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THE EFFECT OF LOCUS OF CONTROL AND TWO  
COLLEGE ENVIRONMENTS ON ACHIEVEMENT AND  
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THE EFFECT OF LOCUS OF CONTROL AND TWO  
COLLEGE ENVIRONMENTS ON ACHIEVEMENT AND ATTITUDES

by

Margret M. Hazen

A DISSERTATION

Presented to the Faculty of  
The Graduate College in the University of Nebraska  
In Partial Fulfillment of Requirements  
For the Degree of Doctor of Philosophy  
Department of Community and Human Resources

Under the Supervision of Professor W.C. Meierhenry

Lincoln, Nebraska

August, 1979

**TITLE**

The Effect of Locus of Control and Two College Environments

on Achievement and Attitudes

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## ACKNOWLEDGEMENTS

Two people deserve special recognition for their long term support and encouragement. Dr. W.C. Meierhenry has helped me throughout my five years of graduate work, as has my husband Tom. Without these two people I probably would not have undertaken my graduate study as effectively.

The other three members of my doctoral committee, Dr. Gerald Boardman, Dr. Willis Moreland, and Dr. Richard Schonberger deserve appreciation for their efforts towards the final draft of the dissertation thesis. I have also enjoyed working with the many members of the Computer Science Department who have been involved in this project, and in particular the department chairman, Dr. George Nagy who initiated and directed the experimental instructional project which became the basis of this research study.

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## CHAPTER I

## INTRODUCTION

Learning and development are often seen as crucially related to the successful interaction of the individual with the environment (Piaget, 1952; J. McV. Hunt, 1961; Tyler, 1978; Hunt and Sullivan, 1974). Also, individuals are successful at assimilating environmental experiences if and only if they have the appropriate cognitive structures. Cognitive structures or schemata serve as organizations of past experience and directly influence subsequent perception and behavior. Learning, in terms of assimilation and accommodation, is thereby dependent upon the individual's current status with respect to cognitive structures. That is, individuals have to have appropriate structures or schemata to assimilate or to be capable of accommodation to the learning experiences provided by an environment.

To put it differently, learning, or the successful assimilation of and accommodation to new experiences, indicates that there has been a match between the individual's internal cognitive structures and the environmental stimuli that have been experienced. Cognitive structures or schemata are the internal mental representations of the individuals' interaction with their environment. These structures are the key element of several theories in cognitive psychology (e.g. Ausubel, 1963; Kelly, 1955; Piaget, 1970).

The matching of persons or individuals and environments has also been a major premise for successful learning among several adult edu-

cators (Kidd, 1959; Knowles, 1973; and Knox, 1977). Such a match is more crucial for adults since, as they get older, they vary increasingly in terms of individual differences and past experiences. Adults are therefore even more sensitive and responsive to the requirements of person-environment interactions or matches, than are younger learners (Piaget, 1972).

The matching hypothesis also has roots in the interaction research paradigm as originally proposed in Cronbach's (1957) American Psychological Association presidential address where he recommended the study of coordination of individual differences and environmental effects. These recommendations were made specifically to educational psychologists in 1967 (Cronbach, 1967); and were then restated in Lewinian terms by Mitchell (1969). Hunt and Sullivan (1974) have stated the matching hypothesis in Lewinian terms as:  $B = f(P,E)$ , or Behavior is a function of the Person and the Environment. Hunt's (1975) paradigm, the B-P-E paradigm, was an attempt to coordinate these earlier suggestions into a new paradigm and was the foundation of this research study.

The purpose of this study was to investigate the matching hypothesis or interaction paradigm in the higher education setting. More specifically, this was an investigation of the interaction between instructional environments and individual differences. As Pervin (1968) has indicated, a successful match between the individual and the environment is indicated by higher performance and satisfaction. Therefore the analysis that follows looked at both cognitive and affective outcome measures as they were affected by environmental and individual differ-

ences.

In order to maximize the opportunity to support the interaction or matching hypothesis, both the person characteristics or individual difference dimension and the environment characteristics to be investigated need to be carefully selected. In so doing it is desirable to use salient and theoretically compatible person and environment characteristics.

The instructional environments of this study were considered to differ significantly with respect to the amount of responsibility and initiative a student is expected to have and to take. The first environment, individualized learning, was expected to require far more responsibility taking than the second environment, traditional lecture. In the traditional lecture environment students can rely heavily upon their notes and class discussion for assistance during the completion of the assignments. In the individualized environment, there are no lectures and students must therefore take far more initiative with respect to reading the text, doing sample problems and seeking assistance when required. When progress in learning goals is not being made, students involved in the individualized mode must accept such a situation as their own responsibility and act accordingly.

A personality measure of responsibility was considered as the most theoretically compatible individual characteristic to match or interact with the instructional environments outlined above. Locus of control is such a personality variable. It has its primary roots in Rotter's social learning theory (Rotter, 1954), wherein Rotter identified con-

trasting expectations about the efficacy of one's own actions by constructing an inventory of events that were due to chance or luck, and events that were the responsibility of one's own actions. Individuals who exhibited internal orientations were more likely to feel responsible for their own actions and those with an external orientation, or externals, were more likely to feel that their actions would result in outcomes determined by others, chance, or luck. DeCharms (1968) referred to this personality dimension as personal causation, that is, individuals intentionally initiate behavior that is meant to produce a change in their environments.

The attribution for cause and effect has been studied as a developmental phenomenon by Piaget (1929). A child learns that the temporal contiguity between two events means that one caused the other, and similarly that one can cause one's own actions through volition. As an adult, "man's primary motivational propensity is to be effective in producing changes in his environment" (DeCharms, 1968, p. 269). Men strive to be causal agents, to be the primary locus of causation for (or the origin of) their own behavior.

The type of individual referred to as an "origin" by DeCharms (1968) is very similar to Rotter's "internal" individual, that is, a person who perceives his behavior as determined by his own choosing. The type of individual referred to as "pawn" by DeCharms bears resemblance to Rotter's "external" individual, that is, a person who perceives his behavior as determined by external forces beyond his control. Also, DeCharms, like Rotter (1975), has indicated that this personality dimension

is specific to the context it occurs in.

The importance of the locus of control variable in the educational environment has been pointed out by several early research attempts to study the relationship between achievement and locus of control (Coleman, et al., 1966; Crandall, et al., 1965; McGhee and Crandall, 1968). Its major significance in the educational environment, as Lefcourt (1976) has suggested, is that without "an expectation of internal control, persistence despite imminent failure, the postponement of immediate pleasures, and the organizing one's time and efforts would be unlikely" (p. 66). Such characteristics of internally oriented students are predictive of academic success.

Researchers have not however found a consistent relationship between locus of control and academic achievement (Lefcourt, 1976) and therefore Crandall, et al. (1965), Rotter (1975), DeCharms (1968), and Watson and Bauml (1967) have all hypothesized an interactive relationship between internal-external locus of control orientations and environmental settings. Watson and Bauml (1967) have specifically hypothesized that internal students would prefer settings in which the locus of control resided within themselves; whereas externals would prefer settings in which their outcomes were controlled by others.

Only a few researchers have explored this matching hypothesis in the interaction paradigm, and to some extent contradictory results have been found. Daniels and Stevens (1976) for example found a definite interaction effect for achievement outcomes while Johnson and Croft (1975) found that internally oriented students did not necessarily

achieve more in an individualized instructional setting. Several factors have been cited as affecting these contradictory results including sex differences, the use of inappropriate locus of control measures, and confusion about what constitutes evidence for an interaction or differential behavioral effect.

In an attempt to minimize or eliminate prior confounding factors, this study

- (1) controlled for sex differences by including sex as a factor in the research design,
- (2) used a locus of control measure, the Intellectual Achievement Responsibility questionnaire, specifically designed for the academic environment,
- (3) chose instructional environments that were both of relatively long duration and theoretically compatible with the personality dimension, locus of control, and
- (4) chose to investigate the interaction or matching hypothesis for both cognitive and affective outcomes.

These four factors were considered to greatly enhance the possibility of finding interaction effects taking place within the computer programming course of this study.

### Statement of the Problem

The purpose of this study was to determine the interaction effect between instructional environments and student locus of control orientations on cognitive and affective outcome measures. Two instructional environments—individualized and traditional lecture—were investigated, and students were categorized into two locus of control orientations—internal and external. Final examinations were used as a measure of cognitive outcomes. Student attitudes towards computer programming and computers, the content of the course, were taken as an affective measure.

As Watson-Bauman's "congruency" hypothesis, Hunt and Sullivan's "matching" hypothesis, and Pervin have indicated, students were expected to perform best and express more positive attitudes towards the subject matter in those instructional settings which matched their locus of control.

### Hypotheses

There is a significant interaction at the  $p \leq .05$  level of confidence between instructional environment, locus of control, and sex for differences in student achievement and attitudes toward the course content.

Within this hypothesis, it is also hypothesized that there is a significant interaction between instructional environment and locus of control for achievement and attitude differences; that there is a significant interaction between instructional environment and sex for achievement and attitude differences; and that there is a significant inter-

action between locus of control and sex for differences in achievement and attitudes.

Definition of Terms.

Course. Introductory FORTRAN for Business—a required undergraduate computer programming course for freshmen and sophomores.

Attitude toward content. An affective domain characteristic which was measured by the Computer Programming and Computer Attitude Scale developed for this research study.

Academic Achievement. A cognitive domain characteristic measured by the final examination grade.

Academic locus of control. An individual differences characteristic measured by the Intellectual Achievement Responsibility questionnaire (IAR) (Crandall, et al., 1965). This personality dimension describes students' expectancies about their own control over their academic successes and failures.

internals. Students who attributed school-related success and failures to themselves.

externals. Students who attributed school-related successes and failures to other factors such as instructors or luck.

Individualized instruction. Instruction that is characterized by: (1) active learning, (2) explicit learning goals or objectives, (3) small lesson units or modules, and (4) feedback and evaluation (Cross, 1976). The emphasis of the instruction is on the individual.



### Scope and Delimitations

1. The three instructors involved in the research study had varying degrees of teaching experience and educational backgrounds.

2. The majority of the students involved in the research study were College of Business Administration majors at the University of Nebraska. Results may not be generalizable to other subjects and locations.

3. Although instruction was categorized into individualized and traditional lecture, not all characteristics were mutually exclusive.

4. Similarly, although students were categorized into internal and external classifications, this operational distinction between groups of students may not consist of mutually exclusive behaviors.

5. Variables outside of the immediate instructional environment were not considered although they may have been causing effects. The presumably randomized assignment of students to each instructional method does however minimize such possibilities and thereby maximizes internal validity.

### Organization of the Study

The remainder of this research is divided into four parts. Chapter II contains a review of the literature relative to the major areas of concern pertaining to this study, namely instructional environments, locus of control, and interaction models. In Chapter III the procedures for selecting or designing instruments that address the research hypotheses are described as well as the designs used to analyze the gathered data. The results of the data analysis are presented in Chapter IV.

Chapter V, the conclusion chapter, summarizes the study and the findings; draws conclusions from this research effort; and presents recommendations for further research and for educational practitioners.

PREVIEW

## CHAPTER II

### REVIEW OF THE LITERATURE

The preceding chapter provided the theoretical rationale for this study. This chapter demonstrates why the three variables—locus of control, instructional environment, and sex—are presumed to interact in their effect upon cognitive and affective outcome measures, and therefore discusses the empirical findings that relate these variables to their respective outcomes and the implications of these findings for this study.

This chapter's review of the literature is subdivided into three major areas:

- (1) a brief historical and philosophical survey of relevant instructional environments; a discussion of the taxonomy difficulties for instructional environments; and the empirical findings that relate locus of control to one instructional environment—the individualized environment.
- (2) a discussion of the locus of control theory as it applies to the academic setting, and the findings that relate locus of control to achievement.
- (3) a discussion of the underlying rationale of interaction research paradigms.

### Instructional Environment

In the late 1960's, Cronbach (1969) commented on the difficulty and newness of taxonomy efforts with respect to instructional environments or treatments:

"The effort to conceptualize treatment dimensions is almost entirely new, and it is not astonishing that thinking is still at the level of gross concepts such as 'difficulty,' 'degree of structure,' and 'degree of self-direction.' There is reason enough to consider variables of this sort important, despite the ambiguity and need for sharper conceptualization which can only come from empirical research" (p. 194).

Presently, in the 1970's there is a strong movement within higher education toward individualized instruction that has further added to the complications involved in conceptualizing treatment dimensions.

In the past, efforts to consider the student as an individual in the educational process have been referred to as student-centered, as opposed to teacher-centered environments or methods. Withall (1949) was actually one of the first to use the terms "learner-centered" and "teacher-centered" when referring to climates or environments. Learner-centered climates encouraged learner supportive statements, and statements of acceptance and clarification. Teacher-centered statements were characterized as directing statements, reproving statements, and self-supporting. Earlier terms that were used to refer to essentially the same differences in climate were democratic and autocratic (Lewin, Lippitt, and White, 1939). The democratic environment consisted of group leaders or teachers who socially integrated with group members and al-

lowed the group to decide work goals and procedures. An autocratic environment on the other hand, consisted of group leaders or teachers who dictated work tasks, work procedures, work partners, and who remained aloof from group members.

More recently, McKeachie (1963) has summarized these teaching methods or environmental characteristics as follows:

<u>Student Centered</u>	<u>Instructor Centered</u>
<u>Goals</u>	
Determined by group	Determined by instructor
Emphasis upon affective and attitudinal changes	Emphasis upon intellectual changes
Attempts to develop group cohesiveness	No attempt to develop group cohesiveness
<u>Classroom Activities</u>	
Much student participation	Much instructor participation
Student-student interaction	Instructor-student interaction
Instructor accepts erroneous or irrelevant student contributions	Instructor corrects, criticizes, or rejects erroneous or irrelevant student contributions
Group decides upon own activities	Instructor determines activities
Discussion of students' personal experiences encouraged	Discussion kept on course materials
De-emphasis of tests and grades	Traditional use of tests and grades
Students share responsibility for evaluation	
Instructor interprets feelings and ideas of class members when it is necessary for class progress	Instructor avoids interpretation of feelings
Reaction reports	No reaction reports

(p. 1134)

Especially during the 1950's and 1960's these types of conceptualizations were heavily influenced by one's view of man and of the world. Kuhn (1962) and Polanyi (1958) have demonstrated that such world views,

paradigms, or interpretive frameworks influence what is researched in scientific endeavors and the manner in which the research process is conducted. Furthermore, paradigms tend to develop their own concepts, their own rules for collecting and structuring data, and their own criteria for deciding which research questions are worth asking. Within education, not only do the models influence educational research, but they also influence conceptions of what teaching ought to be like.

Two paradigms or world views are currently well recognized within psychology and education. Nuthall and Snook (1973) have referred to these two dominant models in the instructional context as: (1) the discovery-learning model, and (2) the behavior-control model, and these two models have influenced the classifications of the student and teacher-centered instructional environments as used by Withall, Lewin et al., and McKeachie.

#### The Discovery-Learning Model

The discovery-learning model incorporates those views of teaching which place greatest emphasis on the self-directed activity of the student. No precise psychological theory is used to support this model. Instead, this model encompasses a loose amalgam of ideas from child development, cognitive psychology, and the study of creativity. Bruner (1961) and Suchman (1961) are recent proponents of discovery learning and these two theorists emphasize the significance of the process of induction as the factor that distinguishes discovery learning from the usual expository nature of classroom teaching where deduction is the rule.

Discovery learning is considered to foster thinking and meaningful learning (Ausubel, 1968) and is an alternative to the passive, rote, meaningless incorporation of isolated facts often comprising the approach of traditional instructional environments. Knowledge gained in this way is considered to remain longer with the student and to be more easily transferable to other situations. Research in concept attainment, problem-solving, creativity, and intellectual development as initiated by Piaget and his coworkers has fostered support for the discovery-learning model.

#### The Behavior-Control Model

The behavior-control model originates from the attempt to apply behavioral psychology to the classroom. This model contains within its boundaries both the educational technology movement and the claims of behavior-modification advocates, with the former being of particular interest to this study. Educational technology's behavior-control origins lie in Skinner's (1954) management-of-contingencies approach to teaching, which later developed into the programmed instruction movement.

Teaching, as Glaser (1965) has claimed, consists of determining precise definitions of the stimulus, the desired response, as well as the structural characteristics of the subject matter and the involved behavioral repertoires. Entering student behaviors for a course are important considerations. Both Glaser (1969) and Stolurow (1965) have been careful to emphasize that the efficient design of instructional procedures must depend upon precise measurement of the characteristics

and capabilities of the individual student thereby fostering attention on individual differences.

### Comparing the Two Models

Each model has had its critics. The discovery-learning model has been criticized for being difficult and time-consuming when being implemented into the classroom. Students cannot realistically be expected to rediscover the entire contents of the culture for themselves. Behavior control models have been criticized as reductionist to an extreme. Understanding, thinking, and appreciating cannot always be reduced to observable student responses and teaching cannot be effectively viewed as solely the elicitation and reinforcement of responses. The behavioral laboratory-based conceptual system does not always readily translate into the context of the larger educational environment. As Nuthall and Snook (1973) have summarized, the problem is then "Do you alter the conceptual system so that it fits the existing realities of the outside world? or do you attempt to remake the outside world so that it comes to look like the laboratory situation?" (p. 59).

### Individualized Instruction

Individualized instruction is a generic term that has come to denote several different techniques, many of which have arisen from one model or the other or both. Some, like PSI (Personalized System of Instruction), have emerged out of the behavioral model but have undergone changes deemed necessary during the actual implementation of the instruction. In this sense, the conceptual system has been altered to fit the existing realities of the classroom.