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THE EFFECTS OF INSTRUCTIONAL APPROACH, LOCUS OF CONTROL,
AND COGNITIVE STYLE ON THE DECISION TO TEACH

Iowa State University

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The effects of instructional approach, locus of control,
and cognitive style on the decision to teach

by

Linda Ann Rogers Wilson

A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of the
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1982

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CHAPTER I. INTRODUCTION

Clearly the public sees teachers as those most directly responsible for the quality of instruction and, perhaps, wants to punish them for the so-called "decline" in the quality of learning.¹

Teacher education programs have come under similar attack for inadequate preparation of school teachers.² It seems that the public also holds teacher education institutions accountable for turning out the "right" number of teachers proportionate to the fields of instruction. In fact, Watts suggests that "the present system of teacher preparation has lost the confidence and respect of much of the public, many school teachers, and some professors of education."³

Contrasting views exist on how teacher education institutions can improve the "delivery" of school teachers that are competent in content and process skills. One solution recommends the need for more stringent and selective requirements for entry into teacher education programs.⁴ Another solution focuses on assessment techniques and doing a better job of monitoring student progress in the teacher education program.⁵ Some institutions have revolutionized the curriculum by implementing competency-based teacher education (CBTE) programs.⁶ Finally, a fourth solution both alters the curriculum and increases student assessment by lengthening the teacher preparation to five years.⁷

Weaver and others address the issue of teacher supply and demand by challenging teacher preparation programs to expand their "mission."⁸ According to Weaver, education majors should be prepared with skills

that enable them to find professionally fulfilling positions in non-school settings as well as school settings.

The creation of alternatives for education majors, if taken seriously, is the only way to reduce the chronic over-supply of new graduates now being singly prepared for one educational role -- public school teaching.⁹

Gallegos argues that the proposals for extended/five-year teacher education programs seem to deal mainly with form rather than substance. According to Gallegos, qualitative improvement of teacher education should begin with identification of knowledge and skills vital to professional practice that preservice teachers are not learning in current programs.¹⁰ Although the criticism is aimed at the extended/five-year programs, it also applies to the other three solutions outlined above.

The solutions that have been recommended for achieving accountability in teacher education programs tend to function as program alterations or outward changes. Raising academic requirements alters standards externally. CBTE and five-year programs impose regulations extrinsic to the individual. Finally, expanding the "mission" changes general curricular goals in the teacher education program rather than considering needs of the individuals in the program.

Chapter I proposes that the inclusion of career education concepts in teacher preparation programs provides a link to accountability. The chapter opens with a review of career education efforts in higher education. Next, the chapter discusses career education in the specific context of teacher preparation. The issues discussed

point to a growing interest in self-assessment approaches in teacher education programs. The chapter presents a rationale for including self-assessment experiences in introductory education courses. Finally, the chapter concludes with the thesis for the present study, a problem statement, and suggested implications of the study.

Career Education: A Link to Accountability

In contrast to external remedies, teacher education programs can be altered to focus on the individual in the process of preparing for a teaching career. Infusing career education concepts into the teacher education program may reconcile the pressures for accountability relative to both teacher competence and teacher supply and demand. Concepts and processes related to career development of adolescents may be vital information needed by teachers in the future. Additionally, career education concepts may be some of the important skills Gallegos referred to that preservice teachers are not learning in current teacher education programs.

Career education in higher education

Kenneth Hoyt, Director of the United States Office of Career Education in 1976, describes career education as a process extending over an entire life span in which work becomes part of a person's total lifestyle.¹¹ More simply, career education "means everything formal education systems can do to facilitate the career development process in students."¹² Hoyt further identifies specific career education concepts that have been listed in official Office of Career

Education policy publications:

1. Basic academic skills
2. Skills in practicing good work habits
3. Skills in developing and using personally meaningful work values
4. Skills in understanding and appreciating the private enterprise system
5. Skills in self-understanding and understanding of educational/occupational opportunities
6. Career decision-making skills
7. Job seeking/finding/getting/holding skills
8. Skills in making productive use of leisure time (unpaid work)
9. Skills in overcoming bias and stereotyping as they act to deter full freedom of career choice for all persons
10. Skills in humanizing the workplace for one's self.¹³

The need for including specific career education concepts in existing college courses as well as in career development courses has been documented in a number of studies. Grotevant and Durrett surveyed a large sample (6,029) of high school seniors from a broad cross-section of backgrounds and concluded that the students seemed to be making important career decisions based on limited information. Specifically, the seniors did not seem to have accurate knowledge of the educational requirements of the careers they had tentatively chosen, nor did they have much information about the relationship between their own vocational interests and their career choices.¹⁴

In a similar study of career development needs, 17-year-olds were asked how they found out about job opportunities. Of the students surveyed, 28 percent said they talked to an advisor or counselor, 2 percent said they talked to teachers, and 69 percent said they "observed the field." According to Mitchell, such an informal

observation of work opportunities would not produce excellent decisions when making the final occupational choice.¹⁵

Hoyt proposes an idealistic model for career education at the college or university level. His model is both comprehensive and university-wide. The model includes: a large career education resource center; expansion of work experiences, internship, and work-study programs; involvement of the teaching faculty; and curriculum modification geared to meet the needs of students.¹⁶

However, Hoyt suggests that pressures exist to limit career education efforts to elementary and secondary age students. According to Hoyt, the need for career education at the post secondary and adult levels is virtually ignored.¹⁷ Incorporating career education concepts into existing programs in higher education seems to be a more modest, but a more realistic beginning than attempting to implement a comprehensive program of career education in the face of such opposition.

Career education and the teacher education program

Jorgenson and Spooner suggest that a dual purpose is served by infusing career education concepts into teacher education programs. The personal career development needs of students can be met. Additionally, the program itself serves as a model demonstrating a number of concepts related to career education that are included in many elementary and secondary school curricula. Indirectly, such teacher education programs may prepare future classroom teachers to become "career education teachers."¹⁸

The link between career education K-12 and in colleges and universities is nowhere as apparent as it is in those institutions preparing K-12 teachers. Here, if anywhere in higher education, there should be concern for the career development needs of students -- both personally, as the student prepares for the teaching profession and professionally -- to prepare the future K-12 teacher to incorporate the career education elements in the curriculum.¹⁹

A number of educators believe that introductory courses in education taken by undergraduates can meet some of the personal career development needs of students who are considering teaching as a career.²⁰ Such introductory courses, bearing titles similar to "Introduction to Education" or "Social Foundations of Education," are often considered as foundational components in the teacher education program.²¹

One typical goal of introductory education courses often relates to the foundations of education. Critical analysis of educational concepts and issues; development of a conceptual basis for theory and practice; and examination of the historical, philosophical, and sociological roots of educational concepts/issues frequently comprise the cognitive component of the courses.²²

A second goal, advocated by a number of educators, is related to career development and remains somewhat affective in nature.²³ This second goal focuses on helping students to make a rational decision about entering the teaching profession. Introductory courses in education can provide experiences and processes that encourage students to make rational career decisions.

Ryan and Cooper suggest that many people make the decision to teach in a careless, unreflective manner without an understanding of the pressures, sacrifices of time or effort, and competition faced by school teachers.²⁴ Furthermore, Ornstein suggests that a casual entry into the teaching profession serves to restrict the depth and practicality of preservice training.²⁵

Teaching may be more conducive to "careless" choices than other occupations because students have had extensive time and experience "observing the field." However, according to one paradigm, successful progress through the stages (or steps) of career decision-making results in career decisions that have been assiduously considered, with alternatives and consequences carefully weighed.²⁶

A Self-assessment Approach in an Introductory Education Course

The link between career education and accountability may be found in a major hypothesis about career development:

Those people for whom the world of work has the greatest meaning consonant with their own previously developed meaning system will find the greatest satisfaction and success in their work.²⁷

It may be that discovery of a dissonant relationship between one's personal value system and value systems of the teaching profession encourages a student to explore alternative career options. In reviewing research on self-concept theory, Epstein concluded that strong evidence supports the view that individuals are motivated to maintain internal consistency in their conceptual systems. Perception of

a lack of consistency produces anxiety, which in turn motivates attempts to reduce the discrepancy.²⁸ Furthermore, Rokeach demonstrated in a series of studies that when individuals are faced with discrepancies in self-related values, they resolve the discrepancies. The resolution of discrepancies results in changes in related attitudes and behavior.²⁹

Self-assessment skills are used to assess one's personal attributes. According to Wise et al., these skills may be applied in at least two situations: searching for new opportunities for work, exploration, or self-development; and deciding among career-related alternatives.³⁰ Such skills have been included as relevant objectives in programs and models. For example, self-assessment skills are included in one of the four major parts of a conceptual framework for career awareness in career decision-making prepared by the Career Awareness Division of the National Institute of Education.³¹ Knowledge of self was one of the six competency areas proposed by Ryan for teacher preparation and certification in Michigan.³²

Self-assessment activities and experiences in an introductory education course have the potential of revealing to students the degree of harmony between teaching and their personal, previously developed meaning systems. Students address such questions as the following in an internal assessment of self: Who am I? What do I want out of life? What do I want from a career? Why am I considering teaching as a career? How do I relate to children and young people?

Do I have the qualities that will make a good teacher? How will I handle the issue of teacher stress?

Through a self-assessment process in an introductory education course, students may discover a dissonant relationship between the values of the profession and their personal value system. Such a discovery may encourage students to explore alternative careers. On the other hand, discovering that one's personal value system is in harmony with the teaching profession would likely reinforce preliminary decisions relative to career development (for example, the choice of college major).

A discovery of harmony between personal values and the meaning system of the profession may both increase the understanding of teaching and learning and increase the commitment to mastery of content and process skills needed for good teaching. Additionally, individuals in the clarification stage, following a rational career choice, may seek out experiences believed to enhance their chances for future employment (for example, summer employment at youth camps, certification in more than one subject area, and a coaching endorsement).

Thesis of the Present Study

Combs suggested that teacher education should focus on "the person in the process" rather than only stressing certain competencies to be mastered.³³ The thesis of the present study is based on the hypothesis that a self-assessment approach in an introductory education course can enhance competencies of future teachers and indirectly provide an adjustment to teacher supply and demand by fostering career

development of undergraduates. Humanistic psychology, recognizing the importance of the self-concept in every aspect of life, provides support for the thesis.

According to Combs, the self-concept is a vital factor in a person's success or failure in school, on the job, or in social interactions.³⁴ Aspy and Buhler found that the teacher's perceptions of self as adequate were translated into behaviors resulting in higher student achievement.³⁵

Self-assessment activities and experiences appear to assist students in clarifying personal goals, in crystallizing self-concept, and in career decision-making. Aspy and Roebuck concluded that a component of "a good teacher training program should be aimed at helping teacher trainees develop appropriate perceptions of self and of their tasks."³⁶

Furthermore, Lasley argued that teacher education students should critically examine their personal beliefs about teaching. According to Lasley, such examinations are important so that future teachers do not use unquestioned "conventional wisdom" and traditional methods in their classrooms. "Unchallenged beliefs may even hinder learning about appropriate responses to the reality that does exist."³⁷

The concern about "unchallenged beliefs" pertains to career development as well as to future teaching practices. Undergraduates who decided to teach before entering college may not have realistically assessed their personal abilities, interests, needs, and employment opportunities. Identity foreclosure, explored by a number of researchers,

occurs when students make decisions before they have adequately explored their values and needs.³⁸ Understanding of personal values and needs seems to be necessary for adequate progress through the stages of career decision-making. Similarly, Erikson suggests that by accepting role identity too soon, some students avoid the crises that are necessary for growth and creativity.³⁹

Statement of problem

A study is needed to determine the effects of a self-assessment approach in an introductory education course on students' career-related decisions. Do self-assessment activities and experiences foster career decision-making? Additionally, a study is needed to investigate the relationships between selected personal-social factors of students enrolled in an introductory education course and career-related decisions. What effects do locus of control (see page 29) and cognitive style of making decisions (see page 27) have on career-related decisions?

Implications of the study

Knowledge gained from the study will enhance the understanding of the career development process in students who consider teaching as a possible career choice. The study may suggest curricular changes needed in an introductory education course to meet better the individual needs of students. In addition, the study has the potential of collecting empirical data for use in a comprehensive course evaluation in the future.

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¹⁸Jorgenson and Spooner, "Career Education in Colleges and Universities," pp. 255-256.

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CHAPTER II.

REVIEW OF RELATED LITERATURE

Social-psychological studies have provided profiles of teacher characteristics and reasons teachers give for having chosen their vocation.¹ The "desire to work with young people" seems to be the most common reason cited by men and women when asked why they chose teaching as a career. Other reasons for this choice include interest in a subject matter field, material benefits, service to society, continuation of positive school experiences, social mobility, and job security.²

Lortie interviewed practicing teachers and found that 63 percent of the women had decided before they left high school to become teachers, while only 24 percent of the men did so. With sex held constant, elementary teachers made an earlier career decision than did secondary teachers. Lortie described women who had chosen elementary teaching as the "most eager recruits to teaching."³

In order to comprehend how prospective teachers choose a career in education, or for that matter, how anyone selects his/her career, it is necessary to review basic literature on career development. According to Osipow, theories of career choice are in some way related to personality development.⁴ Furthermore, one career decision-making paradigm illustrates the interdependence of personality and career choice. It seems to follow that a personality construct such as locus of control may influence the career decision-making process and the choice of teaching as a career.

The present study raises a number of questions regarding the choice of teaching as a career. How is the choice to become a teacher explained by a decision-making paradigm? Do relationships exist between locus of control, teacher surpluses, early decision to teach, progress in a decision-making task, and cognitive style? Can a self-assessment approach in an introductory education course promote career decision-making?

The chapter opens by discussing a self-concept theory of vocational development, a career decision-making paradigm, and social learning theory as the theoretical foundations for the present study. The chapter reviews a number of research studies that correlate locus of control with vocationally-related behaviors and career maturity. The discussion identifies career maturity as a measurement problem. Finally, the chapter reviews studies that investigate career decision-making.

Theoretical Foundations for the Study

A self-concept theory of vocational development and social learning theory form the theoretical bases for investigating the choice of teaching as a career. This section first discusses Donald Super's lifelong theory of vocational development. Next, the review examines a paradigm that explains how career-related decisions are made. Finally, the section discusses locus of control and its relationship to career development.

Super's theory of vocational behavior

Super's self-concept theory of career development identifies a broad spectrum of life stages. As a comprehensive theory, it describes a lifelong sequence of positions occupied by individuals throughout life. Specific vocational tasks need to be accomplished in each stage in order to move toward vocational maturity. The theory provides the context for understanding the process of career decision-making. In addition, the theory seems to be compatible with goals included in career education programs such as graded exposure to concepts of self and concepts of work, emphasis on self-awareness, and continuous occupational exploration.⁵

According to Super, an individual attempts to implement his/her self-concept by selecting an occupation that is most likely to allow self-expression.

A self concept is the individual's picture of himself, the perceived self with accrued meanings. Since the person cannot ascribe meanings to himself in a vacuum, the concept of self is generally a picture of the self in some role, some situation, in a position, performing some set of functions, or in a web of relationships.⁶

An individual's particular vocational behavior depends upon his/her life stage and his/her level of self-concept development. A self-concept becomes more stable as an individual matures. Vocational changes occur throughout the life cycle as changes in self-concept formulations occur. According to Super, diverse vocational behaviors are better understood as attempts to implement a self-concept within changing demands of the life cycle.⁷

Super and associates postulated five vocational life stages: growth (birth - age 14), exploration (ages 15-24), establishment (ages 25-44), maintenance (ages 45-64), and the decline stage (age 65 and older). A series of tasks must be successfully accomplished in each stage for progress onto the next stage.⁸

Super extended the analysis of life stages by describing several substages within the exploration and establishment stages. The exploration stage includes three substages: a tentative substage, a transition substage, and an uncommitted trial substage. The establishment stage is composed of a committed trial substage and an advancement substage.

Vocational developmental tasks According to Super, the process of moving from substage to substage occurs by means of achieving vocational developmental tasks.⁹ Achievement of the developmental tasks is necessary for progress toward vocational maturity. Osipow provided a concise summary of the five developmental tasks related to each substage.

1. Crystallization (ages 14-18) requires an individual to formulate ideas about work appropriate to himself/herself and allows for development of occupational and self-concepts.
2. Specification (ages 18-21) requires an individual to narrow a general career direction into a specific one and to take the necessary steps to implement the decision.
3. Implementation (ages 21-24) requires an individual to act on the vocational choice and obtain job entry.

4. Stabilization (ages 25-35) represents a "settling down" in one's field of work and the use of one's talents in such a way as to demonstrate the appropriateness of the career decisions previously made.
5. Consolidation (ages 35+) requires that the worker firmly establishes himself, his skills, and his seniority, so that he/she can generate a secure and comfortable vocational position for himself/herself as his career matures into his 50s and early 60s.¹⁰

A profile of preservice teachers Undergraduates who consider teaching as their possible career choice are likely to be achieving different levels of three vocational developmental tasks: crystallization, specification, and implementation. A description of attitudes and behaviors relevant to these three tasks suggests a normative profile of preservice teachers' career development.

Undergraduates achieving the crystallization task are aware of the need to formulate a vocational choice. They are formulating a generalized desire for an occupation related to education and are involved in planning for this preferred choice. Those who consider teaching as a career possibility are likely to examine the nature of the profession, characteristics and responsibilities of teachers today, and qualities that good teachers exhibit as they deliberate their career choice.

Students reaching the level of specification have narrowed the general career direction. These students would enroll in the teacher education programs with confidence that teaching is the right career for them. The behaviors and attitudes at this stage are similar to

those in the crystallization stage, but they differ in that they are directed toward one distinct vocation.

Implementation, the third vocational developmental task relevant to undergraduates, becomes evident near the end of college preparation. At this level, preservice teachers would be aware of the need to activate the decision to teach in a specific level/field. They would be directly involved in executing plans to qualify for state certification. Resume writing and preparing of job applications would follow student teaching. The final behavior relative to implementation usually occurs following graduation as a teaching job is secured.

Vocational maturity According to Super and others, vocational maturity is defined as the congruence between an individual's vocational behavior and the expected vocational behavior at that particular age.¹¹ The concept of vocational maturity allows an observer to assess the rate and level of an individual's development with respect to career matters. It is expected that vocationally mature behavior will assume different forms depending upon the context provided by an individual's life stage. For example, a vocationally mature 14-year-old would be concerned with assessing his interests and abilities to reach the goal of deciding on an educational plan. A vocationally mature 45-year-old, on the other hand, would be concerned with ways he/she can maintain his/her career status in the face of competition from younger persons.¹²

The Tiedeman-O'Hara career decision-making paradigm

Super's self-concept theory and the Tiedeman-O'Hara paradigm both focus on developmental tasks that individuals accomplish as they progress from stage to stage. Super's tasks are more general in suggesting the career decisions that individuals must make. The Tiedeman-O'Hara paradigm, on the other hand, focuses solely on decision-making tasks and attempts to provide an explanation for each task. Super's theory provides the context for understanding the decision-making paradigm that "essentially denotes the delaying mechanism of decision and of action upon decision, a mechanism necessary for rational endeavor."¹³

Additionally, career development theories or models can be distinguished from career decision-making models in several ways. The former focus on characteristics of the decision maker and developmental tasks confronting the individual at each life stage. Career development models are broader in scope and pay less attention to the internal psychological processes the person uses to resolve the developmental tasks. Decision-making models, on the other hand, do not attempt to provide a comprehensive theory covering the entire life span. The internal psychological processes an individual uses to resolve developmental tasks within one life stage are investigated.¹⁴

Tiedeman defined the term "career" as the "imposition of direction into the vocational behavior of a person which is subject to his comprehension and will."¹⁵ Central to the career decision-making paradigm is the view that individuals are responsible for their

own behavior at the decision points and are capable of "purposeful action."

Tiedeman and O'Hara proposed that vocational development is one aspect of general development in which the self-concept interacts with decision-making. These researchers focused on the psychological processes of career decision-making in only two of Super's life stages: exploration (ages 15-24) and establishment (ages 25-44).

According to Tiedeman and O'Hara, rational problem solving leads to adequate career-related decisions. Individuals are confronted with environmentally caused "study and work discontinuities" at various points in their lives. These "discontinuities" are caused by transitional events that require career-related decisions. Examples of transitional events include moving from elementary to high school, selecting subjects to take in high school, and choosing a program of study in college.¹⁶

Tiedeman and O'Hara described the processes of differentiation and integration in rational problem solving as the mechanisms of career development. An individual differentiates thought, feeling, and action through two processes: education and conscious reflection of one's life as a problem. Differentiations are properly integrated with closure resulting in career decisions.¹⁷

The seven step paradigm Tiedeman and O'Hara described the process of career decision-making in a seven step paradigm. Each of the steps intends to represent discontinuities in the psychological state of an individual as he/she is involved in the process of acting

upon elements of a vocational problem. Transition from one step to the next is gradual and not irreversible. Additionally, the steps occur in a general order but need not occur in the particular order represented by the continuous steps.¹⁸

According to the paradigm, exploration marks the beginning of the rational problem solving process. The initial step is characterized by unrestricted exploration and vague general concerns with little or no progress toward choice. The need for self-knowledge in relation to the world of work is felt by the individual, but no plan of action has been developed to satisfy the need.

The crystallization stage represents a progress toward, but not attainment of, choice. Alternative choices are recognized with at least some of their consequences noted. Conflicts are perceived, and advantages and disadvantages are weighed. The bases for a decision are being developed in the process of narrowing down the range of possibilities through negative choices.

The choice stage represents a definite commitment with some degree of certainty for a particular vocational goal. It is accompanied by expressions of satisfaction and relief for having made the resolution, and the individual may focus on aspects of self that provide evidence of an appropriate decision. The individual may express naive optimism about the future and usually expresses firm goal direction as well as eagerness and impatience to reach the goal. Focus on the consequences of the career decision and further planning are not yet in evidence.

The clarification stage represents a process of closure. The individual is refining and elaborating the consequences of his/her commitment. Planning the details and next steps to be taken become important. The individual is usually engaged in elaborating and perfecting self-image. Specific plans are made to implement the career decision. However, actions related to these plans may be delayed until the environmental conditions are appropriate.

The step of induction involves initial contact with a new environment after a vocational decision is made. The primary mode of behavior as implementation of career choice begins is passive. The individual's goal is to become accepted by the social system, and self goals are deferred to group purpose. Behaviors in this step also include a general defense of self. The individual gradually identifies with the work group through assimilation of personal values and goals into the group's values and purposes.

Upon acceptance of the individual by the group, the assertive step of reformation ensues. The individual is highly involved, strives to help the group improve, and acts upon the group to bring its values and goals into harmony with his/her own value system. A strong sense of self is evident, but the self may also be abandoned to reach the group goal. In this step, older members of the group tend to be modified by the zealous, newer members.

The final step of the career decision-making paradigm involves a process of synthesis. Older members are likely to resist and act against a new force seeking change in the group. The result is a

change or compromise of individual intention in the final stage of integration. As the new member is able to effect this compromise, he/she gains objectivity to self and to group. In the step of integration, differentiation has been achieved, and a new-found appreciation of self is integrated with its larger field, the work group. Both individual and group strive to maintain a condition of "dynamic equilibrium."¹⁹

According to Tiedeman and O'Hara, differentiation and integration occur repeatedly many times in the course of one's life. Career development occurs within the context of several decisions. At any one time, an individual may be in one or another of the seven steps with respect to several overlapping career decision-making tasks.²⁰ For example, a college undergraduate is in the process of implementing and acting upon the decision to go to college and may, at the same time, be in the exploration stage of selecting a college major. Previous decisions as well as the actions on previous decisions affect the resolutions that are only in the anticipatory stages.

Measuring progress on decision-making tasks Harren applied the Tiedeman-O'Hara paradigm to construct an instrument that measures progress on three specific decision-making tasks. The Assessment of Career Decision-Making (ACDM) measures college students' degree of progress in making and implementing three related career decisions: the decision to go to college, the choice of major, and the choice of occupation. Additionally, the ACDM measures students' cognitive styles of making decisions.²¹

Decision-making style Harren postulated that an individual's mode of perceiving and responding to tasks influences the process of decision-making. This cognitive style refers to the manner in which decisions are made. Three styles outlined by Harren include: rational decision-making, intuitive decision-making, and dependent decision-making.

The rational decision-making style is characterized by the ability to recognize the consequences of earlier decisions for later ones. The future need to make resolutions is anticipated, and the individual seeks information about self and the anticipated situation. Decisions are executed in a logical and deliberate manner. The judgments are effective to the degree that accurate information about the situation is acquired and the degree to which the individual's self-appraisal is realistic. Rational decision-making represents the ideal of the self-actualizing individual, "one who is the architect of one's own future as one lives it."²²

Intuitive decision-making may be described as similar to the rational style in that the individual accepts responsibility for resolving problems. However, little anticipation of the future, information seeking behavior, or logical weighing of factors are evident. Resolutions are likely to be based on the use of fantasy, attention to present feelings, and an emotional self-awareness. Although commitment to a course of action is reached relatively quickly and is felt "internally," the individual can offer few reasons to explain how the decision was reached. Harren suggested that

the intuitive style is:

... less likely to result in effective decision-making than the rational style, due to fluctuations over time in the individual's internal state, and to limited capacity to accurately represent an unfamiliar situation in fantasy.²³

Dependent decision-making is viewed in contrast to the rational and intuitive styles. The individual denies personal responsibility for decision-making and projects the burden outside himself/herself. Expectation and desires of authorities, parents, and peers influence decision-making. The individual tends to be passive and compliant, to have a high need for social approval, and to perceive the environment as providing restricted or limited options. According to Harren, the dependent style is likely to result ultimately in lack of fulfillment or personal satisfaction in vocational choices.²⁴

Social learning theory

Decision-making style, as defined by Harren, suggests that individuals take varying levels of responsibility for their decisions. It would seem that this cognitive style is related to a personality construct known as locus of control which has social learning theory as its theoretical base.

Social learning theory was proposed by Julian Rotter as an explanation for the nature and effects of reinforcement. According to the theory, a reinforcement acts to strengthen an expectancy that certain behavior will be followed by reinforcement in the future. A behavior-reinforcement sequence is learned. However, if a particular expected reinforcement fails to occur, the expectancy will be reduced

or extinguished. Therefore, as an infant develops and acquires more experience in his/her social environment, he/she differentiates events that are causally related to preceding events and those that are not.²⁵

Locus of control Rotter postulated that individuals would differ in the degree to which they attribute reinforcements to their own actions depending upon their history of reinforcements. Additionally, the expectations that develop in personality formation tend to generalize from a specific situation to a series of situations that are perceived as similar. Individuals who believe that what happens to them is a result of their own actions are said to possess "internal control." In contrast, persons with "external control" attribute success and rewards in life to luck, chance, or the whims of powerful others rather than to their own personal behavior and achievements.²⁶

The decision to teach The rationale for examining locus of control in the context of career development and the decision to teach is implied in Rotter's statements.

The role of reinforcement, reward, or gratification is universally recognized by students of human nature as a crucial one in the acquisition and performance of skills and knowledge.²⁷

A generalized attitude, belief, or expectancy regarding the nature of the causal relationship between one's own behavior and its consequences might affect a variety of behavioral choices in a broad band of life situations.²⁸

Generalized expectancies, learned as the personality develops over time, are likely to influence the acquisition of knowledge and skills by undergraduates. It seems likely that generalized expectancies will also affect the career development process. Locus of control

may influence the development of competencies by preservice teachers. It may affect preservice teachers' abilities to progress on vocational developmental tasks. Locus of control may also influence individuals' cognitive style of resolving career-related issues.

Additionally, locus of control may help to explain the continued teacher surpluses in a number of teaching areas. Students with an external locus of control may not perceive college preparation and choice of major as directly influencing future employment opportunities. These persons do not perceive their rewards or external reinforcements to be direct consequences of their own actions. Therefore, an individual attributes success in life to luck -- "knowing the right people" and "being at the right place at the right time."

Logically, then, teacher education students having an external locus of control may not critically assess their personal interests, abilities, and employment opportunities in light of the current teacher supply and demand. Elementary school teaching or physical education teaching, for example, are considered as likely as other occupations given the requirement of chance or luck needed in securing jobs.

On the other hand, individuals with an internal locus of control may also explore careers in teaching areas that have teacher surpluses. Undergraduates with an internal locus of control are actors in their lives and rely on personal abilities to achieve desired goals. It would seem to follow that these students proceed to implement career choices in teaching areas having well-documented teacher surpluses with confidence in their personal abilities both to demonstrate

competencies needed by teachers and to secure employment. Unlike the passive position taken by externals, however, "internal" preservice teachers are likely to participate actively in experiences that develop needed competencies for teaching and experiences that enhance future job opportunities.

A relationship may exist between locus of control and unexamined or "causal" decisions to become school teachers. Individuals who do not assume responsibility for their actions and decisions may tend to rely on opinions or experiences of significant others rather than personal interests and abilities in the career decision-making process. For example, they might respond to the question of why they have chosen teaching as a career by saying, "My parents and grandparents were teachers, and I've observed how rewarding that career has been for them."

Related Research

Locus of control

Locus of control is an example of a "generalized expectancy" -- whether individuals believe that what happens to them is dependent upon their own behavior (controlled by their actions) or is contingent upon luck or powerful others.²⁹ Rotter constructed an Internal-External Scale (I-E Scale) for measuring an individual's locus of control, and a large amount of research has been generated from the psychological construct.³⁰ Between 1966 and 1971, well over 300 studies were published using Rotter's I-E Scale and relating locus of control to a wide variety of behaviors. In addition, the I-E Scale

has been translated into at least six other languages, and four children's scales are in use based on the original I-E Scale.³¹

In a review of early research on locus of control, Rotter found evidence supporting the hypotheses that an individual who has a strong belief that he/she can control his/her own destiny is likely to:

- a. be more alert to those aspects of the environment which provide useful information for his/her future behavior;
- b. take steps to improve his/her environmental condition;
- c. place greater value on skill or achievement reinforcements and be generally more concerned with his/her ability, particularly failures; and
- d. be resistive to subtle attempts to influence him/her.³²

Inferences from this research may be applied more specifically to the behaviors and career decisions of undergraduates who consider teaching as a career option. Students with an internal locus of control may be likely to exhibit behaviors that improve their chances for future employment as teachers. For example, working toward certification in more than one area or qualifying for a coaching endorsement may increase a graduate's chances for finding employment.³³

Teacher competencies A further inference from the early research summarized by Rotter relates to teacher competencies. Internally-oriented preservice teachers participating in elementary or secondary classroom activities may be more perceptive and gain a better understanding of the school environment than externally-oriented

students in similar activities. Internal preservice teachers may place greater value on achieving the behaviors believed to be characteristic of effective teachers than would externals.

Consistent with the reasoning that relates locus of control to teacher competencies, Scheck and Rhodes found a relationship between junior high school teachers' rated competence and locus of control.³⁴ The researchers hypothesized that teachers scoring high internal on a measure of locus of control would be more likely to be rated high in overall teaching competence. All 30 teachers at a San Diego middle school volunteered to complete a questionnaire including background information and the Norwicki-Strickland Internal External Scale.³⁵ Teaching success and competence was reported on a rating scale by a four-member team composed of the school principal, vice-principal, and two counselors.

Physical conditions were judged to be conducive to the observation technique for evaluation, producing little or no observer bias. The school was an architecturally open building containing movable walls and no doors. Observers could attend to classroom activities without disturbance. The principal was required by the administration to evaluate teachers twice a year. The vice-principal and counselors frequently discussed various aspects of school life with teachers enabling the evaluation to be non-disruptive.

The observation scale consisted of 20 Likert-type items with individual scores ranging from a low of 20 to a high of 100. The higher the score, the higher the rated teaching competence on the

following 20 items:

Professional zeal	Loyalty
Cooperation	Classroom personality
Personal appearance	Social qualities
Punctuality	Voice and speech
Classroom management	Knowledge of subject area
Evaluation process	Discipline
Use of oral and written English	Creativity in teaching
Ability to organize learning situations	Class achievement
Economical use of class time	Consistent attendance
General knowledge and information	Ability to organize materials for teaching. ³⁶

The data were analyzed statistically using the chi square statistic with Yate's correction and Yule's Q. Sixty-nine percent of the teachers scoring high on internal control were evaluated high in teaching competence. Seventy-one percent of the low internals (those Rotter classified as externals) were rated low on overall teaching ($X^2 = 3.35$, $p \leq .05$; Yule's Q = .69). Spearman's Rho indicated interrater reliability with five of the six correlations significant at the .01 level, and one significant at the .05 level.³⁷

Vocationally-related behaviors In addition to teacher competencies, researchers have considered locus of control to be an important construct in understanding human behavior in work organization and work attitudes.³⁸ Research studies have related locus of control to personality characteristics, task characteristics and work attitudes, career planning, vocational indecision, and career maturity.

Personality characteristics Personality characteristics are likely to influence the competence of school teachers or other individuals in work settings. Bledsoe and Baber studied 205 college women to determine the extent to which 16 personality characteristics

could reliably predict the degree of internality. Rotter's I-E Scale and the Sixteen Personality Factor Questionnaire, developed by Cattell et al., were administered.³⁹ Pearson product moment correlations were computed between the 16 predictors and the criterion, locus of control. A stepwise multiple regression procedure determined a significant prediction model of eight personality variables (multiple $R = .442$, accounting for 20 percent of the variance). Internal women were more likely to be controlled, emotionally stable, conscientious, trusting, shrewd, and sociable. Externals were more likely to be excitable and insecure.⁴⁰

Task characteristics and work attitudes Additionally, perceptions of task characteristics and work attitudes would seem to influence teacher competency. Dailey conducted a study of the relationship between locus of control, task characteristics, and work attitudes.⁴¹ Subjects were employees in 15 different research and development organizations. Activities in these organizations involved research in the fields of environmental and physical sciences. Of the 281 subjects completing the instruments, 98 percent were male college graduates. Forty-four percent of the subjects held Master's or Ph.D. degrees.

Subjects completed a battery of instruments measuring task variability and difficulty, job involvement, general job satisfaction, job motivation, psychological growth satisfaction, and locus of control. The data indicated that individuals with an internal locus of control perceived more task variability and task difficulty in

their work than did persons with an external locus of control. Internals also demonstrated higher levels of job involvement, job motivation, job satisfaction, and psychological growth satisfaction than did externals.

Career planning Career planning activities, also correlated with locus of control, are likely to affect the adequacy of career-related decisions. Differential effects of a one-day career planning workshop on internally- and externally-oriented secretaries were studied by Thornton.⁴² The purpose of the workshop, based on the assumption that individuals can influence the direction of their careers, was to encourage the participants to take actions to plan and advance their careers. A modified version of the Internal/External Locus of Control Scale was administered prior to the workshop.⁴³

The workshop included small group discussions and a career planning activity in which each individual noted specific actions she would take in three areas: identifying strengths and developmental needs; exploring potential career opportunities and goals; and specifying and carrying out some means of goal attainment. The criterion measure was a follow-up questionnaire completed four months after the workshop. The questionnaire determined specific career planning and advancement actions they had taken since the seminar.

Results indicated that internals reported significantly ($p < .01$) more career planning actions than externals when all three areas of action were considered together. Internals took more steps to explore

potential career goals ($p < .05$) and to identify means of altering these goals ($p < .10$). There were no significant differences in the percent who took steps to explore current strengths and developmental needs.

Vocational indecision Vocational indecision has been investigated by a number of researchers in an attempt to characterize individuals who are decided versus individuals who are undecided. Decision-making, avoidance behavior, social and moral attitudes, risk taking, values, and personality traits are among the variables that have been studied in relation to career indecision.⁴⁴

Literature reviewed by Kishor, a professor of education at the University of South Pacific, suggests that self-esteem and locus of control serve as moderating variables in the vocational choice process.⁴⁵ A study was conducted using 224 male and female Indo-Fijians to examine the effects and relationship of self-esteem and locus of control orientation to the educational and vocational decisional statuses of individuals.⁴⁶ It was hypothesized that decided individuals (presence of an educational or vocational decision) would have high positive self-esteem as measured on Coopersmith's Self-Esteem Inventory and more internal locus of control as measured by the Children's Nowicki-Strickland Internal-External Locus of Control scale than would undecided individuals. The dependent variable, vocational decisional status, was determined by the Scale of Vocational Indecision constructed by Osipow et al.

Results were analyzed statistically using analysis of variance and correlational analyses. Decided individuals had higher self-esteem ($p < .01$) as well as a more internal orientation ($p < .01$). Both correlations between self-esteem and decisional status and between locus of control and decisional status were highly significant ($p < .001$). Locus of control was found to account for greater variance (22.1 percent) in decisional status than self-esteem.

Kishor concluded that the study lends support to previous theory and research. Results supported Super's theory of self-implementation in vocational development. The study also supported the relationship between locus of control and decisional status found by Gable et al.⁴⁷ According to Kishor, Rotter's theory of generalized expectancies is applicable in vocational guidance.⁴⁸

Career maturity In addition to individual characteristics and attitudes, numerous studies have investigated locus of control in relation to a multi-dimensional concept called career maturity. Vocational behaviors that are consistent with those expected for a particular age may be classified as mature behaviors.⁴⁹ Vocational maturity has been defined as a score on an instrument that purports to measure the construct.

Using the Attitude Scale from Crites' Career Maturity Inventory (CMI, 1971) and the MacDonald and Tseng's I-E Scale, Gable et al. studied the relationship between locus of control and career maturity.⁵⁰ Ratings of typical versus atypical vocational choice were obtained from 179 freshmen to senior female student volunteers. Contrary to

theoretical expectation, no differences were found across grade levels on the CMI Attitude Scale. Nor were differences found across grade levels on the I-E scale. No significant differences were found in vocational maturity between those women making typical versus atypical vocational choices.

The analysis of variance did indicate that internally-controlled women had significantly higher vocational maturity scores than externally-controlled women at the .01 level. The lowest level of vocational maturity was found for externally-controlled females making atypical vocational choices in contrast to the prediction that external-typical choice would score lowest on vocational maturity.

Gable et al. concluded that the I-E control construct is an important variable to consider when investigating career development. According to the researchers, I-E scores, representing a continuum from internal to external, tend to be more homogenous in a group of college women merely because they all did "make it" to college. Even though the college women studied tended to form a homogenous group on the I-E construct, significant vocational maturity differences were found for those categorized as internally or externally controlled.⁵¹

In a correlational study, Froke investigated the relationships between locus of control, career maturity of attitudes, and consistency and congruency of career choice.⁵² Subjects were a sample of 135 students enrolled in an educational foundations course in the fall of 1975. Students completed background information and three instruments: the Vocational Preference Inventory, the Attitude Scale of

Crites' CMI, and Rotter's I-E Scale. Results indicated that internals were more mature in their career attitudes than externals. Sex, age, and college class were independent of the negative relationship between externality and maturity of career attitudes.

Similarly, Taibi studied the relationship between locus of control, ego identity status, and vocationally mature behaviors in a career decision-making course.⁵³ The general hypothesis of a positive relationship between internality and vocational maturity was not supported. One positive finding was that internal subjects reported being more active than external subjects in obtaining self and occupational information before participating in the study. This was supported by significant but low correlations between internal locus of control and greater information acquisition activity.

Effects of a career guidance class In addition to correlational studies, experimental or quasi-experimental studies have investigated the effects of treatments on career maturity. Smith reported results of a study testing the effects of different instructional treatments in career guidance classes at Western Illinois University.⁵⁴ Subjects self-selected the guidance class. Experimental group one included undergraduates who participated in the class in 1976-1977, and experimental group two included undergraduates participating in the class in 1977-1978. Undergraduates were randomly selected from the residence hall population to serve as a control group. The assumption was made that the groups did not vary significantly from year to year.

The Crites CMI Attitude Scales (1973) were used as pre- and posttest measures of career maturity. A number of structural similarities between the instructional treatments were outlined. The philosophical and methodological differences between treatments were the focus of the investigation.

Experimental group one used a text and workbook format that allowed for flexibility in structure. Various activities were selected from the text to be used in class. The structure of the course allowed for spontaneity in topical presentation and individual pursuit. Group one was presented with valuing and values clarification activities during the first half of the quarter. The remainder of the instructional treatment involved a consideration of the world of work, occupational information, exploring alternatives, and decision-making.

The second experimental group used a text with a more formal structure, The Career Search.⁵⁵ All participants were required to read the same content and complete the same exercises within a given time. The didactic, structured guidance approach emphasized phase progression through a 20-step process. Phase one required students to expand their horizons by recognizing and considering options available to them. Phase two focused on narrowing choices and decision-making. The second phase included valuing and values clarification processes as well as recognizing the importance of self-concepts and abilities. Each step within the two phases required a written activity.

Results of statistical tests indicated that experimental group two was significantly different ($p < .01$) from both the control group and the experimental group one. Career maturity of students in group one did not appear to improve. It was concluded that career maturity can be significantly increased by a career guidance class with the effect being dependent upon methodological variables.⁵⁶

A measurement problem Numerous studies document a positive relationship between internal locus of control and career maturity as measured by Crites' Career Maturity Inventory.⁵⁷ Recent reviews, however, raise questions concerning the discriminant validity of the Crites instrument.⁵⁸ Two studies investigating the validity of the CMI found significant convergent validity of the scales. In other words, Career Choice Attitude scores correlated substantially with the Career Choice Competencies ($r = .59$) within the CMI. However, the Attitude Scale also correlated significantly with the Otis-Lennon Mental Ability Test ($r = .56$) which is generally accepted as a measure of a different construct. In fact, the Competence Scale correlated more highly with the Otis-Lennon Mental Ability Test ($r = .73$) than it did with the Attitude Scale. Westbrook et al. concluded that the CMI lacks discriminant validity because the Crites variables do not have more in common with each other than they have with variables such as intelligence, scholastic aptitude, and school achievement.⁵⁹

Career decision-making

Investigating constructs believed to be dimensions of career maturity may help resolve the measurement problem. Career decision-making

is one such construct. A number of studies have investigated career decision-making as it was outlined in the Tiedeman-O'Hara paradigm and measured by Harren.⁶⁰

A more manageable approach is to focus on a given life stage or period of development and bring together decision-making and developmental concepts for a more complete understanding of vocational behavior within that life stage.⁶¹

The Assessment of Career Decision-Making (ACDM) was developed by Harren as an extension of an earlier instrument to test empirically part of the Tiedeman-O'Hara vocational decision-making paradigm.⁶² The ACDM is limited to a specific context, to specific types of decisions, and to a limited number of decision-maker characteristics. Three scales of the ACDM assess college students' degree of progress in making and implementing three related career decisions: the decision to go to college (DMT-C), the choice of major (DMT-M), and the choice of occupation (DMT-O). Decision-maker characteristics are limited to an assessment of cognitive style in making decisions.⁶³

Counseling/instructional interventions A number of studies have found significant improvement on ACDM scores resulting from counseling and/or instructional interventions.⁶⁴ Cochran et al. studied the effects of the System of Interactive Guidance and Information (SIGI) on the decision-making processes of college students.⁶⁵ Subjects were drawn from the undergraduate population, and those selected were given an opportunity to volunteer to use SIGI during registration. A total of 72 students participated.

Students were randomly assigned to the experimental group (N=48) and the control/wait group (N=24). An earlier version of the ACDM was used to measure occupational decision-making stage. Locus of control was measured by Rotter's I-E Scale. Pre- and posttest scores constituted the within subjects dimension. Experimental and control/wait groups formed the between group analysis.

A two-way analysis of variance was performed for each dependent variable studied: locus of control, occupational decision-making stage, and academic major decision-making stage. Results showed significant ($p < .05$) positive change for the treatment group on pre-post measures of decision-making stage related to choice of college major. No significant changes ($p < .05$) were found on pre-post decision-making stage measures related to vocation or on locus of control of reinforcement.

Evans and Rector used an earlier version of the ACDM as one of several instruments evaluating the effects of a college course in career decision-making.⁶⁶ Analysis of variance was used to test for statistical significance of pre- and posttest course mean differences on each of three subscales of the Vocational Decision Checklist. Significant differences ($p < .01$) were observed for mean academic major, occupational, and total subscale pre- and postcourse scores for the 79 students tested. According to Evans and Rector, the course contributed to positive changes in students' vocational development. However, the researchers cautioned that care should

be used in interpreting the data since full control of all variables was impossible.

The effect of course structure and locus of control on career decision-making of community college students was studied by Furbish.⁶⁷ Fifty-five students enrolled in a career development course were classified as internals or externals based on I-E Scale scores. Career decision-making was assessed before and after the treatments with the ACDM. Two intervention styles were used in the course: one stressing a structured systematic approach and the other emphasizing self and environmental exploration in an unstructured context.

Results indicated that the mean ACDM decision-making task scores for college major and occupation were higher after treatment than before, regardless of the intervention. Comparison of the two intervention styles revealed that the means for the unstructured groups on the college major task were higher than those in the structured group ($p < .08$). Internals tended to have higher decision scores after exposure to the structured intervention, and externals tended to have higher scores after having been in unstructured groups. Furbish concluded that attitude, or the importance an individual places on making decisions, is the best predictor of post intervention decision-making scores.

Cognitive style Part one of the ACDM includes three scales to assess an individual's style of making career-related decisions.⁶⁸ The categories are based upon the degree to which an individual takes personal responsibility for decision-making versus projecting

responsibility outward toward "fate" or significant others. Decision-making style also indicates the application of rational versus emotional strategies. See the discussion of decision-making styles on pages 27-28.

Lunneborg reported the results of three studies testing the hypothesis of greater reliance on the intuitive style by females and on the planning style (rational) by males in making career decisions.⁶⁹ Results of the studies indicated that the rational style was most highly associated with vocational decisiveness. No sex differences were found in cognitive style, vocational self-concept crystallization, or self-rated vocational decisiveness. It was concluded that differential career counseling for the sexes does not appear to be indicated. Rather, encouragement of the rational style and discouragement of the dependent style may be correlated with vocational decisiveness, vocational self-concept crystallization, and stronger work values.

Harren et al. studied the influence of sex role attitudes and cognitive styles on career decision-making.⁷⁰ Decision-making style was one of three cognitive style variables studied. A path analysis procedure indicated that about one-third of the variance in decisional status was accounted for by the variables in the study. A student's progress in the decision-making process accounted for the greatest amount of the predictable variance in decisional status. To a lesser extent, the decision-making process was influenced by decision-making style and sex role attitudes. Gender did not directly influence decision-making style but exerted a strong influence on sex role attitudes.

According to Harren et al., the influence of style on the decision-making process suggests that assessment of clients' decision-making style may be important in identifying appropriate types of interventions. Assessing a client's decision-making style may be helpful in predicting the client's response to the type of intervention and in deciding whether efforts to modify the decision-making style of the client should be taken.⁷¹

Summary

Theory and research establish the context for the present study. According to Super's theory of career development, the decision to become a teacher is an implementation of self-concept in the world of work. The process of deciding about teaching as a career requires achievement of developmental tasks. Undergraduates are in differing levels of crystallizing a general vocational direction, specifying a specific career, and implementing the vocational choice.

According to Tiedeman and O'Hara, an adequate and satisfying career choice results from a process of rational problem solving. However, the decision to teach or to pursue another career can be an unreflected selection of career direction based on opinions of significant others. An investigation of both cognitive style in decision-making and locus of control may reveal factors affecting the choice of teaching as a career.

Additionally, results of research suggest that counseling and instructional interventions have increased scores on the ACDM scales. Instructional techniques that require students to examine critically their

decision about teaching may also indicate progress on one scale of the ACDM, the decision-making task related to college major.

Notes

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²National Education Association, The American Public-School Teacher, 1965-66; Lortie, Schoolteacher: A Sociological Study, pp. 27-36.

³Lortie, Schoolteacher: A Sociological Study, p. 38.

⁴Samuel H. Osipow, Theories of Career Development, 2nd ed. (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1973), p. 173.

⁵Ibid., p. 167.

⁶Donald E. Super, "Toward Making Self-Concept Theory Operational," in Career Development: Self-Concept Theory, eds. Donald E. Super et al. (New York: College Entrance Examination Board, 1963), p. 18.

⁷Donald E. Super, The Psychology of Careers (New York: Harper & Row Pubs., Inc., 1957), pp. 112-128, 191-196.

⁸Donald E. Super et al., Vocational Development: A Framework for Research (New York: Bureau of Research, Teachers College, Columbia University, 1957), pp. 34-53.

⁹Donald E. Super, "Vocational Development in Adolescence and Early Adulthood: Tasks and Behaviors," in Career Development: Self-Concept Theory, eds. Donald E. Super et al. (New York: College Entrance Examination Board, 1963), pp. 81-84.

¹⁰Summarized from Osipow, Theories of Career Development, pp. 137-140.

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¹²Osipow, Theories of Career Development, p. 137.

¹³David V. Tiedeman and Robert P. O'Hara, Career Development: Choice and Adjustment (New York: College Entrance Examination Board, 1963), p. 37.

¹⁴Vincent A. Harren, "A Model of Career Decision Making for College Students," Journal of Vocational Behavior 14, 2 (April 1979): 120.

¹⁵David V. Tiedeman, "The Cultivation of Career in Vocational Development Through Guidance in Education," in Guidance in American Education II: Current Issues and Suggested Action, eds. Edward Landy and Arthur M. Kroll (Boston: Harvard Graduate School of Education, 1964), p. 265.

¹⁶Tiedeman and O'Hara, Career Development: Choice and Adjustment, p. 34.

¹⁷*Ibid.*, pp. 36-38.

¹⁸*Ibid.*, pp. 36-43; Assumptions were summarized in David A. Jepsen and M. W. Grove, "Stage Order and Dominance in Adolescent Vocational Decision-making Processes: An Empirical Test of the Tiedeman-O'Hara Paradigm," Journal of Vocational Behavior 18, 2 (April 1981): 238.

¹⁹Tiedeman and O'Hara, Career Development: Choice and Adjustment, pp. 38-43; The paradigm was summarized in Vincent A. Harren, The Influence of Sex Roles and Cognitive Styles on the Career Decision-making of College Men and Women, Carbondale, Illinois: Southern Illinois University, 1976. (ERIC ED 189 265), pp. 19-21.

²⁰Tiedeman and O'Hara, Career Development: Choice and Adjustment, pp. 44-46.

²¹Harren, The Influence of Sex Roles and Cognitive Styles on the Career Decision-making of College Men and Women, p. 11.

²²*Ibid.*, p. 20.

²³*Ibid.*

²⁴*Ibid.*

²⁵Julian B. Rotter, "Generalized Expectancies for Internal Versus External Control of Reinforcement," Psychological Monographs 80, 1, Whole No. 609 (1966): 2.

²⁶*Ibid.*, p. 1.

²⁷*Ibid.*

²⁸Ibid., p. 2.

²⁹E. Jerry Phares, Locus of Control in Personality (Morristown, New Jersey: General Learning Press, 1976), p. 19.

³⁰Rotter, "Generalized Expectancies for Internal Versus External Control of Reinforcement," pp. 9-28.

³¹Julian B. Rotter, "External Control and Internal Control," Psychology Today 5, 1 (June 1971): 42.

³²Rotter, "Generalized Expectancies for Internal Versus External Control of Reinforcement," p. 25.

³³Trevor G. Howe, "Placement Report," Ames, Iowa: Iowa State University, Education Placement Office, November 1980. (Typewritten.)

³⁴Dennis C. Scheck and Gregory A. Rhodes, "The Relationship between Junior High School Teachers' Rated Competence and Locus of Control," Education 100, 3 (Spring 1980): 243-248.

³⁵Stephen J. Nowicki and Marshall P. A. Duke, "Locus of Control Scale for Noncollege as Well as College Adults," Journal of Personality Assessment 38, 2 (April 1974): 136-137.

³⁶Scheck and Rhodes, "The Relationship between Junior High School Teachers' Rated Competence and Locus of Control," p. 245.

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³⁸Robert C. Dailey, "Relationship between Locus of Control, Task Characteristics and Work Attitudes," Psychological Reports, 47, 3, 1 (December 1980): 855.

³⁹Joseph C. Bledsoe and William C. Baber, "Personality Correlates of Locus of Control among College Women," Psychological Reports 43, 2, 2 (December 1978): 1129-1130.

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⁴¹Dailey, "Relationship between Locus of Control, Task Characteristics and Work Attitudes," pp. 855-861.

⁴²George C. Thornton, III, "Differential Effects of Career Planning on Internals and Externals," Personnel Psychology 31, 3 (Autumn 1978): 471-476.

⁴³John R. Robinson and Philip R. Shaver, Measures of Social Psychological Attitudes (Ann Arbor, Michigan: Institute for Social Research, 1973).

⁴⁴Research on career indecision was summarized in Virginia N. Gordon, "Undecided Student: A Developmental Perspective," Personnel and Guidance Journal 59, 7 (March 1981): 433-439.

⁴⁵Nand Kishor, "The Effect of Self-esteem and Locus of Control in Career Decision Making of Adolescents in Fiji," Journal of Vocational Behavior 19, 2 (October 1981): 227-232.

⁴⁶Indo-Fijians are descendents of Indians who migrated to Fiji from India over one century ago.

⁴⁷Robert K. Gable et al., "Perceptions of Personal Control and Conformity of Vocational Choice as Correlates of Vocational Development," Journal of Vocational Behavior 8, 3 (June 1976): 259-267.

⁴⁸Kishor, "The Effect of Self-Esteem and Locus of Control in Career Decision Making of Adolescents in Fiji," p. 230.

⁴⁹Note the discussion on page 21.

⁵⁰Gable et al., "Perceptions of Personal Control and Conformity of Vocational Choice as Correlates of Vocational Development," pp. 259-267.

⁵¹Ibid., p. 265.

⁵²Barbara K. Froke, "Study of the Relationships among Locus of Control, Maturity of Career Attitudes, and Consistency and Congruence of Career Choice," Dissertation Abstracts International 36, 6 (December 1976): 3417-A.

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⁵⁷ Examples of such studies include the following: Michael F. Miller, "Relationship of Vocational Maturity to Locus of Control of Reinforcement," New York State Personnel and Guidance Journal 11, 1 (Winter 1976): 18-20; James C. Stansbury, "Maturity of Vocational Attitudes and Locus of Control as Dimensions of Vocational Personality Types," Dissertation Abstracts International, 37, 7 (January 1977): 4147-A; Walter G. McIntire et al., "The Relationship of Locus of Control to Career Maturity and Work Attitudes," Career Education Quarterly 3, 2 (Spring 1978): 54-60; Betty J. Grossman, "The Effects of Decision-making Skill Instruction on Locus of Control, Career Choice Competency, and Occupational Information-seeking Behavior," Dissertation Abstracts International 40, 5 (November 1979): 2552-A; Grace J. Cowan, "The Effects of Teaching Goal Setting Procedures on the Career Maturity and Classroom Performance of Business College Women Differing in Locus of Control," Dissertation Abstracts International, 40, 5 (November 1979): 2424-A; John A. Curry, "The Effects of Life Planning Instruction and Career Counseling on Locus of Control Orientation and Career Maturity Scores of University Compensatory Education Students," Dissertation Abstracts International 41, 5 (November 1980): 1968-A.

⁵⁸ Martin R. Katz, "Review of the Career Maturity Inventory by J. O. Crites," in Eighth Mental Measurements Yearbook, ed. Oscar K. Buros (Edison, New Jersey: Gryphon House Inc., 1978), pp. 1562-1565; Donald G. Zytowski, "Review of the Career Maturity Inventory by J. O. Crites," in Eighth Mental Measurements Yearbook, ed. Oscar K. Buros (Edison, New Jersey: Gryphon House, Inc., 1978), pp. 1565-1567.

⁵⁹ Bert W. Westbrook et al., "The Validity of the Crites Model of Career Maturity," Journal of Vocational Behavior 16, 3 (June 1980): 273-277; Similar correlations between the CMI Attitude Scale scores and cognitive measures were reported by David A. Jepsen and Dale J. Prediger, "Dimensions of Adolescent Career Development: A Multi-Instrument Analysis," Journal of Vocational Behavior 19, 3 (December 1981): 366.

⁶⁰ See pages 23-26.

⁶¹ Harren, "A Model of Career Decision Making for College Students," p. 120.

⁶² Vincent A. Harren, "A Study of the Vocational Decision-making Process among College Males," Dissertation Abstracts 25, 9 (March 1965): 5114.

⁶³ Harren, The Influence of Sex Roles and Cognitive Styles on the Career Decision-making of College Men and Women, pp. 2-3.

- ⁶⁴Dale G. Wachowak, "Personality Correlates of Vocational Counseling Outcome," Journal of Counseling Psychology 20, 6 (November 1973): 567-568; R. Douglas Smith and John R. Evans, "Comparison of Experimental Group Guidance and Individual Counseling as Facilitators of Vocational Development," Journal of Counseling Psychology 20, 3 (May 1973): 202-208; Donald E. Streufert, "Differential Classroom Effects upon the Vocational Decision-making Processes of Male College Students Grouped According to Conceptual Level," Dissertation Abstracts International 36, 12 (June 1976): 7879-7880-A; Marilyn R. Berman et al., "The Efficacy of Supportive Learning Environments for Returning Women: An Empirical Evaluation," Journal of Counseling Psychology 24, 4 (July 1977): 324-331.
- ⁶⁵Donald J. Cochran et al., "Effects of Client/Computer Interaction on Career Decision-making Process," Journal of Counseling Psychology 24, 4 (July 1977): 308-312.
- ⁶⁶John R. Evans and Alice P. Rector, "Evaluation of a College Course in Career Decision Making," Journal of College Student Personnel 19, 2 (March 1978): 163-168.
- ⁶⁷Dale S. Furbish, "The Effect of Structure and Locus of Control on the Career Decision Making of Community College Students," Dissertation Abstracts International 40, 5 (November 1979): 2479-A.
- ⁶⁸Vincent A. Harren, Assessment of Career Decision-Making (Carbondale, Illinois: Southern Illinois University, 1980).
- ⁶⁹Patricia M. Lunneborg, "Sex and Career Decision-making Styles," Journal of Counseling Psychology 25, 4 (July 1978): 299-305.
- ⁷⁰Vincent A. Harren et al., "Influence of Sex Role Attitudes and Cognitive Styles on Career Decision Making," Journal of Counseling Psychology 25, 5 (September 1978): 390-398.
- ⁷¹*Ibid.*, p. 397.

CHAPTER III. METHOD

Purposes of the Study

Based on theories of career development and previous research, the present study postulates that locus of control and decision-making style may affect students' progress in making career-related decisions. Specifically, locus of control and decision-making style may affect students' certainty about teaching and progress toward the decision about a college major. Additionally, an instructional approach that helps students assess their personal values and reasons for considering the teaching profession may both increase certainty about teaching (either for or against) and increase progress in the career decision-making task relative to college major.

The purposes of the present study include the following: 1) to determine the effects of a self-assessment approach as an instructional technique in an introductory education course on commitment to teaching as a career and on students' progress on the decision-making task of choosing a college major; 2) to investigate the effects that locus of control and decision-making style have on certainty about teaching and on the decision-making task of selecting a college major; and 3) to identify additional variables that affect certainty about teaching and progress on the decision-making task of choosing a college major.

Research questions

General questions are listed that have been deduced for testing in the present study.

1. Does the self-assessment instructional approach increase certainty about teaching?
2. Does the self-assessment instructional approach increase progress on the career decision-making task relative to college major (DMT-M score)?
3. Is locus of control related to certainty about teaching?
4. Is locus of control related to progress on the career decision-making task relative to college major (DMT-M score)?
5. Is decision-making style related to certainty about teaching?
6. Is decision-making style related to progress on the career decision-making task relative to college major (DMT-M score)?
7. Are the following variables related to posttest certainty about teaching: the time when the initial decision about teaching was made, major as classified by teacher supply and demand, and participation in the Teacher Aide Program?
8. Are the following variables related to posttest progress on the decision-making task relative to college major (DMT-M score): the time when the initial decision about teaching was made, major as classified by teacher supply and demand, and participation in the Teacher Aide Program.

Definitions of terms

For the purposes of this study, the following terms are defined as follows:

Teaching profession - The occupation including elementary and secondary school teaching; does not include junior college or college teaching.

Major as classified by teacher supply and demand - The classification of college majors according to teacher supply and demand as reported by the Iowa State University Education Placement Office and ASCUS.¹

Shortage - A situation in which fewer student graduates in teaching receive certificates than the number of public school vacancies.

Surplus - A situation in which more students graduate and receive state certification to teach than the number of public school vacancies.

Undifferentiated - A situation in which the number of new graduates that receive certification is balanced with the vacancies; also included are situations in which the number of graduates and public school vacancies are not reported in the Iowa State University "Placement Report" or the 1982 ASCUS report.

Scope and limitations of the study

1. The study is limited to teacher education students at Iowa State University.
2. The ability to generalize results of the study is dependent upon the degree to which the sample is representative of the teacher education student population at Iowa State University.
3. Generalizing beyond the institutional level depends upon the degree to which the sample is representative of teacher education students enrolled in other institutions.
4. Student rather than section is used as the experimental unit, and some results may be due to unique "intrasession (or intrasection) history" or instructor differences.²

Experimental Design

Description of sample

The population of interest to this study is the group of undergraduates at Iowa State University who have chosen or are considering the teaching profession as a career. A representative sample of this population may be identified as students who enrolled in Elementary/Secondary Education 204 (EL/SEC ED 204) Fall Semester of 1981. A small number of students enrolled do not plan to become teachers and are taking the course either as an elective or to fulfill requirements for a non-teaching major such as horticulture. Empirical data from students who do not identify teaching as a possible career objective are not included in the analyses.

Sampling technique

Computer scheduling by the Iowa State University Registrar's Office is used to place students into courses.³ Prior to each semester, students preclassify for the courses they wish to take, specifying the particular sections desired. The first step in computer scheduling is the assignment of random numbers (1-9), called student numbers, to the front of each student's social security number. Students are then scheduled in groups according to year-in-school, whether the course is required by the identified major, and the particular college of enrollment. The student number determines the sequence in which student schedule requests are handled within groups.

Graduate students, veterinary medicine students, and graduating seniors are scheduled first. Following the first group, all other seniors are scheduled. Juniors follow the group of seniors in scheduling. Freshmen and sophomores (combined into one group) are the last group to be scheduled.

According to Kathy Jones, Assistant to the Registrar, between 50 and 66 percent of the students receive the schedules that were requested during pre-registration.⁴ This estimate considers both single section courses and multi-section courses. Considering only multi-section courses such as EL/SEC ED 204, the percentage of students receiving the desired schedule is likely to be less than 50 percent.

Students enrolling in EL/SEC ED 204 receive no prior information regarding the assignment of instructors to sections, and instructors employing one of the two instructional approaches do not consistently teach the same sections each semester. Therefore, assignment of students to sections can be assumed to be approximately random. Any students changing sections after the first class meeting of the course are not included in the sample.

Description of instructional techniques

EL/SEC ED 204, Social Foundations of American Education, is considered an educational foundations course at Iowa State University. Two different instructional approaches view one course goal to be helping students understand and appreciate the historical, sociological, and philosophical roots of the American school system. What is schooling like in America today? What societal forces explain events

in the development of American education? What were the teachers' roles historically? What impact do informal education and nonpublic education have in America today? What is the social class background of teachers today, and what are society's expectations for school teachers?

Self-assessment instructional approach A secondary goal, considered important by instructors using a self-assessment instructional approach, relates to career development. It is assumed that undergraduates enrolled in EL/SEC ED 204 are in an important stage in their career development. These students are likely to be identified in the crystallization or specification stages according to Super. (See pages 19-20.) Students are likely to be involved in differing levels of the career decision-making tasks according to Tiedeman and O'Hara. (See pages 23-25.) It is further assumed that students are recognizing the need to decide on their college major and are directly involved in progress on that decision-making task.

Therefore, a secondary goal of EL/SEC ED 204 for instructors using a self-assessment approach focuses on career education -- assisting students in the exploration of their interests, values, abilities, and ambitions as they attempt to answer the question: Is teaching the career for me? The objectives to accomplish this goal are occupation specific in contrast to career planning workshops or courses discussed in the review of literature.

A self-assessment approach for EL/SEC ED 204 has been developed over the span of several years by Charles R. Kniker. Classroom techniques

include small group activities, speakers, films, and simulations which attempt to involve directly students in relevant issues. Lectures are combined with discussion and/or small group activities. The text for the course, Teaching Today and Tomorrow, follows a self-assessment approach as students begin the first chapter by asking themselves the question: Who am I?⁵ Many activities throughout the text challenge students to explore their personal values and attitudes as they consider whether or not teaching is the right career choice for them.

Kniker stresses the importance of students accepting responsibility for their career decisions and being able to state clearly reasons for their decisions. The self-assessment approach seems to include the type of career development described by Fuller and Whealon when they wrote:

Career development as a new focus for educators has the potential to restructure substantially the processes and activities of education, modify the values and attitudes of educators, and maximize the opportunities for student involvement and responsibility.⁶

The text and classroom procedures are used in conjunction with varied written assignments for students: research papers, audio-visual projects, reviews of periodicals, group projects, and/or student journals. The journal assignment requires students to state career goals, complete one activity from the text related to the unit being studied, develop a rudimentary philosophy of education, and present and support an argument based on one issue in education from the unit. Journal components are completed four times during

the semester with assignments for each of the four units. See Appendix A for a sample cover sheet for student journals and self-assessment outlines for each unit.

Kniker and Naylor suggest that the use of activities in pinpointing one's personal values is similar to "forest rangers in lookout towers triangulating the location of a fire."⁷ Three different types of activities help students identify their personal values related to education and teaching. The success of the self-assessment depends on the degree of involvement and commitment students have in this process of "triangulation." Five suggestions are given to students for the success of the journals:

1. Reexamine each activity. Save responses to all activities and review them later in the course noting changes you would make in your responses.
2. Be as honest and specific as possible. Although the activities are reviewed by your instructor, the purpose served is for you personally. "You may fool your instructor, but you are unlikely to deceive yourself."
3. Engage in a variety of activities. Some activities should be done quickly, as snapshots of your outlook on life while others should help you to assess how well you work with others. For some activities you might read a book by a critic of education and personally react to some of the authors' ideas in a short paper. By doing a variety of activities, it is likely that you will improve self-awareness.
4. Evaluate your comments. A number of questions are suggested for evaluation such as: How forceful were your comments? Do they reflect your position or are they

a carbon copy of the opinions you've heard from others? Who is your model for teaching? Do you tend to take the same role in most group situations -- consensus-seeker, maverick, leader, supporter?

5. Share your findings. As well as assessing who you are and what career you should pursue, it would be helpful to see whether others perceive you the same way. In sharing your activities with a friend or parent, questions to ask may include: What are my best talents? If I had to improve one characteristic, which should it be? What about me surprises you the most?⁸

Students elect one of two assignment possibilities at the beginning of the semester. Most students elect to write the journal, while a smaller number choose a research paper or project. Instructors usually review journal assignments and progress on research papers/projects four times during the semester. Comments are shared with students individually, usually in writing.

Traditional foundations instructional approach In addition to a self-assessment approach in EL/SEC ED 204, at least two sections a semester are taught using a traditional foundations approach. As stated previously, the major course goal is to help students understand and appreciate the historical, sociological, and philosophical roots of American education. Lecture, discussion, and media are used to accomplish the course objectives.

Teacher Aide Program The Teacher Aide Program (EL/SEC ED 280) is a one credit elective offered in conjunction with EL/SEC ED 204. This elective is encouraged because it allows students to interact with

young people in classrooms early in their college education. Students taking the elective participate in elementary or secondary school classrooms two hours a week. Some of the journal activities used in the self-assessment instructional approach are directly applicable to EL/SEC ED 280 experiences such as "Interview a Teacher," "Visit a School," or "Analyze Curriculum."

Participation in the Teacher Aide Program may affect the dependent variables in the present study. Therefore, participation or non-participation in the Teacher Aide Program are data gathered on the background questionnaire.

Description of experimental treatments

Fall Semester of 1981 had four sections, approximately 30 students each, receiving a self-assessment instructional approach. Two sections were taught by a full professor and two "self-assessment" sections were taught by a graduate teaching assistant. Two sections, taught by another full professor, received a traditional foundations instructional approach.

Treatment 1: Self-assessment instructional approach

Text: Teaching Today and Tomorrow
(Kniker and Naylor, 1981)

Student journal or research paper/project

Exams

Treatment 2: Traditional foundations instructional approach

Text: Manuscript written by the instructor

Exams

Assumptions for the study

For the purposes of this study, the following assumptions are made:

1. Students enrolled in EL/SEC ED 204 are directly involved in career planning and decision-making.
2. Computer scheduling approximates random assignment of student to sections and instructional approach.
3. Teaching majors can be separated into three discrete groups: surplus, shortage, and undifferentiated, based on the 1980 and 1981 "Placement Reports" from the Iowa State University Education Placement Office and the 1982 ASCUS Report.

Description of instruments

1. Personal/social variables and certainty about teaching as a career were obtained by the pretest and posttest questionnaires. See Appendix B. Certainty about teaching was measured by a seven-point item on the questionnaires similar to Holland and Holland's six-point scale.⁹

Points were assigned to each response of the certainty item for analysis. See page 80 for values assigned.

2. Locus of control was quantified using Rotter's Internal-External Locus of Control Scale (I-E Scale).¹⁰ The instrument requests individuals to respond to 29 items, six of which are filler items. The scale is a two-option, forced choice scale. Evidence for construct validity was presented by Rotter et al.¹¹ Test-retest reliability with one- to two-month intervals in samples of college females (N=84)

ranged from .61 to .83. Chronbach alpha reliability for samples of 50 to 250 college females ranged from .70 to .76. A low score implies an internal locus of control, and a high score indicates an external locus of control.

Permission to reproduce an I-E Scale for the study was granted in a letter dated 1 July 1981.

3. Decision-making style and progress on the choice of college major were assessed empirically with scales from the Assessment of Career Decision-Making (ACDM).¹² Harren suggested that research evidence using the ACDM provides evidence of construct validity.¹³

The Decision-Making Task-Major (DMT-M) Scale indicates an individual's progress in the decision of college major. A single progress score ranging from 1 to 20 is obtained from the DMT-M Scale. A sample of 73 undergraduates took the ACDM twice over a two-week interval with a reliability coefficient of .84 on the DMT-M Scale.¹⁴

Rarely does an individual rely on one decision-making style totally. Rather, one style may be favored in comparison with the other two styles. Three continuous scores ranging from 1 to 10 indicate the degree to which an individual applies each style in decision-making. Harren reported the following reliabilities for the three style scales: Decision-Making Style-Rational (DMS-R)=.85, Decision-Making Style-Intuitive (DMS-I)=.76, and Decision-Making Style-Dependent (DMS-D)=.85. Intercorrelations between the three style scales were reported by Harren as follows: DMS-R versus DMS-I = -.33, DMS-R versus DMS-D = -.09, and DMS-I versus DMS-D = .18.¹⁵

Somewhat greater intercorrelations were reported by Jepsen and Prediger as $-.40$, $-.17$, and $.27$, respectively.¹⁶

Permission to reproduce and use the three ACDM style scales and the DMT-M Scale in the present study was granted by letter from Howard E. A. Tinsley, Department of Psychology, Southern Illinois University, in August 1981.

Data collection

Data were collected during regular class periods. Pretest data were collected with the September Questionnaire during the second week of the semester. Posttest data were collected two weeks before the culmination of the semester with the December Questionnaire. See Appendix C for a sample cover letter. EL/SEC ED 204 students absent from class on either data collection dates were contacted to enlist their participation. Several make-up dates and times were scheduled for the pretest questionnaire. Letters were distributed to students that were absent from the posttest session. See Appendix D for a sample letter.

Method of analysis

Data collected on the September and December Questionnaires were keypunched on IBM computer cards. The Statistical Analysis System (SAS) was used to analyze the data.¹⁷ Results were analyzed with both descriptive and inferential statistics. Chapter IV presents the results and a discussion of findings.

Notes

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²Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs for Research (Chicago: Rand McNally College Publishing Company, 1963), p. 14.

³Kathy Jones, "Computer Scheduling at Iowa State University." Report of the Registrar's Office, Ames, Iowa, September 1981. (Type-written.)

⁴Interview with Kathy Jones, Registrar's Office, Iowa State University, Ames, Iowa, 23 October 1981.

⁵Charles R. Kniker and Natalie A. Naylor, Teaching Today and Tomorrow (Columbus, Ohio: Charles E. Merrill Publishing Co., 1981).

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⁷Kniker and Naylor, Teaching Today and Tomorrow, p. 6.

⁸Ibid., pp. 6-8.

⁹John L. Holland and Joan E. Holland, "Vocational Indecision: More Evidence and Speculation," Journal of Counseling Psychology 24, 5 (September 1977): 407.

¹⁰Julian B. Rotter, "Generalized Expectancies for Internal Versus External Control of Reinforcement," Psychological Monographs 80, 1 Whole No. 609 (1966): 11-12.

¹¹Julian B. Rotter, M. Seeman, and S. Liverant, "Internal Versus External Control of Reinforcements: A Major Variable in Behavior Theory," in Decisions, Values, and Groups, Vol. 2, ed. N. F. Washburne (London: Pergamon Press, 1962), pp. 473-516.

¹²Vincent A. Harren, Assessment of Career Decision-Making (Carbondale, Illinois: Southern Illinois University, 1980).

¹³Vincent A. Harren, The Influence of Sex Roles and Cognitive Styles on the Career Decision-Making of College Men and Women, Carbondale, Illinois: Southern Illinois University, 1976. (ERIC ED 189 265), pp. 15-19.

¹⁴Ibid., p. 30.

¹⁵Ibid.

¹⁶David A. Jepsen and Dale Prediger, "Dimensions of Adolescent Career Development: A Multi-Instrument Analysis," Journal of Vocational Behavior 19, 3 (December 1981): 359.

¹⁷Jane T. Helwig and Kathryn A. Council, eds., SAS User's Guide 1979 Edition (Raleigh, North Carolina: SAS Institute, Inc., 1979).

CHAPTER IV. RESULTS AND DISCUSSION

The chapter opens with statistics describing the characteristics of the sample. The second section discusses the findings relative to each research question. Finally, part three presents a discussion of additional findings.

Characteristics of the Sample

A total of 190 students were enrolled in Sec. Ed. 204 Fall Semester 1981. All students were given an opportunity to participate in the study. One hundred forty-nine students, or 78 percent, completed all parts of the questionnaires. Table 1 summarizes the percentages of subjects responding to questionnaires in each of six sections.

Table 1. Percentage of sections participating in the study

Section	Instructional approach	Number enrolled	Number responding	Percent response
B	Self-assessment	34	25	73.5
C	Self-assessment	33	22	66.7
D	Self-assessment	31	25	81.0
E	Self-assessment	30	28	93.3
F	Traditional	31	24	77.4
J	Traditional	31	25	80.6

General characteristics

College classification The majority of the sample identifies freshman, sophomore, or junior classification. Five students in the sample are seniors, and five students have completed undergraduate degrees. Table 2 describes the sample in terms of college classification.

Table 2. Distribution of sample according to college class

College classification	Number	Percent of sample ^a
Freshman	35	23.5
Sophomore	69	46.3
Junior	35	23.5
Senior	5	3.4
Post B.S.	5	3.4

^aPercent does not sum to 100 due to rounding error.

Academic major The sample identifies 18 academic majors as summarized in Table 3. The major identified by the largest number of students, N=35 or 23.5 percent of the sample, is elementary education. The Research Institute for Studies in Education previously reported that 27.8 percent of a similar sample indicated elementary teaching.¹ Psychology, family environment, and foreign language are each identified by one student.

Additionally, Table 3 classifies the 18 academic majors as areas of teacher shortage, areas of teacher surplus, and areas that either have a teacher balance or remain undifferentiated. Approximately 32 percent of the sample report undifferentiated majors. About 50 percent of the sample are enrolled in majors having teacher surpluses. The remaining 19 percent of the sample identify majors having teacher shortages.

Time when the decision was made Table 4 summarizes data about academic majors according to the time when students made their initial decision about teaching. The table reports statistics for majors have N > 10. The physical education majors indicate that about

Table 3. Academic majors summarized by percentage of the sample

Academic major	N	Percent of sample ^a	Teacher supply and demand
Elementary Ed.	35	23.5	Surplus
Agricultural Ed.	19	12.8	Shortage
Child Development	15	10.1	Undifferentiated
Physical Education	13	8.7	Surplus
English/Speech	12	8.1	Undifferentiated
Home Economics Ed.	11	7.4	Surplus
Science & Humanities/ Open Option	11	7.4	Undifferentiated
Preschool Handicapped	6	4.0	Undifferentiated
Art Education	6	4.0	Surplus
Music Education	5	3.4	Surplus
Math	4	2.7	Shortage
Social Studies	3	2.0	Surplus
Science	2	1.3	Shortage
Industrial Ed.	2	1.3	Shortage
Biology	2	1.3	Undifferentiated
Psychology	1	.7	Surplus
Family Environment	1	.7	Undifferentiated
Foreign Language	1	.7	Shortage

^aPercent does not sum to 100 due to rounding error.

77 percent had made the decision about teaching before entering college.

Agricultural education majors indicate that about 53 percent had made their decision prior to entering college. Science & Humanities-Open Option majors have the smallest percentage that decided about teaching before college (18.2 percent).

Elementary education majors report the largest percentage of a major that made the decision about teaching during college (42.9 percent). Physical education majors, on the other hand, report the smallest percentage of a major that decided about teaching during college (7.7 percent).

Science & Humanities-Open Option majors indicate the largest percentage that are undecided about teaching (54.5 percent). Elementary education majors report the smallest percentage of a major that are undecided about teaching (11.4 percent undecided).

Table 4. Time when students made the initial decision about teaching reported as percentages of the number enrolled in an academic major

Academic major	Number	Early	College	Undecided
Elementary Education	35	45.7	42.9	11.4
Agricultural Ed.	19	52.6	21.1	26.3
Child Development ^a	15	33.3	33.3	33.3
Physical Education	13	76.9	7.7	15.4
English/Speech ^a	12	41.7	16.7	41.7
Science & Humanities- Open Option	11	18.2	27.3	54.5
Home Economics Ed. ^a	11	45.0	18.2	36.4

^aPercent does not sum to 100 due to rounding error.

Teacher Aide Program Students reported whether or not they were participating in the Teacher Aide Program on the September Questionnaire. Twenty percent (N=30) indicated participation, and 80 percent (N=119) of the sample reported non-participation in the elective program.

Locus of control Locus of control is reported as a continuous score on Rotter's I-E Scale. The instrument is scored in the direction of external with lower I-E scores indicating an internal orientation. Students completed the I-E Scale twice, in September and again in December. The mean I-E score in September is virtually the same as the mean I-E score in December (\bar{X} =10.31 and \bar{X} =10.48, respectively).

A Pearson product moment correlation coefficient for the two I-E Scale scores indicates a high degree of correlation between the two scores with $r=.69$ ($p \leq .0001$). Therefore, the study uses average I-E Scale score for each subject in the analysis.

Figure 1 presents graphically the frequency of students scoring in five discrete levels on the I-E Scale. Similar to the findings of Gable et al., the I-E scores of the sample tend to be more internal than external.² Considering an arbitrary neutral range between 9.2 and 13.8 (with higher scores indicating external locus of control and lower scores indicating internal locus of control), about 39 percent of the students score as internals; 40 percent score in the neutral range; and 21 percent score as externals.

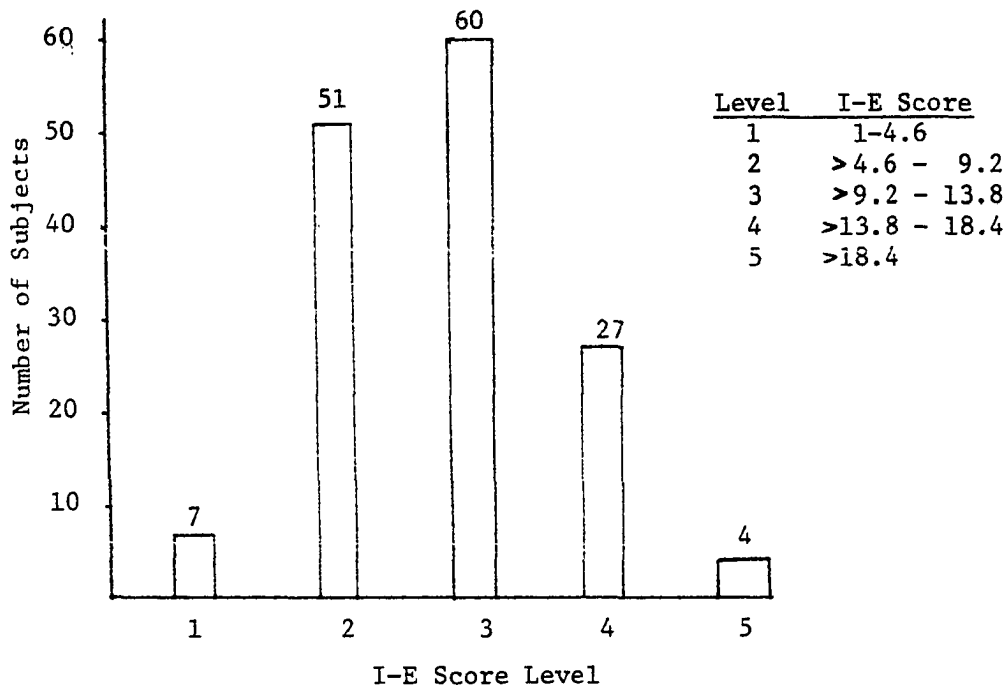


Figure 1. Frequency of subjects in five classes of I-E Scale scores

Also consistent with the research of Gable et al., locus of control scores are similar for all college classes as reported in Table 5.³ Mean I-E Scale scores range from a low of 9.63 for the junior class to a high of 11.03 for the sophomore class.

Table 5. Mean I-E Scale scores reported by college class

College class	N	\bar{X}	Standard deviation
Freshman	35	10.01	3.88
Sophomore	69	11.03	3.91
Junior	35	9.63	3.20
Senior	5	10.10	4.62
Post B.S.	5	9.90	2.99

Table 6 indicates mean I-E Scale scores for selected academic majors having $N > 10$. The means range from a low of 7.86 for Science & Humanities-Open Option to a high of 12.83 for child development.

Table 6. I-E Scale scores reported by academic major

Academic major ^a	N	\bar{X}	Standard deviation
Elementary Education	35	11.21	3.49
Agricultural Ed.	19	9.13	2.95
Child Development	15	12.83	4.72
Physical Education	13	10.92	3.54
English/Speech	12	11.96	4.22
Science & Humanities- Open Option	11	7.86	3.61
Home Economics Ed.	11	9.82	2.80

^aReporting only majors having $N > 10$.

Decision-making style Table 7 summarizes characteristics of the seven academic majors (having $N > 10$) in terms of decision-making style. Home economics education majors have the highest mean score for the rational style of decision-making with $\bar{X}=9.09$. Science & Humanities-Open Option students have the second highest DMS-R mean with $\bar{X}=8.36$. Elementary education majors score the lowest on mean rational decision-making ($\bar{X}=6.54$).

Mean scores for the intuitive style of decision-making are similar for all seven majors as reported in Table 7. Physical education have the high mean of 5.54, and Science & Humanities-Open Option have the low mean of 4.64.

Mean scores for the dependent style of decision-making have a greater range than those for the intuitive decision-making style. The means range from a low of 2.82 for home economics education to a high of 4.63 for elementary education.

The data indicate that the sample favors the rational style in making decisions. All seven majors score highest on rational decision-making when compared to their respective scores on the other two styles. Similarly, all seven majors score higher on the DMS-I scale than on the DMS-D scale. Therefore, all seven majors report their lowest scores for the least desirable style of decision-making -- dependent.

Table 8 reports mean decision-making style scores for the five discrete I-E levels. Additionally, Figure 2 displays graphically the means for each decision-making style. The data indicate that as the

Table 7. Mean scores for decision-making styles reported by academic major

Academic major	Number	\bar{X}	Standard deviation
<u>Rational</u>			
Elementary Education	35	6.54	2.97
Agricultural Ed.	19	7.26	2.56
Child Development	15	6.07	2.63
Physical Education	13	7.00	2.83
English/Speech	12	7.33	2.39
Science & Humanities	11	8.36	1.43
Home Economics Ed.	11	9.09	1.45
<u>Intuitive</u>			
Elementary Education	35	5.06	2.18
Agricultural Ed.	19	4.68	2.11
Child Development	15	5.53	2.67
Physical Education	13	5.54	1.90
English/Speech	12	4.92	2.50
Science & Humanities	11	4.64	.92
Home Economics Ed.	11	4.82	2.14
<u>Dependent</u>			
Elementary Education	35	4.63	2.99
Agricultural Ed.	19	4.11	2.23
Child Development	15	4.73	3.13
Physical Education	13	3.69	2.59
English/Speech	12	3.42	3.23
Science & Humanities	11	4.18	2.86
Home Economics Ed.	11	2.82	.98

intuitive style means and the dependent style means increase, locus of control becomes more external. The DMS-R has a contrasting relationship to locus of control. As the rational style means increase, locus of control becomes more internal.

Certainty about teaching

The study investigates the effects of several independent variables on two dependent variables -- certainty about teaching

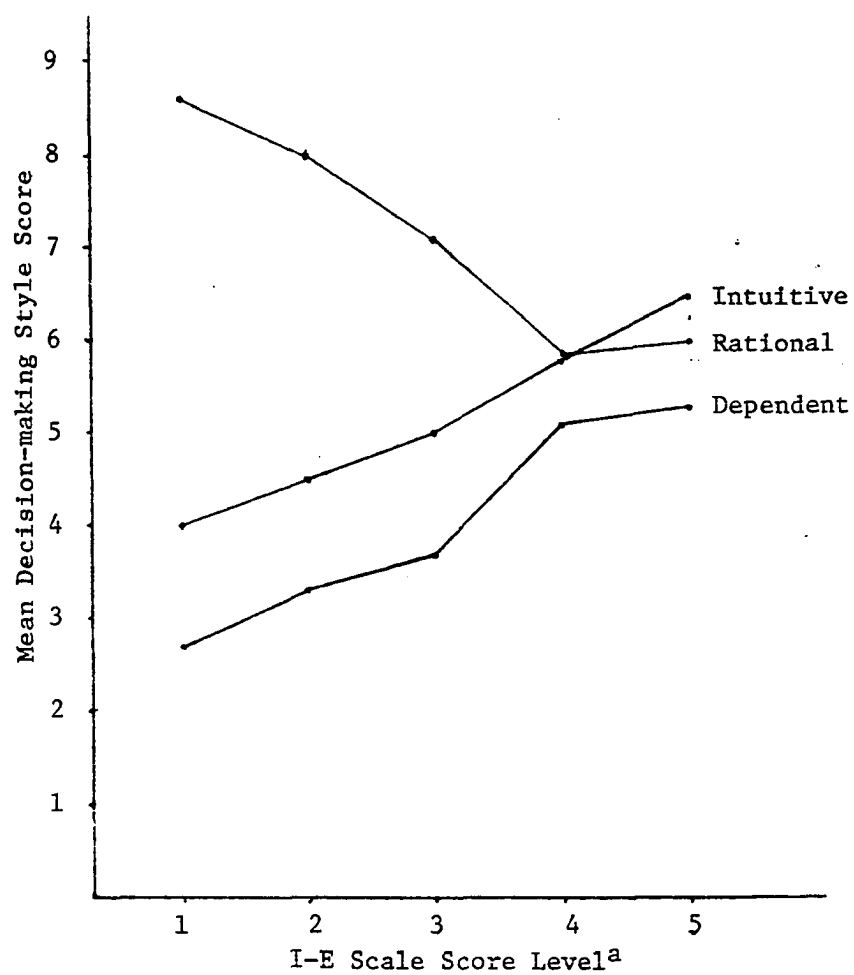
Table 8. Mean decision-making style reported by I-E Scale score level

I-E Scale score Level ^a /style	N	\bar{X}	Standard deviation
<u>Rational</u>			
1	7	8.57	1.62
2	51	8.02	2.20
3	60	7.08	2.68
4	27	5.85	2.52
5	4	6.00	3.16
<u>Intuitive</u>			
1	7	4.00	1.00
2	51	4.45	2.05
3	60	5.03	2.15
4	27	5.81	1.94
5	4	6.50	1.73
<u>Dependent</u>			
1	7	2.71	2.53
2	51	3.31	2.37
3	60	3.72	2.64
4	27	5.15	2.97
5	4	5.25	4.27

^aSee Figure 1 for level values (page 74).

and progress on the career decision-making task of choosing a college major (DMT-M score). Descriptive statistics using certainty score as a dependent variable are presented first, followed by descriptive statistics using DMT-M as a dependent variable.

Degree of certainty about teaching as a career was reported on both the September and December Questionnaires by a single item. Scores are assigned to each response for analysis as indicated in Table 9.



^aSee Figure 1 for level values (page 74).

Figure 2. The relationship between decision-making style and I-E Scale score

Table 9. Scoring of certainty about teaching item

Item choice	Score assigned
a. Definitely plan to teach; well-satisfied with career choice	+3
b. Strongly feel teaching is the career for me; not totally satisfied	+2
c. Believe teaching is the career for me, but have some doubts	+1
d. Undecided	0
e. Probably will not teach, but remain open to suggestions	-1
f. Strongly feel teaching is not for me; uncommitted to another career	-2
g. Definitely do not plan to teach; committed to another career	-3

Instructional approach Table 10 summarizes the percentages of subjects in an instructional approach that received each of the seven scores. Pretest data indicate that 75 percent of the subjects in the self-assessment instructional approach and 78 percent of the subjects in the traditional approach report a level of certainty between -2 and +2. Only 24 percent and 22 percent of the subjects in the respective instructional approaches report the highest level of certainty about teaching (+3). One student reporting "definitely do not plan to teach" (-3) on the pretest is not included in the sample.

Posttest data indicate that 57 percent of the subjects in the self-assessment approach and 60 percent of the subjects in the

Table 10. Certainty about teaching reported by percentage of subjects in an instructional approach

Degree of certainty score	Self-assessment approach ^a	Traditional approach
Pretest		
-3	0	0
-2	0	0
-1	5	16
0	14	20
+1	31	20
+2	25	22
+3	24	22
Posttest		
-3	4	4
-2	2	2
-1	7	14
0	5	10
+1	16	12
+2	27	22
+3	38	36

^aPercent does not sum to 100 due to rounding error.

traditional approach score between -2 and +2 on the measure of certainty about teaching. The percentages of subjects expressing posttest certainty about teaching at the highest level (+3 or -3) are 42 percent and 40 percent for the respective instructional approaches.

Figure 3 presents graphically the pretest and posttest percentages of subjects in the self-assessment approach for each of the seven degrees of certainty about teaching. Percentages decrease in the 0 and +1 levels, while increasing in the other five levels from pretest to posttest. The level with the largest percentage of

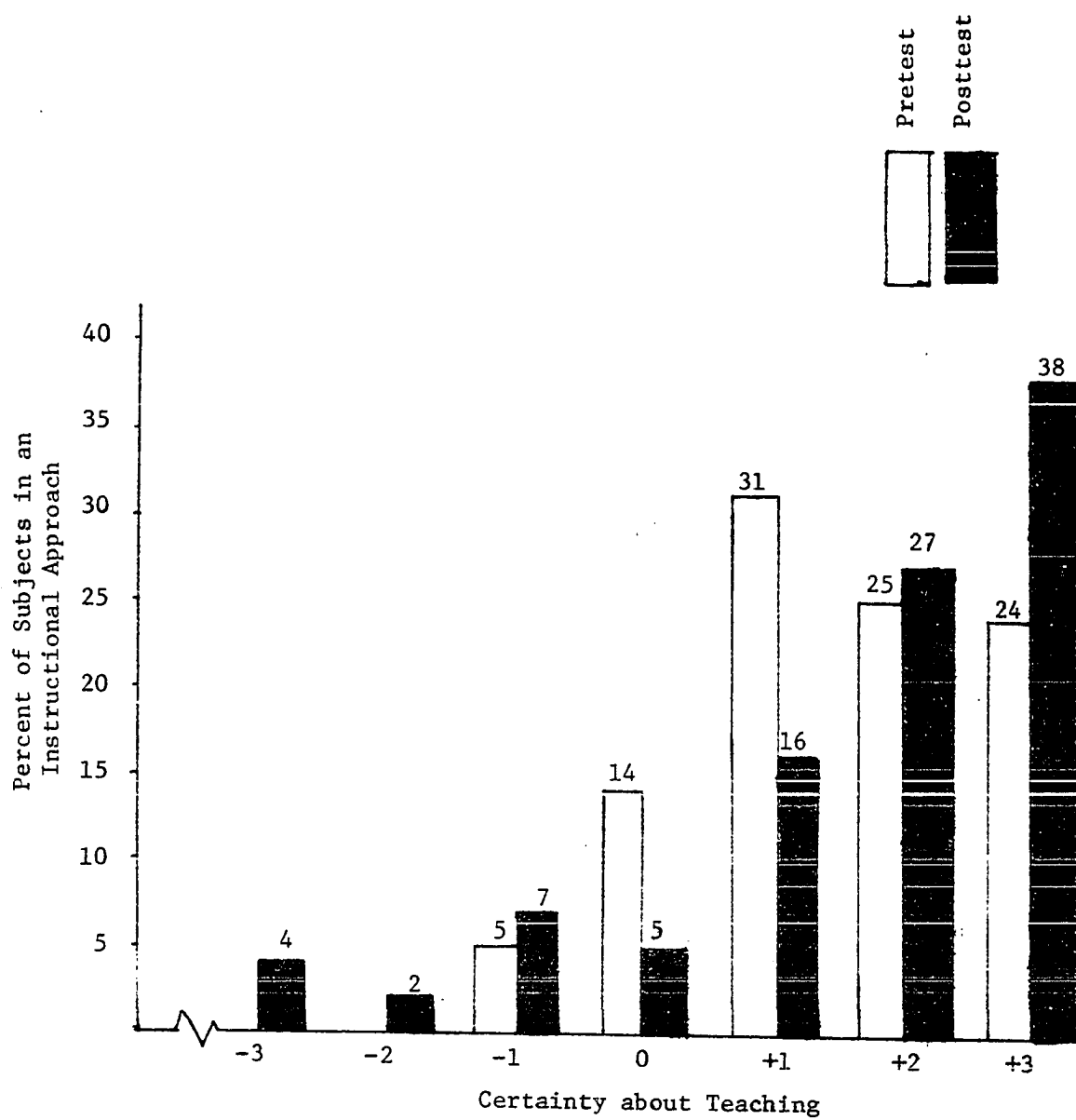


Figure 3. Degree of certainty about teaching for the self-assessment approach

subjects on the pretest is +1. However, posttest data indicate that the largest percentage of subjects in the seven levels is reported by the +3 certainty.

Similarly, Figure 4 displays graphically the pretest and posttest percentages of subjects in the traditional approach for each of seven levels of certainty about teaching. Percentages decrease or stay the same in four levels (-1, 0 +1, +2). Three levels, -3, -2, and +3, have increases in percentages of subjects reporting each level of certainty about teaching. The score of +3 reports the greatest increase in percentage of subjects with a percent increase of 14. Additionally, the largest percentage of students reports a posttest certainty of +3.

Table 11 reports the posttest-pretest change in certainty about teaching. Fifty-three percent of the sample receiving the self-assessment approach indicate changes in certainty about teaching. Similarly, 52 percent of the subjects receiving the traditional approach indicate changes in certainty about teaching.

Table 11. Change in certainty about teaching reported by percentage of subjects within an instructional approach

Change in certainty about teaching	Self-assessment approach ^a	Traditional approach
Positive	34	36
Negative	18	16
No change	47	48

^aPercent does not sum to 100 due to rounding error.

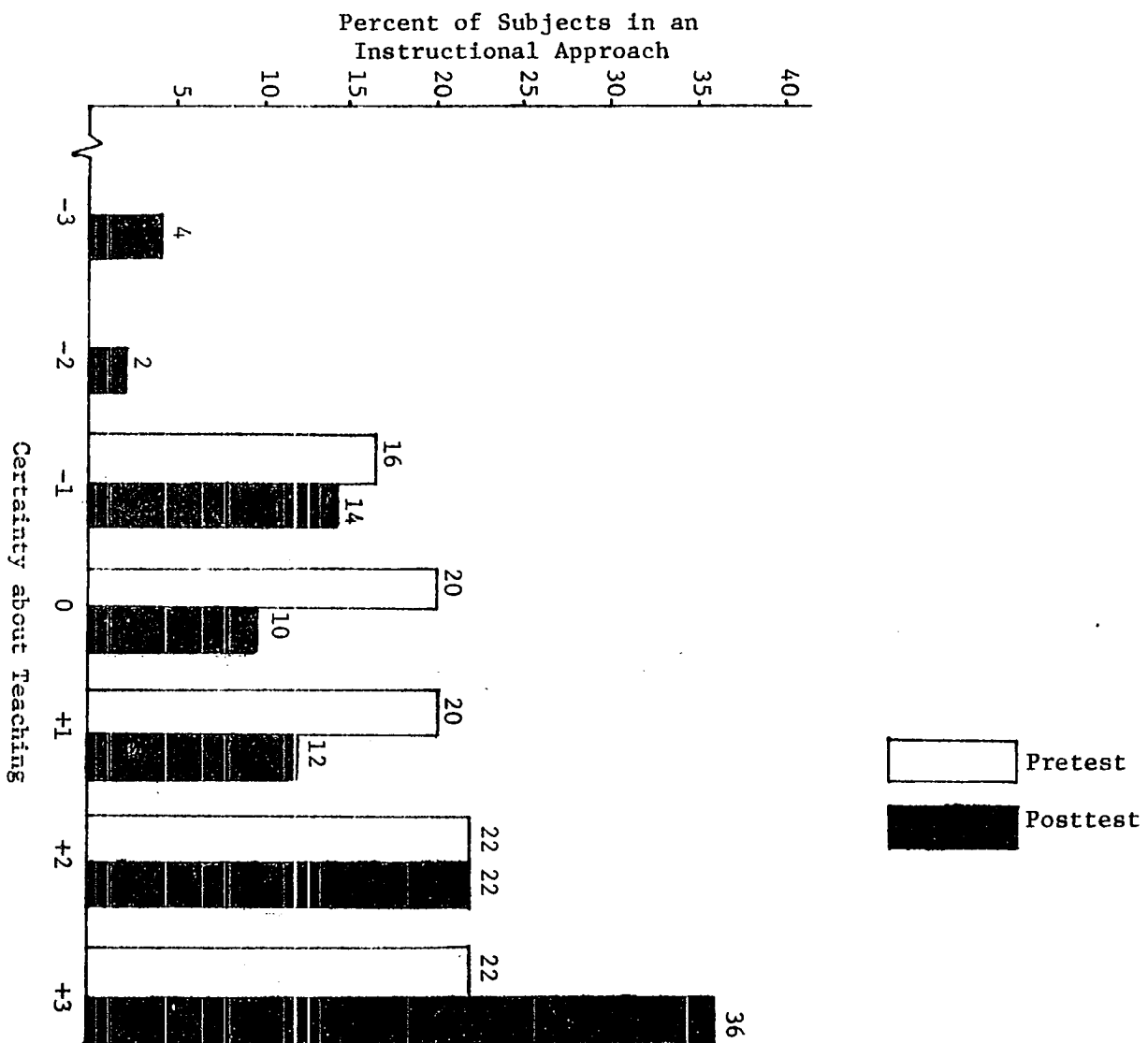


Figure 4. Degree of certainty about teaching for the traditional approach

Figure 5 graphically illustrates the degree of change in certainty about teaching for the two instructional approaches. The largest percentages in both instructional approaches report no change.⁴ Percentages of the traditional approach exceed those of the self-assessment approach for students having no change, +1 change, -1 change, or +4 change. Percentages of the self-assessment approach exceed those of the traditional approach for students having -3 change, -2 change, and +2 change in certainty.

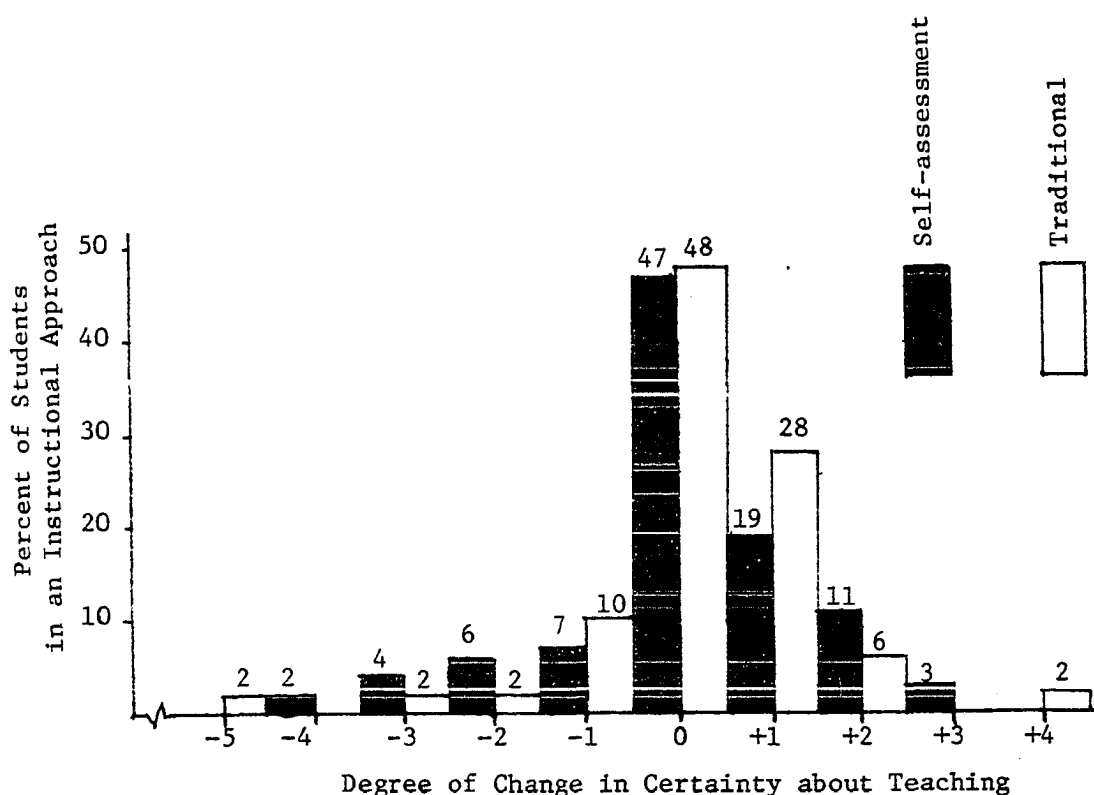


Figure 5. Percentage of approach indicating changes in certainty about teaching

Table 12 summarizes mean certainty for the two instructional approaches. A positive 10 is added to raw certainty scores to avoid the cancelling effect of positive and negative scores in computing means. Mean pretest certainty scores are similar for the two approaches with the self-assessment mean exceeding the traditional mean by .35. Mean posttest certainty scores for the two approaches are also similar with $\bar{X}=11.63$ for the self-assessment approach and $\bar{X}=11.32$ for the traditional approach.

Table 12. Mean certainty about teaching reported by instructional approach

Instructional approach	N	\bar{X}	Standard deviation
Pretest			
Self-assessment	99	11.49	1.16
Traditional	50	11.14	1.40
Posttest			
Self-assessment	99	11.63	1.61
Traditional	50	11.32	1.78

Students in the two instructional approaches indicate both positive changes and negative changes in certainty about teaching. Table 13 reports mean change in certainty (posttest-pretest) for the two instructional approaches according to type of change. The group of students reporting negative change in the self-assessment approach has the greatest mean change in certainty ($\bar{X}=2.11$). Traditional approach-positive change group reports the smallest mean change ($\bar{X}=1.33$).

Table 13. Mean change (posttest-pretest) in certainty about teaching reported by type of change and instructional approach

Instructional approach/ type of change	N	\bar{X}	Standard deviation
Self-assessment			
Positive change	34	1.50	.66
Negative change	18	2.11	1.02
Traditional			
Positive change	18	1.33	.77
Negative change	8	1.87	1.46

Time when the decision was made Data are sorted by student response to one item on the September Questionnaire -- time when the decision about teaching (as reported in certainty item) was made. Table 14 presents mean certainty about teaching scores according to the time when the initial decision about teaching was made. Both pretest and posttest mean certainty scores are similar for all groups except those reporting no initial decision. Pretest means for groups reporting no decision differ from the greatest pretest mean certainty (early) by 2.37. The posttest mean for the group reporting no decision differs from the highest posttest mean certainty (Post B.S.) by 2.06.

Figure 6 displays graphically the level of certainty for groups making the decision about teaching at different life stages. A pretest-posttest comparison indicates increases in certainty for all groups. Students who had decided after completing an undergraduate degree report the greatest increase in certainty. However, it should be noted that the number of students in this category is small (N=6).

Table 14. Mean certainty about teaching reported by time when the decision was made

Time when initial decision about teaching was made	N	\bar{X}	Standard deviation
Pretest			
Early	66	12.09	.89
College	41	11.63	.73
Post B.S.	6	11.67	1.21
Undecided	36	9.72	.66
Posttest			
Early	66	12.12	1.34
College	41	11.71	1.58
Post B.S.	6	12.17	.75
Undecided	36	10.11	1.63

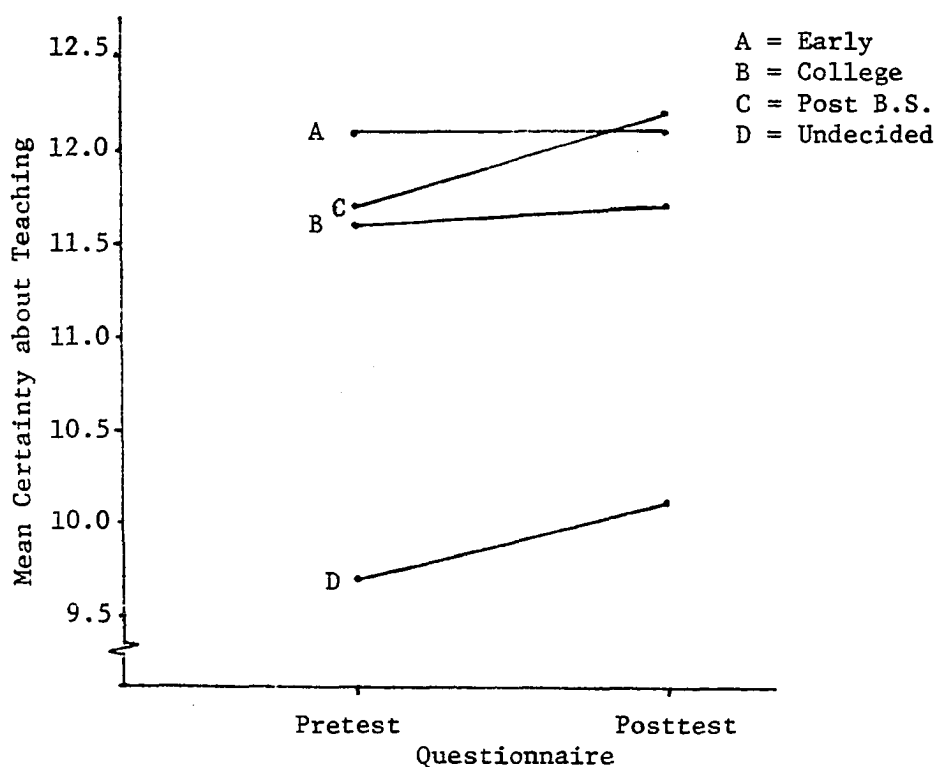


Figure 6. Mean certainty about teaching reported by time when the initial decision was made

Teacher supply and demand Table 15 reports pretest and posttest mean certainty scores for three categories of teacher supply and demand. Mean certainty is similar for all three classifications for both the pretest and posttest. The surplus group indicates the greatest certainty on both pretest and posttest with $\bar{X}=11.73$ and $\bar{X}=11.93$, respectively.

Table 15. Mean certainty about teaching reported by teacher supply and demand

Supply/demand	N	\bar{X}	Standard deviation
Pretest			
Shortage	28	11.07	1.24
Surplus	74	11.73	1.13
Undifferentiated	47	11.00	1.30
Posttest			
Shortage	28	11.32	1.76
Surplus	74	11.93	1.33
Undifferentiated	47	11.00	1.94

Figure 7 presents graphically the data that are reported in Table 15. The surplus and shortage groups indicate increases in mean certainty from pretest to posttest. Only the undifferentiated group reports no change in certainty about teaching.

Teacher Aide Program Table 16 summarizes mean pretest and posttest certainty scores according to participation in the Teacher Aide Program. Mean certainty increases by .10 for the group participating in the program. Similarly, mean certainty increases

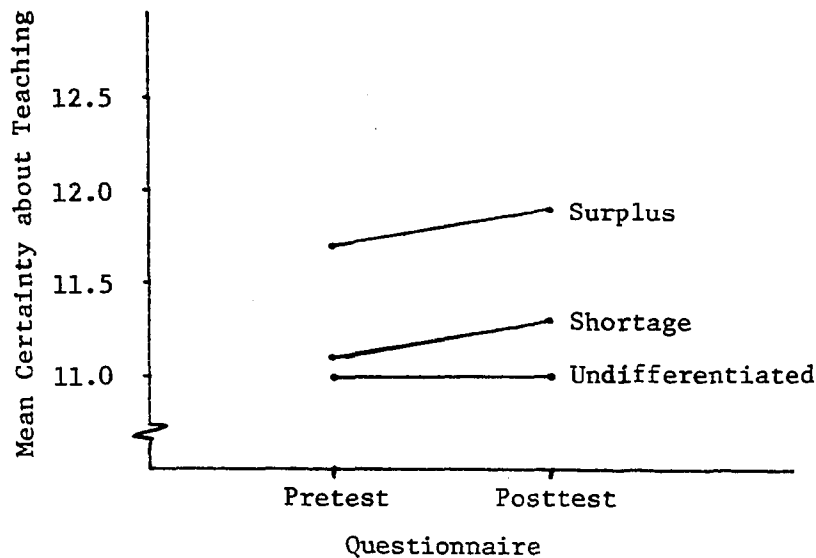


Figure 7. Certainty about teaching as related to teacher supply and demand

by .16 for non-participants. Differences between the group means for both pretest and posttest are less than .30.

Table 16. Mean certainty about teaching reported by participation in the Teacher Aide Program

Participation in Teacher Aide Program	N	\bar{X}	Standard deviation
Pretest			
Yes	30	11.60	.97
No	119	11.32	1.31
Posttest			
Yes	30	11.70	1.73
No	119	11.48	1.66

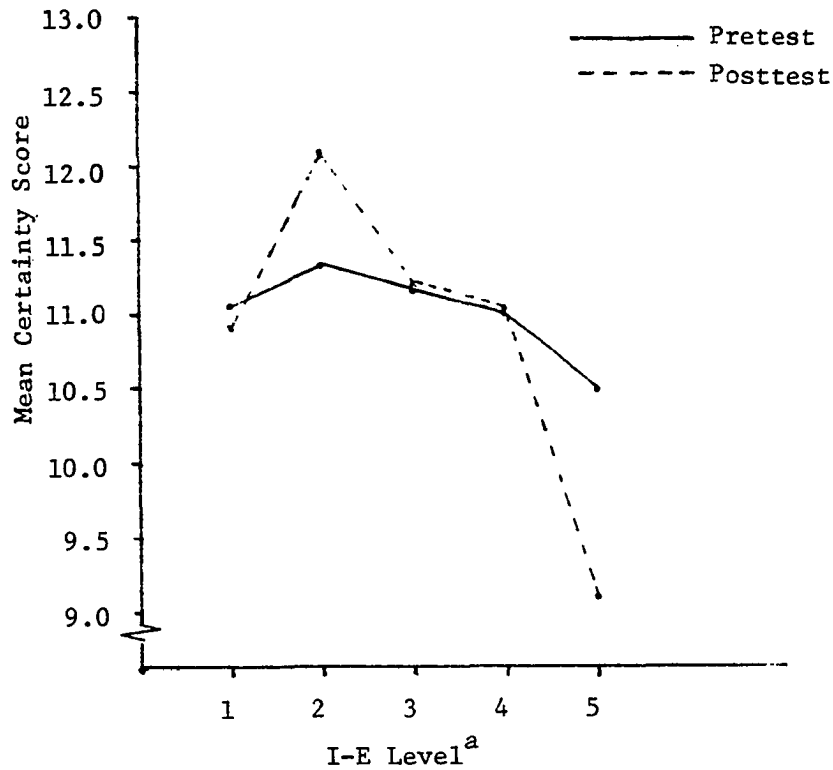
Locus of control Table 17 reports mean pretest and posttest certainty scores according to five I-E levels. Externals (I-E level 5, >18.4) report the lowest mean certainty for both pretest and posttest. Internals (I-E level 2, >4.6-9.2) report the greatest mean certainty for both pretest and posttest.

Table 17. Mean certainty about teaching reported by I-E level

I-E level ^a	N	\bar{X}	Standard deviation
Pretest			
1	7	11.14	1.35
2	51	11.76	1.16
3	60	11.28	1.25
4	27	11.04	1.26
5	4	10.50	1.29
Posttest			
1	7	10.86	1.77
2	51	12.20	1.30
3	60	11.37	1.71
4	27	11.11	1.69
5	4	9.25	1.89

^aSee Figure 1 for values of I-E levels (page 74).

Figure 8 presents graphically the means from Table 17. Certainty increases from pretest to posttest for three I-E levels (2, 3, and 4). In contrast, mean certainty decreases from pretest to posttest for I-E level 1 (1-4.6) and I-E level 5 (>18.4). The data indicate that as locus of control becomes external, mean certainty score decreases. Caution must be used in interpreting data from I-E levels 1 and 5 due to the small numbers in the groups.



^aSee Figure 1 for I-E level values (page 74).

Figure 8. Relationship between student I-E level and mean certainty about teaching

Decision-making style The data indicate that greater certainty about teaching is related to the rational style of making decisions. Table 18 reports means for the three decision-making styles according to pretest certainty scores. Additionally, Figure 9 illustrates graphically the relationships between DMS means and pretest certainty scores. The greatest certainty score (+3) also has the greatest DMS-R mean ($\bar{X}=7.14$). Certainty scores of -1 and 0 have the two smallest DMS means ($\bar{X}=6.38$ for both).

Table 18. Mean decision-making style (DMS) scores reported by pretest certainty scores

Pretest certainty score	N	DMS \bar{X}	Standard deviation
		<u>Rational</u>	
-1	13	6.38	3.20
0	24	6.38	2.48
+1	41	7.41	2.01
+2	36	7.36	2.84
+3	35	7.74	2.62
		<u>Intuitive</u>	
-1	13	5.92	2.06
0	24	5.29	2.22
+1	41	4.51	1.83
+2	36	5.25	1.98
+3	35	4.63	2.30
		<u>Dependent</u>	
-1	13	4.15	3.08
0	24	4.92	3.02
+1	41	4.51	2.50
+2	36	3.44	2.37
+3	35	2.57	2.48

The relationships between DMS means and pretest certainty scores for the intuitive and dependent styles are contrasts to the corresponding relationship for the rational decision-making style. Pretest certainty scores of -1 and 0 report the greatest DMS-I and DMS-D means with $\bar{X}=5.92$ and $\bar{X}=4.92$, respectively. Pretest certainty scores of +3 report the smallest DMS-I and DMS-D means with $\bar{X}=4.63$ and $\bar{X}=2.57$, respectively.

Table 19 reports three decision-making style (DMS-R, DMS-I, and DMS-D) means for each of the seven posttest certainty scores. Posttest certainty scores of -3 and +3 indicate the two greatest DMS-R

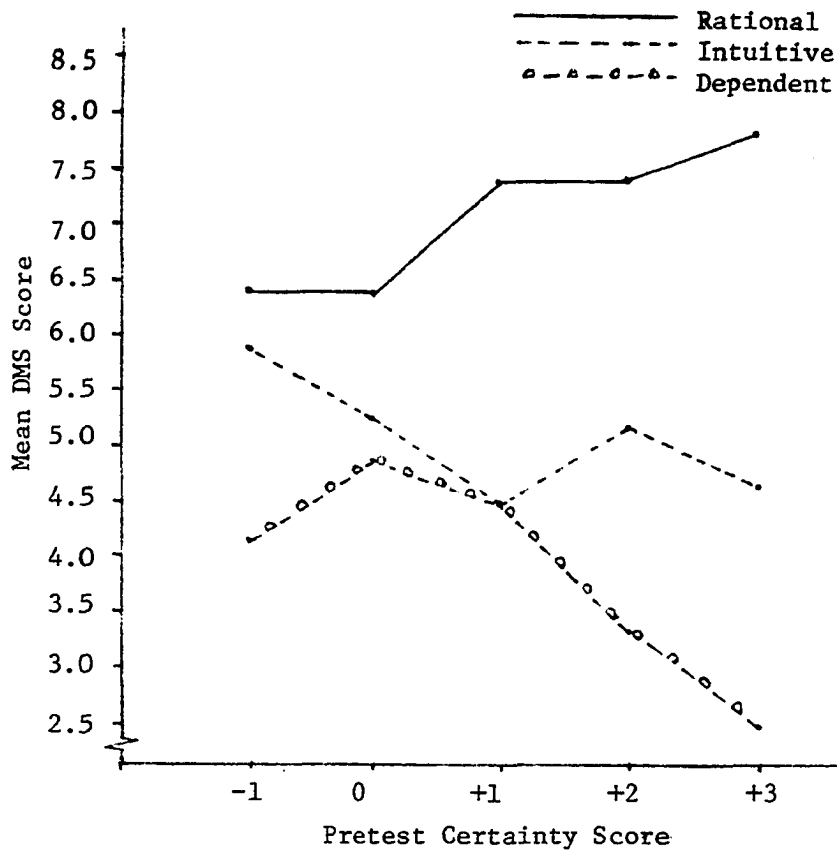


Figure 9. Relationship between pretest certainty scores and decision-making style

means with $\bar{X}=7.83$ and $\bar{X}=7.70$, respectively. A posttest certainty score of -1 reports the smallest DMS-R mean ($\bar{X}=6.13$).

Additionally, the data indicate that the greatest DMS-I mean is reported for a -1 certainty score with $\bar{X}=6.00$. The second largest DMS-I mean is reported for +2 certainty. The smallest DMS-I mean is reported for 0 certainty score ($\bar{X}=3.89$).

Data for dependent decision-making style are contrasts to those for the other two styles. The greatest DMS-D is reported for 0

Table 19. Mean decision-making style (DMS) scores reported by posttest certainty score

Posttest certainty score	N	DMS \bar{X}	Standard deviation
<u>Rational</u>			
-3	6	7.83	2.32
-2	3	7.00	3.00
-1	15	6.13	3.29
0	9	6.55	2.55
+1	22	6.82	2.17
+2	38	7.26	2.55
+3	56	7.70	2.52
<u>Intuitive</u>			
-3	6	4.00	1.26
-2	3	5.00	1.73
-1	15	6.00	2.07
0	9	3.89	1.76
+1	22	4.82	1.97
+2	38	5.32	2.03
+3	56	4.79	2.23
<u>Dependent</u>			
-3	6	3.00	3.03
-2	3	4.00	3.00
-1	15	4.40	3.64
0	9	5.89	2.85
+1	22	5.41	2.24
+2	38	3.76	2.25
+3	56	2.86	2.44

certainty score with $\bar{X}=5.89$. The smallest dependent style mean is reported for +3 certainty score ($\bar{X}=2.86$).

Figure 10 illustrates the relationship between posttest certainty scores and means for the three decision-making styles. The data suggest curvilinear relationships for both rational and dependent styles. Certainty scores of 0 and +1 have the smallest DMS-R means but also have the greatest DMS-D means.

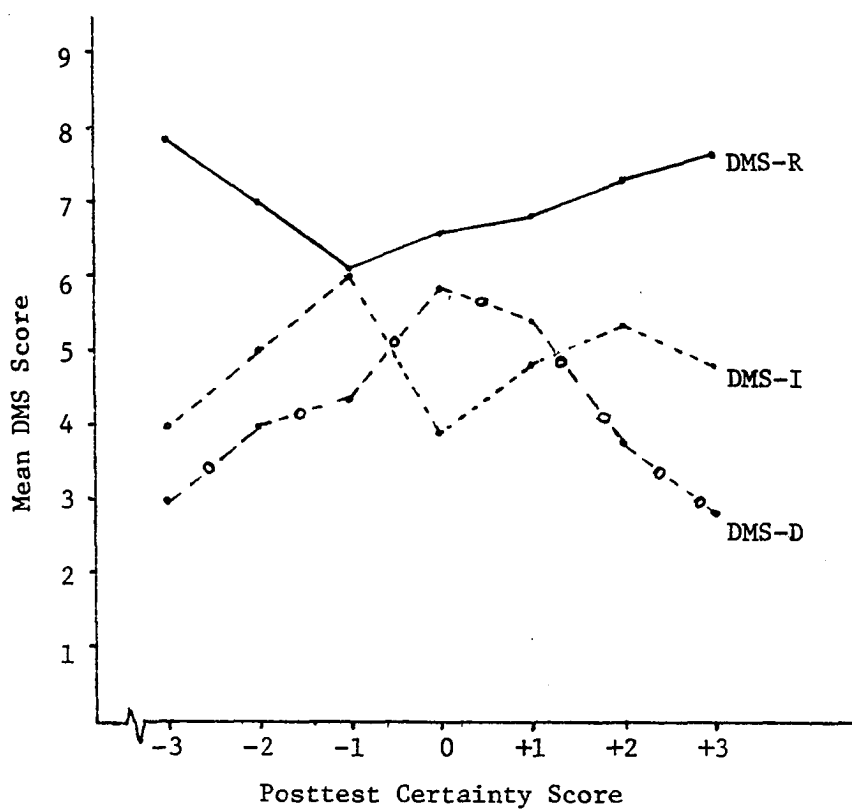


Figure 10. Relationship between decision-making style and posttest certainty score

Decision-Making Task-Major (DMT-M)

The career decision-making task relative to college major (DMT-M score) is a second dependent variable investigated in the present study. Table 20 reports overall mean DMT-M scores for the pretest and posttest. The posttest mean exceeds the pretest mean by 1.23 with a pooled standard deviation of 4.54.

Instructional approach The data indicate that mean DMT-M scores are similar for both instructional approaches. Table 21 summarizes mean DMT-M scores for the two treatments. The initial

Table 20. Overall DMT-M means

Questionnaire	N	\bar{X}	Standard deviation
Pretest	149	15.66	5.07
Posttest	149	16.73	3.92

pretest DMT-M mean for the self-assessment approach exceeds the pretest DMT-M mean for the traditional approach by 1.42. Posttest means for the two approaches are similar with $\bar{X}=16.92$ for the self-assessment approach and $\bar{X}=16.36$ for the traditional approach.

Table 21. Mean progress in DMT-M reported by instructional approach

Instructional approach	N	\bar{X}	Standard deviation
Pretest			
Self-assessment	99	16.14	4.54
Traditional	50	14.72	5.93
Posttest			
Self-assessment	99	16.92	3.54
Traditional	50	16.36	4.60

Tables 22 and 23 summarize DMT-M means for subjects in both instructional approaches according to their reported certainty about teaching. Individuals scoring the most certain, +3 (excluding groups with $N<5$), report the highest DMT-M pretest and posttest means for both instructional approaches. Similarly, individuals scoring -1, 0, or +1 on certainty (excluding groups with $N<5$) report the lowest DMT-M means for both instructional approaches.

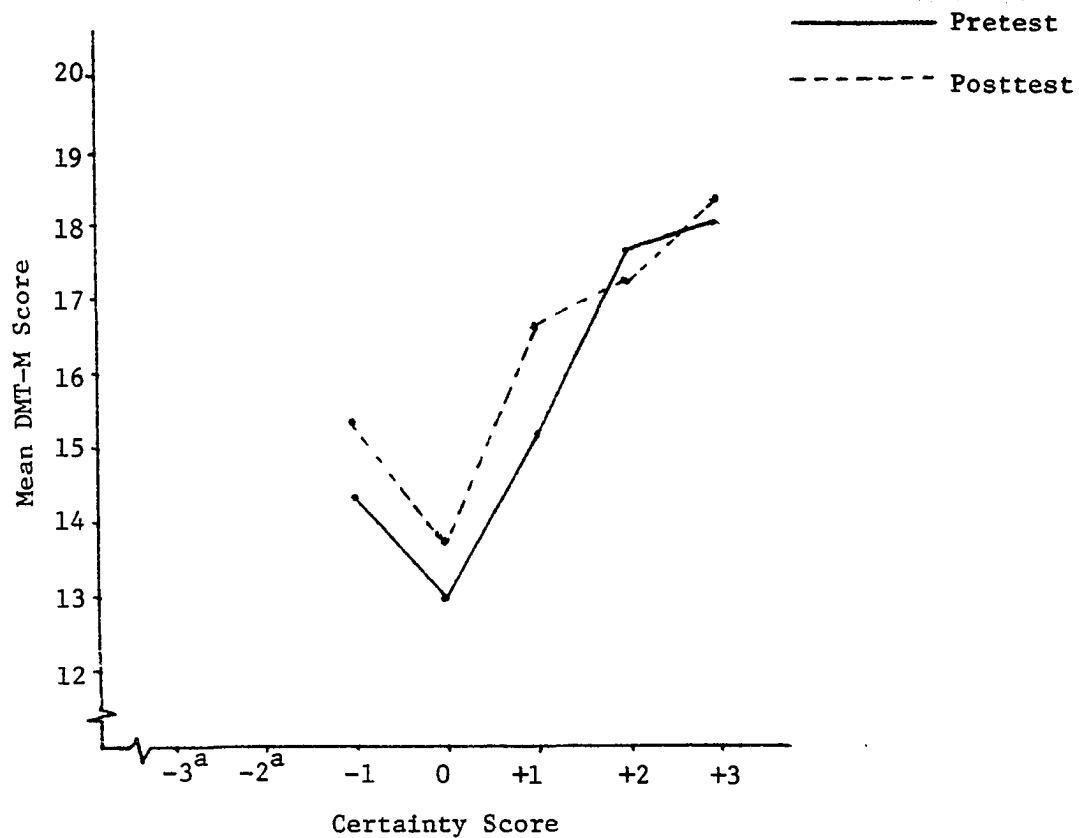
Table 22. Mean progress in DMT-M for the self-assessment approach reported by certainty about teaching score

Certainty about teaching score	N	\bar{X}	Standard deviation
Pretest			
-1	5	14.40	7.60
0	14	13.00	6.39
+1	31	15.23	5.11
+2	25	17.56	1.89
+3	24	18.04	1.76
Posttest			
-3	4	16.75	1.50
-2	2	2.50	.71
-1	7	15.29	3.45
0	5	13.80	7.46
+1	16	16.62	3.67
+2	27	17.19	1.76
+3	38	18.34	1.49

Table 23. Mean progress in DMT-M for the traditional approach reported by certainty about teaching score

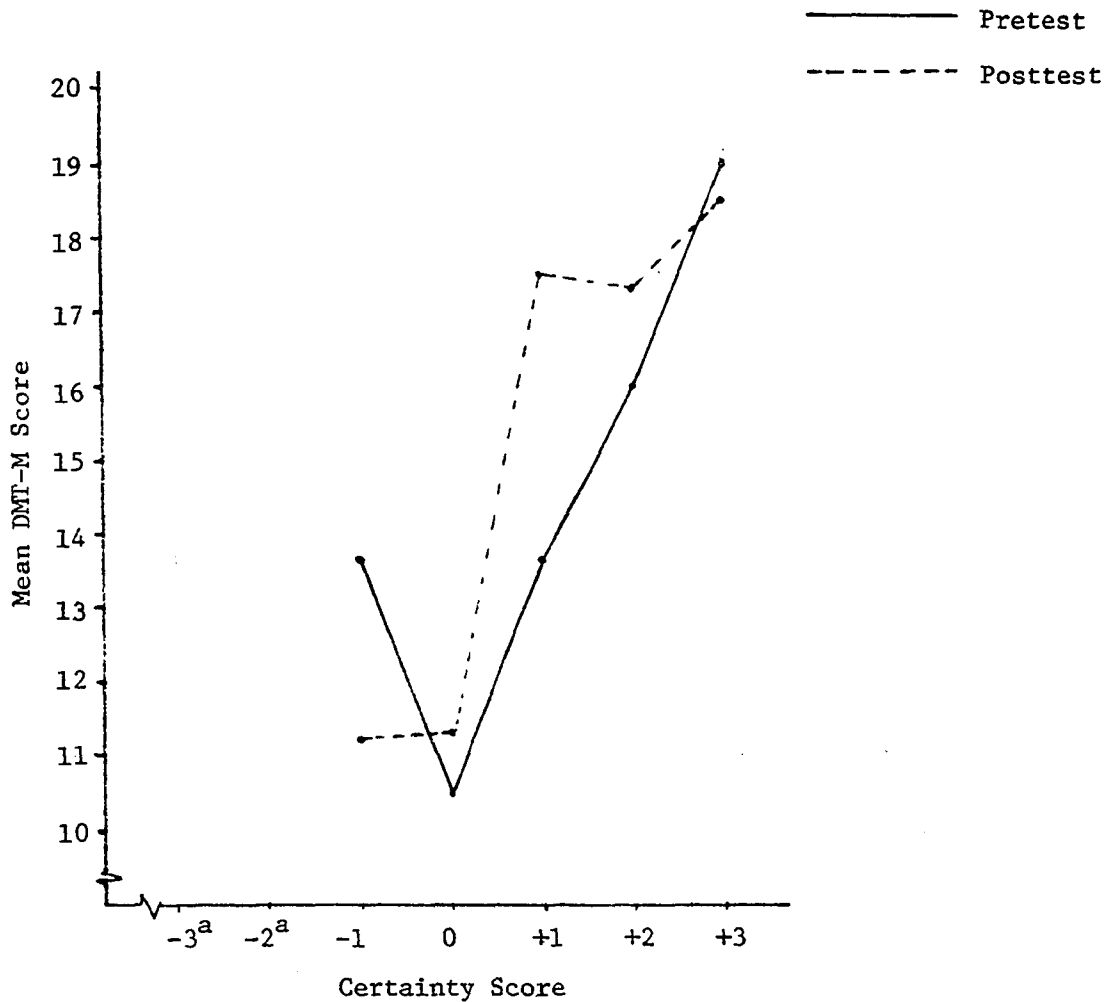
Certainty about teaching score	N	\bar{X}	Standard deviation
Pretest			
-1	8	13.62	6.74
0	10	10.50	7.40
+1	10	13.60	5.40
+2	11	16.00	4.65
+3	11	19.09	.83
Posttest			
-3	2	19.00	1.41
-2	1	17.00	--
-1	8	11.12	6.22
0	4	11.25	8.10
+1	6	17.50	1.52
+2	11	17.36	1.75
+3	18	18.50	2.26

Figures 11 and 12 illustrate graphically the relationship between DMT-M means and certainty about teaching for the two instructional approaches. The data suggest a curvilinear relationship between certainty score and DMT-M score. As mean certainty about teaching moves away from uncertainty, DMT-M mean also increases.



^aValues not plotted for groups with $N < 4$.

Figure 11. DMT-M mean plotted by certainty about teaching score for the self-assessment approach

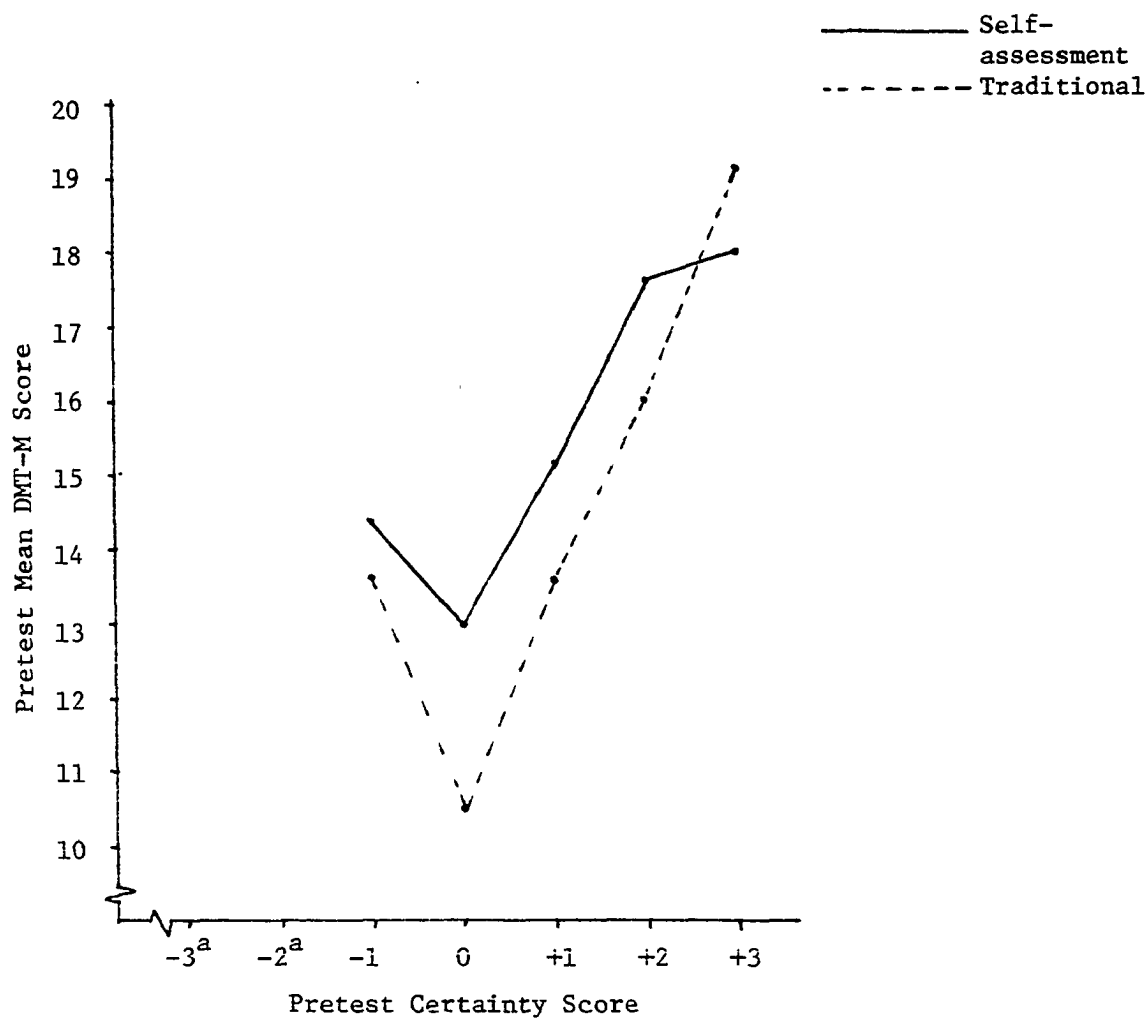


^aValues not plotted for groups with $N < 4$.

Figure 12. DMT-M mean plotted by certainty about teaching score for the traditional approach

Figure 13 plots pretest certainty scores and pretest DMT-M means for the two instructional approaches. Data indicate that the relationships between pretest certainty scores and pretest DMT-M means are similar for both instructional approaches. A certainty score of 0

reflects the lowest DMT-M mean for both the self-assessment approach and the traditional approach. Although the relationships between pretest certainty scores and pretest DMT-M mean scores are similar for the two instructional approaches, DMT-M means for the traditional approach tend to be lower than DMT-M means for the self-assessment approach.



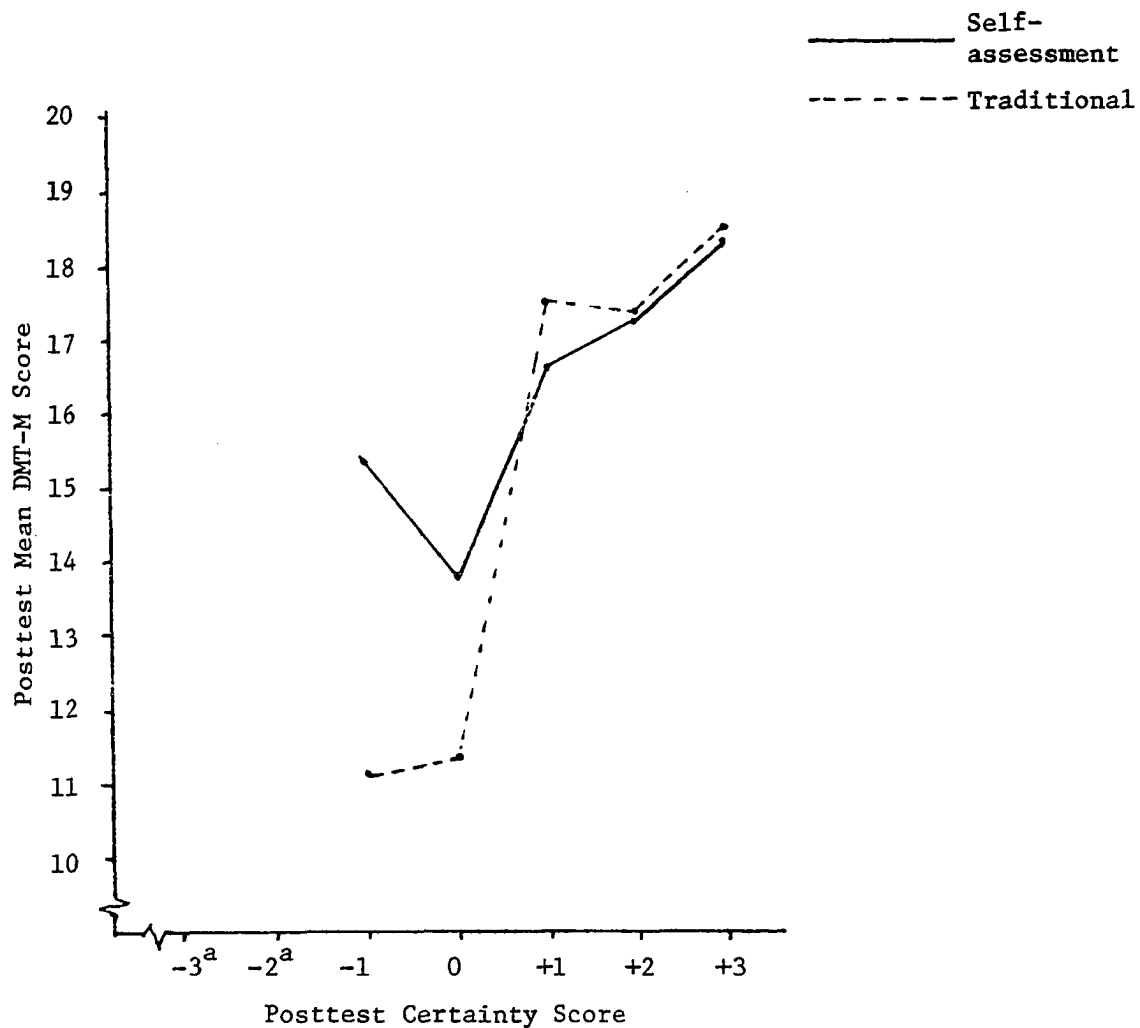
^aValues not plotted for groups with $N < 4$.

Figure 13. Comparison of the relationship between pretest DMT-M score and pretest certainty score for the two instructional approaches

A plot of means in Figure 14 suggests a relationship between posttest certainty scores and posttest DMT-M means for both instructional approaches. Numbers are too small for generalizations about certainty levels -3 and -2 ($N < 4$). The data generally indicate similar relationships for the two instructional approaches with the exception of certainty levels -1 to 0 and +1 to +2. Greater mean DMT-M scores are related to greater certainty about teaching for both instructional approaches. The interval on the graph between -1 and 0 for the self-assessment approach indicates a drop in DMT-M mean score, and the same interval for the traditional approach indicates a slight increase in DMT-M mean. Data for the traditional approach suggest a slight decrease in DMT-M from +1 to +2 certainty. However, the self-assessment approach indicates an increase in DMT-M mean from +1 to +2 certainty.

Time when the decision was made Table 24 reports mean DMT-M scores according to the time when students made the initial decision about teaching (as reported in the September Questionnaire). The group that decided about teaching before entering college has the largest pretest and posttest means. The group that had not made a decision about teaching in September reports the lowest DMT-M means on both pretest and posttest.

All groups report increases in DMT-M means from pretest to posttest, as illustrated graphically in Figure 15. The group that had made an early decision about teaching reports the smallest increase. The two groups that indicate the greatest increases in



^aValues not plotted for groups with $N < 4$.

Figure 14. Comparison of the relationship between posttest DMT-M score and posttest certainty score for the two instructional approaches

Table 24. Mean DMT-M score reported by when initial decision about teaching was made

When	N	\bar{X}	Standard deviation
Pretest			
Early	66	17.09	2.63
College	41	16.10	4.93
Post B.S.	6	16.67	1.37
Undecided	36	12.39	6.63
Posttest			
Early	66	17.64	2.62
College	41	17.07	3.82
Post B.S.	6	18.17	1.17
Undecided	36	14.44	5.29

DMT-M means from pretest to posttest are undecided students and Post B.S. students.

Teacher supply and demand Table 25 reports DMT-M means for three groups classified according to teacher supply and demand. Additionally, pretest and posttest means for the three groups are plotted in Figure 16. The shortage group reports the highest DMT-M pretest mean ($\bar{X}=16.61$) and indicates no change in mean score on the posttest. Both the undifferentiated group and the surplus group score higher on the DMT-M posttest than on the pretest. The surplus group has a mean DMT-M increase of .89, and the undifferentiated group has a mean increase of 1.98.

Teacher Aide Program Data reported in Table 26 summarize pretest and posttest DMT-M means according to participation in the Teacher Aide Program. The non-participant pretest mean is greater than the participants pretest mean with $\bar{X}=15.87$ and $\bar{X}=14.85$, respectively.

Both groups report increases on posttest DMT-M means. The posttest DMT-M mean for participants exceeds the posttest DMT-M mean for non-participants by .37.

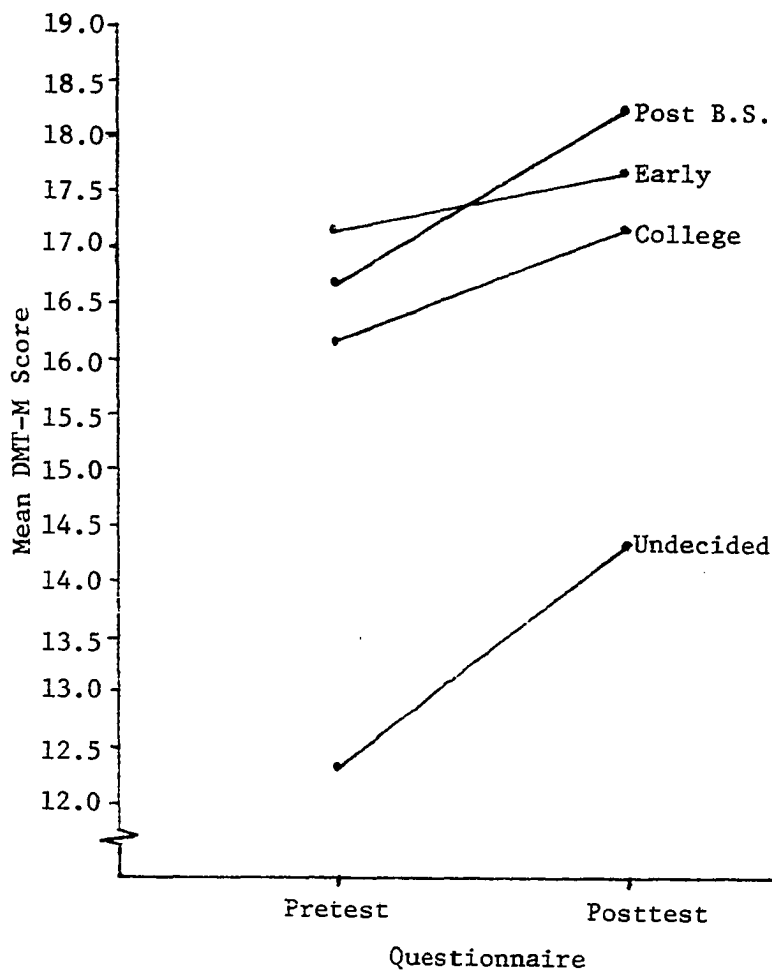


Figure 15. Relationship between DMT-M means and when the initial decision about teaching was made

Table 25. DMT-M means as reported by teacher supply and demand

Teacher supply and demand	N	\bar{X}	Standard deviation
Pretest			
Shortage	28	16.61	3.48
Surplus	74	15.85	4.80
Undifferentiated	47	14.81	6.16
Posttest			
Shortage	28	16.61	3.70
Surplus	74	16.74	4.11
Undifferentiated	47	16.79	3.83

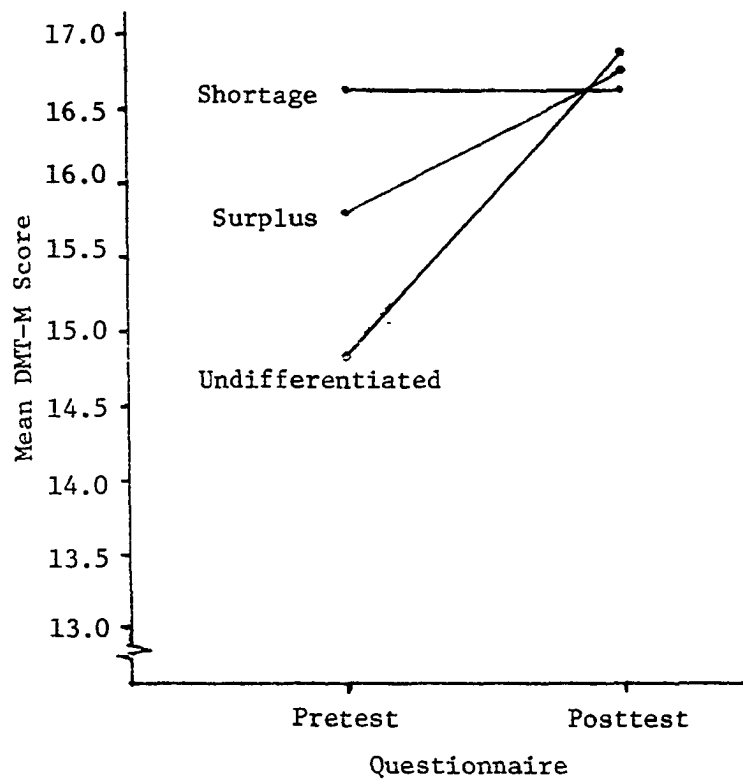


Figure 16. Relationship between DMT-M scores and teacher supply and demand

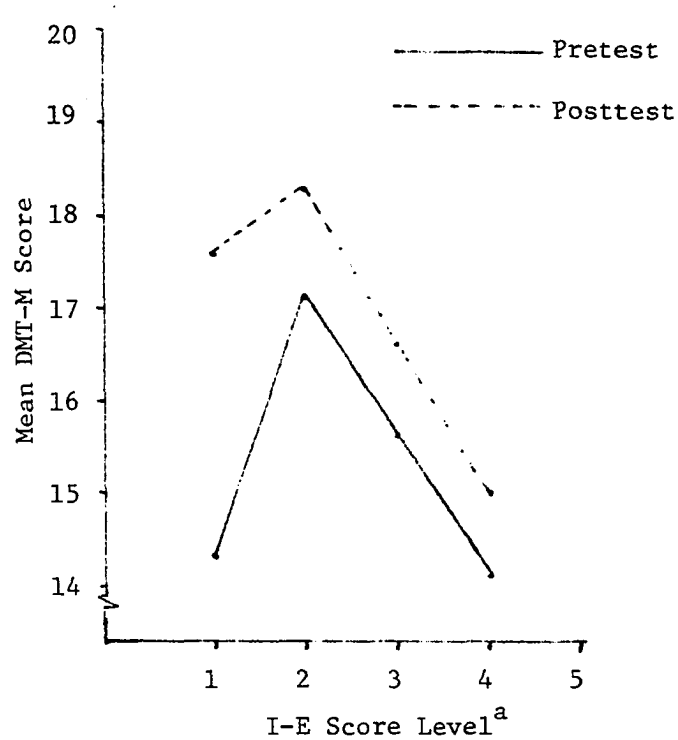
Table 26. DMT-M reported by participation in the Teacher Aide Program

Teacher Aide Program	N	\bar{X}	Standard deviation
Pretest			
Yes	30	14.85	5.73
No	119	15.87	4.90
Posttest			
Yes	30	17.03	3.55
No	119	16.66	4.02

Locus of control Table 27 reports DMT-M means for five levels of I-E Scale scores, and Figure 17 displays the means graphically. Means for level 5 are not plotted due to the small number in the group (N=4). I-E level 2 (>4.6-9.2) reports the greatest pretest and posttest means with \bar{X} =17.09 and \bar{X} =18.31, respectively. Additionally, I-E level 4 (>13.8-18.4) has the smallest pretest and posttest DMT-M means that are plotted (\bar{X} =14.07 and \bar{X} =14.96, respectively).

Table 27. Mean DMT-M scores as reported by I-E level

I-E level	N	\bar{X}	Standard deviation
Pretest			
1	7	14.29	5.38
2	51	17.09	3.87
3	60	15.60	4.81
4	27	14.07	6.48
5	4	11.75	7.89
Posttest			
1	7	17.57	1.27
2	51	18.31	1.91
3	60	16.60	3.56
4	27	14.96	5.23
5	4	9.00	7.53



^aSee Figure 1 for values of I-E levels (page 74)

Figure 17. The relationship between I-E scale score and DMT-M means

Table 28 reports posttest means for the two instructional approaches according to I-E level, and Figure 18 displays the means graphically. Similar relationships between DMT-M mean and I-E level are suggested for both instructional approaches. Levels 1 and 5 must be interpreted with caution due to small numbers.

Decision-making style Table 29 reports pretest DMT-M means according to decision-making style scores (DMS). Figure 19 plots the

Table 28. DMT-M posttest means reported by locus of control and instructional approach

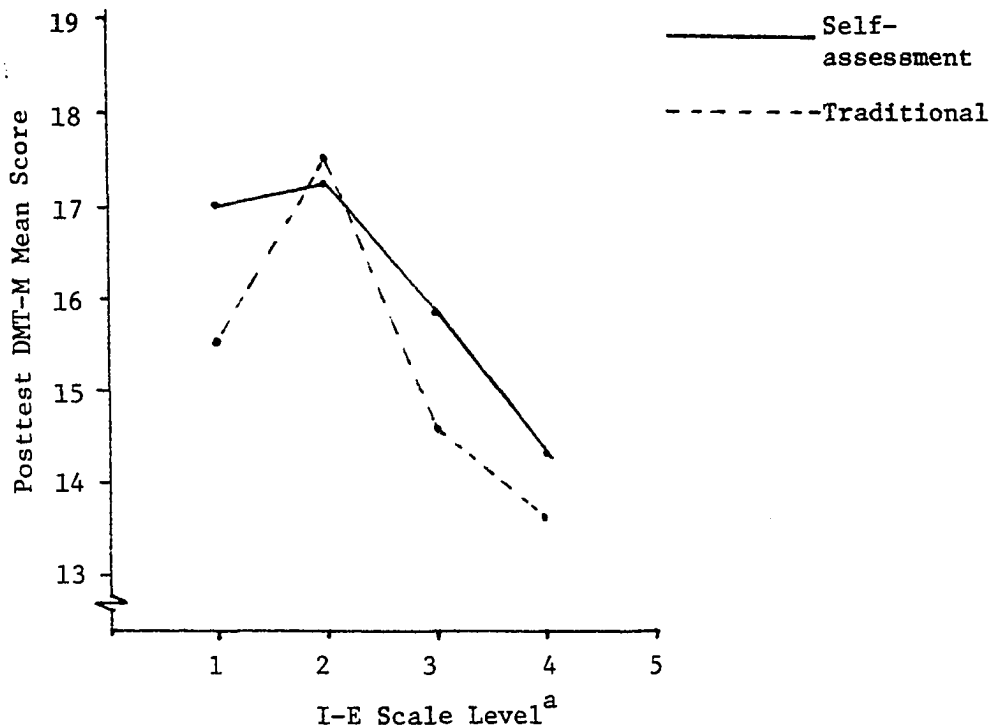
I-E level ^a /Instructional approach	N	\bar{X}	Standard deviation
Self-assessment			
1	5	18.00	1.22
2	34	18.21	2.13
3	45	16.93	2.90
4	13	15.31	4.01
5	2	2.50	.71
Traditional			
1	2	16.50	.71
2	17	18.53	1.42
3	15	15.60	5.05
4	14	14.64	6.30
5	2	15.50	.71

^aSee Figure 1 for I-E level values (page 74).

means for each cognitive style graphically. The data indicate contrasting relationships for the rational style and the dependent style of decision-making. The plot suggests that as DMS-R score increases, DMT-M also increases. However, as DMS-D decreases, mean DMT-M score increases.

The data suggest a curvilinear relationship between DMS-I scores and DMT-M means. The three highest mean scores are reported for DMS scores of 2, 8, and 9. The lowest DMT-M mean ($\bar{X}=15.00$) is reported for a DMS-I score of 6.

Table 30 reports posttest DMT-M means according to DMS scores, and Figure 20 presents plots of the means for the three cognitive styles. The data suggest contrasting relationships between posttest DMT-M means and two cognitive styles, rational and dependent.



^aSee Figure 1 for I-E level values (page 74).

Figure 18. The relationship between I-E level and DMT-M posttest means for two instructional approaches

The plot indicates that as the rational decision-making score increases, DMT-M mean also increases. However, as the dependent decision-making score increases, DMT-M decreases.

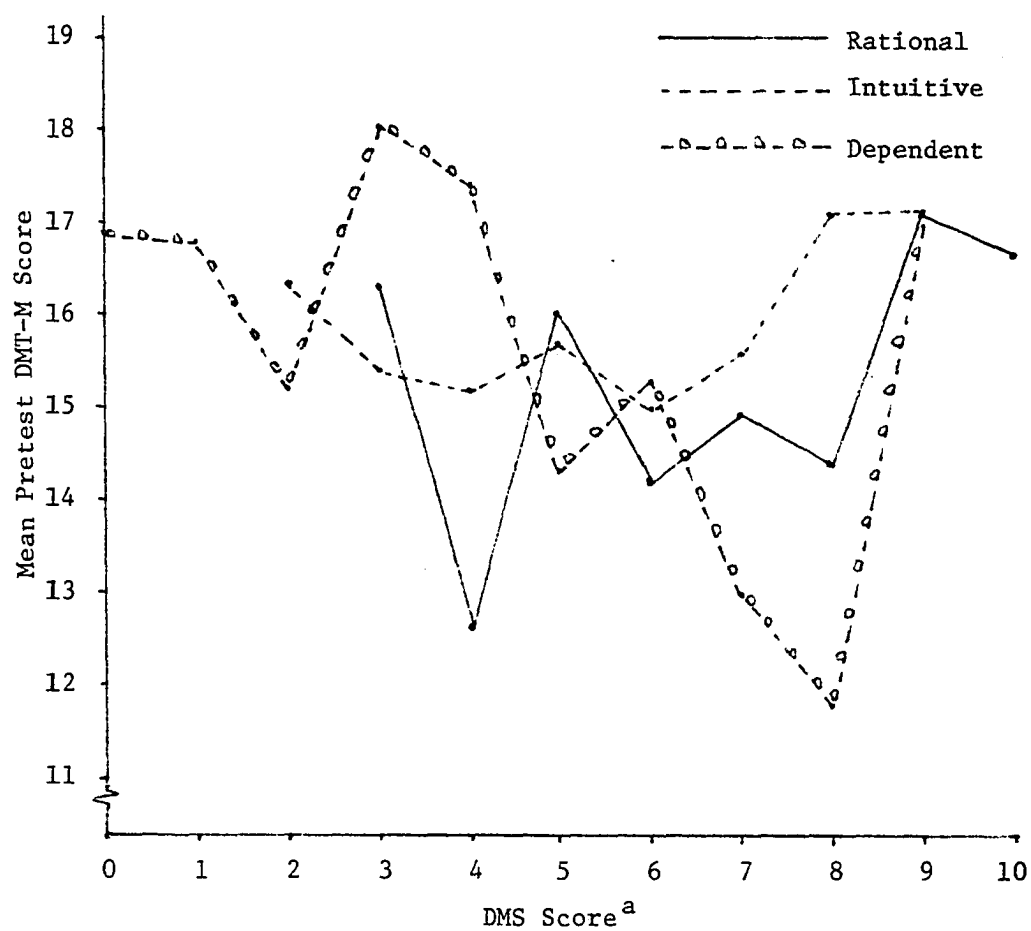
Research Questions

This section presents the results of the analysis. The data are analyzed to answer eight research questions. Each question is

Table 29. Pretest DMT-M means reported by decision-making style score

DMS score ^a	N	DMT-M \bar{X}	Standard deviation
Rational			
3	8	16.25	2.43
4	7	12.57	7.81
5	14	16.00	4.19
6	12	14.17	7.03
7	17	14.94	5.80
8	23	14.39	5.80
9	28	17.14	3.51
10	32	16.69	4.26
Intuitive			
2	12	16.33	4.21
3	21	15.38	5.55
4	34	15.21	5.80
5	23	15.65	5.15
6	19	15.00	5.06
7	17	15.59	5.65
8	9	17.11	2.03
9	7	17.14	2.12
Dependent			
0	17	16.94	4.05
1	17	16.76	5.02
2	18	15.22	3.92
3	23	18.00	1.81
4	19	17.37	2.81
5	15	14.33	5.61
6	15	15.27	5.66
7	8	13.00	7.05
8	6	11.83	7.17
9	6	17.00	2.45

^aReporting groups with N>5.



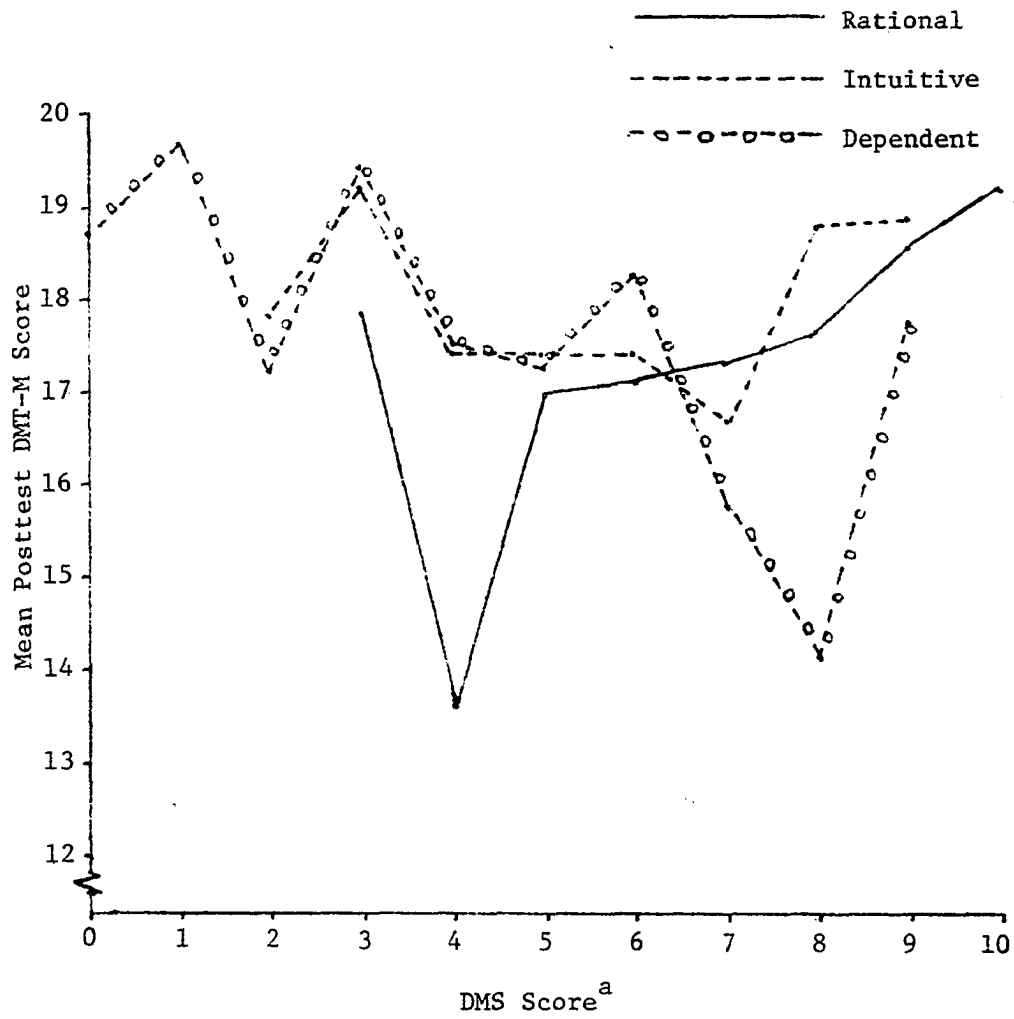
^aPlotting groups having $N > 5$.

Figure 19. Relationship between decision-making style scores and pretest DMT-M means

Table 30. Posttest DMT-M means reported by decision-making style score

DMS score ^a	N	DMT-M \bar{X}	Standard deviation
Rational			
3	8	16.88	2.36
4	7	12.57	7.14
5	14	16.00	4.74
6	12	16.08	4.85
7	17	16.24	4.25
8	23	16.65	3.94
9	28	17.61	2.75
10	32	18.16	1.61
Intuitive			
2	12	16.83	3.59
3	21	18.24	1.09
4	34	16.35	4.95
5	23	16.35	1.77
6	19	16.37	3.32
7	17	15.65	4.68
8	9	17.67	1.87
9	7	17.86	1.68
Dependent			
0	17	17.76	1.39
1	17	18.65	1.41
2	18	16.22	4.31
3	23	18.39	1.37
4	19	16.53	4.02
5	15	16.33	2.90
6	15	17.27	3.38
7	8	14.75	6.65
8	6	13.17	5.15
9	6	16.83	2.86

^aReporting groups with N>5.



^aPlotting groups with N>5.

Figure 20. Relationship between posttest DMT-M means and DMS scores

designed to reveal existing relationships among the selected research variables.

Pearson product moment correlations indicate relationships between quantified variables. Coefficients of .20 and higher are significantly greater than zero for a sample of 149 students at the .01 level. Table 31 presents a correlation matrix for quantified variables in the study.

Furthermore, regression analyses reveal relationships among classification variables such as "time when the decision about teaching was made." Tables 32 and 33 report regression analyses for all main effects with the two dependent variables: posttest DMT-M score and posttest certainty score. A significance level of .05 is established for the statistical tests.

The section in which subjects were enrolled is included as a main effect to investigate systematic effects on the criterion variables. Each section sees one and only one instructional approach. Therefore, section is nested within instructional approach.

The results report both Type I and Type IV sums of squares. Type I (or sequential) sums of squares measure incremental sums of squares as each variable is added in the model. Type IV (or partial) sums of squares are the sums of squares due to adding each variable last in the model.⁵ Said in another way, Type IV sums of squares indicate the unique contribution of each variable to the variance of the criterion variable. The present study uses the F statistics

Table 31. Within groups correlation matrix

	Variables									
	1	2	3	4	5	6	7	8	9	10
1. Pretest certainty	1.00	.18	-.12	-.27*	.40*	.60*	.38*	-.19	.13	-.09
2. DMS-R		1.00	-.51*	-.27*	.11	.13	.24*	-.35*	.11	.02
3. DMS-I			1.00	.12	-.01	-.01	-.11	.29*	-.20*	.03
4. DMS-D				1.00	-.33*	-.19	-.36*	.30*	-.10	-.04
5. Pretest DMT-M					1.00	.46*	.64*	-.20*	.13	.08
6. Posttest certainty						1.00	.43*	-.25*	.09	-.05
7. Posttest DMT-M							1.00	-.40*	.07	-.04
8. I-E Scale score								1.00	-.12	.07
9. Instructional approach									1.00	-.07
10. Participation in Teacher Aide Program										1.00

*Denotes $p \leq .01$.

Table 32. Regression analysis for main effects on posttest certainty about teaching

Main effects	df	Type I SS	F value	Type IV SS	F value
I-E score	1	25.69	12.8**	11.91	5.95*
DMS-R	1	.77	.39	.23	.12
DMS-I	1	3.69	1.84	2.94	1.47
DMS-D	1	5.26	2.63	.42	.21
Instructional approach	1	1.65	.83	.30	.15
When decision about teaching was made	3	83.12	13.84**	64.34	11.38**
Major classified by teacher supply/demand	2	8.52	2.13	8.39	2.10
Section (instructional approach)	4	16.23	2.03	16.23	2.03
Error	134	268.23			
Corrected total	148	413.17			

*Denotes $p \leq .05$.**Denotes $p \leq .01$.

Table 33. Regression analysis for main effects on posttest DMT-M

Main effects	df	Type I SS	F value	Type IV SS	F value
I-E score	1	367.23	31.9**	154.76	13.45**
DMS-R	1	28.75	2.5	9.21	.80
DMS-I	1	9.46	.82	6.53	.57
DMS-D	1	122.57	10.65**	76.34	6.64**
Instructional approach	1	.12	.01	2.03	.18
When decision about teaching was made	3	157.43	4.56**	161.69	4.68**
Major classified by teacher supply/demand	2	18.92	.82	17.46	.76
Section (instructional approach)	4	31.35	.68	31.35	.68
Error	134	1,541.63			
Corrected total	148	2,277.26			

**Denotes $p \leq .01$.

computed for Type IV sums of squares to answer research questions and to investigate two-way interactions.

The following paragraphs discuss each research question separately.

1. Does the self-assessment instructional approach increase certainty about teaching as a career (certainty score)?

The data indicate that instructional approach is not related to certainty score. Table 31 reports a correlation coefficient of $r=.09$ between instructional approach and posttest certainty score. No significant relationship is indicated by the data. Similarly, the regression analysis reported in Table 32 indicates no significant main effect for instructional approach on the criterion variable.

2. Does the self-assessment approach increase DMT-M score?

The data in Table 31 indicate no significant relationship between instructional approach and posttest DMT-M score with $r=.07$. Similarly, instructional approach as an independent variable has no significant effect on posttest DMT-M score ($F_{1,134}=.18$) as reported in Table 33.

3. Is locus of control related to certainty about teaching?

The data suggest that locus of control is related to certainty score. The correlation coefficient between locus of control and pretest certainty score, $r=-.19$, is significantly greater than zero at the .05 level and approaches significance at the .01 level. The Pearson product moment correlation between I-E score and posttest certainty, $r=-.25$, is significantly greater than zero at the .01 level.

Additionally, data summarized in Table 32 indicate that locus of control is a significant independent variable affecting posttest certainty. Type IV sums of squares for posttest certainty equal 11.91, and the F test ($F_{1,134}=5.95$) is significant at the .05 level.

The plot of means in Figure 8 (page 92) suggests the nature of the relationship between certainty score and I-E score. As I-E score increases (more external), certainty about teaching decreases. Caution must be used in interpreting I-E levels 1 and 5 and the corresponding certainty means because numbers in these groups are small.

4. Is locus of control related to students' progress on DMT-M score?

The data suggest significant relationships between pretest/posttest DMT-M scores and locus of control. The correlation coefficient between pretest DMT-M score and I-E score reported in Table 31, $r=-.20$, is significantly greater than zero at the .01 level. The correlation between posttest DMT-M score and I-E score ($r=-.40$) is also significant at the .01 level.

Similarly, the regression analysis reported in Table 33 indicates that locus of control significantly affects the dependent measure (posttest DMT-M score) at the .05 level. Type IV sums of squares are 154.76 with $F_{1,134}=13.45$.

Figure 17 (page 108) illustrates graphically the nature of the relationship between locus of control and DMT-M scores. I-E level 1 reports a DMT-M posttest mean that is lower than the mean for level 2.

However, the number of subjects in level 1 is small (N=7). The data indicate that an internal locus of control is generally related to greater DMT-M posttest scores.

5. Is decision-making style related to certainty about teaching?

Table 31 reports six correlation coefficients relating decision-making style (DMS) scores to pretest/posttest certainty scores as follows:

pretest certainty versus DMS-R	r= .18
pretest certainty versus DMS-I	r=-.12
pretest certainty versus DMS-D	r=-.27*
posttest certainty versus DMS-R	r= .13
posttest certainty versus DMS-I	r=-.01
posttest certainty versus DMS-D	r=-.19

One of the six correlations, pretest certainty versus DMS-D, is significantly greater than zero at the .01 level. Figure 9 (page 94) displays graphically the nature of the relationship between pretest certainty and DMS-D score. Greater certainty scores are related to lower DMS-D means.

6. Is decision-making style related to progress on the career decision-making task relative to college major (DMT-M score)?

Table 31 reports six correlation coefficients for the relationships between DMS scores and pretest/posttest DMT-M scores as follows:

DMS-R versus pretest DMT-M	r= .11
DMS-I versus pretest DMT-M	r=-.01
DMS-D versus pretest DMT-M	r=-.33*
DMS-R versus posttest DMT-M	r= .24*
DMS-I versus posttest DMT-M	r=-.11
DMS-D versus posttest DMT-M	r=-.36*

Three correlations are significantly greater than zero at the .01 level. Figure 19 (page 112) graphically indicates the nature of the

correlation between the dependent decision-making style and pretest DMT-M mean score. As DMS-D score increases, pretest DMT-M decreases.

Figure 20 (page 114) displays the relationship between the rational and the dependent decision-making style scores and posttest DMT-M means. As DMS-R increases, DMT-M also increases. In contrast to this relationship, as DMS-D increases, DMT-M decreases.

7. Are the following variables related to posttest certainty about teaching:

- * Participation in the Teacher Aide Program (T.A. Program),
- * Time when the initial decision about teaching was made, and
- * Major as classified by teacher supply and demand?

a. The correlation coefficient that relates participation in the T.A. Program to posttest certainty score is reported in Table 31 as $r = -.05$. The data indicate no significant relationship between the T.A. Program and posttest certainty at the .01 level.

b. Four possible answers were given to the question that asked students to indicate the time when the decision about teaching was made (reported on the September questionnaire). Type IV sums of squares calculated in the regression analysis (Table 32) are 64.34. The statistical test of significance, $F_{3,134} = 11.38$, indicates that "When" has a significant main effect in the model at the .05 level.

Figure 6 (page 88) presents a plot of pretest and posttest mean certainty scores according to the time when the decision was made. The slopes of the pretest and posttest plots for the three groups remain about the same with the exception of the Post B.S. group.

However, the number in the Post B.S. group is small ($N=6$). Considering only the groups that have a cell size large enough to draw conclusions, the early deciders report the greatest certainty about teaching.

c. Table 32 presents a regression analysis with major classified by teacher supply and demand as an independent variable. Type IV sums of squares are 8.39. The statistical test of significance, $F_{2,134}=2.10$, reveals no significant main effect for major classified by teacher supply and demand on the criterion variable.

8. Are the following variables related to posttest progress on the decision-making task relative to college major (DMT-M score):

- * Participation in the Teacher Aide (T.A.) Program,
- * Time when the initial decision about teaching was made, and
- * Major as classified by teacher supply and demand?

a. The correlation between participation in the T.A. Program and posttest DMT-M score is reported in Table 31 as $r=-.04$. The data indicate no significant relationship between these two variables at the .01 level.

b. The regression analysis (Table 33) reports Type IV sums of squares for "When" as 161.69. The statistical test, $F_{3,134}=4.68$, indicates that "When" has a significant main effect on posttest DMT-M score at the .05 level. Figure 15 (page 105) plots pretest and posttest means for groups based upon the time when the decision about teaching was made. Early deciders report greater posttest DMT-M scores than either those deciding in college or the undecided students. Undecided students report the lowest mean posttest DMT-M scores.

The number of Post B.S. students is too small to allow interpretation of data ($N=6$).

c. Major as classified by teacher supply and demand is also analyzed as an independent variable. Results of the regression analysis, presented in Table 33, indicate that major classified by teacher supply/demand has no significant effect on posttest DMT-M at the .05 level ($F_{2,134}=.76$).

Other Findings

This section reports results of the regression analyses for main effects and two-way interactions on two dependent variables, posttest certainty score and posttest DMT-M score. Participation in the Teacher Aide (T.A.) Program is not included as a main effect since there is no research basis for postulating its effect on the two criterion variables. Main effects in the full model include the following: I-E score, DMS-R, DMS-I, DMS-D, instructional approach, time when the decision was made, major classified by teacher supply and demand, and section nested in instructional approach.

Ott suggests that the overall error rate (α) is increased when testing multiple comparisons.⁶ Twenty-five two-way interactions are investigated. Following Ott's equation for overall error rate of totally independent tests, $[1 - (1-\alpha)^c]$, the overall error rate (α') for investigating these two-way interactions becomes .72. Some correlations are likely to exist between the comparisons resulting in a smaller α' . However, multiple comparisons increase the likelihood of making a Type I error, and some

interactions may be significant due to chance alone. Caution must be used in interpreting the results.

The results report both Type I and Type IV sums of squares. As previously stated, the F statistics calculated for Type IV sums of squares are used to investigate the effects of two-way interactions. The procedure that SAS uses to calculate Type IV sums of squares considers the balance of the design.⁷ Data gathered in this study are unbalanced. In the case of "When," the data are highly unbalanced because only six out of 149 students made the decision about teaching after completing a B.S. degree. Therefore, it should be noted that some data are removed, reducing degrees of freedom for "When" in calculations for Type IV sums of squares.

The section first presents statistics for the two full models including R-square values. Secondly, the section summarizes the effects of two-way interactions on posttest certainty scores. Lastly, the section discusses effects of two-way interactions on posttest DMT-M scores.

Full models

Table 34 summarizes results of the regression analysis to test main effects and two-way interactions on posttest certainty scores. Sums of squares for the full model are 280.98 with 69 degrees of freedom. Error sums of squares are 132.19 with 79 degrees of freedom. The R-square value indicates that approximately 68 percent of the variance in posttest certainty scores can be accounted for by the variables in the model.

Table 35 summarizes the regression analysis on the full model for another criterion variable, posttest DMT-M score. Sums of squares

Table 34. Regression analysis for full model on posttest certainty score

Source	df	Sums of squares	F value	R-square
Model	69	280.98	2.43***	.680059
Error	79	132.19		
Corrected total	148	413.17		

***Denotes $p \leq .001$.

Table 35. Regression analysis with main effect and two-way interaction on posttest DMT-M score

Source	df	Sums of squares	F value	R-square
Model	69	1,575.71	2.57***	.691932
Error	79	701.55		
Corrected total	148	2,277.26		

***Denotes $p \leq .001$.

for the full model are 1,575.71 with 69 degrees of freedom. Error sums of squares are 701.55 with 79 degrees of freedom. Approximately 69 percent of the variance in posttest DMT-M scores is accounted for by the model.

Posttest certainty score

Main effect of section The data indicate that section nested in instructional approach has no main effect on posttest certainty

score at the .05 level. Type IV sums of squares are 7.05 with 4 degrees of freedom. The F statistic is not significant at the .05 level ($F_{4,79}=1.05$).

Locus of control Table 36 summarizes the results of the regression analysis for two-way interactions between locus of control and seven independent variables. The interaction between I-E score and instructional approach (I-E*App) is significant at the .05 level ($F_{1,79}=5.51$).

Table 36. Two-way interactions between I-E score and seven independent variables

Source	df	Type I SS	F value	df	Type IV SS	F value
IE*DMS-R	1	2.17	1.30	1	1.15	.69
IE*DMS-I	1	5.18	3.10	1	1.16	.69
IE*DMS-D	1	.55	.33	1	.81	.48
IE*App	1	25.00	14.94***	1	8.61	5.15*
IE*When	3	5.43	1.08	2	1.30	.39
IE*Teacher supply/demand	2	2.52	.75	2	1.36	.41
IE*Sec(App)	4	4.87	.73	4	12.51	1.87

*Denotes $p \leq .05$.

***Denotes $p \leq .001$.

The data are sorted by both I-E level and instructional approach to investigate the nature of the interaction. Table 37 presents mean posttest certainty scores for each group. Numbers are too small in I-E levels 1 and 5 for interpretation.

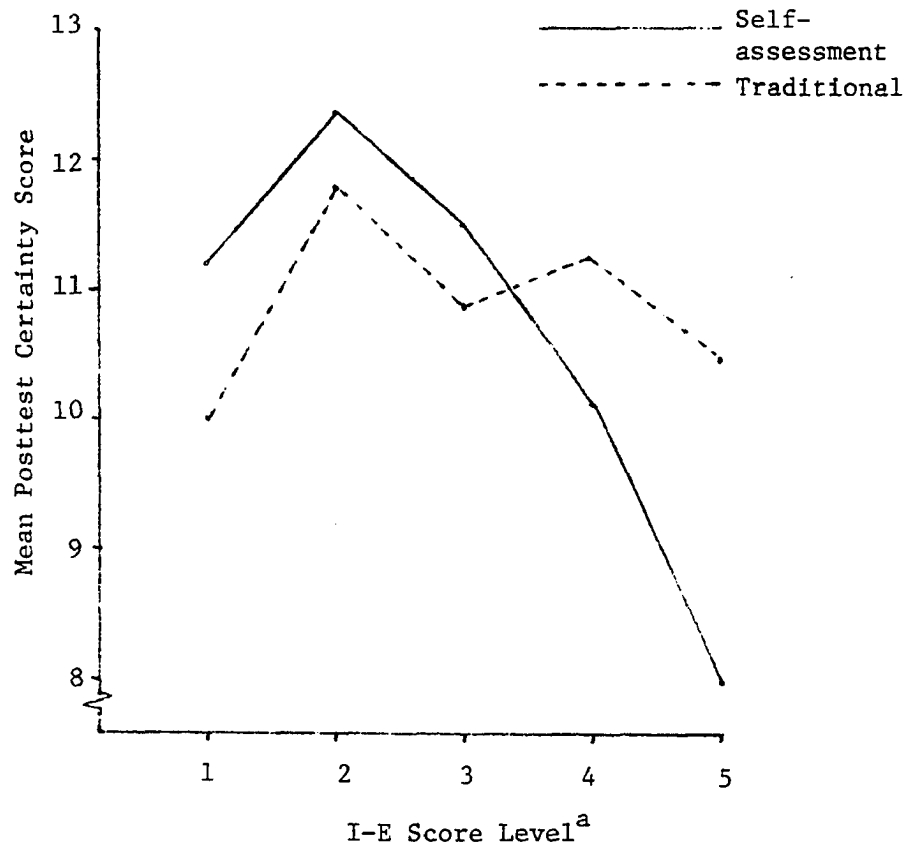
A plot of the means in Figure 21 suggests the nature of the interaction. Mean posttest certainty for the self-assessment approach exceeds mean posttest certainty for the traditional approach in I-E levels 1, 2, and 3. However, the mean for the traditional approach exceeds the mean for the self-assessment approach in I-E level 4.

Externals (I-E level 4) may have entered Sec. Ed. 204 with an unexamined decision about teaching as a career. The self-assessment approach may have caused externals to examine critically their career preference and subsequently discover discrepancies between their self-concept and the nature of the profession. Such a discrepancy is likely to result in a lower certainty about teaching. Additional research is

Table 37. Mean posttest certainty score reported by I-E level and instructional approach

I-E level ^a	N	\bar{X}	Standard deviation
Self-assessment approach			
1	5	11.20	1.48
2	34	12.38	.99
3	45	11.51	1.62
4	13	10.77	1.88
5	2	8.00	0.00
Traditional approach			
1	2	10.00	2.83
2	17	11.82	1.74
3	15	10.93	1.94
4	14	11.43	1.50
5	2	10.50	2.12

^aSee Figure 1 (page 74) for I-E level values.



^aSee Figure 1 (page 74) for I-E level values.

Figure 21. The relationship between posttest certainty and I-E level for two instructional approaches

needed to investigate the effect of the interaction between instructional approach and I-E level on certainty about teaching.

Decision-making style-rational Table 38 reports results of the regression analysis for two-way interaction between DMS-R and six other independent variables. The data indicate no significant

effects of the interactions on the criterion variable, posttest certainty, at the .05 level.

Table 38. The effects of two-way interactions between DMS-R and six independent variables on posttest certainty score

Source	df	Type I SS	F value	df	Type IV SS	F value
DMS-R*DMS-I	1	.75	.45	1	2.54	1.52
DMS-R*DMS-D	1	.27	.16	1	.01	.00
DMS-R*App	1	.15	.09	1	1.67	1.00
DMS-R*When	3	3.52	.70	2	6.80	2.03
DMS-R*Teacher supply/demand	2	3.33	1.00	2	2.64	.79
DMS-R*Sec(App)	4	10.77	1.61	4	8.55	1.28

Decision-making style-intuitive

Table 39 summarizes results

of the regression analysis for two-way interactions between DMS-I and five other variables. No significant interactions at the .05 level are indicated by the data.

Table 39. Effects of two-way interactions between DMS-I and five variables on posttest certainty score

Source	df	Type I SS	F value	df	Type IV SS	F value
DMS-I*DMS-D	1	.71	.42	1	1.19	.71
DMS-I*App	1	.51	.30	1	1.67	1.00
DMS-I*When	3	17.07	3.40*	2	8.98	2.68
DMS-I*Teacher supply/demand	2	2.95	.88	2	.15	.05
DMS-I*Sec(App)	4	9.54	1.43	4	6.69	1.00

*Denotes $p \leq .05$.

Decision-making style-dependent Table 40 reports the effects of four interactions between DMS-D and other independent variables on posttest certainty score. The interaction between the dependent decision-making style and major as classified by teacher supply/demand is significant at the .05 level with $F_{2,79}=3.19$.

Table 40. The effects of two-way interactions between DMS-D and four independent variables on posttest certainty score

Source	df	Type I SS	F value	df	Type IV SS	F value
DMS-D*App	1	2.24	1.34	1	.15	.09
DMS-D*When	3	1.65	.33	2	3.89	1.16
DMS-D*Teacher supply/demand	2	8.44	2.52	2	10.69	3.19*
DMS-D*Sec(App)	4	8.33	1.24	4	10.71	1.60

*Denotes $p \leq .05$.

The data are sorted two ways, by DMS-D and by major as classified by teacher supply and demand, to investigate the nature of the interaction and effects on posttest certainty scores. The sorting procedure resulted in several cells having a small number. Table 41 reports posttest certainty means for groups with $N > 4$. Additionally, Figure 22 represents the means graphically. Data for the shortage group are not plotted.

The plots of data suggest the nature of the interaction. Posttest certainty seems to decrease for the surplus group as DMS-D score increases. In contrast, there appears to be a slight increase in posttest certainty for the undifferentiated group as DMS-D score increases.

Table 41. Posttest certainty mean scores reported by DMS-D and major as classified by teacher supply and demand

DMS-D score	N	\bar{X}	Standard deviation
Shortage			
1	5	11.60	2.61
3	4	12.25	.96
4	6	11.17	.75
Surplus			
0	8	12.25	1.39
1	7	13.00	0.00
2	11	11.91	1.51
3	13	12.38	.65
4	10	11.70	1.49
5	7	11.43	1.51
6	6	11.83	1.67
7	5	10.80	1.64
Undifferentiated			
0	8	11.13	2.42
1	5	10.20	2.59
2	5	10.80	2.05
3	6	11.33	2.25
5	5	10.40	2.41
6	7	11.71	1.50

There are not enough data to interpret the relationship between DMS-D score and posttest certainty for the shortage group.

Other interactions Table 42 indicates the effects of the remaining three two-way interactions on posttest certainty. The F test for the interaction between instructional approach and major as classified by teacher supply and demand (App*Teacher supply/demand) is significant at the .05 level ($F_{2,79}=4.28$).

The data are sorted two ways, by instructional approach and by major as classified by teacher supply/demand, to investigate

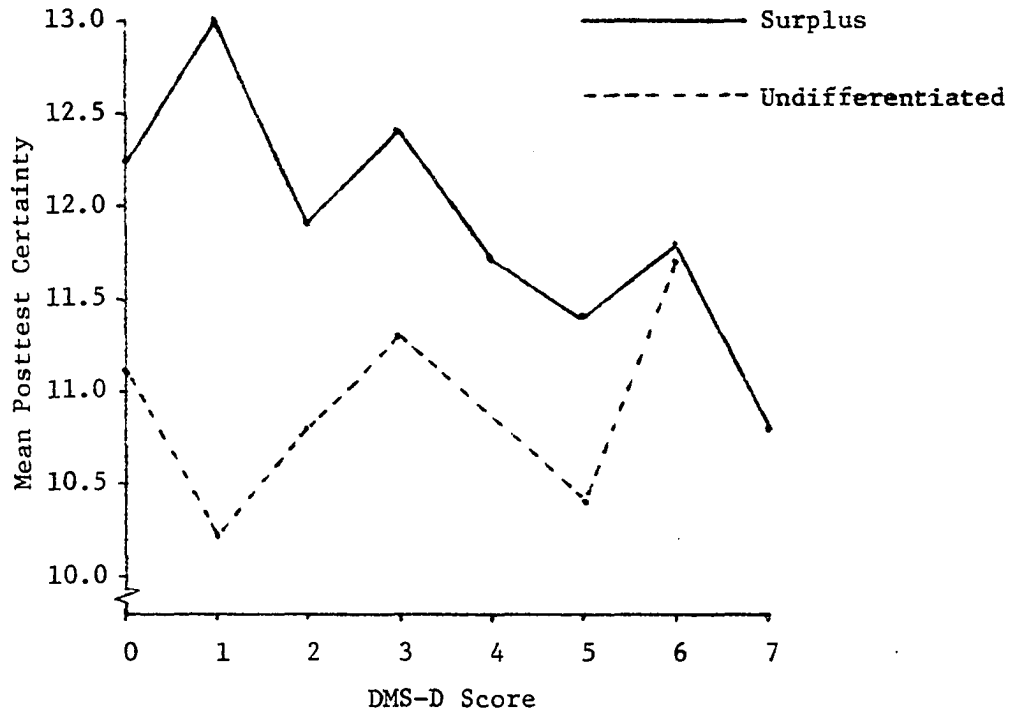


Figure 22. The relationship between posttest certainty and DMS-D score for majors classified by teacher supply and demand

Table 42. The effects of three two-way interactions on posttest certainty score

Source	df	Type I SS	F value	df	Type IV SS	F value
App*When	3	4.08	.81	2	6.30	1.88
App*Teacher supply/demand	2	13.24	3.96*	2	14.31	4.28*
When*Teacher supply/demand	4	2.75	.41	4	2.75	.41

*Denotes $p \leq .05$.

the interaction. Table 43 reports mean posttest certainty scores, and Figure 23 plots the means graphically. The data indicate little difference between the instructional approaches for the surplus group. Certainty is greater for the shortage group in the self-assessment approach than for the corresponding group in the traditional approach. In contrast, certainty is greater in the traditional approach for the undifferentiated group than in the self-assessment approach.

One explanation of these findings might be that the self-assessment approach reinforces a preference for teaching in majors where teacher shortages exist. However, such a reinforcement may not be gained from the traditional approach. Therefore, posttest certainty is greater for the group that has its career preference reinforced.

Continuing with this line of reasoning, it may be that the self-assessment approach raises questions about teaching as a career for the undifferentiated group. These questions result in lower posttest

Table 43. Mean posttest certainty scores reported by instructional approach and major classified by teacher supply and demand

Major classified by teacher supply/ demand	N	\bar{X}	Standard deviation
Self-assessment approach			
Shortage	21	11.76	1.45
Surplus	53	11.96	1.29
Undifferentiated	25	10.80	2.08
Traditional approach			
Shortage	7	10.00	2.08
Surplus	21	11.86	1.46
Undifferentiated	22	11.23	1.80

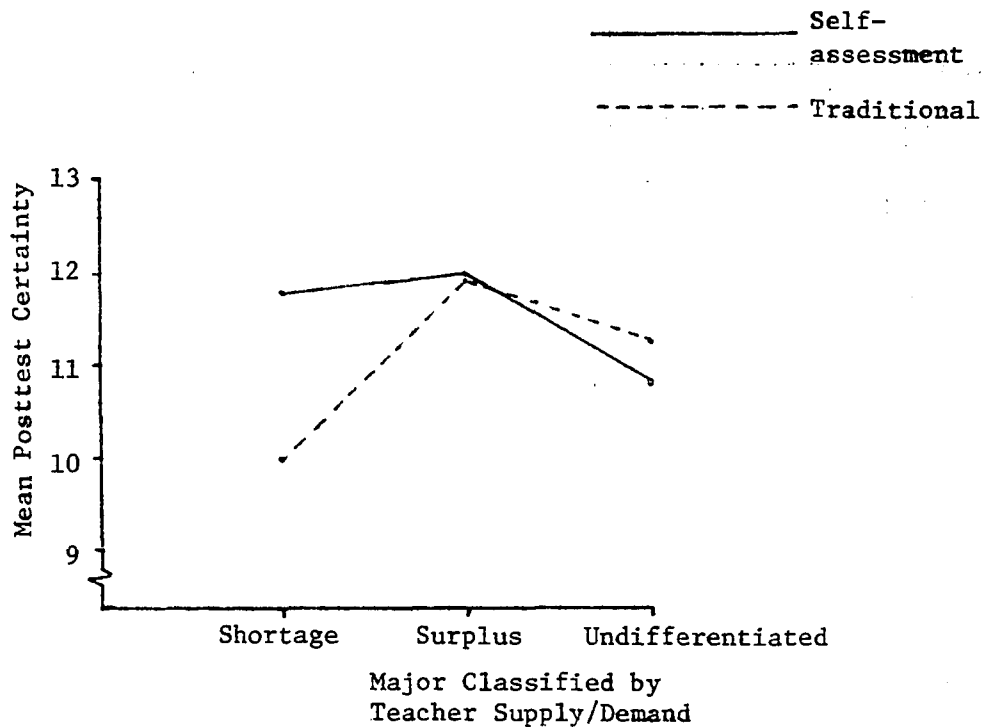


Figure 23. The relationship between major classified by teacher supply and demand and posttest certainty score for two instructional approaches

certainty. However, such questions may not be raised by the traditional approach. Therefore, posttest certainty is less in the self-assessment approach than in the traditional approach for undifferentiated majors.

Posttest DMT-M score

Main effect of section The data indicate no main effect of section as nested in instructional approach on posttest DMT-M score. Type IV sums of squares are 38.54 with 4 degrees of freedom. The F statistic ($F_{4,79}=1.09$) is not significant at the .05 level.

Locus of control Table 44 summarizes effects of interactions between locus of control and seven independent variables on posttest DMT-M score. The interaction between locus of control and major as classified by teacher supply and demand has a significant effect on the criterion variable. The F statistic ($F_{2,79}=4.41$) is significant at the .05 level.

Table 44. The effects of two-way interactions between I-E and seven independent variables

Source	df	Type I SS	F value	df	Type IV SS	F value
IE*DMS-R	1	6.73	.76	1	.58	.06
IE*DMS-I	1	15.32	1.73	1	2.84	.32
IE*DMS-D	1	21.55	2.43	1	29.92	3.37
IE*App	1	25.48	2.87	1	.02	.00
IE*When	3	11.68	.44	2	8.43	.47
IE*Teacher supply/demand	2	137.26	7.73***	2	78.41	4.41*
IE*Sec(App)	4	61.66	1.74	4	70.88	2.00

*Denotes $p \leq .05$.

***Denotes $p \leq .001$.

The data are sorted by I-E level and major as classified by teacher supply/demand to investigate the interaction. Mean posttest DMT-M scores are reported in Table 45. In addition, the means are plotted in Figure 24. Numbers are small for I-E levels 1 and 5, and these values are not plotted on the graph.

The data confirm the expectation that DMT-M score decreases as I-E score becomes external. The interaction suggests that the slope for the undifferentiated group is less steep than the slope for either

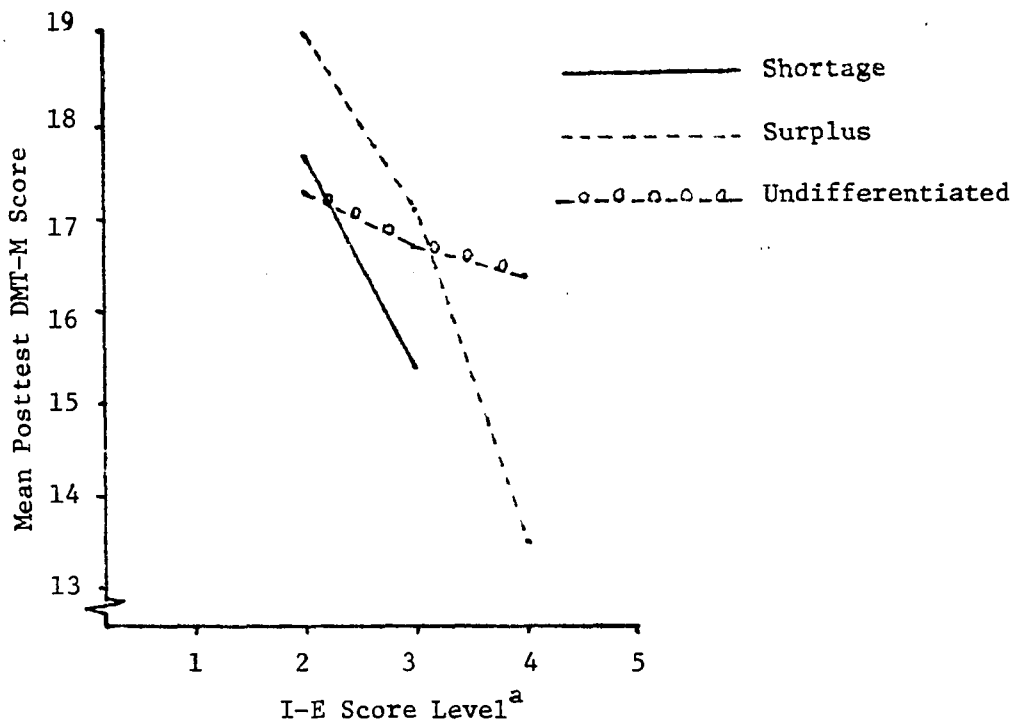
Table 45. Mean posttest DMT-M scores reported by I-E level and major as classified by teacher supply and demand

I-E level ^a	N	\bar{X}	Standard deviation
Shortage			
1	2	18.50	.71
2	11	17.73	1.95
3	14	15.36	4.68
4	1	18.00	--
5	--	--	--
Surplus			
1	1	16.00	--
2	28	19.00	1.19
3	29	17.14	2.18
4	14	13.50	5.26
5	2	2.50	.71
Undifferentiated			
1	4	17.50	1.29
2	12	17.25	2.63
3	17	16.71	4.31
4	12	16.42	5.11
5	2	15.50	.71

^aSee Figure 1 (page 74) for I-E level values.

the shortage group or the surplus group. It may be postulated that the undifferentiated group receives less positive or negative reinforcement regarding their career choice. On the other hand, the other groups may receive more positive or negative reinforcement regarding career choice. The result is subsequently indicated in DMT-M scores for the undifferentiated group that decrease at a slower rate than the decreases for the other two groups as I-E score becomes external.

Decision-making style-rational Table 46 reports two-way interactions between DMS-R and six other independent variables.



^aSee Figure 1 (page 74) for I-E level values.

Figure 24. The relationship between posttest DMT-M scores and I-E level for major classified by teacher supply and demand

The data indicate that the interaction between DMS-R and instructional approach has a significant effect on posttest DMT-M. Type IV sums of squares are 35.47 with one degree of freedom. The F test ($F_{1,79}=3.99$) is significant at the .05 level.

The data can be sorted by instructional approach and DMS-R score to investigate the significant interaction. However, numbers in several cells are too small for interpretation ($N<5$). More data are needed to generalize about the nature of this interaction.

Table 46. The effects of two-way interactions between DMS-R and six independent variables on posttest DMT-M score

Source	df	Type I SS	F value	df	Type IV SS	F value
DMS-R*DMS-I	1	1.01	.11	1	4.65	.52
DMS-R*App	1	40.46	4.56*	1	35.47	3.99*
DMS-R*When	3	16.97	.64	2	7.08	.40
DMS-R*Teacher supply/demand	2	2.65	.15	2	3.52	.20
DMS-R*Sec(App)	4	68.73	1.93	4	38.83	.98

*Denotes $p \leq .05$.

Decision-making style-intuitive Table 47 summarizes the effects of interactions between DMS-I and five independent variables on posttest DMT-M. The data indicate that the interaction between DMS-I and DMS-D has a significant effect on the criterion variable at the .05 level ($F_{1,79}=13.74$).

The data can be sorted two ways by DMS-I score and by DMS-D score to investigate the effects of the interaction on posttest DMT-M score. However, the sorting procedure results in small cell sizes (from $N=1$ to $N=6$). Therefore, it is not possible to interpret the effects of this interaction on the criterion variable.

Decision-making style-dependent The effects for interactions between DMS-D and four independent variables on posttest DMT-M score are indicated in Table 48. The interactions are not significant at the .05 level.

Other interactions Table 49 reports statistics for the effects of three interactions on posttest DMT-M score. The interaction between

Table 47. The effects of two-way interactions between DMS-I and five variables on posttest DMT-M scores

Source	df	Type I SS	F value	df	Type IV SS	F value
DMS-I*DMS-D	1	138.30	15.57***	1	121.99	13.74***
DMS-I*App	1	.98	.11	1	12.62	1.42
DMS-I*When	3	11.44	.43	2	17.83	1.00
DMS-I*Teacher supply/demand	2	7.00	.39	2	4.06	.23
DMS-I*Sec(App)	4	35.59	1.00	4	4.52	1.17

***Denotes $p \leq .001$.

Table 48. The effects of two-way interactions between DMS-D and four independent variables on posttest DMT-M score

Source	df	Type I SS	F value	df	Type IV SS	F value
DMS-D*App	1	2.20	.25	1	2.39	.27
DMS-D*When	3	73.93	2.78*	2	50.20	2.83
DMS-D*Teacher supply/demand	2	7.35	.41	2	.39	.02
DMS-D*Sec(App)	4	30.29	.85	4	24.06	.68

*Denotes $p \leq .05$.

Table 49. The effects of three two-way interactions on posttest DMT-M score

Source	df	Type I SS	F value	df	Type IV SS	F value
App*When	3	16.78	.63	2	2.73	.15
App*Teacher supply/demand	2	57.82	3.26*	2	56.68	3.19*
When*Teacher supply/demand	4	10.87	.31	4	10.87	.31

*Denotes $p \leq .05$.

instructional approach and major as classified by teacher supply and demand has a significant effect on the criterion variable. The F statistic, $F_{2,79}=3.19$ is significant at the .05 level.

Sorting the data two ways, by instructional approach and by major as classified by teacher supply and demand permits interpretation of the significant interaction. Table 50 reports posttest DMT-M means, and Figure 25 illustrates the relationship graphically. Mean posttest DMT-M score is greater for the shortage and the surplus groups taking the self-assessment approach than the means for the groups in the traditional approach. In contrast, the mean for the self-assessment approach is less than the mean for the traditional approach in the undifferentiated majors.

An explanation of the interaction may be hypothesized. The career preference of groups in the shortage and surplus areas may have been reinforced by the self-assessment approach. Such a reinforcement

Table 50. Mean posttest DMT-M scores reported by instructional approach and major as classified by teacher supply/demand

Major classified by teacher supply/ demand	N	\bar{X}	Standard deviation
Self-assessment approach			
Shortage	21	17.57	2.23
Surplus	53	16.83	3.90
Undifferentiated	25	16.56	3.70
Traditional approach			
Shortage	7	13.71	5.65
Surplus	21	16.52	4.70
Undifferentiated	22	17.05	4.05

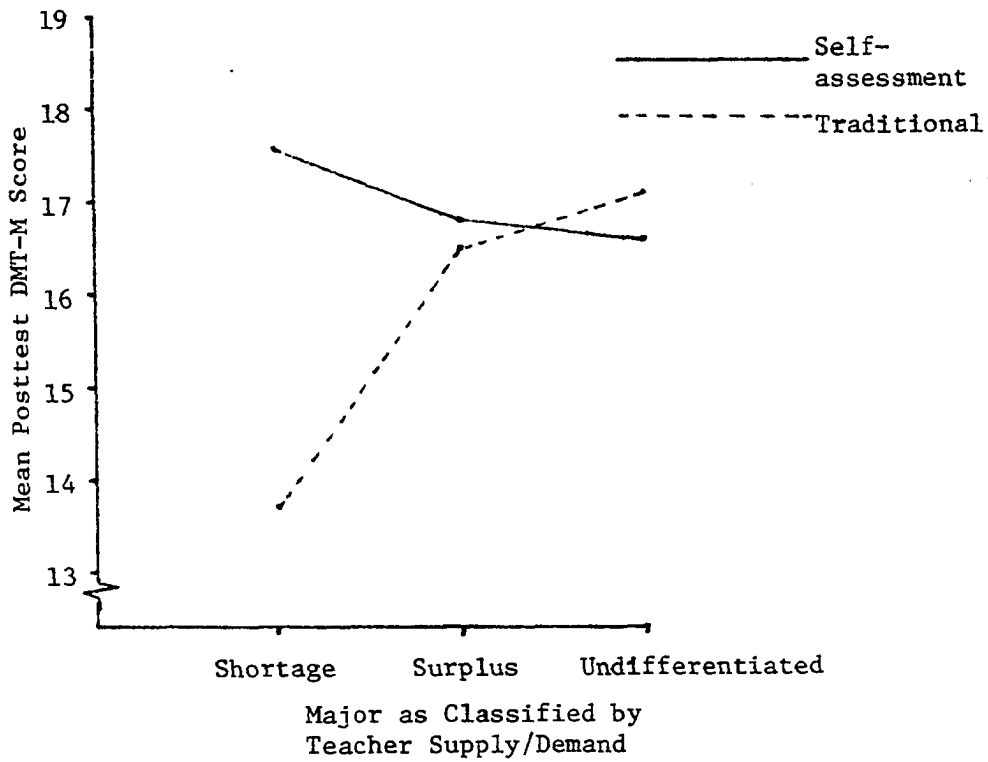


Figure 25. The relationship between major classified by teacher supply/demand and posttest DMT-M mean score for two instructional approaches

would result in increased DMT-M scores. It is possible that the traditional approach reflected lower posttest DMT-M means because the career preference for teaching received no reinforcement.

Additionally, the self-assessment approach may have raised questions regarding the choice of teaching for undifferentiated majors. The questions resulted in lower DMT-M scores. In contrast, the traditional approach may not directly raise issues related to the choice of teaching. Consequently, posttest DMT-M scores are

greater in the traditional approach for undifferentiated majors than in the self-assessment approach. Further research is needed to investigate the effects of the interaction on DMT-M scores.

Notes

¹Harold E. Dilts et al., "Profile of Teacher Education Students," Report No. 1 in the Iowa State University Teacher Education Evaluation Project, Ames, Iowa: Research Institute for Studies in Education, College of Education, Iowa State University, October 1981, p. 8.

²Robert K. Gable et al., "Perceptions of Personal Control and Conformity of Vocational Choice as Correlates of Vocational Development," Journal of Vocational Behavior 8, 3 (June 1976): 265.

³Ibid., p. 263.

⁴Thirty percent of a similar sample indicated no change in decision about teaching as reported by Dilts et al., "Profile of Teacher Education Students," p. 11.

⁵Jane T. Helwig and Kathryn A. Council, eds., SAS User's Guide 1979 Edition (Raleigh, North Carolina: SAS Institute, Inc., 1979), p. 239.

⁶Lyman Ott, An Introduction to Statistical Methods and Data Analysis (North Scituate, Massachusetts: Duxbury Press, 1977), p. 382.

⁷Meeting with Thomas A. Bubolz, SAS Consultant, Department of Statistics, Iowa State University, Ames, Iowa, 13 May 1982.

CHAPTER V. SUMMARY AND CONCLUSIONS

The decision to teach, or the choice of any career, involves the implementation of self-concept in the world of work. An individual makes a number of career-related decisions before entering the teaching profession. Decisions that result from education and conscious consideration of one's life as a problem are likely to result in adequate choices -- important to the individual for self-expression and important to the profession for teacher competency. In contrast, unexamined choices that lead to a career in education may result in a lack of personal fulfillment and in an absence of commitment to mastering the competencies necessary for good teaching. Therefore, the present study investigates the process of career decision-making with a specific focus on the decision to teach.

This chapter first summarizes the methodology and instruments that are used to investigate the decision to teach. Secondly, the chapter outlines the findings of the study. Finally, the chapter suggests areas for further research.

Methodology

The study postulates that instructional approach, locus of control, and cognitive style of making decisions will affect the decision-making process. The study investigates the effects of three additional variables on the decision to teach: time when the initial decision about teaching was made, major as classified by teacher supply and demand, and participation in the Teacher Aide Program.

The population of interest to the study is the group of undergraduates who consider teaching as a possible career choice. Students enrolled in Sec. Ed. 204, an introductory education course at Iowa State University, form a representative sample of the population. The registrar assigns students to sections by a computer scheduling procedure.

Four sections of the course received a self-assessment instructional approach, and two sections received a traditional foundations instructional approach. One hundred ninety students in six sections of Sec. Ed. 204 were invited to participate by completing instruments at the beginning and at the end of the semester.

The September Questionnaires and the December Questionnaires include the instruments and background questions for data collection. Students report certainty about teaching on both questionnaires by a seven-point item. One scale from the Assessment of Career Decision-Making (ACDM) quantifies progress on the decision-making task of choosing a college major (DMT-M score). Three scales on the ACDM measure the degree to which an individual uses rational, intuitive, and dependent cognitive styles in making decisions. Rotter's Internal-External Control Scale (I-E Scale) measures an individual's locus of control of reinforcement. Background items on the September questionnaires assess when the initial decision about teaching was made, major as classified by teacher supply and demand, and participation in the Teacher Aide Program.

Results of the Study

This section outlines findings of the study in three parts. The first part summarizes general characteristics of the sample. Next, the section presents the findings in response to eight research questions. Lastly, the section summarizes additional findings.

Characteristics of the sample

General characteristics describe the sample by college classification and major. More than three-fourths of the sample identify freshman or sophomore classification. The academic major indicated by the largest group is elementary education (24 percent of the sample). One-half of the sample includes students who are enrolled in areas that have well-documented teacher surpluses. In contrast, only 19 percent of the sample are enrolled in areas having teacher shortages.

Physical education and agricultural education have the largest groups of students reporting an early decision about teaching (before college). Elementary education reports the largest group that made the decision about teaching during college. Science & Humanities-Open Option indicates the largest group that are undecided about teaching as a career.

An arbitrary neutral range is identified for I-E scores ranging between 9.2 and 13.8. Thirty-nine percent of the sample score as internals, and 21 percent score as externals. The remaining group, 40 percent of the sample, score in the neutral middle I-E score range.

Additionally, mean I-E scores are similar for all college classes and for seven academic majors having $N \geq 10$.

The sample tends to favor the rational style of decision-making. The seven majors (those having $N \geq 10$) score highest on the rational decision-making style scale when compared to their respective scores on the other two style scales. Similarly, all seven majors report their lowest scores on the measure of dependent decision-making style.

Certainty about teaching Certainty about teaching (scored from a +3 for definitely will teach to a -3 for definitely will not teach) increases for groups receiving both instructional approaches. At the beginning of the semester, 24 percent of the students in the self-assessment approach score +3 on the certainty measure, and 22 percent of the group receiving the traditional approach score +3. The sample does not include students scoring -3 on the pretest.

By the end of the semester, 42 percent of the self-assessment group indicate a certainty about their decision at the highest level (scoring either +3 or -3). Similarly, 40 percent of the group receiving the traditional approach score +3 or -3 on the certainty measure at the end of the semester. However, it should be noted that 47 percent of the self-assessment group and 48 percent of the traditional group report no change on the certainty measure at the end of the semester.

Students in the two instructional approaches indicate both positive (favoring teaching) and negative (against teaching) changes in certainty scores (posttest-pretest). The data indicate that the

group in the self-assessment approach reporting negative changes (N=38) has the greatest mean change in certainty about teaching ($\bar{X}=2.11$) when compared to all groups reporting changes in certainty scores. The group that appears to have the least mean change in certainty is the group in the traditional approach reporting positive change (N=18; $\bar{X}=1.33$). In both instructional approaches, mean change on the certainty item is greater for negative changes than for positive changes.

Decision-making task-major (DMT-M) The sample indicates overall progress on the DMT-M measure. With a possible range of scores from 1 to 20, the sample reports a relatively high mean pre-test DMT-M score of 15.66 (SD=5.07). The mean posttest DMT-M score increases to 16.73 with a standard deviation of 3.92 at the end of the semester. Additionally, progress on the DMT-M scale is related to certainty score. Groups reporting higher certainty scores also report higher DMT-M scores.

Research questions

Correlational statistics and regression analyses suggest answers to eight research questions. The data indicate that the self-assessment approach has no effect on either posttest certainty score or on posttest DMT-M score.

Locus of control is significantly related ($P \leq .01$) to posttest certainty score and to both pretest and posttest DMT-M scores. As I-E score increases (becoming more external), posttest certainty decreases.

Similarly, as I-E score increases, pretest DMT-M and posttest DMT-M scores decrease.

The data indicate negative relationships between one cognitive style of decision-making and both certainty and DMT-M scores. Higher dependent decision-making style (DMS-D) scores are significantly related ($p \leq .01$) to lower pretest certainty scores. Higher DMS-D scores are also significantly related ($p \leq .01$) to lower pretest and lower posttest DMT-M scores.

Two independent variables, major as classified by teacher supply and demand and participation in the Teacher Aide Program, are not significant ($p \leq .05$) as main effects on either posttest certainty score or on posttest DMT-M score.

The time when the decision about teaching was made is an item reported in the background information on the September Questionnaire. The regression analyses indicate that "When" is significantly related ($p \leq .05$) to both posttest certainty score and posttest DMT-M score. Early deciders generally have the highest certainty and DMT-M scores. Similarly, groups deciding in college report higher certainty scores and higher DMT-M scores than the undecided group. Students indicating "undecided" in response to the "When" item report the lowest scores on both the posttest certainty and the posttest DMT-M measures. The number in the Post B.S. group is too small for drawing conclusions ($N=6$).

Other findings

Locus of control Locus of control of reinforcement is related to the three cognitive styles of making decisions. The data indicate

that use of the rational decision-making style is significantly related to lower I-E Scale scores (internal locus of control) with $r = -.35$ ($p \leq .01$). The correlation coefficient relating intuitive decision-making style scores to I-E scores, $r = .29$, is significant at the .01 level. Similarly, the correlation coefficient between the dependent decision-making style scores and I-E scores, $r = .30$, is significant at the .01 level. As both intuitive and dependent style scores increase, I-E scores also increase (more external).

The interaction between locus of control and major as classified by teacher supply/demand has a significant effect on posttest DMT-M score at the .05 level ($F_{2,79} = 4.41$). Mean DMT-M scores for all three groups decrease as locus of control becomes more external. However, the slope of the plot of means for the undifferentiated majors is less steep than the slopes of plots for both "shortage" majors and "surplus" majors. It may be that the undifferentiated majors receive less reinforcement (either positive or negative) regarding their career-related choices. Therefore, DMT-M scores decrease at a slower rate as I-E scores become more external for undifferentiated majors.

Decision-making style The regression analysis indicates a significant effect for the interaction between DMS-D scores and "major as classified by teacher supply/demand" on posttest certainty scores. The number in the shortage group is too small for drawing conclusions. As DMS-D score decreases, certainty about teaching also decreases for the surplus group. In contrast to this relationship, as DMS-D score increases for the undifferentiated group, a slight increase in

certainty score is indicated. It may be that the surplus group, relying on a dependent style to resolve problems, receives negative reinforcement from peers or significant others regarding a career in teaching areas that have well-documented surpluses. In contrast, undifferentiated majors, also relying on others to make their decisions, would neither be discouraged from teaching areas that have a balanced supply/demand nor would be guided away from teaching while they maintain an "undecided" position.

Additionally, the interaction between intuitive DMS score and dependent DMS score has a significant effect on posttest DMT-M score ($F_{1,79}=13.75$) at the .05 level. However, the data are insufficient for drawing conclusions.

Instructional approach The regression analysis indicates a significant effect for the interaction between I-E score and instructional approach on posttest certainty score ($F_{1,79}=5.51$; $p \leq .05$). Mean posttest certainty scores are greater in the self-assessment approach than in the traditional approach for internals as well as those scoring in the neutral I-E range (level 3). However, certainty about teaching is greater in the traditional approach than in the self-assessment approach for externals (I-E Scale scores >13.8-23). Externals may have entered Sec. Ed. 204 with an unexamined career preference for teaching. The self-assessment approach may have caused externals to examine critically their career-related decisions, raising questions about the career choice. Such questions may result in decreases in certainty about teaching. In contrast, the traditional

instructional approach does not directly address career-related issues, and externals in that approach report smaller decreases in certainty scores than the decreases reported by those in the self-assessment approach.

The regression analysis indicates a significant ($p \leq .05$) effect for the interaction between instructional approach and major as classified by teacher supply/demand on posttest certainty score. Certainty about teaching is greater in the self-assessment approach than in the traditional approach for teacher shortage majors. The data indicate no difference in mean certainty scores between the instructional approaches for the surplus group. However, posttest certainty is greater in the traditional approach than in the self-assessment approach for undifferentiated majors.

Similarly, the regression analysis indicates a significant ($p \leq .05$) effect for the interaction between instructional approach and major as classified by teacher supply/demand on posttest DMT-M score. Mean DMT-M score is greater for both shortage and surplus groups in the self-assessment approach than the corresponding means for groups in the traditional approach. However, the posttest DMT-M mean for the undifferentiated group in the traditional approach exceeds the DMT-M mean for the self-assessment approach.

It may be postulated that undifferentiated majors in the self-assessment approach receive more reinforcement regarding career choices than those in the traditional approach. If issues are raised and if conflicts between self-concept and occupational concept are

revealed, undifferentiated majors are likely to report DMT-M scores and certainty scores lower than would similar groups that receive no reinforcement regarding career decisions.

In addition, the data indicate a significant effect for the interaction between rational decision-making and instructional approach on posttest DMT-M score. However, the sorting procedure, allowing investigation of the interaction, results in numbers too small for drawing conclusions.

Caution must be used in interpreting the interactions. Error rate increases when investigating multiple comparisons. Therefore, it is likely that some comparisons are significant due to chance alone.

Recommendations for Further Research

Replication of the study is needed to document the significant main effects and significant interactions on a measure of certainty about teaching and on DMT-M score. Additional research is needed to understand the differential effects that instructional approach has on externals and on majors as classified by teacher supply/demand. The interaction between rational decision-making and instructional approach is important to investigate. More data are needed to study the effects of the interactions on a measure of certainty about teaching and progress on the decision-making task related to major (DMT-M score).

The groups reporting no change on the certainty measure need to be studied to reveal variables related to this lack of change.

Content analysis of biographical sketches, such as those provided in the journal assignments for the self-assessment approach, might reveal systematic variables related to career choice. In addition, a longitudinal study that follows a sample through the stage of career implementation would increase understanding of the career decision-making process as it is related to the choice of teaching.

If lasting changes in values, attitudes, and behavior can be effected by self-confrontation, is it not possible, using similar procedures, to effect lasting change in personality traits?¹

Harren et al. suggest that some individuals need instructional and/or counseling interventions to increase their use of the rational style in making career-related decisions.² A self-assessment approach or other interventions that use self-confrontation may encourage the use of the rational style in decision-making. Instructional approach should be investigated for short-term and long-term effects on cognitive style of decision-making.

Notes

¹Milton Rokeach, The Nature of Human Values (New York: The Free Press, 1973), p. 329.

²Vincent A. Harren et al., "Influence of Sex Role Attitudes and Cognitive Styles on Career Decision Making," Journal of Counseling Psychology 25, 5 (September 1978): 397.

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APPENDIX A

JOURNAL COVER SHEET

Your Name _____ Section _____ Points (Total) _____

Year and Quarter/Semester _____

1. Activity--Part 1 _____ C R (10) _____
(NAME AND NUMBER OF ACTIVITY)

2. Self-Assessment--Part 1(10) _____

3. Activity--Part 2 _____ C R (10) _____
(NAME AND NUMBER OF ACTIVITY)

4. Self-Assessment--Part 2(10) _____

5. Activity--Part 3 _____ C R (10) _____
(NAME AND NUMBER OF ACTIVITY)

6. Self-Assessment--Part 3(10) _____

7. Activity--Part 4 _____ C R (10) _____
(NAME AND NUMBER OF ACTIVITY)

8. Self-Assessment--Part 4(10) _____

Eighty points maximum

(The C and R are references to "Contact" and "Research." One of your activities is to involve contact with someone NEW; the research activity requires you to read a book, series of articles, or locate some reference material. CIRCLE the appropriate designation to make sure you get credit.)

CHECK YOUR SCHEDULE FOR THE DUE DATES OF THE ACTIVITIES AND SELF-ASSESSMENT SHEETS.

Part 1
Self-Assessment

Date _____

To judge your changing attitudes about a teaching career, the school, and education in general, we suggest you respond to these self-assessment questions as soon as possible, and whenever you complete the additional parts of the book, compare your answers to the same questions.

We realize that some of the items under "Philosophy of Education Statement" and "The School as a Social Institution" will not be discussed in each part. Respond to only those items which are related to that part.

1.0. Decision on Teaching as a Career

- 1.1. My position regarding teaching as a career today is:
(Be as specific as you can, i.e., what type of career you have in mind, what grade level, the type of student you wish to work with, what subject areas, and communities you would most enjoy.)

2.0. Philosophy of Education Statement

- 2.1. Goals of education:
(Questions to be considered: What are the purposes of schooling? How can you tell that a person is educated? Is everyone entitled to formal education?)
- 2.2. The curriculum:
(Is there a basic curriculum, i.e., a core of courses that everyone should have? If you answer that everyone should have the basics, or the three Rs, what do you really mean? For example, how much math -- algebra, calculus -- is essential? What about the arts, humanities, physical education?)
- 2.3. The role of the teacher:
(What is your general impression of the individuals who teach today? What responsibilities should teachers have today?)
- 2.4. Perceptions of learning:
(How do individuals learn best? How should the learning environment be structured -- room design, media to be used, class size?)

2.5. Educational policies and procedures:

(How do you feel about the decision-making process in schooling? Who should control the school -- local, state or federal government? Do you have strong feelings about such matters as grading and discipline?)

3.0. The School as a Social Institution

3.1. If you had to use just one word to describe the school, it would be _____ because:

3.2. The following list contains just some of the social interactions found in schools. Comment briefly on three of them: student-student; teacher-students; teacher-teacher; teacher-administrator; administrator-school board; school-community.

4.0. Information Gained

4.1. What specific information or concept(s) mentioned in Part 1 did you personally find most significant or interesting?

4.2. What information did you find of least interest?

5.0. Reflection on an Educational Issue

(Select one of the three issues below, and outline your position on it. Before the course ends, reread your answer, and note any modifications.)

5.1. (Chapter 1) Am I intellectually and emotionally suited to be a teacher?

5.2. (Chapter 2) Are current community expectations for teachers realistic?

5.3. (Chapter 3) Are the best teachers being hired and retained today?

Part 2
Self-Assessment

Date _____

1.0. Decision on Teaching as a Career

Since reading Part 2, my decision on becoming or not becoming a teacher has been --

- () confirmed, because --
- () somewhat modified, in that --
- () drastically changed, because --
- () made more difficult, because --

2.0. Philosophy of Education Statement

Since reading Part 2, my opening statement about education has been modified on the following points (write about only those that have changed; in this unit, 2.3, 2.4, and 2.5 are most likely):

- 2.1. Goals of education.
- 2.2. The curriculum.
- 2.3. The role of the teacher.
- 2.4. Perceptions of learning.
- 2.5. Educational policies and procedures.

3.0. The School as a Social Institution

3.1. Since reading Part 2, my understanding of the school has --

- () not been altered. I still believe the school to be --
- () become more appreciative. For example, --
- () become more critical. I now feel --
- () been expanded. I now realize why the school --

3.2. Regarding the social relationships in the school, I have changed my views on (write about only those that have altered, most likely 3.2.2 and 3.2.4 in this part):

- 3.2.1. Student-student.
- 3.2.2. Teacher-students.
- 3.2.3. Teacher-teacher.

3.2.4. Teacher-administrator.

3.2.5. Administrator-school board.

3.2.6. School-community.

4.0. Information gained

4.1. What specific information or concept(s) mentioned in Part 2 did you personally find most significant or interesting?

4.2. What information did you find of least interest?

5.0. Reflection on an Educational Issue (select only one)

5.1. (Chapter 4) Who should control teacher education?

5.2. (Chapter 4) Is there a teacher surplus?

5.3. (Chapter 5) What role should teachers have in determining their salaries, working conditions, and educational policy?

5.4. (Chapter 6) What criteria should be used in determining effective teaching performance?

5.5. (Chapter 7) Are national assessment evaluations (minimum competency examinations, NAEP, standardized tests) necessary and/or valuable?

Part 3
Self-Assessment

Date _____

1.0. Decision on Teaching as a Career

Since reading Part 3, my decision on becoming or not becoming a teacher has been --

- ☐ confirmed, because _____.
- ☐ somewhat modified, in that _____.
- ☐ drastically changed, because _____.
- ☐ made more difficult, because _____.

2.0. Philosophy of Education Statement

Since reading Part 3, my opening statement about education has been modified on the following points (write about only those in which there are changes; in this unit, 2.1, 2.2, and 2.5 are most likely):

- 2.1. Goals of education.
- 2.2. The curriculum.
- 2.3. The role of the teacher.
- 2.4. Perceptions of learning.
- 2.5. Educational policies and procedures.

3.0. The School as a Social Institution

3.1. Since reading Part 3, my understanding of the role of the school has --

- ☐ not been altered. I still believe the school to be _____.
- ☐ become more appreciative. For example, _____.
- ☐ become more critical. I now feel _____.
- ☐ been expanded. I now realize why the school _____.

3.2. Regarding the social relationships in the school, I have changed my views on (write about only those that have been altered, most likely 3.2.3, 3.2.4, 3.2.5, and 3.2.6 in this part):

- 3.2.1. Student-student.
- 3.2.2. Teacher-students.
- 3.2.3. Teacher-teacher.
- 3.2.4. Teacher-administrator.
- 3.2.5. Administrator-school board.
- 3.2.6. School-community.

4.0. Information Gained

- 4.1. What specific information or concept(s) mentioned in Part 3 did you find most significant or interesting?
- 4.2. What information did you find least interesting?
- 5.0. Reflection on an Education Issue (Select only one; be specific, including points made in class, or evidence cited in the book).
 - 5.1. (Chapter 8) Has the American public school system changed substantially in the past 100 years?
 - 5.2. (Chapter 9) To what extent do citizens control their local public schools?
 - 5.3. (Chapter 10) Is the way we pay for public schools fair?
 - 5.4. (Chapter 11) What are schools for?
 - 5.5. (Chapter 12) What should be the school curriculum?

Charles R. Kniker and Natalie A. Naylor, Teaching Today and Tomorrow (Columbus, Ohio: Charles E. Merrill Publishing Company, 1981), pp. 287-288.

Part 4
Self-Assessment

Date _____

1.0. Decision on Teaching as a Career

Since reading Part 4, my decision on becoming or not becoming a teacher has been--

- () confirmed, because _____.
- () somewhat modified, in that _____.
- () drastically changed, because _____.
- () made more difficult, because _____.

2.0. Philosophy of Education Statement

Now that the course is completed, reread each of your previous statements and comment again on all of the following points in terms of how your statements have been modified:

- 2.1. Goals of education.
- 2.2. The curriculum.
- 2.3. The role of the teacher.
- 2.4. Perceptions of learning.
- 2.5. Educational policies and procedures.

3.0. The School as a Social Institution

3.1. Since reading Part 4, my general understanding of the school's role has--

- () not been altered. I still believe the school to be _____.
- () become more appreciative. For example, _____.
- () become more critical. I now feel _____.
- () been expanded. I now realize why the school _____.

3.2. Regarding the social relationships in the school, I have changed my views on (write about only those which have been altered, most likely 3.2.2 and 3.2.6 in this part):

- 3.2.1. Student-student.
- 3.2.2. Teacher-students.

- 3.2.3. Teacher-teacher.
- 3.2.4. Teacher-administrator.
- 3.2.5. Administrator-school board.
- 3.2.6. School-community.

4.0. Information Gained

- 4.1. What specific information or concept(s) mentioned in Part 4 did you find most significant or interesting?
- 4.2. What information did you find least interesting?
- 5.0. Reflection on an Educational Issue (Select only one; be as specific as you can when you react to the issue, and include specific points made in class or in the book.)
 - 5.1. (Chapter 13) To what extent can the school meet the individual needs of students, considering society's expectation that schools also socialize pupils?
 - 5.2. (Chapter 14) What is equal educational opportunity? Is America providing equal educational opportunity for all students?
 - 5.3. (Chapter 15) To what extent can America permit optional forms of instruction?

Charles R. Kniker and Natalie A. Naylor, Teaching Today and Tomorrow (Columbus, Ohio: Charles E. Merrill Publishing Company, 1981), pp. 371-373.

APPENDIX B

SEPTEMBER QUESTIONNAIREPart One: Background

1. Class rank (circle the appropriate letter)
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. Graduate
 - f. Other (specify) _____
2. Current major _____
3. Are you participating in the Teacher Aide Program (EL/SEC ED 280)?
(circle one)
 - a. Yes
 - b. No
4. Circle the number below that best describes your decision about teaching as your career choice:
 - a. Definitely plan to teach; well satisfied with career choice
 - b. Strongly feel teaching is the career for me; not totally satisfied
 - c. Believe teaching is the career for me, but have some doubts
 - d. Undecided
 - e. Probably will not teach, but remain open to suggestions; considering other career alternatives
 - f. Strongly feel teaching is not for me; uncommitted to another career
 - g. Definitely do not plan to teach; committed to another career
5. If you chose a, b, or c on item #4 above, identify one of the following that best describes approximately when you made this decision (circle only one).
 - a. As a young child during elementary grades
 - b. As a student in high school
 - c. As a college student
 - d. Other _____
specify
6. Social Security Number _____

El Ed/ Sec Ed 204

DECEMBER QUESTIONNAIRE

Part One

1. Circle the letter below that best describes your current position regarding teaching as your career choice:
 - a. Definitely plan to teach; well satisfied with career choice
 - b. Strongly feel teaching is the career for me; not totally satisfied
 - c. Believe teaching is the career for me, but have some doubts
 - d. Undecided
 - e. Probably will not teach, but remain open to suggestions; considering other career alternatives
 - f. Strongly feel teaching is not for me; uncommitted to another career
 - g. Definitely do not plan to teach; committed to another career

2. Class rank (circle the appropriate letter)
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. Graduate
 - f. Other (specify) _____

3. Current major _____

4. Social Security Number _____

APPENDIX C

Iowa State University of Science and Technology Ames, Iowa 50011



Secondary Education
College of Education
Quadrangle
Telephone 515-294-8907
September 7, 1981

Dear Teacher Education Student:

Instructional techniques that stimulate your personal career development and career decision-making are very important to you. The success of your career choice may depend upon a realistic assessment of personal abilities, interests, and needs in the process of forming career aspirations.

A research study is being conducted to investigate the effects of EL/SEC ED 204 on factors related to your career development. During regular class periods at the beginning and at the end of the semester, you are being asked to complete questionnaires related to your decision about teaching as a career, your perception of personal rewards, and your level of career decision-making.

Confidentiality of your responses is carefully safeguarded, and individual answers will not be available to anyone at this or any other university or agency. Your social security number will allow the computation of change scores at the end of the semester. After this computation, a code will be assigned, and all personal identification will be removed. Results will be reported in groups, not as individual scores. Questions may be directed to Linda Wilson, phone: 292-3948.

Please note that participation in this study is voluntary. You may decline to participate at any time without risk to your personal evaluation in the course.

Thank you for your cooperation in completing the instruments. A summary report will be available when the study is completed. The information you provide will assist instructors in curriculum planning and evaluation as they seek to better meet career development needs of teacher education students.

Sincerely,

Linda A. Wilson

Linda A. Wilson
Professional Studies in Education

APPENDIX D

December 4, 1981

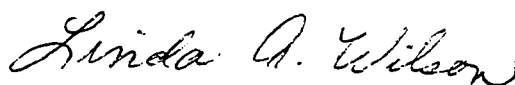
Dear

In September you responded to a questionnaire in Sec. Ed. 204 regarding your choice of academic major and perceptions of daily events.

The second questionnaire was given in class on December 2, 1981. We need your responses to the December Questionnaire to validate the first responses. We are asking for only 10-15 minutes of your time to complete the instrument.

Thank you for your participation.

Sincerely,

A handwritten signature in cursive script that reads "Linda A. Wilson".

Linda A. Wilson
Professional Studies
in Education