes involved in the delivery of instruction regardless of the educational setting or the types of learners to be served. To some extent, most learners are handicapped or disadvantaged. For example, temporary or conditional special needs sometimes occur when a learner's capabilities do not meet:

1. The physical or mental capabilities required by a task: A first attempt to ski or to take a statistics course often puts the learner at a temporary disadvantage for the presentation of information, skills, and/or attitudes.
2. The nature or form of the content to be presented: A class of total immersion in French language lessons would put most persons at a disadvantage in regard to this form of instruction and lesson content.
3. The nature of the behavioral responses/standards expected: First attempts at computer programming leave most learners feeling disadvantaged because they cannot respond in the format required.

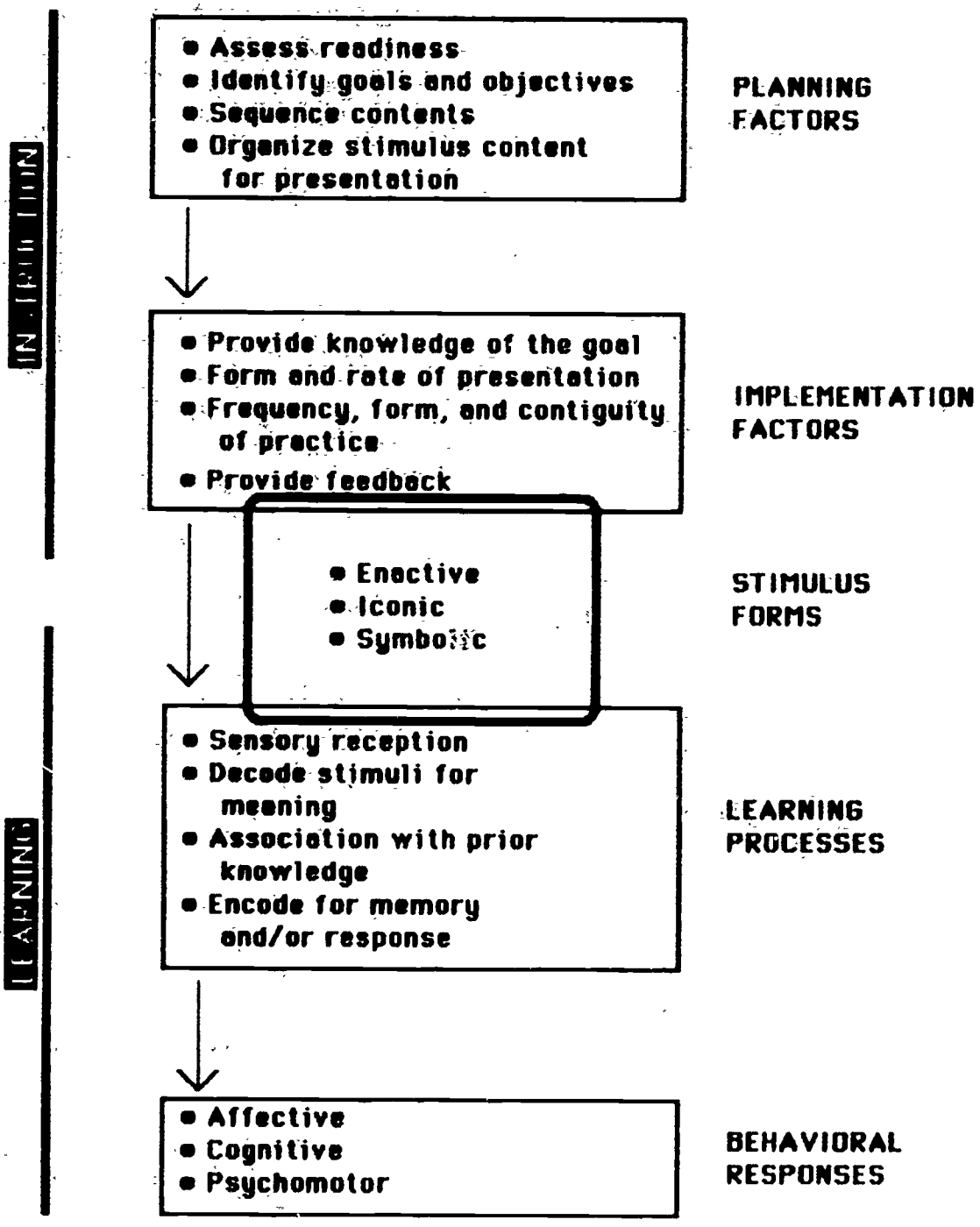
These examples show that being handicapped or disadvantaged may occur as a result of several variables, but the end result is the same: The tasks require a learner to successfully receive symbols related to the instructional content which the learner may find unfamiliar or difficult to translate meaningfully. Such learners, therefore, are unable to meet the expected response standards. The key to learning in each of these situations lies in appropriate delivery of instruction.

Figure 1 illustrates the elements of the teaching/learning process. These elements are involved in the delivery of instruction to all learners but are of particular significance to special needs learners.

Instructional planning. The model depicted in Figure 1 suggests that learning must begin with a learner who interacts with various stimuli (content) in the form of planned instructional activities that are designed to produce changes in individuals' behaviors. Instructional planning consists of efforts to establish sequences of instructional stimuli which will assist learners to reach their instructional goals. Planning activities are essentially the same for all learners but are of particular importance for special needs learners. Planning efforts must consider: (a) the readiness of each learner (i.e., that which is already familiar to the learner), (b) the goals and objectives of subsequent instruction of which present instruction is prerequisite (Ausuble, 1963, 1964), (c) the sequence in which content stimuli are presented, and (d) the organization/structure and form of instructional stimuli.

According to the model, the processes involved in learning are: (a) the reception of stimulus input, (b) decoding the stimulus input's meaning, (c) associate this meaning with prior knowledge, and (d) encoding the material for memory and/or response. The instructor's task is to determine (assess) what forms of content stimuli will bring about the appropriate responding (learning) in individual learners. This task includes a form of assessment and detailed planning.

Figure 1
Elements of the Teaching Learning Process



Adapted from Smith, Brown, & Kayser (1982)

c1

Instructional stimuli can be presented to learners in three forms: enactive, iconic, and symbolic. Enactive stimuli are typically psychomotor, hands-on tasks mastered through practice or trial and error repetitions. Iconic stimuli take the form of pictures, graphs, charts, etc., which present mental images of stimuli. Learners use these mental images to maintain, assimilate, and remember the content of message. Symbolic stimuli include all forms of written and and spoken communication. Symbolic stimuli require that learners must first receive the stimuli and then process the stimuli for meaning (decode).

Various handicaps affect individuals' abilities to make use of stimuli which require enactive responses, e.g., physical handicaps may slow down the practice trials. Iconic presentation of content may create difficulties in recall for persons with learning disabilities. Symbolic communication may have to be replaced by alternate systems for those with sensory disabilities such as sight and/or hearing impairments. Instructors must know their students' individual needs in this regard and plan both presentation and practice appropriately.

Implementation. To implement these concepts, instructors should consider four factors that are believed to account for individual differences in learning ability and the ability to profit from instructional stimuli. These four factors are: (a) knowledge of the instructional goal, (b) the form and rate of presentation, (c) provision of reinforcement, (d) the frequency and continguity of practice, and (e) provision of knowledge of results. It is known that some learners are able to receive stimuli at different rates than others, some need more practice than others, and some need more reinforcement and/or knowledge of results.

The adapted Smith model suggests that the goal of instruction is to present content by means of selected stimuli and, further, to individualize delivery based on instructional planning factors in order to make the instruction appropriate for individual learners. This instructional input is then combined with previously acquired knowledge/behaviors in the learner's repertoire to produce desired cognitive, psychomotor, and/or affective behavioral responses. Some learners need little variation and adaptation in the presentation of instruction, others have special needs which require the instructor to carefully plan instruction.

Applying the model to special needs instruction. In general, all learners tend to have special learning needs when exposed to certain stimuli. This condition is a function of the following variables: (a) the learners' strengths and weaknesses in relation to the perception and assimiliation of information, (b) the forms of instructional stimuli used, (c) instructional planning efforts, (d) instructional implementation methods, and (e) specific behavioral responses required by tasks.

Researchers and teachers, alike, are encouraged to examine the potential implications of the teaching/learning model as they relate to special needs populations. Vocational educators can no longer blindly pursue strategies which they "hope" will improve special needs-related educational offerings. The Smith model has potentially major implications for special needs learners. Its elements should be part of the skills possessed by every vocational educator. Assessment of the inservice needs of these educators should contain elements of that model. Key elements of the Smith model, as adapted for use as competencies, are contained in the following goals:

1. Provide educational activities which are hands-on, trial and error experiences.
2. Effectively use charts, pictures, graphs, and other visually oriented instructional materials.
3. Use spoken and written communications to provide effective instructional experiences.
3. Deliver instructional activities at rates which match students' abilities to learn.
5. Match instructional activities to students' readiness (ability and prior training) to learn.
6. Organize vocational topics into meaningful units or clusters which will maximize students' opportunities to learn.
7. Select appropriate sequences for instructional activities.
8. Establish realistic goals and objectives for each student.
9. Determine how often students need to practice new vocational skills they have learned.
10. Reinforce or reward students for achieving goals or for desired behavior.
11. Inform students of how well they are performing so they know where improvement is needed.

These competencies have been encorporated into the Special Needs Inservice Survey. They are grouped together and labeled Specific Instructional Skills. (See Appendix A).

Other Competencies for Vocational Special Needs Educators

The literature reviewed by Peak and Brown's 1980 pilot study noted large variations among the special needs-related educator competencies identified by previous researchers. The number of identified competencies varied from 16 to 384. There were also differences in their definition and categorization. For example, Hamilton and Harrington (1979) reported that "...the level of competency specificity varies as widely as the number of competency statements identified" (p. 5). There also is disagreement between studies on whether specific competencies should be taught.

Peak and Brown also examined how prior researchers validated their competency identification efforts. In general, competencies were identified by analyzing the roles of teachers working with special needs students. Only one study identified competencies by analyzing the process of actually serving students with special needs. Unfortunately the prior studies put little emphasis on empirical validation of the competencies. Rather, they appear to represent estimates by researchers who have examined this problem area.

The most common characteristic of the competency lists was that they used categories to group related items. However, none of the studies used a model for organizing these categories into meaningful domains of skills and knowledge. Peak and Brown (1980) extracted common elements from the literature and constructed a matrix (Figure 2) which classifies the domains and phases of competencies needed by instructors of special needs students. This synthesis also presented a "...conceptual framework within which to consider the special skills and knowledge required when teaching mainstreamed special needs students" (p. 2). The conceptual framework shown in Figure 3 was based on the educational concept of Aptitude-Treatment-Interaction (Cronbach and Glaser, 1965; Cronbach and Snow, 1977) which demonstrates that the process of education results from the interaction of individual aptitudes and treatment(s) for those aptitudes.

The competencies identified by Peak and Brown fit logically into twelve domains. The competencies within each domain were found to outline a sequence

of steps which describe complete and successful functioning for that domain. These steps formed a set of four phases of performance: assessing needs, planning activities to meet those needs, implementing those activities, and evaluating the adequacy and effects of the activities. The domains and phases are combined to form the competency matrix shown in Figure 2.

After minor versions of the domains identified and pilot tested by Peak and Brown, they were incorporated into the present version of the needs assessment instrument as General Instructional Skills. The phases of performance became a separate section of the instrument labeled Skill Categories. See Appendix A for a sample of the current needs assessment instrument.

Developments in Evaluation

Stufflebeam (1971) has exerted a major theoretical and practical influence on instructional evaluation. He defined evaluation as a process whose purpose is the provision of information for decision making. Evaluation needs to be an ongoing process involving at least three phases: delineating the purpose and context of the evaluation, obtaining information, and feedback of information for decision making. He describes the evaluation process in a model whose components are Context, Input, Process, and Product (CIPP). The Context stage identifies the actual conditions of the situation to be evaluated, including unmet needs. Goals are set during this stage. The conduct of a needs assessment is an essential part of the context stage and should result in the development of specific goals which become the basis for the second evaluation stage, Input.

During the Input stage potential treatments are designed (i.e., inservice experience). Process evaluation provides ongoing information about the achievement of goals and objectives. These evaluations are frequently referred to as formative, that is, they provide information which shapes the formation of the final product. Product evaluations measure attainment of objectives and are widely known as summative evaluation, that is, the summing up of progress.

Stufflebeam clearly supported the careful identification of teaching competencies. In the CIPP model this identification process is a necessary prerequisite to inservice training efforts. Needs assessment activities should be relevant to the context in which they will be conducted in order to best determine the content of inservice training and to maximize the results of that training.

Improving Special Needs Inservice Activities

The development and assessment of quality teachers has become a major educational issue for the mid-1980s. Many teachers are beginning to realize that the competencies they mastered during undergraduate programs are inadequate to meet their ever-developing needs in the classroom (Berman & Friederwitzer, 1981). Lindsay, Morrison, and Kelly (1974) use the term professional half-life to describe the phenomenon of professional competencies becoming obsolete.

> In 1940, new professionals became half as competent within 12 years of their formal training, the emerging professionals today are confronted with the fact that their level of competency becomes obsolete in only five years. (p. 189)

DOMAINS	PHASES			
	Assessment	Planning	Implementation	Evaluation
1. Educational Needs of the Student				
2. Personal Needs of the Student				
3. Classroom Social Environment				
4. Classroom Physical Environment				
5. The Individualized Education Plan				
6. Course Curriculum				
7. Instructional Materials				
8. Special Needs Support Services				
9. Parents				
10. Community Resources				
11. Legislation and Funding				
12. Continuing Professional Development of the Teacher				

Figure 2
The Special Needs Teacher Competency Matrix

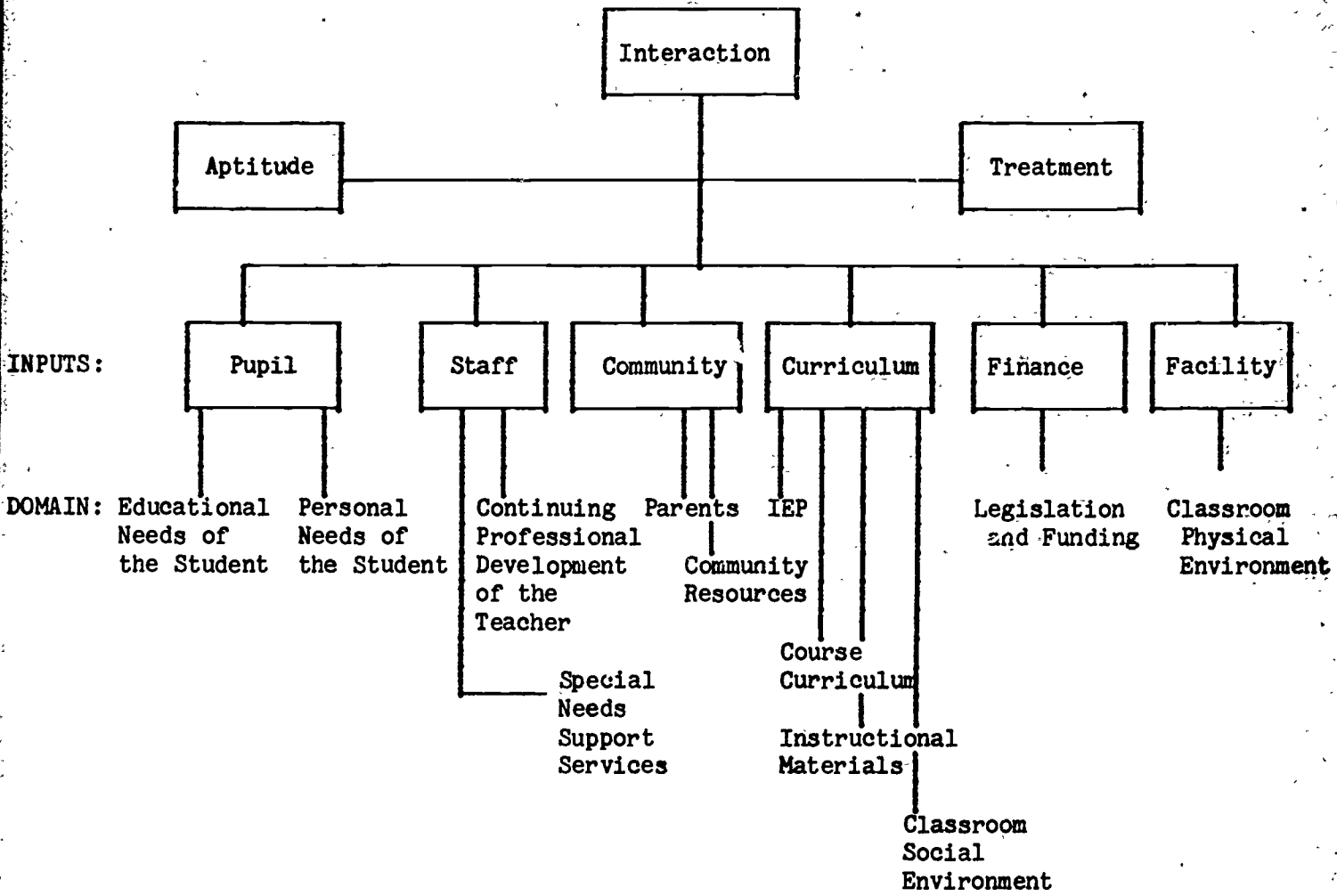


Figure 3
The Special Needs Conceptual Framework

Adapted from Russo, R. P. Toward Understanding and Evaluating Special Needs Programs. Minnesota Research and Development Center for Vocational Education, University of Minnesota, 1981.

If teachers are to persevere throughout a typical 20 or 30 year professional career, they will need increased amounts of frequent, high quality, inservice education. It seems reasonable to conclude that effective inservice training programs must be developed to increase the special needs-related competencies of vocational educators before they fall even further behind the technological, sociological, economic, and educational developments occurring in today's society. Periodic needs assessments provide potentially valuable methods for enhancing the efficiency and effectiveness of efforts to develop inservice activities.

Inappropriate inservice training programs may actually inhibit the delivery of effective vocational programs to special needs populations. Specifically, poor quality inservice activities may be more detrimental to the special needs cause than no inservice activities at all (Batsche, 1979). Inservice activities imply the need for change, but even when the need for change is recognized, it is difficult if the mandate is externally imposed. It is crucial that members of the total educational community assume the responsibility of deciding how educational changes will be achieved in schools, colleges, and universities; such changes will not be achieved easily or quickly (Butler, 1978). In the past, most inservice activities have been initiated by colleges or universities and state education agencies. Recently, however, there has been a growing recognition of the fact that relevant inservice training can and should be provided in a variety of forms by numerous types of deliverers (Rude, 1978). The individual needs of participating school personnel should be considered if improved competencies/skills and, eventually, more effective services are to be achieved. This means that inservice activities should be more personalized (Tunick & Holcomb, 1980). It is imperative that we acknowledge Berman and Friederwitzer's (1981) conclusion that the quality of inservice experiences should be improved by relating the content of inservice programs directly to identified staff needs.

Once acceptable ways of implementing inservice activities have been initiated successfully, the motivation and interest generated by those successes may be contagious. The visible results of inservice activities often encourage other educators to attempt strategies and experiences that have been shown to be effective for their inservice-participant peers (Burks, 1973). Inservice activities which are well designed and which meet specifically identified needs can, therefore, potentially serve an extended population beyond the initial participants. This extended impact would appear to be the excellent justification for investing school districts' and inservice planners'/deliverers' time and resources.

Positive Impact of Effective Inservice Activities

Phelps and McCormick (1981) examined four special needs-oriented inservice training programs which were shown to have had numerous substantial positive effects. Participants in these programs noted that they perceived themselves to have appreciably improved their abilities to "...collect and use vocational assessment information, plan and individualize vocational instruction, and communicate with other professionals" (p. 19). Clearly, if such improvements can be achieved elsewhere by means of appropriate inservice activities, the costs in terms of time and effort will have been wellinvested.

Lawrence (1974) and Mann (1976) discovered that successful inservice activities tend to use materials which were specifically designed and prepared for participants and which offered active participation and immediate opportunities for success. These activities have also tended to offer self-initiated, self-directed learning experiences.

Regrettably, not all inservice efforts are as successful as those cited above. When inservice or staff development activities are delivered, it is often naively assumed that participants share delivery agents' acceptance and enthusiasm for such experiences. In reality, this has not always been the case. In fact, institutions of higher education which offer teacher inservice have often been viewed in a negative light by teachers at the local district level (Dillion, 1979). Unfortunately, most research-oriented university efforts have dwelled on initial acquisition of teaching skills, rather than the improvement of teaching performance (McNergency & Carrier, 1981). It is the latter which is the focus of inservice activities.

The National Education Association (1977) noted increasing teacher dissatisfaction with the available options for obtaining inservice training. They found that many teachers were demanding the following:

1. Inservice activities should be closely related to teaching duties and must be made a part of their job assignments;
2. Inservice offerings should be related to teachers' assessments of their teaching-related needs;
3. Teachers should have significant input in the determination of the content of inservice activities and delivery systems which they perceive to be most meaningful; and
4. Inservice activities must not duplicate offerings available elsewhere (p. 2).

A study by Joyce, Howey, and Yarger (no date) focused on the delivery of inservice activities. They found three factors which contributed to effectiveness: (a) incentives; (b) the interface of learners and training, i.e. when and how; and (c) the selection of staff appropriate to the training process, i.e. who delivers the inservice activities. To enhance the provision of useful, acceptable inservice activities and avoid past problems caused by excluding planning input from teachers (Mortenson & Grady, 1979), a more thorough understanding of the When, How, and By Whom dimensions should be developed.

Inservice Delivery

There appears to be very little information available about vocational education that would be directly applicable to efforts specifically designed to deliver special needs-related inservice activities. The following section synthesizes the limited contents of the literature about inservice issues. It is believed appropriate to extrapolate, in regard to times, format, and providers of inservice, to inservice for vocational educators serving special needs learners.

When. Regan and Deshler (1980) noted that the time selected for inservice delivery is an important factor in the planning of inservice activities. The Southeast Idaho Teacher Center Consortium (1979) proposed that inservice activities may be delivered to teachers at the following times: (a) weekday afternoons after school, (b) weekday evenings, (c) saturdays, (d) during summer vacation, and (e) during the school day. The West Virginia State Department of Education (1979) suggested similar categories and added: (f) during abbreviated school days, and (g) before the school day begins. Pucel (1976) researched inservice time preferences among part-time adult vocational instructors. In rank order, he found the following preferences: (a) late afternoons, (b) evenings, (c) early afternoons, and (d) weekends.

How. Numerous authors have suggested extensive lists of inservice formats containing up to 21 options. Only a few of these will be elaborated here. Marmot (1980) classified inservice education formats in the following way: (a) large group training activities, (b) small group meetings, (c) individualized training activities, and (d) cross-district activities. Mohr (1979) was more specific in his listing of inservice formats: (a) regularly scheduled courses; (b) summer institutes, i.e., credit courses for three weeks or less; (c) weekend courses; (d) conferences; (e) mini-institutional modules, i.e., self-contained learning packages; and (f) gratis consultancies where university faculty or other experts render free consulting services in brief one-time-only problem solving efforts. Seven basic delivery formats for inservice were identified by the Lincoln Teacher Corps Project (1977). Only those that differ from any of the above are listed here: (a) curriculum development exercises; (b) team teaching; (c) teacher resource centers; (d) workshops, symposia, and retreats; and (e) staff development meetings.

Two studies were found which identified teachers' preferences for the various formats. The research by Regan and Deshler (1980) examined teachers' inservice preferences with regard to format. In rank order their respondents identified the following choices: (a) field-based experiences, (b) demonstrations, and (c) group work. Pucel's work found the following order of preference: (a) workshops, (b) university courses, (c) self-study materials, and (d) others.

By whom. Inherent in the inservice delivery options listed by the Southeast Idaho Teacher Consortium (1979) are several potential providers: (a) college or university faculty, (b) professional group representatives, (c) teaching colleagues, and (d) self-study. In addition, the National Education Association (1975) alluded to a variety of persons who should be considered potential inservice deliverers: (e) other teachers with appropriate expertise; (f) educator colleagues, (g) topic experts, (h) higher education faculty specialists, (i) students who will be impacted by planned instructional activities, and (j) the teachers themselves, via independent study or research activities.

Substantial evidence has been presented that supports the belief that it is important that teachers can and must make input into the planning of inservice important issues. Unfortunately, little has been done to identify the vocational special needs inservice delivery options which are most preferred by the educators to whom they potentially will be delivered.

CHAPTER THREE

METHODOLOGY-DESIGN

This chapter describes the methodology/research design used in the development and field testing of the Special Needs Inservice Survey. This includes the survey's instrumentation, population, sampling plan, data collection methods, and data analysis techniques.

Instrumentation

Peak and Brown (1980) previously reported on the development of a pilot-test instrument to determine the feasibility of identifying educator training needs in each of the domains and phases of the Teacher Competency Matrix. (See Figure 2). After additional revisions and field-testing, the finalized instrument was used to collect data for this study. Part I of the instrument focuses on specific information about each respondent's educational background, vocational licenses obtained, and amount of teaching experience.

Part II of the instrument identifies respondents' training and self-perceived levels of skill in four phases: (a) pre-assessment, (b) planning, (c) delivery, and (d) assessment. Additionally, respondents noted whether or not those skill phases are currently part of their job descriptions. Likert scales with three to five choices allowed respondents to rate their responses to most questions. Questions in Part II are based on the Peak & Brown (1980) and the Smith et al. (1982) models. They are referred to as General Instructional Skills and Specific Instructional Skills, respectively.

Part III of the instrument asks respondents to rate various aspects of inservice delivery options. Respondents rate how they would like to have inservice activities delivered, when they would prefer to receive the training, and who they would prefer to have deliver these activities. Finally, they are asked to estimate the extent of their willingness to pay tuition costs to enroll in inservice activities.

Part IV of the instrument asks respondents to estimate the total number of quarter hours of college credit previously acquired in courses related to special needs topics. In addition, the instrument asks respondents to estimate the total number of clock hours of noncollege credit inservice activiites they have completed. These data provide additional insights into respondents' level of commitment to developing their special needs-related skills. Appendix A contains a copy of the survey instrument.

Population

The population surveyed with this instrument was comprised of individuals identified by the Minnesota State Deparmtent of Education as being vocational educators, industrial arts instructors, or administrators of secondary and post-secondary vocational education progams. For the purposes of this study, it was assumed that educators employed by secondary schools (n=5045) and those employed by postsecondary institutions (n=3235) are sufficiently different that they should be treated as separate subsets of this study's population. Both the secondary and postsecondary strata were broken into various subgroups of administrators and teachers (see Table 1).

Sampling Plan

The sample sizes of the subgroups surveyed were based on a predetermined amount of acceptable error and the estimated return rate from three mailings of the questionnaire for each of the two strata. A more detailed discussion of the

procedure used to calculate the number of surveys to mail to each subgroups is presented in Appendix B.

Based on past special needs-related inservice survey studies, it was estimated that after three mailing of the questionnaire a return rate of about 67% might be achieved. Therefore, the sample size needed (i.e., the number of surveys to mail) for the secondary strata was 542. The sample size needed for the postsecondary strata was 521. It was also determined that the proportion of each subgroup within each sample should accurately reflect the proportion of that subgroup in the strata. The acceptable error rate for each strata within this study was set at ± 5%. Therefore there is a 95% probability that the results of this study are correct if the number of surveys returned met the error band criteria. Table 2 shows the size and relative proportion of each strata for the sample and the actual population.

TABLE 1. Number and Percentage of Individuals in Various Subgroups of the Secondary and Postsecondary Strata

Subgroup	Secondary		Postsecondary	
	n	%	n	%
Administrators	470	9.3	565	17.5
Agriculture instructors	285	5.6	175	5.4
Distributive Education instructors	145	2.9	225	7.0
Health Occupations instructors	65	1.3	325	10.0
Home Economics instructors	1310	26.0	95	2.9
Industrial Arts instructors	1255	24.9	*	
Business and Office instructors	1040	20.6	555	17.2
Trade and Industrial instructors	475	9.4	1295	40.0
TOTAL	5045	100.0	3235	100.0

* Industrial arts is not offered as a course/curriculum option in Minnesota postsecondary institutions.

TABLE 2: Number and Percentage of Individuals in Various Subgroups of the Secondary and Postsecondary Samples and Population

Subgroup	Secondary				Postsecondary			
	Sample		Population		Sample		Population	
	n	%	N	%	n	%	N	%
Administrators	50	9.2	470	9.3	91	17.4	565	17.5
Agriculture instructors	31	5.7	285	5.6	29	5.6	175	5.4
Distributive Education instructors	16	3.0	145	2.9	37	7.1	225	7.0
Health Occupations instructors	7	1.3	65	1.3	53	10.2	325	10.0
Home Economics instructors	140	25.8	1310	26.0	16	3.1	95	2.9
Industrial Arts instructors	135	24.9	1255	24.9				
Business and Office instructors	112	20.7	1040	20.6	89	17.1	555	17.2
Trade and Industrial instructors	51	9.4	475	9.4	206	39.5	1295	40.0
TOTAL	542	100	5045	100	521	100	3235	100

*Industrial arts is not offered as a course/curriculum option in Minnesota postsecondary institutions.

Data Collection Procedures

Mailing labels for educators in each of the strata under study were obtained from the Minnesota State Department of Education. Each mailing label was numbered with a four digit code for identification purposes. Clerical personnel selected a sample from the labels so that the number of surveys mailed for each subgroup was as close as possible to the predetermined number calculated in the sampling plan. Differences were slight in number and proportion. Table 3 indicates the relationship between the calculated sample sizes and the actual number mailed. In all, a total number of 1053 surveys were mailed.

TABLE 3. Calculated Sample Sizes Versus Actual Sample Sizes

Subgroup	Secondary		Postsecondary	
	Calculated	Actual	Calculated	Actual
	n	n	n	n
Administrators	50	50	91	92
Agriculture instructors	31	30	29	29
Distributive Education instructors	16	17	37	35
Health Occupations instructors	7	9	53	51
Home Economics instructors	140	130	16	12
Industrial Arts instructors	135	146	*	*
Business and Office instructors	112	111	89	86
Trade and Industrial instructors	51	52	206	203
TOTAL	542	545	521	508

* Industrial arts is not offered as a course/curriculum option in Minnesota postsecondary institutions.

The statewide sample was divided into three geographic areas. Mailings were sent from universities located in those areas (University of Minnesota, St. Cloud State University, or Bemidji State University). Cover letters were signed by the special needs teacher educators at those institutions and return envelopes were included. Participants were asked to send the completed survey to the appropriate institution. Samples of the cover letters are found in Appendix C. It was believed that this procedure would enhance response rates.

Data Analysis

Because responses to the instrument were marked on optical scanning forms, coding and key punching of the data were not necessary. However, the forms were scanned at the University of Minnesota Measurement Center and recorded on magnetic tape. The tape was delivered to the University of Minnesota Computer Center for analysis. Appendix A contains a copy of the response form.

Both descriptive statistics and inferential tests of significance were used to examine the results and test the reliability and validity of the Special Needs Inservice Survey instrument. All statistical analysis were conducted using the Statistical Package for the Social Sciences (SPSS) (Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975).

CHAPTER FOUR

FINDINGS

The results of the Special Needs Inservice Survey indicate that Minnesota's vocational and industrial educators have a perceived need for additional special needs-related inservice training, as well as definite preferences regarding the formats, times, and providers of inservice activities. In addition, the data also indicate that this project examined a sample population that was representative of the total target population.

Table 4. Response Rates for Subgroups

Subgroup	Secondary			Postsecondary		
	Number mailed n	Number Returned n	Percent Returned %	Number Mailed n	Number Returned n	Percent Returned %
Administrators	50	38	76.0	92	75	81.5
Agriculture instructors	30	28	93.3	29	20	69.0
Distributive Education instructors	17	6	35.3	35	20	57.1
Health Occupations instructors	9	4	44.4	51	34	66.7
Home Economics instructors	130	85	65.4	12	10	83.3
Industrial Arts instructors	146	53	36.3	*	*	*
Business and Office instructors	111	62	55.8	86	48	55.8
Trade and Industrial instructors	52	30	57.7	203	121	59.6
TOTAL	545	306	56.1	508	328	64.6

*Industrial Arts is not offered as a course/program option in Minnesota postsecondary institutions.

Chapter 5 of this publication reports the reliability and validity of the survey instrument. Reliability reports are based on test-retest and nonrespondent follow-up data. In addition, the instrument was analyzed for its content, face, construct, and concurrent validity.

Sample Characteristics

The overall response rate of 60.27% was slightly lower than the expected response rate of 67%. Of the 634 usable surveys received, 328 were from the postsecondary strata (for a response rate of 64.6%) and 306 surveys from the secondary strata (response rate of 56.1%). More specific details of the response rates are displayed in Table 4. Overall, a larger proportion of the postsecondary personnel population tended to respond than those educators in the secondary population.

Proportional representation of the population. A Chi-Square goodness of fit analysis was used to compare the proportion of surveys returned by subgroups with proportions found in the statewide population. In each case the null hypothesis stated that the proportional representation of the subgroups in the samples was equivalent to the proportional representation of the subgroups in the strata.

Table 5. Sample and Population Proportions of Subgroups from the Secondary and Postsecondary Strata

Sample Subgroup	Secondary		Postsecondary	
	Sample %	Population %	Sample %	Population %
Administrators	12.4	9.3	22.9	17.5
Agriculture instructors	9.2	5.6	6.1	5.4
Distributive Education instructors	2.0	2.9	6.1	7.0
Health Occupation instructors	1.3	1.3	10.4	10.0
Home Economics instructors	27.7	26.0	3.0	2.9
Industrial Arts instructors	17.3	24.9	*	*
Business and Office instructors	20.3	20.6	14.6	17.2
Trade and Industry instructors	9.8	9.4	36.9	40.0
TOTAL %	100.0	100.0	100.0	100.0

Both secondary and postsecondary analyses yielded nonsignificant values (Secondary X^2 (7) = 14.07, $p \leq .05$; Postsecondary X^2 (6) = 12.59, $p \leq .05$). Thus, the representation of the subgroups among respondents shown in Table 5 is assumed to be equivalent to the statewide population and the sample population can also be assumed to be representative of the total target population.

Confidence limits. A major part of this project's methodology was based on the desire to make accurate projections for the population and its secondary and postsecondary strata, based on the samples obtained.

The use of this technique to estimate confidence levels is illustrated in the following example. In order to be 95% sure that the secondary sample is an accurate representation of the population, the difference between the sample and population porportions must be no greater than + or -2.4%. This can be determined by examining Table 6. Details of these calculations and those to follow are described in Appendix B.

Table 7 shows the proportional differences between the population and sample porportions for each subgroup. These differences were calculated from the data shown in Table 5. For example, the subgroup of secondary administrators was 12.3% of the sample; however, they constitute 9.3% of the total population of vocational educators. The difference is 3.1%. Locating this figure on Table 6 we can see that it falls between the confidence levels of 90 and 85%. It can readily be seen that we can be very confident that the sample of respondents represents the greater population of vocational educators.

Table 6. Confidence Levels and Allowable Error Band Estimate for the Secondary and Postsecondary Strata

Confidence Levels	Allowable Error Band	
	Secondary[a]	Postsecondary[b]
%	%	%
50	+ or - 5.4%	+ or - 5.1%
55	+ or - 5.4%	+ or - 5.1%
60	+ or - 5.3%	+ or - 5.0%
65	+ or - 5.2%	+ or - 4.9%
70	+ or - 5.0%	+ or - 4.7%
75	+ or - 4.7%	+ or - 4.4%
80	+ or - 4.3%	+ or - 4.1%
85	+ or - 3.9%	+ or - 3.7%
90	+ or - 3.3%	+ or - 3.1%
95	+ or - 2.4%	+ or - 2.2%

[a] Sample size = 306, Population = 5,045 [b] Sample size = 328, Population = 3,235

Table 7. Differences and Their Confidence Levels for Subgroups of the Secondary and Postsecondary Strata.

Sample Subgroup	Secondary		Postsecondary	
	Difference %	Confidence Level %	Difference %	Confidence Limits %
Administrators	3.1	90-95	5.4	<50
Agriculture instructors	3.6	85-90	.7	>95
Distributive Education instructors	.9	>95	.9	>95
Health Occupation instructors	0	100	.4	>95
Home Economics instructors	1.7	>95	.1	>95
Industrial Arts instructors	7.6	<50	*	*
Business and Office instructors	.3	>95	2.6	90-95
Trade and Industry instructors	.4	>95	3.1	90
Average	2.2%	>95%	1.88%	>95%

* Industrial Arts programs are found only at the secondary level.

At the time of data analysis, a printing error was found in the optically scanned response sheet. The response options in Parts I and IV were intended to be zero to nine, but were printed as one to ten. These scales were used to indicate demographic information (Part I) and amounts of prior training (Part IV). To analyze these data, all cases that contained a zero or one in any column were omitted. While this greatly reduced the sample size in some analytical procedures, nevertheless, a limited amount of information can be examined without the fear that those numbers were incorrectly recorded.

Respondent job titles, duties, and licenses. Table 8 indicates that almost three-fourths of those responding identified themselves as vocational educators. About 5% of the respondents listed themselves either as an administrator or a work experience program coordinator. Less than 1% of the respondents listed themselves as special education teachers.

Table 8. Present Job Title.

Job Titles	Percent
Vocational Teacher	74.7
Special Education Teacher	0.6
Administrators	5.2
Work Experience Program Coordinator	4.5
Support Services Manager	1.6
Counselor	1.9
Support Services	2.7
Other	8.8
TOTAL	100.0

Slightly over one-fourth (26.2%) of all respondents identified their most recent educational license as Trade and Industrial (See Table 9). About one sixth (15.9%) of the respondents identified their most recent license as Business Education. Almost 10% of the respondents identified their most recent license as related to Special Needs. Only 2.7% listed their most recent license as Technical. In a related item on the survey, 92.7% of all respondents indicated that they currently held a valid vocational license.

Table 9. Most Recent Educational License.

License	Percent
Administrative and Related	6.1
Agriculture	7.3
Business Education	15.9
Distributive Education	4.3
Health Occupations	6.5
Home Economics	14.5
Special Needs	9.6
Technical	2.7
Trade and Industrial	26.2
Other	6.9
TOTAL	100.0

Special needs students served. Slightly more than half of all respondents indicated they served either secondary or postsecondary special needs students (see Table 10). One-third indicated they dealt with special needs students in adult education programs. Few respondents indicated they served nongraded special education students or students in other categories.

Table 10. Percent of Respondents Serving Specific Student Populations

Grade Level	Percent
Secondary	53.6
Postsecondary	54.6
Adult	33.1
Nongraded special education	2.2
Other	3.0

* Does not total 100 percent because respondents may respond to more than one grade level served.

Special Needs-Related Skills

Part II of the survey examines instructors' skills related to teaching special needs students. The purpose of Part II's General Instructional Skills scale was to measure respondents' self-perceptions of their skills in areas derived from the model developed by Peak and Brown (1980). On the five point response scale, 1 was low, 3 was moderate, 5 was high. Table 11 indicates that respondents perceived their area of greatest strength was in using their schools' support services to help in the instruction of their students. Respondents felt weakest in the use of parents/guardians or community resources as supplements to instructional efforts. Standard deviations can be found in Appendix B.

The Specific Instructional Skills scale in Part II, derived from the 1982 Smith et al. model, also measured respondents' self-perceptions in various skill areas related to special needs students. Respondents felt most proficient at providing educational activities which were hands-on, trial-and-error experiences (see Table 12). Respondents tended to feel weakest in their abilities to match educational activities with students' readiness and to determine the length of time students need to practice newly learned skills. The standard deviations of these ratings can be found in Appendix D. Thus, respondents tended to rate themselves somewhat higher on the Specific Skills items than on the General Skills items.

Table 11. Item Means and Standard Deviations on the General Instructional Skills Scale

Item	Low 1	2	Moderate 3	4	High 5
8. Use styles of instruction which match the ways in which your students prefer to learn. (n=624)			b [. X̄ .] b		
9. Help your students improve their ability to interact effectively with other people. (n=631)			[. X̄ .]		
10. Establish a classroom environment which stimulates learning (n=629)			[X̄.]		
11. Identify physical changes needed in your classroom/ laboratory to accommodate students' instructional needs (n=628).			[. X̄ .]		
12. Adapt your instructional activities, as required for students with Individualized Education Programs (IEPs). (n=627)		[. X̄ .]			
13. Adapt your instructional materials to the unique instructional needs of your students. (n=628)		[. X̄ .]			
14. Use your school's support services (reading and math specialists, counselors, interpreters, etc.) to help you instruct your students. (n=630)			[. X̄]		
15. Use your students, parents, or guardians to supplement your instructional efforts. (n=628)		[. X̄ .]			
16. Use community resources to supplement your instructional efforts. (n=630)		[. X̄. .]			
17. Comply with special needs-related laws and regulations. (n=631)			[. X̄ .]		

a, X=mean
b, [ ]=spread of standard deviation

Table 12. Item Means and Standard Deviations on the Specific Instructional Skills Scale

Item	Low 1	2	Moderate 3	4	High 5
18. Provide educational activities which are hands-on trial and error experiences. (n=625)			b a b [X]		
19. Effectively use charts, pictures, graphs, and other visually-oriented instructional materials. (n=630)			[X]		
20. Use spoken and written communications to provide effective instructional experiences.			[X]		
21. Deliver instructional activities at rates which match students' ability to learn. (n=631)			[X]		
22. Match instructional activities to students' readiness (ability and prior training) to learn. (n=631)			[X]		
23. Organize vocational topics into meaningful units or "clusters" which will maximize students' opportunity to learn. (n=631)			[X]		
24. Select appropriate sequences for instructional activities. (n=630)			[X]		
25. Establish realistic goals and objectives for each of your students. (n=629)			[X]		
26. Determine how often students need to practice the new vocational skills they have learned. (n=631)			[X]		
27. Reinforce or reward students for achieving goals or for desired behavior. (n=630)			[X]		
28. Inform students of how well they are performing so they know where improvement is needed. (n=630)			[X]		

a, $\bar{X}$=mean
b, [ ] spread of standard deviation

Part II of the survey also asked respondents to rate themselves in relation to four broad statements about assessment, planning, instruction, and evaluation (the phases of instruction) and to indicate whether or not each phase was presently a part of their job. These Skill Categorys items indicated that respondents tended to feel their skills levels were moderate or higher (See Table 13). In general, respondents felt that their skills in planning and preparing (item 31) and implementing or delivering instructional activities (item 33) were greater than their skills in identifying or assessing instructional needs of students (item 29) or assessing the effectiveness of instructional activities or materials (item 35). Actual values of means and standard deviations are reported in Appendix D.

Almost 60% of the respondents felt that identifying and assessing instructional needs of students was definitely part of their job. Three-fourths of all educators who responded felt that planning, preparing, implementing or delivering, and/or assessing the effectiveness of instructional materials and activities was definitely part of their job. Actual values of means and standard deviations are reported in Appendix D.

Table 13. Item Means and Standard Deviations for Skill Categories

Item	Skill Level				
	Low		Moderate		High
	1	2	3	4	5
29. Identify and assess instructional needs of students related to each of the skill areas listed in items 8 to 28 (n=628)	.	.	[. $\bar{X}$.] (a, b)		
31. Plan and prepare instructional materials and activities (n=6280)	.	.	[. $\bar{X}$.].		
33. Implement or deliver instructional materials and activities(n=629)	.	.	[. $\bar{X}$.].		
35. Assess the effectiveness of instructional materials and activities(n=629)	.	.	[. $\bar{X}$.].		

a, $\bar{X}$=mean
b, [ ] spread of standard deviation

Inservice Delivery Preferences

Part IV of the survey examined the preferences for the delivery of inservice instruction related to special needs students. The format listed as most desirable by respondents was the observation of successful programs and teachers (See Table 14). In fact, all formats except courses had average ratings of desirable or better. Course work (item 41) was listed as only slightly below desirable. Means and standard deviations are found in Appendix B.

Table 14. Inservice Format Preferences Means and Standard Deviations

	Not Desirable 1	2	Desirable 3	4	Highly Desirable 5
37. Individual advice from instructional consultants or specialists (n = 632)			b a b [. X̄ .]		
38. Individualized teacher training materials (i.e. films, workbooks, programmed learning packages) (n = 630)			[. X̄ .]		
39. Observations of programs and teachers who have successfully served special needs students (n = 628)			[. X̄ .]		
40. Workshops (1 to 3 days) (n = 627)			[X̄ .]		
41. Courses (e.g., 10 weeks - 1 session/week) (n = 629)		[. X̄ .]			
42. On-the-job experiences (internships) in programs successfully educating special needs students (n = 628)			[. X̄ .]		

a, X̄=mean
b, [ ] spread of standard deviation

The range of mean ratings for respondents' preferences for the time of inservice activities was quite large (see Table 15). Respondents had a strong tendency to feel that the most desirable time to receive inservice training was during professional days. Respondents also felt that after school-afternoons, after school-evenings, and summer-weekdays to be slightly undesirable. Respondents clearly felt that inservice training before school in the morning or on weekends is not desirable.

Table 15. Time of Inservice Preferences Means and Standard Deviations

Item	Not Desirable 1	2	Desirable 3	4	Highly Desirable 5
43. "Professional" days (days when teacher released from teaching dutues to participate in Professional development activities.) (n-630)	.	.	[X]		
44. Before schcol--mornings (n=629)	[. X .]		.	.	.
45. After school--afternoons(n=629)	.	[. X .]		.	.
46. After school-evenings(n=631)	.	[. X .]		.	.
47. Weekends(n=629)	[X.]		.	.	.
48. Summer--weekdays(n=629)	.	[X]		.	

a, X=mean
b, [ ] spread of standard deviation

Responses to the potential providers of inservice activities are listed in Table 16. All were rated as desirable or higher by respondents. The highest rated items were university faculty with expertise in both special and vocational education, or other educators who are instructional methods experts. The lowest rated choice was professional education organizations. Means and standard deviations can be found in Apendix D.

When asked if they would be willing to pay college tuition in order to participate in special needs-related inservice activities, assuming topic, format, time, and provider were acceptable, over half (53.2%) said they would. About one-fourth (24.5%) indicated they would probably or definitely not be willing to pay. About one-fifth (22.3%) were uncertain as to their willingness to pay college tuition for special needs-related instruction.

Table 16. Ranked Item Means and Standard Deviations for Provider of Inservice References

	Not Desirable 1	2	Desirable 3	4	Highly Desirable 5
49. Other educators who are instructional methods experts			$\bar{X}$		
50. Professional education organizations			$\bar{X}$		
51. University faculty from departments of vocational education			$\bar{X}$		
52. University faculty from departments of special education			$\bar{X}$		
53. University faculty with expertise in both vocational and special education			$\bar{X}$		

Findings Summarized

The findings of this survey are many and diverse. The sample's demographic characteristics show that respondents are a very good representation of the target population throughout Minnesota. Respondents rated their General Instructional Skills only moderately strong (3.08 on a 5 point scale) as related to service to special needs students. Respondents perceived their skills in Specific Instructional Skills relatively high (3.8 on a 5 point scale). Over 75% of the educators responding identified planning, implementation, and evaluation of instruction as a part of their job while only 58% identify or assess the instructional needs of their students.

Preferred service delivery models were clearly identified. Observations, individualized training, and advice were top ranked formats. Also, the use of professional days was a clear favorite for inservice training. In addition, respondents favored training by persons with expertise in instructional methods and in both vocational and special education.

CHAPTER FIVE

INSTRUMENT RELIABILITY AND VALIDITY

A major aspect of this research was the in-depth examination of reliability and validity of the Special Needs Inservice Survey. The careful sampling methodology of this project provided assurance that the sample population was highly representative of the potential population of vocational educators. Satisfactory reliability of the instrument itself was established by three differing methods. In addition, the instrument was examined for its content, face, construct, and concurrent validity. All were found to be adequate.

Reliability

This section of the report examines three aspects of the reliability of the Special Needs Inservice Survey. Data are provided to establish both the test-retest reliability and the similarity of the respondents with those who did not respond. Finally, evidence is provided to establish the internal consistency/reliability of the General Instructional Skills and the Specific Instructional Skills scales.

Test-Retest and Nonrespondent Reliability Methodology

In the second phase of the sampling plan a telephone survey was used to determine: (a) test-retest reliability and (b) to examine the possibility that basic differences exist between respondents and nonrespondents. Approximately 10% of the original respondents and 10% of those who had not responded to the survey were randomly selected for the reliability studies. These will be referred to as the reliability samples. Those educators who were members of the reliability samples were asked to respond to all of the demographic (Part I) and prior special needs training questions on the instrument (Part IV), plus a random selection of 14 items from Parts II and III. Table 17 lists the method of item selection for reliability samples.

Plans for Analysis

The method used to establish instrument reliability compared responses by members of the original sample with two subsamples: a group who previously responded to the mailed survey, test-retest (TRT), and a group who had not responded, nonrespondent (NR). This method calculated the Absolute Difference between the average rating of the original respondents on instrument items and the average rating of both reliability samples on those same items. When the absolute difference between the above mentioned groups' scores is zero or close to zero, it is assumed to be evidence that the instrument reliably assessed respondents' inservice needs and that the groups' respondents and nonrespondents are similar. Additionally, the absolute difference should be within plus and minus one standard deviation of the original scores indicating they are very like the original sample. It is a major assumption of this methodology that, because of random sampling, the small sample of scores per item for the nonrespondent and retest groups are representative of their respective groups.

Table 17. Item Selection Methods for Reliability Samples

Item Type	Instrument Item Numbers	Selection Process	Number of Items on NR* and TRT** Samples
Part I			
Demographic	1-5	All	5
Part II			
General Instructional Skill Scale	8-17	Random	2
Specific Instructional Skill Scale	18-28	Random	2
Skill Categories	29-36	Random	4 (2 pairs)
Part III			
Inservice Delivery Preference			
Format	37-42	Random	2
Time	43-48	Random	2
Provider	49-54	Random	2
Part IV			
Prior Training	55-60	All	2

* Nonrespondent
** Test-retest

Reliability Findings

Sample

Approximately 10% of the original respondents were randomly selected to participate in the test-retest reliability study. Table 18 describes the 10% sub-population sizes and response rates for each educator category used in the survey. Of the 64 people selected for the test/retest reliability study, 58 or 90.6% agreed to participate. In coding and key punching the data, one response was found to contain unexplainable errors and was omitted, therefore, test-retest reliability was calculated on a sample of 57 surveys. In some cases

Table 18. Response Rate for Two Reliability Samples

Subgroup	Test-retest Sample Selected n/ Responded n	Test-retest Sample Response Rate %	Nonrespondent Sample Selected n/ Responded n	Nonrespondent Sample Response Rate %
Administrators	11[a]/10[b]	90.9	3[a]/2[b]	66.6
Agriculture Instructors	5/5	100	2/1	50
Distributive education instructors	3/3	100	2/2	100
Health occupations instructors	4/4	100	3/2	66.6
Home Economics instructors	10/10	100	6/3	50
Industrial Arts instructors	5/3*	60*	9/6*	66.6
Business and Office instructors	11/9	81.8	8/6	75
Trade and Industrial instructors	15/14	93.3	11/9	81.8
TOTAL	64/58	90.62	44/31	70.45

*Industrial Arts is not offered as a course/program option in Minnesota postsecondary institutions.

[a] Number of subjects selected for the reliability sample, 10% of original sample
[b] Number of subjects responding to the reliability survey.

the sample size was less than 57; this was due to the fact that not all individuals answered all questions, and therefore, many items have less than 57 responses.

Subgroups. The test-retest reliability sample described in Table 18 closely resembles the original sample with regard to its distribution of participants in the various educator subgroups. There was a 93.75% response rate from the original population of secondary educators and 87.5% response rate from those serving postsecondary students. Approximately 10% of those who had not originally responded to the survey were selected randomly to participate in the nonrespondent reliability study. Of the 44 people selected for the nonrespondent follow-up study, 31 (70.4%) agreed to participate. The nonrespondent

reliability sample is somewhat less representative of the original sample's distribution. The response rate for those serving postsecondary students is 78.9%, but only 64% for the secondary level. Appendix C shows the details of response rates for both strata and both reliability subgroups.

Grade level. The average Absolute Difference for the retest sample concerning the grade level served was 6.6 (see table 19). This represents an average difference of about 7% when comparing this group's retest responses with their original responses.

Table 19. Percent of Test-Retest and Nonrespondent Samples Serving Specific Student Populations.

	Test-Retest (TRT) Sample			Respondent/ Nonrespondent (NR) Sample		
Grade level	Test %	TRT %	Absolute Difference %	Original %	NR %	Absolute Difference %
Secondary	60.7	53.6	7.1	53.6	54.8	1.2
Postsecondary	53.6	53.6	0	54.6	48.4	6.2
Adult	30.4	19.6	10.8	33.1	22.6	10.5
Non-graded Special Education	3.6	3.6	0	2.2	0.0	2.2
Other	1.8	0.0	1.8	3.0	0.0	3.0
Average absolute difference			6.6			4.6

The average Absolute Difference for the nonresponding sample concerning grade level served was 4.6. This represents an average difference of about 5% when comparing the groups served by the respondents versus the nonrespondents. Clearly, the reliability sample of nonrespondents was very similar to the original group of respondents with regard to whom they served.

General Skills Compared

The average Absolute Difference on the General Instructional Skills scale for both the test-retest group and nonrespondents was .32 (See Table 20). This figure represents about one-third of one unit on a five point scale. For the test-retest group, the items with the highest Absolute Differences (.71 and .64) were: ability to use students' parents/guardians to supplement instruction, and ability to comply with special needs-related laws and regulations. For nonrespondents the item with the largest absolute difference (1.01) asked persons to rate their ability to use school support services to supplement students' instruction.

As can be seem in Table 20, even these large differences are still well within the standard deviation of the original sample responses. The findings, therefore, support both the reliability of responses over time for the original sample and similarity of respondents with those who did not respond.

Table 20. Absolute Differences for the General Instructional Skills in the Two Reliability Samples

Item	Absolute Difference TRT	Absolute Difference NR	Original Sample SD*
8. Use styles of instruction which match the ways in which your students prefer to learn.	.30	.36	± .89
9. Help your students improve their ability to interact effectively with other people.	.04	.21	± .89
10. Establish a classroom environment which stimulates learning.	.06	.16	± .80
11. Identify physical changes needed in your classroom/laboratory to accommodate students' unique instructional needs.	.23	.16	± 1.02
12. Adapt your instructional activities, as required for students with Individualized Education Programs (IEPs).	.53	.43	± 1.33
13. Adapt your instructional materials to the unique instructional needs of your students.	.02	.47	± .96
14. Use your school's support services (reading and math specialists, counselors, interpreters, etc.) to help you instruct your students.	.49	1.01	± 1.06
15. Use your students' parents or guardians to supplement your instructional needs.	.71	.12	± 1.14
16. Use community resources to supplement your instructional efforts.	.21	.07	± 1.17
17. Comply with special needs-related laws and regulations.	.64	.20	± 1.17
Average Absolute Difference	.32	.32	1.04

*N's range from 624 to 630

Specific Skills Comparison

The average Absolute Difference on the Specific Instructional Skills scale was .27 for test-retest and .53 for nonrespondents. (See Table 21). These figures represent about 30% and 50% of one unit on a scale of one to five. The instrument item for test-retest group with the highest absolute difference (.61) focused on respondents' abilities to select appropriate sequences for instructional activities.

Within the nonrespondent group, the largest differences were 2.47 and .92. These differences were for items that asked respondents to rate their ability to match instructional activities to students' readiness to learn and to select appropriate sequences for instruction. While the first difference appears large, it should be noted that only one nonrespondent was asked to reply to this item. The large difference value for this instrument item also has a large effect on the average Absolute Difference for this group of items. All other differences are well within the standard deviation values of the original group. These findings, therefore, tend to support the reliability of the original sample and the similarity of nonrespondents to respondents.

Skill Categories

The test-retest group's average absolute difference in mean ability on the Skill Categories section was .23 (See Table 22). This represents about one-fourth of a point on a five point scale. The average Absolute Difference in these abilities for nonrespondents was .16 (See Table 22). This represents about one-sixth of one point on a five point scale. The item having the largest Absolute Difference for both groups (.41 and .45) asked respondents to rate their ability to plan and prepare instructional materials and activities. Table 21 shows that these differences are well within the standard deviation of the original sample, supporting the test-retest reliability, as well as the similarity between nonrespondents and respondents.

The average absolute difference on the job requirement part of the Skill Categories section was .19 for the test-retest group, and .16 for the nonrespondent group (Table 22). These figures represent approximately one-fifth and one-sixth of a point on a three point scale. The retest group's item with the largest absolute difference (.25) asked the degree to which the implementation and delivery of instructional materials and activities were required by the respondents' jobs. The nonrespondent group's item with the largest absolute difference (.28) asked respondents about the degree to which their jobs require the identification and assessment of the instructional needs of students. Again, these small differences provide evidence that supports both instrument reliability and sample similarity.

Inservice Delivery Preferences

The average Absolute Difference on the Inservice Delivery Preferences section of the instrument was .38 for test-retest scores and .33 among the nonrespondent groups (Table 23). These represent about one-fifth and one-third of one point on a scale of one to five. The test-retest group showed the largest Absolute Difference (1.24) when respondents rated their preference as to the delivery of inservice programs during professional days. The nonrespondent group's largest difference (.76) occurred among preferences related to the delivery of inservice programs on summer weekdays. Results support the instrument's reliability and the similarity of nonrespondents to those who did respond.

Table 21. Absolute Differences for the Specific Instructional Skills in the Two Reliability Samples

Item	Absolute Difference TRT	Absolute Difference NR	Original Sample SD*
18. Provide educational activities which are hands-on trial and error experiences.	.31	.15	± .94
19. Effectively use charts, pictures, graphs, and other visually-oriented instructional materials.	.35	.22	± .83
20. Use spoken and written communications to provide effective instructional experiences.	.11	.46	± .75
21. Deliver instructional activities at rates which match students' ability to learn.	.09	.15	± .94
22. Match instructional activities to students' readiness (ability and prior training) to learn.	.32	2.47	± .97
23. Organize vocational topics into meaningful units or "clusters" which will maximize students' opportunity to learn.	.33	.43	± .97
24. Select appropriate sequences for instructional activities.	.61	.92	± .90
25. Establish realistic goals and objectives for each of your students.	.18	.21	± .96
26. Determine how often students need to practice the new vocational skills they have learned.	.04	.30	± .94
27. Reinforce or reward students for achieving goals or for desired behavior.	.33	.34	± .84
28. Inform students of how well they are performing so they know where improvement is needed.	.31	.22	± .81
Average Absolute Difference	.27	.53	.895

*N's of original respondent sample range from 629 to 631.

Table 22. Absolute Differences for the Skill Categories Two Reliability Samples

Item	Absolute Difference TRT	Absolute Difference NR	Original Sample SD*
Skill Level			
29. Identify and assess instructional need of students related to each of the skill areas listed in items 8 to 28.	.19	.11	± .95
31. Plan and prepare instructional materials and activities.	.41	.45	± .97
33. Implement or deliver instructional materials and activities.	.19	.01	± .92
35. Assess the effectiveness of instructional materials and activities.	.12	.09	± .94
Average Absolute Difference.	.23	.16	.94
Job Requirements			
30. Identify and assess instructional needs of students related to each of the skill areas listed in items 8 to 28.	.21	.28	not
32. Plan and prepare instructional materials and activities.	.17	.20	reported
34. Implement or deliver instructional materials and activities.	.25	.03	
36. Assess the effectiveness of instructional materials of activities.	.13	.11	
Average Absolute Difference.	.19	.16	

*Original sample sizes were 628 and 629

Table 23. Absolute Differences for the Inservice Delivery Preferences in the Two Reliability Samples

Item	Absolute Difference TRT	Absolute Difference NR	Original Sample SD*
Inservice Format			
37. Individual advice from instructional consultants or specialists.	.351	.43	± 1.05
38. Individualized teacher training materials (i.e., films, workbooks, programmed learning packages).	.10	.52	± 1.12
39. Observations of programs and teachers who have successfully served special needs students.	.56	.67	± 1.08
40. Workshops (1 to 3 days).	.49	.04	± 1.05
41. Courses (e.g. 10 weeks - 1 session/week).	.61	.52	± 1.15
42. On-the-job experiences (internships) in programs successfully educating special needs students.	.22	.59	± 1.25
Time of Inservice			
43. "Professional" days (days when teacher are released from teaching duties to participate in professional development activities.	.24	.39	± 1.07
44. Before school - mornings.	.01	.06	± 1.04
45. After school - afternoons.	.51	.23	± 1.26
46. After school - evenings.	.54	.12	± 1.22
47. Weekends.	.17	.01	± 1.12
48. Summer - Weekdays.	.29	.76	± 1.36
Inservice Provider			
49. Other educators who are instructional methods experts.	.59	.10	± 1.07
50. Professional education organizations.	.11	.25	± 1.02
51. University faculty from departments of vocational education.	.02	.32	± 1.10
52. University faculty from departments of special education.	.18	.59	± 1.08
53. University faculty with expertise in BOTH vocational and special education.	.30	.15	± 1.13
54. Would you be willing to pay college tuition in order to participate in special needs-related inservice activities? (Assume that the TOPIC, FORMAT, SOURCE, and TIME are acceptable to you.)	.50	.25	± 1.12
Average Absolute Difference	.38	.33	± 1.12

* Original Sample N = 627 to 632.

Given the previous discussion and the data presented in Tables 18 through 23, it appears that the Special Needs Inservice Survey has a substantial degree of reliability as indicated by both the test-retest and nonrespondent methodologies. Absolute Differences of .50 or larger were found for only 1 of 47 items on the retest sample, and only 8 of 47 items for the nonrespondent sample. None of these differences were larger than the original sample's standard deviation. Absolute differences of 1.00 or larger were found for only 1 of 47 items on the re-test sample, and 2 of 47 items for the nonrespondent sample. Two of these large differences were greater than the standard deviations of the original sample. However, data for those items were based on a very low number of respondents in the reliability sample.

It can be seen that absolute difference results from the reliability samples fulfill both assumptions to establish instrument reliability: They are uniformly close to zero and within the standard deviation of the original sample.

Internal Consistency Reliability

In order to obtain evidence of the internal consistency/reliability for the Special Needs Inservice Survey, relationships among the ratings on the competencies listed as General Instructional Skills and the Specific Instructional Skills scales were measured via Cronbach's Alpha reliability procedure. The analysis was performed on SPSS.

Both the General and Specific Instructional Skills scales possess a high degree of internal consistency as measured by Cronbach's Alpha which is based on the average correlation among items (see Table 24). Both scales possessed Alpha values of .80 or greater.

Table 24. Internal Consistency Reliability of Scales as Measured by Cronbach's Alpha. (N=609)

Scale	n	Alpha
General Instructional Skills (items 8-17)	609	.80
Specific Instructional Skills (items 18-28)	609	.87

In addition to the overall test of internal consistency, the corrected item-total correlation for each item on both scales was also calculated (see Table 25). The General Instructional Skills scale items produced corrected item-total correlations ranging from .38 to .62. All correlations were positive and their probabilities were significant at the .001 level. The Specific Instructional Skills scale items produced corrected item-total correlations ranging from .41 to .65. Again, all correlations were positive and significant at the .001 level.

Based on the reported Cronbach's Alpha values and the corrected item-total correlations, there appears to be adequate internal consistency for both the General and Specific Instructional Skills scales.

Summary

The previous pages have presented evidence as to the degree of reliability of the Special Needs Inservice Survey. The test-retest and nonrespondent reliabilities were calculated by comparing the Absolute Difference between the mean score of the items for the original survey participants with those of a 10% reliability sample (re-test group, n=58. and nonrespondent's, n=31). The sampling procedure collected information from differing numbers of individuals for each separate item. The overall average Absolute Difference measure for the reliability sample was .289 with a range of .16 to .53. The group average standard deviation was 1.00 with a range .89 to 1.12. These low Absolute Difference figures show that the reliability sample responses are very similar to those of the original sample. Futher evidence of retest reliability and nonrespondent sample similarity can be deduced from the fact that Absolute Differences are well within the standard deviations of the original sample means.

Both the General and Specific Instructional Skills scales produced Cronbach Alpha values of .80 or greater. The lowest corrected item-total correlation for the General Instructional Skills scale was .38. The lowest corrected item-total correlation for the Specific Instructional Skills scale was .41. These correlation scores were well above the .30 level, which is quite acceptable for correlation measures of reliability of this nature.

The evidence presented here tends to strongly support the claim that the Special Needs Inservice Survey is a suitably reliable instrument. The nonrespondent reliability data indicates that those individuals that originally responded are essentially equivalent to those who did not respond. The test-retest reliability indicates that the responses of individuals are highly consistent over a three-month period of time. The internal consistency reliability and calculated corrected item-total correlations show that the items on both the Specific and General Instructional Skills scales tend to measure similar constructs.

Validity

The validity of the General Instructional Skills and the Specific Instructional Skills scales of the Special Needs Inservice Survey were analyzed in terms of content, face, construct, and concurrent validity.

Content Validity

Content validity is a measure of the extent to which an instrument's items represent the domains of content it was designed to measure (Borg & Gall, 1979). The Special Needs Inservice Survey contains items designed to measure respondents' inservice needs. These items correspond to the set of knowledge and skills identified by Peak and Brown's Competency Matrix (1980) and to the skills derived from the model developed by Smith et al. (1982). The survey is believed to reflect the broad domain selected for measurement; i.e., all areas represented by the Competency Matrix and the Smith model.

Since Peak and Brown's Competency Matrix and the Smith model were developed after a review and synthesis of the literature, the content validity associated with prior research studies also tends to support this study.

Table 25. Corrected Item-Total Correlations for the General and Specific Instructional Scale and the Specific Instructional Skills Scale (n = 609).

Item	Corrected Item - Total Correlation *
General Instructional Skills	
Use styles of instruction which match the ways in which your students prefer to learn.	.52
Help your students improve their ability to interact effectively with other people.	.47
Establish a classroom environment which stimulates learning.	.42
Identify physical changes needed in your classroom/laboratory to accommodate students' unique instructional needs.	.44
Adapt your instructional activities, as required for students with Individualized Education Programs (IEPs).	.58
Adapt your instructional materials to the unique instructional needs of your students.	.62
Use your school's support services (reading and math specialists, counselors, interpreters, etc.) to help you instruct your students.	.38
Use your students' parents or guardians to supplement your instructional efforts.	.40
Use community resources to supplement your instructional efforts.	.46
Comply with special needs-related laws and regulations.	.50
Specific Instructional Skills	
Provide educational activities which are hands-on trial and error experiences.	.41
Effectively use charts, pictures, graphs, and other visually-oriented instructional materials.	.51
Use spoken and written communications to provide effective instructional experiences.	.58
Deliver instructional activities at rates which match students' ability to learn.	.59
Match instructional activities to students' readiness (ability and prior training) to learn.	.63
Organize vocational topics into meaningful units or "clusters" which will maximize students' opportunity to learn.	.57
Select appropriate sequences for instructional activities.	.65
Establish realistic goals and objectives for each of your students.	.63
Determine how often students need to practice the new vocational skills they have learned.	.62
Reinforce or reward students for achieving goals or for desired behavior.	.51
Inform students of how well they are performing so they know where improvement is needed.	.61

*NOTE: $p > .001$ for all correlations on this table

In addition, drafts of this instrument and prior pilot study revisions of the instrument were reviewed by other researchers, teachers, project advisory committee members, and vocational teacher educators. Therefore, the content validity of this instrument seems to have been well established.

Face Validity

A Comments Page was attached to the pilot test version of the instrument in order to obtain respondents' reaction to the following aspects of the instrument: a) appropriateness as an inservice needs assessment device, b) level of reading difficulty, c) physical layout and size, d) length, e) competency domains selected, and f) clarity of instructions. The instrument's face validity, a subjective judgment that the instrument appears to cover relevant content (Borg & Gall, 1979), was high among most respondents, especially those with special needs-related job titles. However, among some of the respondents who had little or no prior contact with special needs learners, there were numerous comments which indicated that the instrument was too complex in format, used too many technical terms, and that the skills identified were not necessary for persons not serving special needs learners. Although persons in this group represented fewer than 20% of the respondents, their concerns were considered as the instrument was revised.

It was concluded, therefore, that respondents believed the instrument could measure their inservice needs and that the instrument had moderate to high levels of face validity. However, in order to assure high face validity among a broader range of respondents, the instructions, item content, and format of the final version of the instrument were simplified and its objectives were more clearly stated.

Construct Validity

The rationale used to determine the construct validity of the instrument is that a relationship should exist between respondents' ratings of their instructional skills and their number of: a) special needs students served; b) total credits in special needs-related courses; and c) total inservice noncollege clock hours of preservice/inservice in special needs-related topics. The basis for this rationale is that instructors serving greater numbers of special need students should have had substantial experiences with special needs learners, and that such experiences should enhance their special needs-related instructional expertise. Similarily, increasing amounts of instruction in both college and noncollege inservice activities are assumed to bring about higher related instructional skills and self-ratings of those skills.

The total scores from the General Instructional Skills and the Specific Instructional Skills sections of the instrument scales were analyzed by correlating them with the number of special needs students served, total quarter hours of college credits in special needs topics, and total clock hours of noncollege inservice activities in special needs topics (see Table 26). It should be noted that due to major editing of the data necessitated by a printing error in the instrument, the sample sizes were greatly reduced. Table 26 indicates statistically significant relationships between the General Instructional Skills scale total and the various external measures of exposure to special needs students and/or special needs-related topics. It also seems apparent that a positive relationship exists between the Specific Instructional Skills and the number of special needs students served, as well as with the total quarter hours of college credits in special needs-related topics.

Table 26. Correlations Between Scale Scores and Selected Demographic Variables

Demographic	Scale			
	General Instructional Skills		Specific Instructional Skills	
	r	n	r	n
Number of special needs students served	.21***	204	.18**	206
Total quarter hours of college credit in special needs related topics	.17**	187	.12*	188
Total clock hours of non-college inservice activities in special needs related topics	.30***	158	.12	159

* $p < .05$, ** $p < .01$, *** $p < .001$

Based on the relationships presented in Table 26, it appears there is moderate evidence to support the construct validity of the two scales. However, the impact of the printing error's reduction of the sample size is unknown and, thus, limits inferences that can be drawn from these particular data.

Concurrent Validity

The concurrent validity of the instrument is based on the degree of relationship between the total scores of the General and Specific Instructional Skills scales. It was reasoned that because the scales attempted to measure the same construct, the scale totals should, therefore, be highly positively correlated. The Pearson product-moment correlation between the scale totals was .67 ($p < .001$, $n = 611$) and, thus, substantial evidence of concurrence seems to exist.

Summary

It appears that the competencies listed under General Instructional Skills and Specific Instructional Skills scales on the Special Needs Inservice Survey possess a substantial degree of validity. Content validity is established based on past research into the domains of knowledge from which the scales originated. Face validity of the scales was established during various pilot studies and the present study by teachers, advisory committee members, and other researchers. Construct validity is moderately supported by positive significant correlations between scales scores and external measures of expertise in dealing with special needs students. Concurrent validity is based on a highly positive and significant relationship between the two skill-related scales of the needs assessment instrument.

CHAPTER SIX

CONCLUSIONS

This report has presented the development of a needs assessment instrument. The report has also examined the data collected with the instrument in order to validly and reliably identify the educational competencies which should be the focus of inservice training for vocational educators who are, or will be, serving mainstreamed special needs populations.

It has been shown that the sample used for this study was extremely representative of the population of Minnesota's vocational and industrial arts educators.

Inservice Topics

The respondents' self-perceived skill levels were used to identify logical topics for inservice training efforts. Those competencies receiving the lowest self-ratings (and thus the strongest consideration as inservice topics) were: (a) the use of students, parents, or guardians to supplement instructional efforts, (b) the use of community resources to supplement instruction, (c) the adaptation of instructional activities, and (d) the adaptation of instructional materials. The latter two competencies were identified as being needed on their jobs by approximately 80% of respondents. More than 50% of the respondents indicated that they had moderate or lower ability levels related to the identification and assessment of the instructional needs of students.

Together, this group of competencies provides a clear outline for future inservice training efforts. The identified areas of inservice needs are probably the most difficult of all the competencies to teach because they will be different for every program and, probably, for every instructor. No amount of lecture can adequately develop participants' skills to adapt educational activities and materials for learners with special needs. These skills require creativity, motivation, and imagination. A set of guiding principles or options to consider or the presentation of examples represent only initial steps toward that goal. These skills are acquired by trial and error and perfected by practice. Educators' efforts to assess instructional needs and to adapt curricula to those needs are most productive when results of such efforts can be discussed and compared. This is necessarily time consuming and will certainly not be accomplished in a one day inservice session. The mode of delivery for training related to the identified competencies by this research will determine whether or not those competencies are acquired.

Inservice Preferences

Respondents participating in this research showed clear preferences among inservice delivery models. Observations, individualized training and advice were top ranked formats. The use of professional days was a clear favorite for this training which was thought to be best delivered by persons who have expertise in both vocational and special education and in instructional methods. These responses paralleled those found by earlier researchers.

It is true, unfortunately, that inservice training groups/organizations rarely encourage the practice of observation or offer individualized consultations rather than group training. Also, it is rare to find persons with expertise in all three disciplines whom schools can afford to bring in for extended period of time. These findings have been repeated elsewhere. In addition, such findings offer logical confirmation that respondents in this research effort realized that standard inservice presentations would not be ade-

quate for the skills they needed. These findings should be considered by those in charge of policies and decisions which will impact future inservice training activities. Inservice efforts which attempt to acknowledge these factors will typically take more time, planning, coordination, and imagination than less enlightened efforts. Fortunately, the new approaches are also likely to be more effective in terms of their positive impact on educators, as well as on their students.

Methodological Implications

This study applied sampling techniques borrowed from market research in order to be very certain that the resulting information represented the opinions of the wider population. The use of tightly controlled sampling techniques lends high credence to results. It can be assumed that they are generalizable to the population of vocational educators in Minnesota but the usefulness with vocational educators in other states has not yet been proven. This research project report contributes to the literature by documenting both the reliability and validity of the Special Needs Assessment Instrument and by identifying high priority inservice topics.

Sampling Technique

A major aspect of this study was the application of polling techniques. Educational researchers ordinarily determine sample size based on a calculation of the power needed for a statistical test. It may be that more often, sample size is a pragmatic decision based on the size of the budget. This study used a predetermined acceptable error band, preselected the confidence interval, and specified sample parameters as factors in the determination of sample size. The effect of using the polling techniques was that the number of usable responses was exceedingly close to that which had been predetermined. Careful sampling can result in very usable data bases.

In addition, the use of polling techniques allows researchers to present findings in a common and easily understood manner. Many Americans are aware of the Gallop Poll (and others) in which the percentages reported are said to be accurate 95 times out of 100 to within plus or minus three percentage points. The generalizability of this report is readily visible. Educational research ordinarily relies on reports of statistical significance as represented by probability figures. These are not concepts readily understood or retained by many persons. Ease of comprehension means that data may be presented to, and understood by, a larger audience.

The polling techniques are clearly desirable both for reporting ease and controlling error. However, researchers too must admit the necessity of pragmatic considerations. Future uses of this procedure should include budget considerations. Researchers must be able to calculate the error rate-cost ratio for use in decision making at the proposal level. It would be far better to cancel a survey in which a limited budget would result in an excessive error band than to proceed and report results which cannot be generalized. This cost-effect calculation should result in more efficient use of our limited research dollars.

A decentralized data gathering system was used on the assumption that respondents were more likely to reply to a known source, e.g. their local university and special needs teacher educator as compared to an unknown source. The use of incentives in educational research also has major implications. Incentives have been common in commercial marketing research for several years. In this study the use of an incentive (a certificate for two clock hours of

license renewal credits related to special needs inservice was offered to respondents) may well have had a positive effect on the response rate. Comparison data would be interesting and valuable.

Reliability and Validity

Test-retest and nonrespondent reliability studies were conducted by telephone. An arbitrary choice of 10% of each of the original samples' stratification levels was selected as an adequate representation of the original sample for each of the reliability studies. Only a small portion of the survey questions were asked of each participant in these reliability samples. The results of these studies indicate both a high degree of reliability over time, and the analogous nature of those who had not responded by mail.

More powerful statistical tests would have been possible if the reliability samples had been larger. Future studies of reliability should use standard power calculations* such as in determining sample size so that the appropriate statistical tests may be used.

Validity of the instrument was measured by several methods. Content, face, construct, and concurrent validity analyses resulted in moderate to high support that this instrument is a valid measure of the constructs it presents.

All in all, the methodology used in this study worked well and resulted in data representative of the general population of vocational eduators in Minnesota. The instrument developed by the study is both reliable and valid. Future research of this kind should apply the polling technique of calculating sample size prior to budget determinations and power calculations should be applied to reliability sampling. Greater emphasis should continue to be focused on establishing test-retest and nonrespondent reliability data. Additionally, the effect of offering incentives should undergo comparative testing.

SUMMARY

Now that the validity and reliability of the instrument and the study's findings have been discussed, it seems appropriate to take a brief final look at the implications of this study for future inservice efforts. In terms of appropriate inservice topics for this target population, all of the competencies listed in the instrument are considered necessary to effectively educated special needs learners. Thus, all of these competencies should continue to be an important part of vocation educators' array of competencies. However, the following issues seem to represent these surveyed educators' area of greatest priority for special needs-related professional development: (a) the use of parents or guardians and community resources to supplement instructional activities, (b) how to match instructional activities to students' "readiness" levels, and (c) how to determine the ways in which students should practice their newly acquired vocational skills.

* The probability of making a Type II error, minus one.

Inservice Delivery Factors

Respondents in this study were reasonably receptive to all of the inservice formats suggested. However, the opportunity to observe successful special needs programs and teachers were clearly the most desired choices. Unfortunately, for most teacher educators, the practice of offering courses which typically span an academic quarter, was found to be the least desirable option. The average rating for this option was slightly below the mid point ("moderate") of the rating scale. When feasible, teacher educators and other inservice providers should consider using other formats such as short-term workshops and internships.

As was found during the pilot testing of the instrument, this group of educators has a very strong preference for inservice activities to be held on "professional days" which are officially set aside for such professional development activities. Persons planning inservice efforts would be well advised to use these designated times when that proves feasible. The other time options should be analyzed and selected, as appropriate, when the nature and/or availability of inservice activities preclude the use of professional days.

As might was expected, the preferred deliverers for special needs-related inservice activities are persons with expertise in both vocational education and special education. Unexpectedly, professional education organizations were clearly the least desirable resource for inservice delivery.

Other high priority inservice topics have emerged recently and should also be considered: (a) the Carl D. Perkins Vocational Education Act, for which rules and regulations are currently still under development; (b) the need for technical updating that will keep educators informed of the latest knowledge about student learning processes and related implications for enhancing instructional effectiveness; and (c) the growing importance of the use of "human amplifier" devices, such as microcomputers, to enhance the learning and performance potential of educators, as well as their students.

The Emerging Focus on Transition

Since this study's data were collectd, the US Department of Education has begun to focus substantial amounts of attention and resources on the "Transition" issue. This new emphasis addresses the understandable belief that our society should focus on overcoming many of the problems that occur when special needs learners leave secondary school programs and attempt to enter post-high school vocational training programs or seek to begin functioning as adults in the "world of work." As research and development activities continue to examine transition and related issues, such as more effective collaboration between multiple community social service agencies, a new body of knowledge and policies will emerge that should be addressed more directly in future special needs-related inservice efforts.

RECOMMENDATIONS

As we seek to address these divergent issues, vocational educators should attempt to develop stronger working relationships with other key groups which are also working to provide more efficient/effective services to special needs populations. Not only should we attempt to train special needs persons and their employers, we should be doing so in a cross-disciplinary manner. As vocational educators begin to better understand where their inservice efforts should be focused, they should work more effectively with personnel from other agencies/institutions in our society who also have similar goals.

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APPENDIX A
SPECIAL NEEDS SURVEY INSTRUMENT

SPECIAL NEEDS INSERVICE SURVEY

DIRECTIONS:

Your responses will be read by an optical scanning machine. Respond to each item on this questionnaire by darkening the appropriate circles on the answer sheet.

Carefully observe the following simple rules:

1. Use a pencil with a soft black lead.
2. Make heavy black marks that completely fill the circles on the answer sheet.
3. Completely erase any changes.
4. Do not make any stray marks on the answer sheet.
5. Record your name and mailing address on the answer sheet.

1. Present job title: (Select only **ONE**.)
   1. Vocational Teacher
   2. Special Education Teacher
   3. Administrator
   4. Work Experience Program Coordinator
   5. Support Services Manager
   6. Counselor
   7. Support Services
   8. Other

2. Most recent educational license: (Select only **ONE**).
   1. Administrative & Related
   2. Agriculture
   3. Business Education
   4. Distributive Education
   5. Health Occupations
   6. Home Economics
   7. Special Needs
   8. Technical
   9. Trade & Industrial
   10. Other

3. Do you now hold a valid vocational license. 1 Yes 2 No

4. Grade levels now served: (Select **ALL** that apply.)
   1. Secondary
   2. Postsecondary
   3. Adult
   4. Non-graded Special Ed.
   5. Other

5. **Estimate** how many SPECIAL NEEDS STUDENTS* **YOU** served last school year? (Record on answer sheet as items 5, 6, and 7) — 5 6 7 ☐☐☐

***SPECIAL NEEDS STUDENTS:**
Persons with characteristics (i.e., handicapped, disadvantaged, limited-English proficiency, etc.) which prevent them from succeeding in vocational education programs without **ADDITIONAL** or **SPECIAL** assistance.

DEVELOPED BY:

Minnesota Research and Development Center
for Vocational Education
Department of Vocational and Technical Education
University of Minnesota
St. Paul, Minnesota 55108

SPECIAL NEEDS-RELATED SKILLS

Directions:

A. Assume that **YOU** will be educating **10 SPECIAL NEEDS STUDENTS** next year.

B. Regardless of your job title or duties, it is expected that **YOU** will be providing a variety of instruction and instruction-related services to these special needs students.

C. **CAREFULLY** read each of the following descriptions (items 8 to 28) of the skills **REQUIRED** to effectively serve special needs students.

D. Regardless of how often these skills are **NOW** used, please rate your skill level on **EACH** item listed.

GENERAL INSTRUCTIONAL SKILLS	**YOUR** Skill Level				
Your ability to:	Low		Moderate		High
8. Use **styles of instruction** which match the ways in which your students prefer to learn.	1	2	3	4	5
9. Help your students improve their ability to **interact** effectively with other people.	1	2	3	4	5
10. Establish a **classroom environment** which stimulates learning.	1	2	3	4	5
11. Identify **physical** changes needed in your classroom/laboratory to accommodate students' unique instructional needs.	1	2	3	4	5
12. Adapt you instructional activities, as required for students with **Individualized Education Programs** (IEPs).	1	2	3	4	5
13. Adapt your **instructional materials** to the unique instructional needs of your students.	1	2	3	4	5
14. Use your school's **support services** (reading and math specialists, counselors, interpreters, etc.) to help you instruct your students.	1	2	3	4	5
15. Use your students' **parents** or **guardians** to supplement your instructional efforts.	1	2	3	4	5
16. Use **community resources** to supplement your instructional efforts.	1	2	3	4	5
17. Comply with special needs-related **laws** and **regulations.**	1	2	3	4	5
SPECIFIC INSTRUCTIONAL SKILLS					
18. Provide educational activities which are **hands-on** trial and error experiences.	1	2	3	4	5
19. Effectively use charts, pictures, graphs, and other **visually-oriented** instructional materials.	1	2	3	4	5
20. Use **spoken** and **written** communications to provide effective instructional experiences.	1	2	3	4	5
21. Deliver instructional activities at **rates** which match students' ability to learn.	1	2	3	4	5
22. Match instructional activities to students' **readiness** (ability and prior training) to learn.	1	2	3	4	5
23. **Organize** vocational topics into meaningful units or "clusters" which will maximize students' opportunity to learn.	1	2	3	4	5
24. Select appropriate **sequences** for instructional activities.	1	2	3	4	5
25. Establish realistic **goals** and **objectives** for each of your students.	1	2	3	4	5
26. Determine how often students need to **practice** the new vocational skills they have learned.	1	2	3	4	5
27. **Reinforce** or **reward** students for achieving goals or for desired behavior.	1	2	3	4	5
28. **Inform** students of how well they are performing so they know where improvement is needed.	1	2	3	4	5

SKILL CATEGORIES

The duties of educators can be grouped into four categories. Please rate **your** skills in each of those categories and indicate if they are a part of **your** job duties.

SKILL CATEGORIES	YOUR Skill Level:					PART of YOUR JOB?			
Your ability to:	Low		Moderate		High		Yes	Rarely	No
Identify and **assess** instructional needs of students related to each of the skill areas listed in items 8 to 28	**29.** 1	2	3	4	5	**30.**	1	2	3
Plan and **prepare** instructional materials and activities	**31.** 1	2	3	4	5	**32.**	1	2	3
Implement or **deliver** instructional materials and activities	**33.** 1	2	3	4	5	**34.**	1	2	3
Assess the effectiveness of instructional materials and activities	**35.** 1	2	3	4	5	**36.**	1	2	3

INSERVICE DELIVERY PREFERENCES

Rate **each** of the following inservice **FORMATS.**

INSERVICE FORMAT	Not Desirable		Desirable		Highly Desirable
37. Individual advice from instructional consultants or specialists	1	2	3	4	5
38. Individualized teacher training materials (i.e., films, workbooks, programmed learning packages)	1	2	3	4	5
39. Observations of programs and teachers who have successfully served special needs students	1	2	3	4	5
40. Workshops (1 to 3 days)	1	2	3	4	5
41. Courses (e.g., 10 weeks - 1 session/week)	1	2	3	4	5
42. On-the-job experiences (internships) in programs successfully educating special needs students	1	2	3	4	5

Rate **each** of the following inservice **TIME PERIODS.**

TIME OF INSERVICE	Not Desirable		Desirable		Highly Desirable
43. "Professional" days (days when teacher are released from teaching duties to participate in professional development activities.)	1	2	3	4	5
44. Before school—mornings	1	2	3	4	5
45. After school—afternoons	1	2	3	4	5
46. After school—evenings	1	2	3	4	5
47. Weekends	1	2	3	4	5
48. Summer—weekdays	1	2	3	4	5

Rate each of the following **PERSONS** or **GROUPS** who could provide inservice activities in your school.

INSERVICE PROVIDER	Not Desirable		Desirable		Highly Desirable
49. Other educators who are instructional methods experts	1	2	3	4	5
50. Professional education organizations	1	2	3	4	5
51. University faculty from departments of vocational education	1	2	3	4	5
52. University faculty from departments of special education	1	2	3	4	5
53. University faculty with expertise in BOTH vocational and special education	1	2	3	4	5

54. Would you be willing to pay college tuition in order to participate in special needs-related inservice activities? (Assume that the **TOPIC, FORMAT, SOURCE,** and **TIME** are acceptable to you.)

1	2	3	4	5
Definitely Not	Probably Not	Uncertain	Probably Yes	Definitely Yes

PRIOR SPECIAL NEEDS-RELATED TRAINING

Estimate how many **total quarter hours of college credits** you have earned in special needs-related topics. (Examples: special education, disadvantaged conditions, limited-English proficiency, chemical abuse, the special needs learner, vocational assessment, etc.).

55 56 57

☐☐☐ (Record on answer sheet as items 55, 56, and 57)

Estimate how many total **clock hours of non-college** inservice activities you have completed in special needs-related topics.

58 59 60

☐☐☐ (Record on answer sheet as items 58, 59, and 60.)

☐☐☐☐☐☐☐☐☐☐

Appendix B

APPENDIX B

SAMPLING PLAN

T. J. Welo and J. K. DeBerry

Almost any research initially considers the determination of sample size. A researcher's goal is to determine a sample size which will provide values which are a good estimate of the values that would have been obtained from the whole population. One method of increasing confidence that the sample values are close to the population's values is to use a sample which is a very large proportion of the population; this approach can be very expensive. Another method is to identify a range or interval of values which have a high probability of enclosing the true population value.

The process used to determine the number of surveys mailed in this project uses: (a) a judgment of the acceptable difference between the sampling value mean and the true mean of the population, (b) a judgment specifying the desired level of confidence that the sample values do not exceed those specified, and (c) an estimate of the return rate. These techniques are most commonly found in market research and polling efforts where the value of the information and the cost of the sample both are considered in determining the appropriate sample size. The reader desiring further understanding of these methods is referred to the listing of texts at the end of this Appendix. Following the explanations of terminology and the formulae, an example demonstrates their application. Details of the steps in the calculation of the sample sizes for this project are then presented.

Definitions

In order to clarify terminology it is best to begin with definitions. Those readers who are more familiar with the terminology of statistics for the social sciences will see some confusing similarities with terms used in market research.

Confidence interval. A statement expressing how close the sample values must be to the population values, or conversly, the amount of error one is willing to tolerate. It is a statement of precision. It can be thought of as an acceptable error band or range. The confidence interval is preselected by the researcher.

Confidence coefficient. The probability that the results will fall within the confidence interval. This probability value is preselected by researchers.

These terms are very similar to the expression of a score and its standard error of measurement (i.e., 68% of the times the true score lies between + and -1 Standard Error of Measurement). The difference is that the level of confidence and range of expected error are specified prior to the research rather than derived from the results of the research.

In market surveys, researchers make prior judgments about the allowable error (i.e., the confidence interval) and the level of probability required (i.e., confidence coefficient). The goal, as in research for the social sciences, is to find that sample size which will provide an estimate which has a high probability (confidence coefficient) that sample values do not exceed those specified, while maintaining a narrow band of sampling error (confidence interval).

Derivation and Use of the Formulae

Marketing researchers frequently must be concerned about proportions or percentages of the population who use brand X or Y. Therefore they deal with the sampling distribution of proportions.

A sampling distribution of the proportion is "the relative frequency distribution of the sample proportions (p) of all possible samples of size n taken from a population of size N." (Tull & Hawkins, 1980). A sampling distribution of a proportion for a simple random sample is assumed to be normaly distributed, have its mean equal to the population proportion (P), and a standard error ( ) equal to

$$\sigma_p = \sqrt{\frac{P(1-P)}{n}}$$

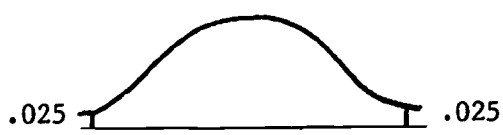
With a large sample size which is a small proportion of the population the standard error of the sample can be estimated

$$\hat{\sigma}_p = \sqrt{\frac{p(1-p)}{n}}$$

A confidence interval at the 95% level is obtained by adding and subtracting the value of the standard error from the mean. Thus the formula which connects the foregoing with the desired degree of precision is the familiar Z score formula

$$Z = \pm 1.96 \frac{\sigma}{\sqrt{n}}$$

The value 1.96 corresponds to the critical region for the normal curve using .05 level (1 minus .95) and a two-tailed test.



The researcher makes prior specification of how close the estimate must be (i.e., the allowable error, confidence interval), the confidence coefficient (level of confidence that the actual value does not exceed that specified), and an estimate of the population proportion. The sample size is the only unknown remaining in the Z score formula. The three specifications are related in the following formula:

number of standard errors implied by the confidence coefficient $= \frac{\text{allowable error}}{\text{standard error}}$

Symbolically this is expressed:

$$Z = \frac{e}{\frac{\sigma}{\sqrt{n}}}$$

In order to find the only unknown (n) the formula is converted to its algebraic equivalent.

$$n = \frac{Z^2 \sigma^2}{} \quad \text{or} \quad n = \frac{Z^2[p(1-p)]}{e^2}$$

This formula is used to find the initial or targeted sample size. Another algebraic equivalent of the formula can also be used to solve for the allowable error:

$$n = \frac{Z^2[p(1-p)]}{e^2}$$

Solved for e:

$$e = \sqrt{\frac{Z^2[p(1-p)]}{n}}$$

The error formula must take into account the chosen sample proportion as well as that proportion not being chosen or N-n. We must divide by N-1 in order to obtain the unbiased estimate. Thus the final formula for the finding allowable error is:

$$e = \sqrt{\frac{Z^2[p(1-p)]}{n} * \frac{N-n}{N-1}}$$

An Example

Step 1:

Obtain the actual size of the population to be sampled. For example, all male elementary school teachers in Illinois, N= 9,283.

Step 2:

Specify an acceptable error band, the confidence interval. For example, + or -4.0% of the population mean. This amount of error will be tolerated. This specification is the judgment of the investigators and may be based on prior research outcomes as well as knowledge of the scale values that one is using. In this case allowable error has been stated as a proportion in relation to the mean rather than in absolute terms.

Step 3:

Specify a confidence coefficient. That is, the probability that the true value will lie within the confidence interval. In this example the researchers wanted a sample that is one of the 95% of the samples where values were within ± 4% of the population mean.

Step 4:

Use expert knowledge or results of previous or pilot studies to estimate the standard deviation of the population, or estimate the population proportion. In this case the population proportion was estimated to be a value of .50 (p=.50). This is a very conservative estimate, since the product PQ[1] reaches a maximum value when p = q = .5; therefore, the widest possible confidence interval will be obtained when the value .50 is used as an estimate of the population proportion (Blalock, 1972).

Step 5:

Use these values in the formula:

$$n = \frac{z^2 * [p(1-p)]}{e^2}$$

n = targeted sample size
z = z score associated with the 95% confidence coefficient
e = .04 confidence interval
p = is now .50, the population proportion estimate

$$n = \frac{(1.96)^2 * (.5)(.5)}{.04^2} \qquad n = 600.25$$

---

[1] In discussions of conditional proportions, one proportion is referred to as 'P', and its complement is denoted as 'Q.'

Step 6:

Next, this initial or targeted sample size (600) is analyzed in order to determine exactly what the limits of its confidence interval would be.

N = population size
n = targeted sample size = 600
z = z score associated with 95% confidence interval
e = confidence interval (.04) or allowable error
p = population proportion = .5

$$e = \sqrt{\frac{z^2[p(1-p)]}{n} * \frac{N-n}{N-1}}$$

$$e = \sqrt{\frac{1.96^2*(.5)(.5)}{600} \times \frac{9283-600}{9282}} \qquad e = .0386974$$
$$e = 3.86\%$$

The resulting confidence interval is $\pm$ 3.9%. Since this is less than we need (4%), we can reduce the targeted sample size. As the difference between the sample and the population increases so also does the confidence interval. In this case we can afford more error, so we can decrease the sample size.

Therefore, the sample size targeted was reduced by one and step 5 was repeated. Since the result was still smaller than the needed confidence interval, this process was repeated. After 23 iterations the calculated confidence interval equaled the acceptable confidence interval. At that point the sample size was 577.

Step 7:

Based on past research, or best estimate, the expected return or response rate is determined. In this example a return rate of 65% was expected. The following formula can be used in determining the number of questionnaires that must be initially mailed out:

$$m = \frac{n}{r}$$

Where: m = number of questionnaires to be mailed

n = sample size needed to satisfy acceptable confidence intervals

r = expected return rate

$$887.69 = \frac{577}{.65}$$

In this example 888 quesionnares should be mailed out in order to achieve one of the 95% of samples in which results will fall within $\pm$4% of the population values.

The remainder of this appendix will show the above process applied to the sampling used in the Special Needs Inservice Survey.

Special Needs Sample Determination

The Special Needs Inservice Survey was to be mailed to a population comprised of two strata. Both secondary and postsecondary instructors and administrators were to receive the survey. This section will present calculations for the strata separately. Secondary and postsecondary were treated separately because projections would be made to both strata separately at the completion of the survey.

Postsecondary Strata

Step 1. Population size = 3235

Step 2. Acceptable confidence interval (error band) = ± 5.0%

Step 3. Confidence coefficient = 95%

Step 4. Maximum value of population proportion p = .50

Step 5. Initial sample size = 384

Step 6. Calculated confidence interval (error band) = ± 4.7%
After 35 iterations the caluclated error band equaled the predetermined acceptable error interval.
Final sample size = 349

Step 7. Expected response rate = 67%
Mailing size = 521

The postsecondary strata is composed of several categories of instructors and administrators. The mailing size of 521 accurately reflected the proportions of administrator and instructor categories by curriculum area (see Table 1).

Table 1. Percent of Postsecondary Strata and Mailing Size by Job Description.

	Percentage	
	Mailing List (n=521) %	Population (n=3235) %
Administrators	17.4	17.5
Agriculture instructors	5.6	5.4
Distributive education instructors	7.1	7.0
Health occupations instructors	10.2	10.0
Home economics instructors	3.1	2.9
Business and office instructors	17.1	17.2
Trade and industrial instructors	39.5	40.0
Total	100.0	100.0

Secondary Strata

Step 1. Population size = 5045

Step 2. Acceptable confidence interval (error band) = ± 5.0%

Step 3. Confidence coefficient = 95 percent

Step 4. Maximum value of population proportion p = .50

Step 5. Initial sample size = 384

Step 6. Calculated confidence interval = ± 4.8%
After 21 iterations the calculated error band equaled the predetermined error band
Final sample size = 363

Step 7. Expected response rate = 67%
Mailing size = 542

The secondary strata, like the postsecondary strata, is composed of several categories of teachers and administrators. The mailing size of 542 accurately reflected the proportion of administrators and teachers by curriculum area (see Table 2).

Table 2. Percent of Strata Population and Mailing Size by Job Description.

	Percentage	
	Mailing List (n=542) %	Population (n=5045) %
Administrators	9.2	9.3
Agriculture instructors	5.7	5.6
Distributive education instructors	3.0	2.9
Health occupations instructors	1.3	1.3
Home economics instructors	25.8	26.0
Industrial arts instructors	24.9	24.9
Business and office instructors	20.7	20.6
Trade and industrial instructors	9.4	9.4
Total	100.0	100.0

As can be seen from the previous paragraphs, the determination of the size of the initial mailing was based on a procedure which took into account the size of the strata involved, the selection of an acceptable error rate when making projections from the sample to the strata, the selection of a percent confidence interval, and the estimation of the overall return rate for the survey. It was determined that the populations of the postsecondary and secondary strata numbered 3235 and 5045 respectively. A 95 % confidence interval and error bands of $\pm$ 5.0% were preselected as acceptable. It was calculated that 349 returned surveys from the postsecondary strata and 363 returned surveys from the secondary strata were necessary to satisfy the predetermined error bands and confidence intervals. It was expected that the rate of return after three mailings would be 67%. The resulting mailing size for the postsecondary and secondary strata were 521 and 542 respectively. A total of 1063 surveys were to be mailed.

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APPENDIX C
COVER LETTER

College of Education

UNIVERSITY OF MINNESOTA
TWIN CITIES

Minnesota Research and Development Center
Department of Vocational and Technical Education
R460 Vocational and Technical Education Building
1954 Buford Avenue
St. Paul, Minnesota 55108

May 24, 1982

Dear Minnesota Educator:

I hope that you will take a few minutes to answer the enclosed questionnaire. Your information is absolutely critical to a state-wide effort to examine the abilities of Minnesota's vocational educators to serve special needs learners.

I strongly support St. Cloud State University's effort to identify the special needs inservice needs and preferences in central Minnesota. In addition, I think that the following facts about this activity may be of interest to you:

1. The results of this survey will be of value and interest to teachers and teacher educators in the fields of vocational education, industrial arts, and special education.

2. You are one of 1100 teachers randomly selected across the entire State of Minnesota.

3. This survey is NOT part of an effort to mandate special needs inservice for vocational licensure or relicensure! The combined information collected by this survey will be used ONLY for inservice planning and design purposes.

4. The privacy of your responses is guaranteed, only group data will be reported.

Thank you for your time and assistance in this most important undertaking.

Sincerely,

Jim Brown

Jim Brown
Vocational Special Needs

JB:mg
enclosures

Bemidji State University BEMIDJI, MINNESOTA 56601

DIVISION OF BUSINESS AND INDUSTRY

May 24, 1982

Dear Vocational Educator:

Earlier this month you were asked to complete and return a brief questionnaire which helped you examine your ability to educate special needs students. Unfortunately, I have not received your completed answer sheet. If you have recently mailed the answer sheet, please accept my thanks for your help in this most important effort--your certificate of participation for two clock hours should arrive in a few weeks.

If you have not yet mailed your completed answer sheet to me, would you please take a few minutes to respond to the enclosed questionnaire? It is crucial that I have your information so that I can safely assume that the information I receive is representative of ALL vocational educators in Minnesota.

Also, please remember that your responses will be completely confidential and will be combined with those of more that 1,000 other educators. Once your comments are recorded, all evidence of your identity will be destroyed. Your name and address will be used only to send your inservice participation certificate.

In case you are interested, the information generated by this questionnaire will be used to select needed/desired special needs-related inservice topics across the state and to determine when, by whom, and in what format these activities are most acceptable to vocational educators. You have a chance to express your needs and opinios, and thus, better serve your own future inservice needs.

If you have any questions, please feel free to contact me at (218) 755-2739. Thank you for your assistance. I look forward to receiving your completed questionnaire.

Sincerely,

Dave Kingsbury

David Kingsbury
Vocational/Special Needs
Bemidji State University

Enclosures: Special Needs Inservice Survey, Answer Sheet, Return Envelope

NOTE: On questions 5 to 7 and 55 to 60, use the "10" on the answer sheet to indicate answers of "0" ("10" is recorded as "1" and "0"). Please mail your completed answer sheet NO LATER than June 1, 1982.

May 24, 1982

Dear Vocational Educator:

Earlier this month you were asked to complete and return a brief questionnaire which helped you examine your ability to educate special needs students. Unfortunately, I have not received your completed answer sheet. If you have recently mailed the answer sheet to me, please accept my thanks for your help in this most important effort--your certificate of participation for two clock hours should arrive in a few weeks.

If you have not yet mailed your completed answer sheet to me, would you please take a few minutes to respond to the enclosed questionnaire? It is crucial that I have your information so that I can safely assume that the information I receive is representative of ALL vocational educators in Minnesota.

Also, please remember that your responses will be completely confidential and will be combined with those of more than 1,000 other educators. Once your comments are recorded, all evidence of your identity will be destroyed. Your name and address will be used only to send your inservice participation certificate.

In case you are interested, the information generated by this questionnaire will be used to select needed/desired special needs-related inservice topics across the state and to determine when, by whom, and in what format these activities are most acceptable to vocational educators. You have a chance to express your needs and opinions and, thus, better serve your own future inservice needs.

If you have any questions, please feel to contact David Johnson our faculty member responsible for follow-up at (612) 255-2041. Thank you for your assistance. I look forward to receiving your completed questionnaire.

Sincerely,

Stanley C. Knox

Stanley C. Knox, Ph.D.
Chairman, Special Education

Enclosures

Note: On questions 5 to 7 and 55 to 60, use the "10" on the answer sheet to indicate answers of "0" ("10" is recorded as "1" and "0").
Please mail your completed answer sheet NO LATER than June 1, 1982.

College of Education

UNIVERSITY OF MINNESOTA
TWIN CITIES

Minnesota Research and Development Center
Department of Vocational and Technical Education
R460 Vocational and Technical Education Building
1954 Buford Avenue
St. Paul, Minnesota 55108

June 10, 1982

Dear Minnesota Educator:

Now that the pressures and duties often concentrated at the end of the school year's spring quarter have been reduced for most educators, I hope that you will find it possible to take a few minutes of your time to provide me with some VERY important information.

I have almost completed an effort to describe Minnesota's vocational and industrial arts teachers' ABILITIES to serve special needs learners. I am also examining teachers' PREFERENCES as they apply to inservice activities related to special needs topics.

However, 200 additional responses are needed to be sure that the full range of opinions is considered. In other words, the information that you will provide is VALUABLE, and could have a definite influence on future inservice efforts in Minnesota. Even if you have NO special needs students in your program or do NOT desire such training -- such information is still useful. Don't miss this chance to become one of those lucky 200 people!

I am not asking you to agree to enroll special needs students into your program (some may ALREADY be there!), this is merely an attempt to help local, state, and university planners understand teachers' general strengths and weaknesses and their preferences (if any) for participating in professional development activities.

I am asking that you take a few minutes to complete and return the enclosed questionnaire to me. I assure you that this is NOT part of a graduate student's research project, this is part of a concerted effort to develop interesing, practical inservice activities as well as other factors which could ultimately help vocational students become better prepared to succeed in the WORLD OF WORK.

If you have already returned the previous questionnaire, please ignore this request and accept my thanks for your help -- your certificate verifying your participation for two clock hours for license renewal will be mailed in few weeks.

Sincerely,

James M. Brown

Enclosures: Questionnaire
Answer Sheet
Return Envelope (no Stamps required)

NOTE: Mailing deadline is June 21, 1982

APPENDIX D
DATA TABLES

General Instructional Skills Scale

Item	n	$\bar{X}$	SD
8. Use styles of instruction which match the ways in which your students prefer to learn.	624	3.56	.89
9. Help your students improve their ability to interact effectively with other people.	631	3.62	.89
10. Establish a classroom environment which stimulates learning.	629	3.94	.80
11. Identify physical changes needed in your classroom/laboratory to accommodate students' instructional needs.	628	3.56	1.02
12. Adapt your instructional activities, as required for students with Individualized Education Programs (IEPs).	627	3.26	1.33
13. Adapt your instructional materials to the unique instructional needs of your students.	628	3.47	.96
14. Use your school's support services (reading and math specialists, counselors, interpreters, etc.) to help you instruct your students.	630	4.01	1.06
15. Use your students, parents, or guardians to supplement your instructional efforts.	628	2.52	1.14
16. Use community resources to supplement your instructional efforts.	630	2.93	1.17
17. Comply with special needs-related laws and regulations.	631	3.53	1.17

Specific Instructional Skills Scale

Item	n	$\bar{X}$	SD
18. Provide educational activities which are hands-on trial and error experiences.	625	4.14	.94
19. Effectively use charts, pictures, graphs, and other visually-oriented instructional materials.	630	4.02	.83
20. Use spoken and written communications to provide effective instructional experiences.	631	4.08	.75
21. Deliver instructional activities at rates which match students' ability to learn.	630	3.71	.94
22. Match instructional activities to students' readiness (ability and prior training) to learn.	631	3.71	.97
23. Organize vocational topics into meaningful units or "clusters" which will maximize students' opportunity to learn.	631	3.71	.97
24. Select appropriate sequences for instructional activities.	630	3.92	.90
25. Establish realistic goals and objectives for each of your students.	629	3.71	.96
26. Determine how often students need to practice the new vocational skills they have learned.	631	3.56	.94
27. Reinforce or reward students for achieving goals or for desired behavior.	630	3.95	.84
28. Inform students of how well they are performing so they know where improvement is needed.	630	4.08	.81

Skill Categories and Identification as 'Part of Your Job.'

Items		Skill Level n	Skill Level $\bar{X}$	Skill Level SD	Part of Job Yes %	Part of Job Rarely %	Part of Job No %
29-30	Identify and assess instructional needs of students related to each of the skill areas listed in items 8 to 28	628	3.39	.95	58.6	28.2	13.2
31-32	Plan and prepare instructional materials and activities	628	3.85	.97	78.5	13.2	8.3
33-34	Implement or deliver instructional materials and activities	629	3.87	.92	79.7	12.2	8.1
35-36	Assess the effectiveness of instructional materials and activities	629	3.62	.94	75.7	17.0	7.3

Inservice Format Preferences

Item	n	$\bar{X}$	SD
37. Individual advice from instructional consultants or specialists	632	3.48	1.05
38. Individualized teacher training materials (i.e. films, workbooks, programmed learning packages)	630	3.52	1.12
39. Observations of programs and teachers who have successfully served special needs students	628	3.69	1.08
40. Workshops (1 to 3 days)	627	3.42	1.05
41. Courses (e.g., 10 weeks - 1 session/week)	629	2.86	1.15
42. On-the-job experiences (internships) in programs successfully educating special needs students	628	3.30	1.25

Time of Inservice Preferences

Item	n	$\bar{X}$	SD
43. "Professional" days (days when teacher are released from teaching duties to participate in professional development activities.)	630	4.06	1.07
44. Before school--mornings	629	1.64	1.04
45. After school--afternoons	629	2.44	1.26
46. After school-evenings	631	2.35	1.22
47. Weekends	629	1.82	1.12
48. Summer--weekdays	629	2.46	1.36

Provider of Inservice References

Item	n	$\bar{X}$	SD
49. Other educators who are instructional methods experts	628	3.60	1.07
50. Professional education organizations	627	2.86	1.02
51. University faculty from departments of vocational education	627	3.08	1.10
52. University faculty from departments of special education	627	3.19	1.08
53. University faculty with expertise in both vocational and special education	627	3.85	1.13
54. Would you be willing to pay college tuition in order to participate in special needs inservice activities?	629	3.31	± 1.12

Subject Selection for Non-Respondent Reliability

Subgroup	Secondary			Postsecondary		
	Non-Respondents n	Non-Respondents selected n	Non-Respondents responding n	Non-Respondents n	Non-Respondents selected n	Non-Respondents responding n
Administrators	12	1	0	17	2	2
Agriculture instructors	2	1	0	9	1	1
Distributive Education instructors	11	1	1	15	1	1
Health occupations instructors	5	1	1	17	2	1
Home Economics instructors	45	5	3	2	1	0
Industrial Arts instructors	93	9	6		*	
Business and Office instructors	49	5	3	38	3	3
Trade and Industrial instructors	22	2	2	82	9	7
TOTAL	239	25	16	180	19	15

*Industrial Arts is not offered as a course/program in Minnesota postsecondary institutions.

Subject Selection For Test/Retest Reliability

Subgroup	Secondary			Postsecondary		
	Original Respond-dents n	Test-retest selected n	Test-retest responding n	Original Respon-dents n	Test-retest selected n	Test-retest responding n
Administrators	38	4	4	75	7	6
Agriculture Instructors	28	3	3	20	2	2
Distributive education instructors	6	1	1	20	2	2
Health occupations instructors	4	1	1	34	3	3
Home Economics instructors	85	9	9	10	1	1
Industrial Arts instructors	53	5	3		*	
Business and Office instructors	62	6	6	48	5	3
Trade and Industrial instructors	30	3	3	121	12	11
TOTAL	306	32	30	328	32	28

*Industrial Arts is not offered as a course/program option in Minnesota postsecondary institutions.

Subject Selection For Test/Retest Reliability

	Secondary			Postsecondary		
Subgroup	Respond-dents (n)	Test-retest selected (n)	Test-retest responding (n)	Respon-dents (n)	Test-retest selected (n)	Test-retest responding (n)
Administrators	38	4	4	75	7	6
Agriculture Instructors	28	3	3	20	2	2
Distributive education instructors	6	1	1	20	2	2
Health occupations instructors	4	1	1	34	3	3
Home Economics instructors	85	9	9	10	1	1
Industrial Arts instructors	53	5	3		*	
Business and Office instructors	62	6	6	48	5	3
Trade and Industrial instructors	30	3	3	121	12	11
TOTAL	306	32	30	328	32	28

*Industrial Arts is not offered as a course/program option in Minnesota postsecondary institutions.

Means for the Reliability Samples on General Instructional GI Skills

Item	GI Skill Rating			
	Test-retest Group		Nonrespondent Group	
	$\bar{X}$	n	$\bar{X}$	n
8. Use styles of instruction which match the ways in which your students prefer to learn.	3.93	(14)	3.20	(5)
9. Help your students improve their ability to interact effectively with other people.	3.75	(12)	3.83	(6)
10. Establish a classroom environment which stimulates learning.	3.88	(8)	3.78	(9)
11. Identify physical changes needed in your classroom/laboratory to accommodate students' unique instructional needs.	3.77	(13)	3.40	(5)
12. Adapt your instructional activities, as required for students with Individualized Education Programs (IEPs).	3.79	(14)	2.83	(6)
13. Adapt your instructional materials to the unique instructional needs of your students.	3.50	(10)	3.00	(3)
14. Use your school's support services (reading and math specialists, counselors, interpreters, etc.) to help you instruct your students.	3.40	(10)	3.00	(5)
15. Use your students' parents or guardians to supplement your instructional needs.	3.00	(9)	2.64	(11)
16. Use community resources to supplement your instructional efforts.	3.12	(8)	3.00	(3)
17. Comply with special needs-related laws and regulations.	3.93	(15)	3.33	(9)

Means for the Reliability Samples on the Specific Instructional (SI) Skills

Item	SI Skill Rating			
	Test-retest Group		Nonrespondent Group	
	$\bar{X}$	n	$\bar{X}$	n
18. Provide educational activities which are hands-on trial and error experiences.	4.38	(13)	4.29	(7)
19. Effectively use charts, pictures, graphs, and other visually-oriented instructional materials.	3.67	(12)	3.80	(5)
20. Use spoken and written communications to provide effective instructional experiences.	3.85	(13)	3.62	(8)
21. Deliver instructional activities at rates which match students' ability to learn.	3.70	(10)	3.86	(7)
22. Match instructional activities to students' readiness (ability and prior training) to learn.	3.86	(7)	1.00	(1)
23. Organize vocational topics into meaningful units or "clusters" which will maximize students' opportunity to learn.	3.46	(11)	4.14	(7)
24. Select appropriate sequences for instructional activities.	3.12	(88)	3.00	(4)
25. Establish realistic goals and objectives for each of your students.	3.75	(12)	3.50	(2)
26. Determine how often students need to practice the new vocational skills they have learned.	3.5	(2)	3.86	(7)
27. Reinforce or reward students for achieving goals or for desired behavior.	4.15	(13)	4.29	(7)
28. Inform students of how well they are performing so they know where improvement is needed.	4.38	(13)	3.86	(7)

Means for the Reliability Samples on the Skill Categories

Item	Test-retest Group		Nonrespondent Group	
	$\bar{X}$	n	$\bar{X}$	n
Skill Level				
29. Identify and assess instructional need of students related to each of the skill areas listed in items 8 to 28.	3.31	(16)	3.50	(6)
31. Plan and prepare instructional materials and activities.	3.59	(17)	3.40	(10)
33. Implement or deliver instructional materials and activities.	4.10	(10)	3.88	(8)
35. Assess the effectiveness of instructional materials and activities.	3.73	(.5)	3.71	(7)
Job Requirements				
30. Identify and assess instructional needs of students related to each of the skill areas listed in items 8 to 28.	1.71	(17)	1.83	(6)
32. Plan and prepare instructional materials and activities.	1.38	(16)	1.50	(10)
34. Implement or deliver instructional materials and activities.	1.00	(10)	1.25	(8)
36. Assess the effectiveness of instructional materials of activities.	1.07	(15)	1.43	(7)

Means for the Reliability Samples Inservice Delivery Preferences

Item	Average Rating: Test-retest X	Test-retest n	Nonrespondents X	Nonrespondents n
Inservice Format				
37. Individual advice from instructional consultants or specialists.	3.71	(14)	3.91	(11)
38. Individualized teacher training materials (i.e., films, workbooks, programmed learning packages).	3.35	(20)	3.00	(10)
39. Observations of programs and teachers who have successfully served special needs students.	3.96	(22)	4.36	(11)
40. Workshops (1 to 3 days).	3.75	(12)	3.46	(11)
41. Courses (e.g. 10 weeks - 1 session/week).	3.39	(23)	3.38	(8)
42. On-the-job experiences (internships) in programs successfully educating special needs students.	3.42	(24)	3.89	(9)
Time of Inservice				
43. "Professional" days (days when teacher are released from teaching duties to participate in professional development activities.	2.87	(15)	3.67	(9)
44. Before school - mornings.	1.64	(17)	1.56	(12)
45. After school - afternoons.	2.96	(22)	2.67	(12)
46. After school - evenings.	3.09	(23)	2.23	(13)
47. Weekends.	2.06	(18)	1.83	(6)
48. Summer - Weekdays.	2.12	(17)	1.70	(10)
Inservice Provider				
49. Other educators who are instructional methods experts.	3.91	(22)	3.50	(10)
50. Professional education organizations.	2.80	(20)	3.11	(9)
51. University faculty from departments of vocational education.	3.00	(24)	3.40	(10)
52. University faculty from departments of special education.	3.36	(14)	3.78	(18)
53. University faculty with expertise in BOTH vocational and special education.	4.00	(17)	4.00	(6)
54. Would you be willing to pay college tuition in order to participate in special needs-related inservice activities? (Assume that the TOPIC, FORMAT, SOURCE, and TIME are acceptable to you.)	3.82	(17)	3.56	(9)