1-1-1984

Exploratory study of the relationship between learning and teaching styles in community college faculty.

Joan M. McGowan
University of Massachusetts Amherst

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EXPLORATORY STUDY

OF THE RELATIONSHIP BETWEEN

LEARNING AND TEACHING STYLES

IN COMMUNITY COLLEGE FACULTY

A Dissertation Presented

by

Joan M. McGowan

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

DOCTOR OF EDUCATION

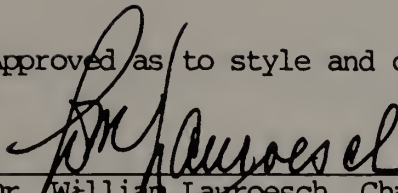February 1984

Education

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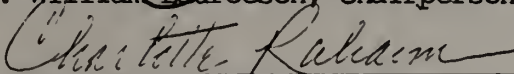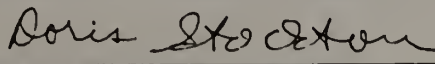Joan M. McGowan

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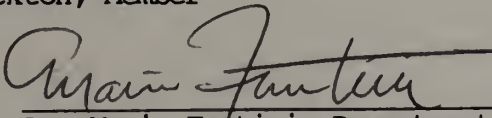
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Dr. William Lauroesch, Chairperson

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Dr. Chartlotte Rahaim, Member

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Dr. Doris Stockton, Member

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Dr. Mario Fantini, Department Head
Education

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ACKNOWLEDGMENTS

I wish to express my appreciation to all those who assisted, encouraged, and supported me in this effort.

Special appreciation is extended to Leah N. Knowlton and Elizabeth J. Tenore, both friends and colleagues: to Leah for her unwavering support, encouragement, and editorial skills; to Betty for her support, encouragement, and for the generous sharing of her fine knowledge of the learning process and for allowing me to use her learning style inventory.

Sincere appreciation is extended to the members of my committee: Dr. William Lauroesch, Chairperson, for his guidance, his time, and his sense of humor; to Dr. Charlotte Rahaim, friend and colleague, without whom there would not have been a program that allowed me this opportunity; to Dr. Doris Stockton, special colleague as we share a common discipline and love of mathematics, for her insightful comments at just the right time.

My thanks to the 28 faculty at Bunker Hill Community College who participated in this study and gave of their time so generously and to the Registrar, Susan Donnelly, and her staff and the staff of the Learning Center for their patience while I used the "machine". Special thanks to President Harold E. Shively who has designed and implemented a fascinating college and has allowed me many opportunities to pursue my goals.

Since a doctoral dissertation marks the end of formal studies, I would like to thank those who started me on the way; to my parents Mary and Gerald McGowan who began my world and filled it with love and who fostered my pursuit of learning and to Dr. and Mrs. Kozodoy who enriched my world in a way that has been enduring.

ABSTRACT

An Exploratory Study

On The Relationship Between

Learning and Teaching Styles

Of Community College Faculty

February 1984

Joan M. McGowan, B. A. Emmanuel College,

M. A. University of Vermont,

D.Ed., University of Massachusetts

Directed by: Dr. William Lauroesch

The purposes of this study are (1) to propose a
theoretical model for teaching and learning style
interaction and to explore the degree of comparison
between the Tenore Learning Style Inventory and any
validated self perception inventories, (2) to compare
faculty learning styles with methods of instruction, and
(3) to explore possibilities of longitudinal studies of
faculty learning style.

The sample consisted of 28 faculty from one urban
community college. Three teaching style inventories were

used: the Canfield Instructional Style Inventory, the
Principle of Adult Learning Style, and the Teaching
Style Q Sort. A survey of methods of instruction was
given. Six faculty had taken the Tenore Learning Style
Inventory three and ten years ago and they were retested
for the longitudinal study.

Pearson moment correlations were run on the
elements of the TLSI with the CISI, with the PALS, with
the TSQS and with the survey. Of the possible 567
correlations of the TLSI with the CISI, 58 or 10.2% were
at the .95 confidence level, of the 27 correlations
between the TLSI and the PALS, 2 or 7.4% were at the .95
level, and of the possible 108 correlations with the
TSQS, 16 or 14.8% were at the .95 level. In the
longitudinal study of the six faculty only one had a
significant change in any part of the learning style
over time.

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CHAPTER I

INTRODUCTION

In 1973, Bunker Hill Community College opened in Boston
as the fifteenth and, to date, the last community college in
the Massachusetts system of public higher education. Harold
E. Shively, then president of North Shore Community College,
was asked to organize and lead this new college in the city.
As a result of his assessment of the needs of the community,
he hired faculty and staff on the basis of how committed they
were to the "new student." He asked recruited faculty to
rethink the traditional "chalk and talk" lecture approach and
to be prepared to meet the new student body with new
approaches to community college education.

At the heart of this new college Shively established The
Learning Center, conceived and directed by Elizabeth J.
Tenore (1979). The purpose of the Center was (and still is)
to provide individualized instruction to meet the varying
needs of a highly diversified student population. Such
purpose required, to begin with, a baseline of information
about students as learners. Conventional achievement tests in
mathematics and reading were given to incoming students for

placement and to help faculty choose suitable learning materials. However, since The Learning Center used many modes of instruction, i.e., audio-tutorial, video, written linear programs, branching programs, etc., students using the Center were given an additional instrument that measures preferences in learning formats. The instrument used was the Tenore Learning Style Inventory (TLSI). It ascertains ways in which students prefer to learn: their preferences for listening, reading, watching, or some combination; learning in groups, by themselves, or from an expert; reasoning inductively or deductively. Student preferences for particular modes of learning have been a major consideration in the purchase and fabrication of materials for use in the Learning Center.

The Problem

Some time ago Tenore adopted a practice of administering the TLSI to faculty as well as to students. This practice has been a catalyst in the framing of a series of provocative questions. Awareness of differences in student learning preferences, coupled with the faculty's understanding of their own, has prompted instuctors to ask if students and

instuctors should be matched on the basis of similar learning
styles or if a mismatch might force student growth? Or is
undue anxiety fostered by mismatch? Some research on this has
been done and is discussed in Chapter II.

At the present time no model has emerged that will give
a theory for the psychological basis for teacher/student
cognitive style interaction. Separate models have been given
for each but none for both. Flanders (1970) and others do
take into consideration student behavior but only in order to
describe teaching style. Some theory ought to decribe both
persons in an interactive space.

Purpose of the study

The purpose of this study has been to propose a
theoretical model for teaching/learning style interaction and
to begin the experimental research needed to study the
teaching and learning styles of the faculty. Specifically
this investigation has accomplished the following:

  1. Using standardized instruments, the study has
     established for the faculty in the sample the
     degree of congruence between performance on

measures of learning style using the TLSI and
teaching styles of faculty.

2. The study has made comparisons of learning and
teaching styles with methods of classroom
instruction.

3. Using data collected in 1973 and in 1980 along
with 1983 data, the study has explored possible
differences in learning style measured by the
TLSI over time and determined whether it is
worthwhile to pursue further study in this
direction.

Delimitations

1. Both the the study's intent and the realities of
manageability delimit the scope of this inquiry.
While the data collected from the samples (see
Chapter III) are, within the boundaries of
sampling error, intended to be representative of
a defined population, there is no presumption of
generalizability to a larger population. This

study is exploratory in nature, opening new
possibilities for discovery.

2. This study is limited to a sample of teachers
from one Massachusetts community colleges.

3. Since the instruments used are personality tests,
all the expected problems of such tests are
present (Anastasi,1976).

Definition of Terms

Assessment. This is the process of gathering data and
fashioning them into an interpretable form (Jackson &
Messick, 1967).

Cognitive psychology. This is the field of psychology in
which the perspective is focused on mental processes: how
people perceive and mentally represent the outside world, how
they go about solving problems, how they dream and daydream
(Rathus,1981).

Cognitive styles. Individual variations in modes of
perceiving, remembering and thinking, or as distinctive ways

of apprehending, storing, transforming and utilizing
information (Kogan, 1971).

Cognitive strategies. Spontaneously applied choices that
people make about which cognitive process to use in given
situations. Messick (1976) describes these as decision-making
regularities in information processing that are, at least in
part, a function of the condition of a particular situation.

Field dependence/independence. This concept refers to a
preference for approaching the environment in analytical
terms as opposed to a preference for experiencing events
globally in an undifferentiated fashion. Field independent
(analytical) individuals tend to perceive figures as discrete
from their backgrounds; they are generally facile on tasks
requiring differentiation and analysis, whether in
identifying the presence of logical errors or in
understanding the point of a joke; this analytical penchant
leads as well to a high degree of differentiation of the self
from its context. Field-dependent (global) individuals, on
the other hand, tend to identify with a group; they are
perceptive and sensitive to social characteristics such as

faces and names, susceptible to external influence, and markedly affected by isolation from other people (Anderson et al., 1975).

Learning Style. A broader term than cognitive style, it also includes cognitive, affective and physiological styles.

Learning strategies. These are responses to the requirements of a particular task.

Measurement. This is the process of linking abstract concepts to empirical indicants (Carmines & Zeller, 1979).

Reliability. As used in psychometrics, the term always means consistency. Test reliability is the consistency of scores obtained by the same persons when retested with the identical form of the test (Anastasi,1976).

Teacher's learning style. This is the learning style of the teacher as measured by a learning style inventory, in this paper usually the Tenore Learning Style Inventory.

Teaching style. This is a broad term that describes the behaviors of teachers in an instructional setting.

Validity. This concept involves the degree to which a test actually measures what it purports to measure. The determination of validity usually requires independent, external criteria of whatever the test is designed to measure; it concerns what the test measures and how well it does so (Anastasi, 1976).

CHAPTER II

REVIEW OF THE LITERATURE

The literature in the field of psychology and education contains considerable information on learning styles, cognitive styles, and teaching styles. Since the purpose of this study has been to focus on learning and teaching styles, this review looks at standardized learning styles and teaching styles similar to the Tenore Learning Style Inventory (TLSI).

Basically there are three kinds of instruments to measure teaching behavior.

1. Teacher Perception Instruments. These instruments are inventories that teachers take. The Hill, Canfield, Witkin, and Tenore models are of this kind.

2. Student Perception Instruments. These are primarily student evaluations of teachers.

3. Independent Observer Instruments. These instruments have an outside observer measure teaching behavior. The educational ethnographic researchers belong to this group.

The next section of this paper is a review of twenty-four (24) instruments, from the three groups, used in measuring teaching behavior. The broadest view of teaching styles is used.

Teacher Perception Instruments

The Canfield Instructional Styles Inventory (CISI). The Instructional Styles Inventory was developed by Albert and Judith Canfield in 1975. It was designed to be used either in conjunction with or independent of the Canfield Learning Styles Inventory (LSI). There are four major areas that the instrument measures: conditions under which teachers think students learn best; teacher interest in four areas of the curriculum; mode or format for the instruction; measures of teachers' perceptions of whose responsibility it is for learning, teacher or student.

Reliability was measured by test-retest with a seven day delay. The correlation was from .81 to .94 on all parts of the test. (Correlation of .25 was necessary for significance at the .05 level and .33 at the .01 level.) Internal consistency was measured by correlation between each question

and total score for each dimension. Results of 200 cases gave Phi values from .59 to .78. The interscale correlations have been showing relationships between items. No criterion related validation has been done.

The research using the Canfield ISI is mixed. In a paper on the "Relationship Between Learning Styles, Grades and Student Ratings of Instructor," Hunter (1979) set up a study in which three hundred (300) students and fifteen (15) teachers were given Canfield's LSI and Canfield's ISI respectively. The results can be summarized as follows:

> The computed difference between preferred teaching style and preferred learning style of the learner was thought to be a possible measure of dissonance between teacher and student or between classroom procedures. This was not the case. Computed differences were not a significant source of variance in either the grade distribution or in student rating of instruction.

In another study (Scerba,1979), students were given the Canfield LSI, a posttest achievment measure for English and mathematics, and a course evaluation. Teachers were given the Canfield ISI. The findings were that there were no first order interaction effects between learning and teaching style on grades, achievment, evaluations, or attrition. There was

significant second order interaction of learning style and academic discipline on course grades (Scerba, 1979).

However, the manual gives four references stating that several of the scales were predictive of student performance (Davis, 1979), further

> students with higher levels of achievement had learning styles more closely related to instructor or teaching styles than the students achieving lower grades.

and that

> significant differences in instructor and student preferences were identified and recommendations were made for altering teaching/learning environment at the University of Florida (Llorens, 1978).

Dunn and Dunn Teaching Style Inventory. Rita and Kenneth Dunn (1977) published a teaching styles inventory to aid administrators (primarily in elementary and secondary schools) in appraising their individual faculty member's teaching style.

There are nine (9) major elements in the style.

1. Instructional Planning measures how often the teacher uses a variety of planning techniques.

2. Teaching Methods measures materials used and interaction with students.

3. Student Grouping measures how teachers group
   students for learning.

4. Room Design measures physical arrangement.

5. Teaching Environment measures time schedules,
   types of instructional stations, multi-level
   resources and nutritional intake.

6. Evaluation Techniques measures the kinds of
   tests, performance assessment observations, and
   self evaluation of students.

7. Educational Philosophy measures attitude toward
   open education, student centered curriculum,
   basic skills approach, etc.

8. Teaching Characteristics measures the degree of
   flexibility, importance of learning, and the
   amount of direction given to students.

9. Student Preference measures what kinds of
   students teachers prefer.

These nine (9) elements are measured by statements with
which teachers agree or disagree. Responses to statements
measuring items 1 through 8 are weighted and totaled. The
scores are put on a profile sheet in order to highlight how
close a faculty member is to a belief in individualized

instruction at one extreme or traditional instruction at the other extreme.

No reliability or validity studies could be found.

No research studies could be found.

Field Dependence/Independence. The work done by Herman Witkin on field dependence/independence (FD/I) is voluminous and well documented elsewhere. This discussion focuses on the area of field dependence/independence only as it applies to teaching style and its implications.

The Group Embedded Figures Test is a perception test that asks one to find a simple figure embedded in a complex figure. Several of these figures are given, each figure becoming more difficult to recognize. A scale determines the ability to perform the tasks.

> The common denominator underlying differences in performance in these various tasks is the extent to which the person perceives part of the field as discrete from the surrounding field as a whole,... to put it in everyday terminology, the extent to which the person perceives analytically. Because at one extreme of the performance range perception is strongly dominated by the prevailing field, that mode of perception was designated as 'field dependent.' At the other extreme, where the person experiences items as more or less separate from the surrounding field, the designation "field independent" is used. (Witkin, 1977)

Research on field dependence/independence with teachers suggests that FD teachers allow more interaction with students and FI teachers are more impersonal in their relationships with students. Two research studies form the basis for teachers' cognitive style, one by DeStefano (1970) and the other by James (1973).

DeStefano used teachers and students in a traditional classroom. He found that teachers and students with similar cognitive styles saw each other in a very positive light, and, conversely, teachers and students with dissimilar styles saw each other negatively. In the James study, teachers taught a class of three field independent and three field dependent students in a specifically designed minicourse. Matched teachers and students with similar learning style showed greater personal attraction for one another than the mismatched teachers and students. In addition, at the end of the course, teachers were asked to assign grades to their six students on the basis of classroom work. The very field independent teachers gave higher grades to their six students on the basis of classroom work. And, similarly, the field dependent teachers gave higher grades to field dependent

students. It is reasonable to assume that the greater the similarity of cognitive style, the greater the interpersonal attraction.

However, in another study (Witkin, 1977), a four session mini-course used a curriculum design to

> allow expression of likely subject matter and teaching technique and learning strategy preferences of field dependent and field independent students.

Classes were formed to have two (2) girls and two (2) boys; one girl, one boy field dependent; and one girl, one boy field independent. Answers on an interpersonal attraction questionnaire did not give the expected cognitive style match/mismatch. Instead, a teacher/student sex match/mismatch was seen. These were adolescent students and apparently sex matching and mismatching were more important.

In a study by Pettman (1976), student evaluation of teachers was considered. He studied three areas: field dependence/independence, likeness of educational and industrial settings, and students perceived grade equity with their ratings of teachers. Results showed that field independent students discriminated about teacher behaviors more than field dependent students.

Witkin (1977) concludes that:

> ... evidence now on hand has established match
> or mismatch in cognitive styles as a factor in
> teacher/student and other kinds of social
> interaction as well. To have demonstrated that a
> match/mismatch phenomenon exists is to have
> opened the door only a crack. What is already
> visible through the crack suggests, however,
> that we may find much of interest behind it for
> the teaching learning process.

Kolb Learning Style Inventory (LSI). The Kolb Learning

Style Inventory (LSI) was developed by D. A. Kolb and is

based on experiential learning theory. Each item corresponds

to one of four learning modes:

1. Concrete experience.

2. Reflective observation.

3. Abstract conceptualization.

4. Active experimentation.

The LSI measures the relative emphasis on these four learning

abilities and, in addition, gives two combination scores that

show abstractness over concreteness and action over

reflection (Kolb, 1976).

Reliability studies have been extensive on the six parts

of the test. On split half studies, reliability coefficients

range from .37 to .86 with the best coefficients from the

combination scores. Test-retest reliability was done over a period of three to seven months. At three months, the range is from .43 to .73 and at seven months from .30 to .49. The decrease in reliability over time would be expected since the inventory is based on experiential learning.

The original norms for the inventory are based on five groups: MIT management graduate students, Harvard management graduate students, MIT Sloan Fellows, acitve managers, and active managers/seminar participants. Other norms are avialble for college undergraduates and other graduate students, and for various occupations.

The inventory has been criterion validated with two graduate aptitude tests, a personal aptitude test, a personnel aptitude test, and two creativty tests. Correlations between the Myers Briggs Type Indicator, Firo-B scores, and the three aspects of motivation - n-achievement, n-power, and n-affiliation - have been done. Correlations have been done using the six parts of the Kolb and are not reported here but are available in the manual (Kolb, 1976).

A great deal of research has been done using the Kolb LSI, much of which has been reported in the manual's bibliography. Correlations have been done between the LSI and

student ratings of situations that facilitate their learning;
between LSI and ratings of students' favorite teacher; and
between combination scores and undergraduate college major.

Hill's Learning Style Inventory. The inventory measures
twenty seven (27) different items of student learning. Since
these are closely related to the Tenore Inventory mentioned
later, there is no need to expand on the description here. At
this point, it is also difficult to find copies of the
inventory or any materials written by Hill as is well
documented by Tenore (1982).

Lange (1973) used Hill's Learning Style Inventory for
two hundred fifty-five (255) students and thirty-three (33)
faculty in a nursing college. She asked what happens if
faculty and students are matched or mismatched. She concluded
that when teachers and students were matched there was no
significant difference on withdrawl or failure rate.

She also came to the following conclusions:

1. When faculty/students matched, students
   perceived their instructors more positively.
2. When there was a match, the mean score on final
   exams was higher.

3. Students reacted favorably to this process of
   matching.

4. Seventy perscent of the nursing faculty would
   recommend its use.

5. The more styles a student had the better
   possibility of passing.

6. Student styles do change and they change toward
   instructor style.

Hill's Teaching Style Inventory. Joseph Hill developed a
teaching style inventory based on the learning style
inventory which was never fully operational and never
validated (Kirby, 1979). As part of his educational cognitive
style, he considered teaching style as a Cartesian set which
is a sort of multiple pairing of several sets. His three sets
were classified as demeanor, concerns, and symbol mode of
presentation.

   Demeanor:

1. Predominant, fixed style: the instructor has
   chosen a method and refuses to change regardless
   of student learning.

2. Adjustive, switcher: instructor makes some adjustment with students but asks students to adjust also.

3. Flexible: instructor changes style to meet students' needs.

Concern:

1. Persons: instructor takes particular care of the students as persons.

2. Process: instructor emphasizes the learning process; what is going on in the learning situation is important.

3. Properties: instructor emphasizes the learning itself and will go to any lengths to have students learn.

Symbolic Mode of Presentation:

1. Theoretical Predominance: teaching is formal and usually through lecture.

2. Qualitative Predominance: instructor uses hands-on experience.

3. Reciprocity: a mixture of the theoretical and qualitative.

Francis Crookes (1977) gave Hill's Teaching Style and Learning Style Inventories to two groups of faculty at one institution. One group was in the disciplines of the arts and sciences, the other in applied arts and sciences. It is interesting to note that Crookes had difficulty with the lack of validity for the inventory and he tried to validate it by giving two forms of the test. His paper is not clear on the results of the validation. As to his study, he came to the following conclusions:

1. There were four areas that were significantly different on the Learning Style Inventory in the two groups: proprioceptiveness, attending to visual stimuli, proximics, and associative learning patterns.

2. On the teaching style, the faculty of arts and sciences were more authoritarian and the faculty of applied arts and sciences were more permissive.

3. In all other areas on both inventories there was no significant difference.

4. Visual linguistics was present in all teachers' styles.

Mann's Categories. Richard Mann (1975) defines six styles
of teaching believed to be effective in teaching:

1. Style I Expert: Instructors define their roles
   as givers of information.

2. Style II Formal Authoritative: Instructors
   establish the rules and students follow.

3. Style III Socializing Agent: Instructors look
   for promising students who will be successful in
   the instructors' disciplines.

4. Style IV Facilitator: Instructors consider
   themselves as a resource for students, helping
   them to attain their own goals.

5. Style V Ego Ideal: Instructors define themselves
   as role models for the students and hope to
   excite them in their disciplines.

6. Style VI Person: Instructors are very open with
   students, sharing experiences, even ones outside
   the classroom.

No specific instrument was found except an adaptation
which asked the frequency with which a teacher used the six
styles. No validation or reliability studies were found.

In a study by Terry W. Blue (1979), the adaptation mentioned above was used with other aspects of teaching style. No specific outcome of the Mann categories was reprted.

Myers Briggs Type Indicator (MBTI). The Myers-Briggs Type Indicator is a significant psychometric intrument in measuring Jungian personality typology. There are four polarities measured: extraversion vs. introversion, sensation vs. intuition, thinking vs. feeling, judgement vs. perception. There is a voluminous amount of material on reliability and validity.

Although there are multitudinous studies on this indicator, a paper by Jonassen (1981) has importance for teaching styles. He had a group of pre-service teachers complete the MBTI, the Kolb Learning Styles Inventory and the Educational Cognitive Style Inventory.

> Personality types, especially thinking/feeling, significantly predicted the importance of instructor/student affiliation and content preferred by the teachers. Strong predictive relationships between cognitive styles and teaching styles also were found, indicating that determinants of preferred teaching styles include individual instructor's learning styles (Jonassen, 1981).

Principles of Adult Learning Scales (PALS). PALS by Gary J.
Conti (1979) measures the degree to which faculty support the
learning principles of the collaborative teaching/learning
mode as articulated by Houle (1963) and Knowles (1970) in
their theories of adult education. It has construct validity
and it is criterion validated with the Flanders Interaction
Analysis Categories (FIAC) with correlations of .85, .79, and
.82 with the various parts of the FIAC. Reliability was done
by test-retest with a coefficient of .92. There is an
implication by Conti that high scores by instructors on PALS
would have the effect of high achievement by adult learners
in collaborative modes in these instructors' classes.

No further research using this instrument could be
found.

Teaching Style Q Sort (TSQS). The TSQS (Heikkinen, 1977)
consists of 28 statements and was intended to reflect the
four families described by Joyce and Weil (1972) in their
book MODELS OF TEACHING. These four families are:

1. Social Interaction: This involves the
    relationships of persons to their society or

their direct relationship with other people (Joyce, 1972).

2. Information Processing: Information processing involves the way in which people handle stimuli from the environment, organize data, sense problems, generate concepts and solutions to problems, and employ verbal and non-verbal symbols (Joyce, 1972).

3. Personal: The distinctive feature of this category is its emphasis on personal development as a source of educational ideas (Joyce, 1972).

4. Behavior Modification: This relies on changing the external behavior of the students and describing them in terms of extremely visible behavior rather than underlying and unobservable behavior (Joyce, 1972).

The validity of the inventory comes from a factor analysis of samples of five hundred forty-one (541) TSQS respondents. Reliability was done through internal consistency with a Pearson moment correlation and a test-retest with Kendall's tau correlation.

<u>Tenore Learning Style Inventory.</u> The TLSI is an adaption of Hill's Learning Style Inventory. This grew out of Tenore's interaction with Hill from 1970 to 1972. Hill's model emphasized a mathematical model using Cartesian sets whereas the Tenore model is grounded in learning theory and is used prescriptively in her Learning Center at Bunker Hill Community College. The Center has been described in her publication ONE STEP BEYOND, various pamphlets, and many workshops at the College. A complete theortical and instrumental description is included in the section on methodology.

As yet the TLSI has no studies of validity (other than face validity of using the instrument over ten (10) years with students and faculty at over twenty (20) colleges) or reliability. To quote Tenore:

> ... what does exist and has existed for nearly ten years is the comprehensive model of a learning/teaching center with interdisciplinary, integrated curricula, and multiple modes of delivery of the same learning content which can accommodate differences in approaches to learning (Tenore, 1982).

At present, Tenore is well into her reliability and validity studies and they should be finished in the Spring of

1984.

Student Perception Instruments

There are probably hundreds of inventories that are used for faculty evaluations by students. At Bunker Hill Community College, in ten (10) years, at least six (6) different evaluations have been used, only one of which had any realibility or validity. Therefore, it would be difficult to address all that are used. This section will concentrate instead on instruments reported in Buros (1978).

Cornell Inventory for Student Appraisal of Teaching Courses. Reliability and validity studies do not exist.

Course Evaluation Questionnaire. Very little is available on reliability and validity. Some data are available on correlation with grades.

Endeavor Instructional Rating System.
    1. Research suggests adequate reliability but
       without sufficient documentation; criterion

related validity is done by correlations with
achievement.

2. Little is available on content validation.

3. Construct validity needs further definition.

4. It is considered to be one of the best
   instructional rating systems available.

I.D.E.A. System. The I.D.E.A. system of student evaluation
is highly reliable and valid with extensive studies done with
thousands of college students. It was developed by the Office
of Educational Research at Kansas State University. It is
unique in that it has a data bank of thousands of student
responses. These responses are compared to responses of
particular students and a particular faculty member. Computer
printouts give faculty ratings compared to all courses in the
data bank and a second score comparing ratings to those
courses in the data bank of similar size and similar level of
student matriculation. This system and others like it are
becoming the most used and best researched evaluations
available.

Illinois Course Evaluation Questionnaire.

1. Reliability coefficients range from .81 to .94.

2. Subscale reliabilities range from .80 to .98.

3. Validity is related to the amount of variance accounted for.

4. Predictive validity is needed.

Instructional Improvement Questionnaire.

1. Internal consistency coefficients range from .62 to .93.

2. Test-retest reliability correlation is from .67 to .76.

3. Factor analysis has yielded seven factors.

4. Questionnaire needs predictive validity.

Teacher Image Questionnaire.

1. Reliability studies are inadequate.

2. No validity studies exist.

Self Perception Inventory (ALSO).

1. Test-retest reliability range is from .68 to .89 with three to four week intervals.

1. Criterion validity is done by correlation with the Coopersmith Self Esteem Inventory (.68) and with the Tennessee Self Concept Scale (.44).
3. Correlates at .37 with internship competence and .38 with a prediction of on the job success.

Independent Observer Instruments

Discovery Expository Instrument. The Discovery Expository Instrument designed by Judith R Gordon is an observation scale on teachers' presentations of discovery. There are nine behaviors measured: definitive; explanative; clarifying; exemplative; summarizing; question raising; problem structuring; directive managing; and neutral. Sixteen signs are used to measure discovery versus expository.

Reliability and validity studies were done with four different grade levels which suggest that the instrument has relatively high inter-observer and intra-observer reliabilities and high validity. An abbreviated version is also available.

No further work has been reported.

Fischer and Fischer. Fischer and Fischer (1979) have
defined teaching style, particularly for teachers of young
students, around six (6) categories. There is no formal
instrument but the categories are based on direct
observations and experience.

1. The task oriented: prescribes materials and
   specifies performance by student.

2. The cooperative planner: facilitates the
   learning process and allows student to plan
   instruction.

3. The youth-centered: provides resources for
   students to pursue learning.

4. The subject centered: focuses on content to the
   exclusion of the learner.

5. The learner-centered: has equal concern for
   content and the learner.

6. The emotionally exciting and its counterpart:
   shows intense interest in teaching or restrains
   the emotional tone.

As yet there is no instrument and no research has been
reported.

Flanders Interaction Analysis Categories (FIAC). The FIAC
is a validated system for measuring the interaction between
teacher and students in a classroom setting by an outside
observer. Behaviors such as questions asked by teachers or
students and statements made by teachers or students are
coded, tabulated, and interpreted on a 10 x 10 interaction
matrix. The purpose of the interaction analysis is to study
teaching behavior and what kinds of classroom behaviors are
most advantageous. The conclusion that this analysis comes to
is that no one observable behavior is significantly
correlated with student achievement; however,

> The percent of teacher statements that make use
> of ideas and opinions previously expressed by
> pupils is directly related to average class
> scores on attitude scales of teacher
> attractiveness, liking the class, etc., as well
> as to average achievement scores adjusted for
> initial ability (Flanders, 1970).

Many research projects have been done and are reported
in Flanders (1970). Of interest to the present study is the
Conti (1979) research reported earlier in this paper under
Principles of Adult Learning Scales.

Observation Scale for Inquiry Teaching. This instrument,
developed by Ernest McDaniel (1979), is based on the

theoretical components of inquiry teaching. Four scales are used to measure personalized planning, confrontational emphasis, transitional querying, and manipulative opportunities. Interrelated reliability was reported using tapes of secondary school classes in social studies. Validity was measured by correlations of observations with measures of divergent and evaluative questioning. Through the reliability and validity data, the author believes this to be a promising instrument for inquiry teaching.

No other research reported.

Teaching Strategies Observation Instrument. Ramirez and Castaneda's (Kirby, 1979) Teaching Strategies Observation Instrument is a direct observation instrument that is based on the field dependent/independent theory. A scale of 1-5 is checked off from "not true" to "almost not true" as an observer notes behavior in a classroom. It is used primarily with grade school children and teachers' training.

Ramirez and Castaneda in using this instrument encourage teachers to recognize the bicognitive approaches to teaching, i.e. ones that will be helpful to both field dependent and field independent learners. However, they did find resistance

among teachers to change their behavior. They found

videotaping to be very helpful in making the feedback more

objective in analyzing teachers' behaviors.

Summary

The January 1979 issue of EDUCATIONAL LEADERSHIP was

devoted exclusively to the subject of learning styles and

teaching styles. In the editorial to this issue, Anthony F.

Gregory states:

> It is sobering to think of the powerful effect a
> teacher can have upon the minds of students
> particularly when he/she is in charge of a
> required course and offers only one or two means
> of reaching the course objectives. Could it also
> be that the most successful students in a
> classroom just happen to have adaptive abilities
> that match the hidden demands being placed upon
> them by the teaching method? The answer is yes!

Later in the issue, Gloria Kuchinskas, who has used the

Hill model on third and fourth graders, says:

> The most revealing thing in those classrooms was
> the overwhelming effect of the teacher's style

on everything and everybody else.

and later:

> The teacher's cognitive style determined how
> students would learn. The teacher's cognitive
> style influenced the learning environment more
> than any other factor (Kuchinskas, 1979).

In a massive study in Britain, N. Bennett came to the
conclusion that:

> Teaching style was statistically and
> educationally significant in all the attainment
> areas tested in his study (Bennett, 1976).

and later:

> Teachers teach the way they learned. ...we found
> that instructors believe that the way they learn
> is the 'easy' or 'right' way, and that they,
> therefore, direct their students,... towards
> mastering knowledge in much the same way
> (Bennett, 1976).

Thus, there is significant past evidence that not only
should students' learning styles be investigated but also
teachers' learning styles and their teaching styles as well.

C H A P T E R   I I I

THEORETICAL BASIS USING LEWIN'S THEORY

Introduction

Kurt Lewin (1935) stated that "to understand or predict
the psychological behavior (B), one has to determine for
every kind of psychological event the momentary whole
situation; that is, the momentary structure and the state of
the person (P) and of the psychological environment (E). B =
f(P,E). Every fact that exists psychobiologically must have a
position in this field and only facts that have such position
have dynamic effects (are causes of events). The environment
is, for all its properties (directions, distances, etc.,), to
be defined not physically but psychobiologically; that is,
according to its quasi-physical, quasi-social, and
quasi-mental structure."

This concept can be further explained by representing
the person (P) by a Jordan curve which is any closed curve
that is a continuous (in a mathematical sense) image of a
circle. Examples are given in Figure 1.

Figure 1. Closed Curve Representing Person.

The important aspect of the curve is that it be closed
and that one can determine the inside and the outside. Inside
is the person (P), outside is the environment (E).

In addition, the life space containing the environment
(E) can be seen as a curve that contains the person which can
be seen in Figure 2.
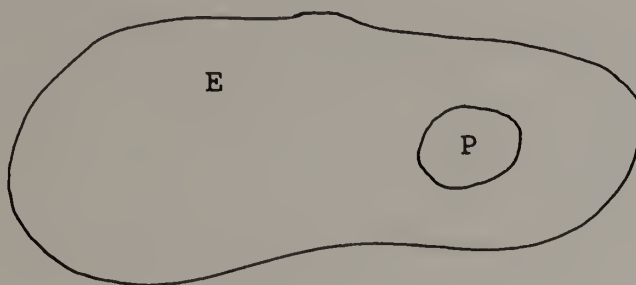
Figure 2. Space showing person embedded in the environment.

Thus, in Lewin's terms (and mathematical ones), the life
space is the union of the area within P and the area within

the larger curve minus P. Behavior is a function of this life space.

> The task of dynamic psychology is to derive unequivocally the behavior of a given individual from the totality of the psychological facts that exist in the life space at a given moment (Lewin, 1936).

The life space and the physical world are not one and the same. Rather, beyond the life space, known to Lewin as "foreign hull of life space," is of no concern psychologically except as those influences come close to the boundary. Thus the boundary, although it is perfectly established, does have a permeability about it that does allow access. It can be said that a person does not communicate directly with the world but through the psychological environment in which the person is embedded and that the boundary of this person is clearly established, even though permeable.

The dynamics here are complex and will bear on the final theoretical basis for studying teachers' learning styles. In order to understand Lewin's concept, two other definitions must be introduced: valence and force or vector.

Valence is a conceptual property of an area in the environment (E). It can be positive or negative; a positive

area reduces tension and negative area increases tension. For
example, for a student who is afraid of mathematics, any area
of the school environment that has mathematics in it will
have a negative valence, whereas a student who likes art will
find any area containing art or things related to art a
positive valence. (See Figure 3.)
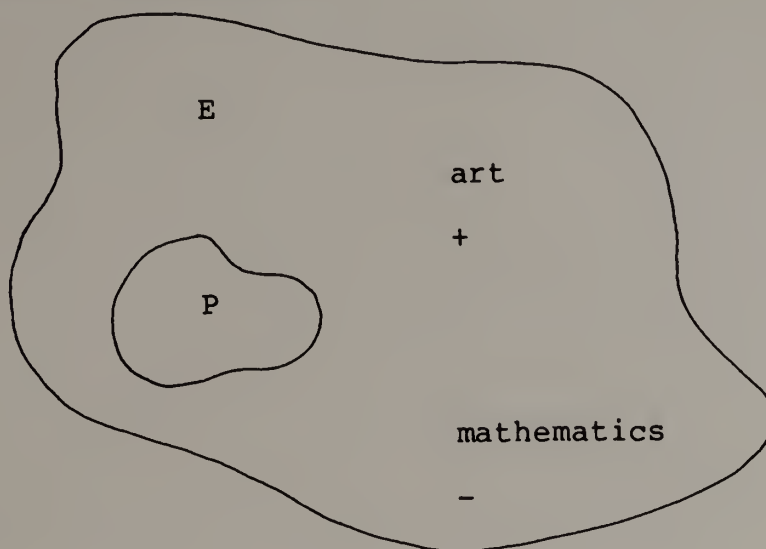
Figure 3. Space showing positive and negative valence.

Valence is closely correlated with a need. Whether a
region has a positive or negative valence depends on a system
in a state of tension. Needs give value to parts of the
environment. Tension exists within the person (P).

A force or vector exists in the psychological
environment (E); it has (as in physics) magnitude, direction,
and point of application. Vectors are outside the person and
act on the boundary. (See Figure 4.)
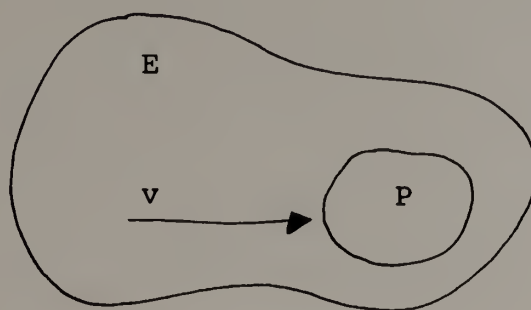
Figure 4. Life space showing the vector.

When there is one vector, there will be a tendency to
move in the direction of the vector with the magnitude of the
vector. The relationship between vectors and valences is
straight forward. Vectors acting upon a person direct the
person away from a negative valence and toward a positive
valence.

Consider a specific example. A woman has been working as
a clerk in a hospital and is influenced by the nurses on her
floor. She decides to become a nurse by going to nursing

school. The sight of a nurse in the hospital does three
things: it releases energy and brings about an inner personal
tension; it gives a positive valence to the concept of school
in her life space; and it creates a force or vector which
pushes her towards school. Suppose further that the woman
wishes to apply to the school but does not have the money.
This situation can be seen in Figure 5.

a   b
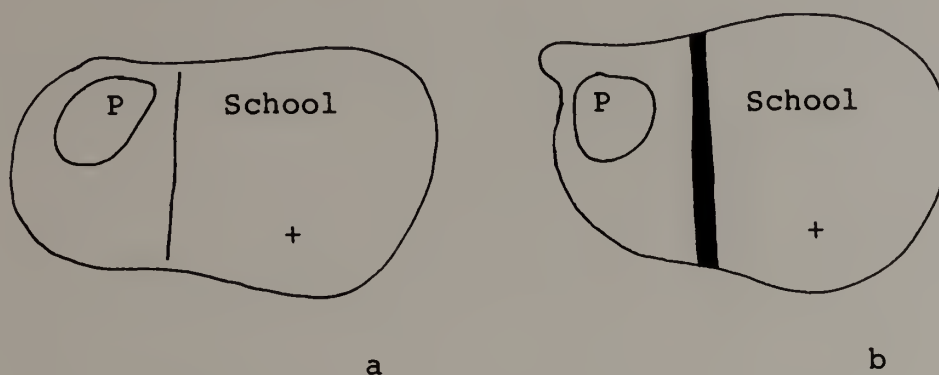
Figure 5. Example showing barriers in person's life space.

In Figure 5. part a, the woman has a barrier to school
denoted by a line but not an insurmountable one. Perhaps, for
example, she can borrow the money from her parents or save
from her earnings.

The situation shown in Figure 5. part b, is different. Here the boundary blocks off part of the environment with a solid barrier that cuts across the life space in a way isolating P. In this case, the student cannot raise the money. For example, she may have eight children for whom she is the sole support and her parents are in no position to help. It is reasonable to assume that without a great deal of assistance this woman will never tear down that barrier and make it part of her life space.

Although Lewin's theory has many other aspects, it is in this simplified form that there exists a basis for a theory of teachers' learning styles. With the concepts thus far outlined, the formal learning situation in higher education can be examined.

For example, consider the case of the woman who wishes to be a nurse. Suppose she has entered a nursing program at a community college and is enrolled in a nursing foundation course. Remember her goal is to become a nurse, a role that she saw at her work at the hospital. Her life space looks like Figure 6.
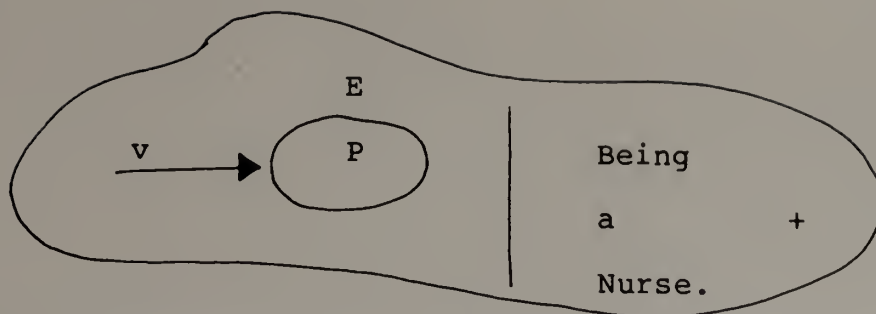
Figure 6. Example of the life space of a student pursuing her goal of being a nurse.

The vector (v) is very strong and it pushes her in the direction of the positive valence, i.e., the area of her psychological life space where she sees herself as a nurse. However, in order to attain that goal, she must cross a barrier which involves many things: time given to study, money for support and college costs, and the greatest of all barriers the learning of the profession. A differentiated life space of this woman can be seen in Figure 7.

This paper concentrates on that part of the life space occupied here by learning.

Learning is defined as a change in behavior. Lewin states that $B = f(P,E)$ where B, behavior, is a function of P, the person and E, the environment. Thus to have a change in behavior either the person or the environment must change.
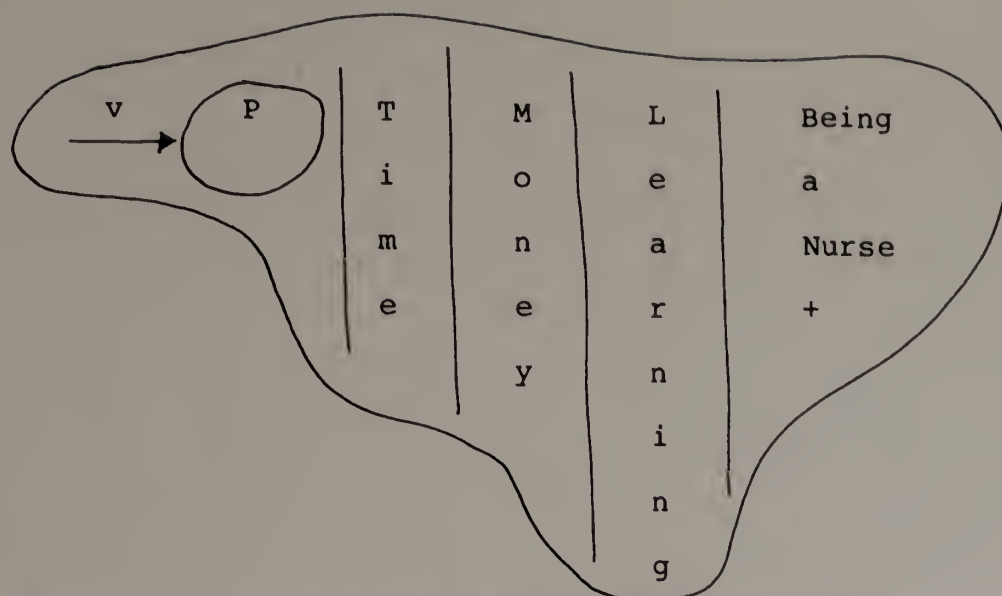
Figure 7. Life space of a student showing barriers.

A closer look at the person in the learning situation shows the person as differentiated with subareas of ability to learn, prior learning, and a preferred way to learn or learning style. This is visualized in the differentiated person (P) in Figure 8.

But what of the environment? To quote Kuchinskas (1979):

> The teacher's cognitive style (or learning style) influenced the learning environment more that any other factor.

The life space of the person is controlled significantly by the learning style of the teacher.

Prior Learning

Ability to Learn

Preferred way to learn or learning style
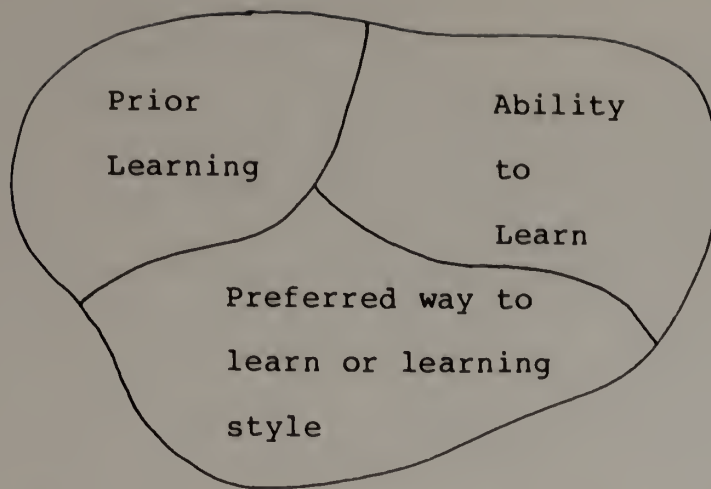
Figure 8. Differentiated life space of a person.

Thus, the environment is considerably changed by the introduction into the space of the teacher's learning style. The life space is now detailed as in Figure 9.

v

Prior Learning

Ability to Learn

Learning Style

P

Teacher's Learning Style (+ or -)

Being a Nurse +
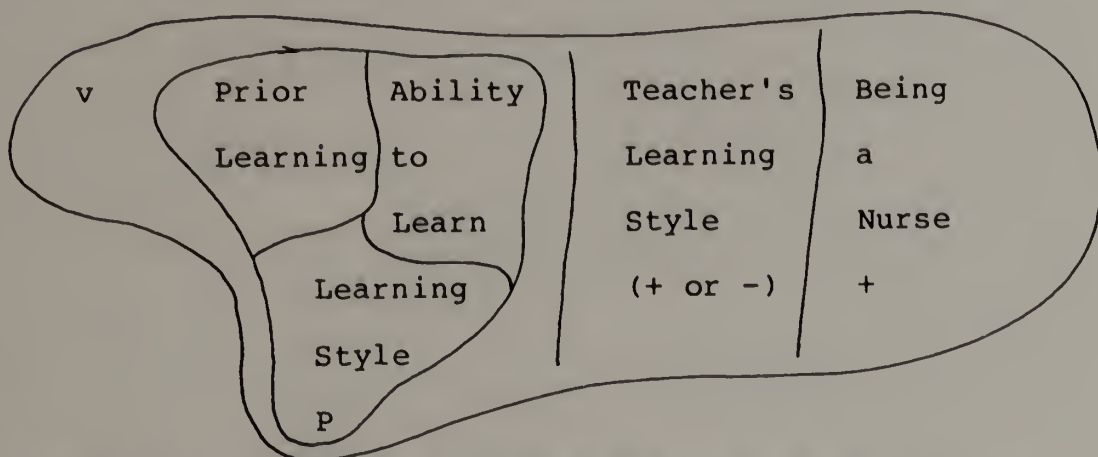
Figure 9. Differentiated life space of a person in the learning process.

From this figure, the teacher's learning style is between the person and the goal. Should the teacher's learning style have a positive valence, the barrier is easier to overcome; however, should the area have a negative valence, the task is going to be very difficult. It is interesting to note in Lange's study (1973) of nursing students that their learning styles changed in the course of their training to more closely resemble the teacher's learning style. Thus, learning probably occurred by the students changing their own learning style to better cross the barrier of the teacher's learning style. It would also have the effect of making the valence of the area of the teacher's learning style more positive which helps to make the vector forces stronger.

It should be obvious at this point that the more both students and teachers know about each others' learning styles the better the environment in the students' life space and the more the behavior can change resulting in learning.

There is one more step to take in defining this space.

and that is to determine how much the learning style of the teacher influences his/her teaching style.

The environment is interactive. The life space of both the student and the instructor is influenced by both their learning styles, but, in addition, there is around the teacher's learning style his/her teaching style. The space is now complete as a basis for this study. (See Figure 10.)

Teacher's

Student's   Teacher's   Being

Learning   Learning   a

Style   Style   Nurse
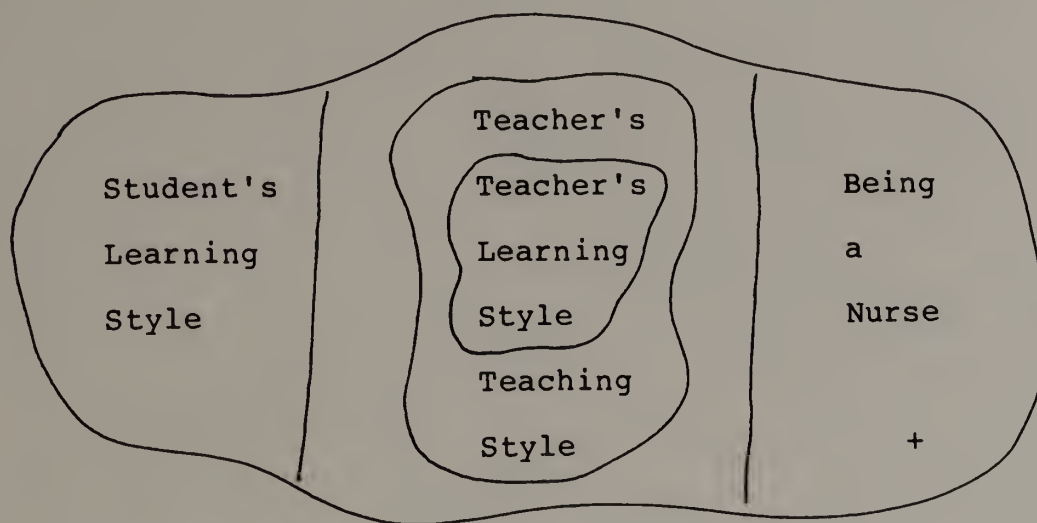
Teaching

Style   +

Figure 10. Life space of student showing the Teacher's Learning Style and the Teacher's teaching style.

As has been said, the student does not communicate directly with the world, but through the psychological environment, in this case through the teacher's learning and teaching style. This study explores the interaction of the two spaces of the teacher's learning style and the teacher's teaching style. For the purposes of the study, the influence of the student's learning style will not be researched.

C H A P T E R   IV

METHODOLOGY

Subjects

Twenty-eight (28) faculty from Bunker Hill Community College participated in the study in parts I and II. Six (6) faculty participated in part III. The mean age of the sample is 46.7. Eighteen are women and ten are men. Eight (8) departments are represented: behavioral science (11), office education (2), mathematics (5), science (3), fine arts (1), learning center (3), radiology (2), and English (1).

Instrumentation

Measuring Learning Styles. One of the most meaningful measures of learning style is Tenore's Learning Style Inventory (TLSI) because it allows the instructor to prescribe means and methods of instruction for students either to match student styles or mismatch when student styles seem deficient. Grounded in reality, Tenore's model is based on the works of Lewin, her own bio-social model of

behavior, Skinner's behaviorism, Markle's systems approach,

and Bloom's taxonomy. The following is quoted from Tenore and

describes the basic configuration of her instrument:

> In the development of personality inventories,
> several approaches can be used to formulate,
> assemble, select and group items. One of these
> approaches is based on personality theory. As
> previously described, the Tenore test is
> grounded in bio-social psychological model of
> human behavior and the Learning Style Assessment
> Inventory is described as a self-report
> inventory. It is a paper and pencil, self
> perception questionnaire suitable for group
> administration. At present, the test statements
> cluster into six categories. It should be
> stressed that these are interactive, and, in
> some cases, not sharply distinct categories.
> They are based on the clusters of theory
> previously presented in the model. The six
> clusters of elements as they are now perceived
> are:
>> 1. The sensory system.
>>   Taste, smell, sight, hearing, and touch
>>   represent one cluster. The interaction of
>>   these with the central nervous system
>>   composed of the brain and the spinal
>>   column is obvious. There are 40
>>   statements that sample an individual's
>>   perception of how he or she attends and
>>   uses the basic sensory input. This is
>>   included in the learning style assessment
>>   because the formulation and construction
>>   of the items recognize both the
>>   fundamental learning principles that one
>>   must attend in order to perceive and the
>>   fact that individuals have stylistic
>>   components of attention, hence
>>   perception. Symbols used are Q(S), Q(O),
>>   Q(V), Q(A), Q(T).
>> 2. Proprioceptiveness and kinesthetics.

These are also obviously a part of the central nervous system activities. Kinesthesis is usually described as feelings aroused by the movement of muscles, tendons, and joints. In sensory psychology, these are called muscular, tendinous, and articular senses (Geldard, 1972). The kinesthetic receptor organs are end organs responsible for initiating proprioceptive messages. The proprioceptors are sense organs that are stimulated mainly by the action of the body itself. Relevant situations are the gross motor functions of walking, running, swimming, and performances such as handgrip, lever (knob) manipulation, pressing a pedal, and the motor adjustments required in acrobatics. These are basic to our body movements and, especially in relation to our learning style, are critical to tasks requiring coordination of bodily senses, movements, and functions. There are sixteen statements used to assess an individual's perception of his motor skills orientation. Symbols used are Q(P), Q(CKH)

3. The developmental aspect as reflected in how one perceives one's realtionship patterns:
    - significant others (immediate family, extended family, husband, wife, lover),
    - peer groups (friends, colleagues, neighbors),
    - self (independence, independent action).
These three are generally seen in the statements as related to an orientation to decision-making in relation to consultation with others. It also is expected that these are related to motivation, especially to various aspects of three of the major learned social

motives usually described as achievement, affiliation, and power. There are 24 statements assessing this cluster of the assessment instrument. (F), (A), (I).

4. As mentioned earlier, our cognitive processes or information systems use symbols or abstractions in the area of memory and complex cognitive levels of thought (concepts, strategies, principles, etc.) so that we may think abstactly or theoretically. This is the cognitive domain. We use the cognitive process in two basic subjects: mathematics and language; and in two modes: hearing and seeing. The four resulting combinations of incoming information
   -listening to language T(A,L)
   -listening to numbers T(A,Q)
   -seeing language (reading) T(V,L)
   -seeing numbers T(V,Q)
are examined by thirty two statements in the inventory.

5. We also use symbols in the realm of the affective (emotional) domain. These are the symbols we learn during the socialization and enculturation processes we experience in our respective groups. These symbols represent awareness, feelings, commitments, values, and attitudes. For the purpose of the inventory, some of the various components of these outside influences on the perceived value of information (caring, self-awareness, interactive skills, non-verbal communications, appreciation of structure and form, appropriate behaviors required: psychological, social, physical) are assessed. There are sixty four statements involved in these perceptions.

6. Finally, there is a group of forty statements aimed at examining the individual's method of reasoning. This is

> done by looking at inductive and
> deductive reasoning processes in five
> types or styles of problem solving
> preferences. For the purpose of this
> proposal, this last group of style
> elements is considered to act as a
> "catalyst" in the interactions of the
> remaining style components. (D, L, M, R,
> K,)
> These descriptions are kept simple and are not
> analyzed in any great depth. This is because of
> anticipated changes, elimination of elements,
> regroupings, and reduction of the number of
> statements expected as the result of several
> factor analyses. (Tenore, 1982)

In this study the research on the TLSI is reported under
the six (6) sections using the following for titles.

Sensory is the heading for the five (5) elements of
sense of taste [Q(S)], sense of smell [Q(O)], sense of sight
[Q(V)], sense of hearing [Q(A)], and sense of touch [Q(T)].

Motor Processes is the heading for the elements of
proprioceptiveness [Q(CP)] and kinesthetics [Q(CKH)].

Relationship Patterns is used as the heading for the
developmental aspects in the learning process: the three (3)
elements are family pattern (F), associative and peer pattern
(A), and independent pattern (I).

Cognitive Processes is the heading for the four (4)
elements of listening to language [T(A,L)], listening to

numbers [T(A,Q)], seeing language [T(V,L)], and seeing numbers [T(V,Q)].

Socialization Processes is used for the heading of the affective domain. The eight (8) elements are: empathy [Q(CEM)], esthetics [Q(CES)], ethics [Q(CET)], histrionics [Q(CH)], kinesics or body language [Q(CK)], proximics or sense of distance [Q(CP)], sense of self [Q(CS)], and transactional [Q(CT)].

Methods of Reasoning is used for the heading on inductive and deductive reasoning. The four inductive reasoning methods are: difference (D) which compares and contrasts, appraisal (L) which is a pattern that can slip into all the other reasoning patterns, magnitude (M) which uses sequential, orderly, and linear reasoning, and relationship (R) which uses a pattern connecting many and varied ideas together. There is one deductive reasoning pattern (K) which uses a method of reasoning from givens and premises.

Measuring Teaching Styles. Of the three kinds of teaching styles reported in Chapter II, the teacher perception instruments are most like the TLSI and are the best for

studying the interaction between teaching and learning styles. Three (3) criteria were used to choose an instrument:

1. Potential of correlation with items on the TLSI.
2. Ease in administering.
3. Availability of reliability and validity data.

The Canfield Instructional Inventory was chosen because:

1. The theoretical basis of the inventory is congruent with the TLSI. They share a common heritage.
2. The inventory takes less than 30 minutes to take and is easy to score.
3. Reliability and validity data are available.

Principles of Adult Learning Scales (PALS) was chosen because:

1. Items have a potential of correlating with the development aspect and methods of reasoning of the TLSI. The inventory is grounded in adult learning theory.
2. The inventory takes about 20 minutes to administer and is easy to score.
3. Reliability and validity data are available.

The Teaching Style Q Sort was chosen because:

1. The inventory is grounded in the theories of
   teaching by Joyce and Weil. Items on
   developmental aspects and sensory input should
   overlap with 3 of the families of Joyce and
   Weil.

2. The inventory takes 20 minutes to take and is
   easy to score.

3. Reliabilty and validity data are available.

Data Collection

Faculty attended two (2) sessions. The first session was
dedicated to taking the TLSI; the second to taking the CISI,
the TSQS, the PALS, and the survey of methods. Faculty were
instructed to consider themselves as learners in the first
session and to consider themselves as instructors in the
second. Each session ran two to three hours. The sessions
were not conducted with all twenty-eight (28) at one time,
but in several groupings. The purpose of the study was
explained to the faculty and interpretations of each
instrument were given at a later date.

An attempt was made to use a larger population, and seventy (70) faculty across Massachusetts were given the TLSI and the survey but not the teaching style inventories and are not included in this study.

Data Analysis

Part I. The TLSI has twenty-seven (27) items that are measured for at least twenty-five (25) faculty. Scores are correlated with the Canfield Inventory to give a twenty-seven (27) by four (4) matrix, with the PALS inventory for a twenty-seven (27) by one (1) matrix, and with the TSQS for a twenty-seven (27) by four (4) matrix. Correlation is measured by a Pearson moment correlation and two confidence levels are examined, a .95 or higher confidence level and .99 or higher level. This can be stated as a level of significance of rho < .05 or a rho < .01 or lower.

Part II. A short inventory of modes of instruction is given every time the TLSI instrument is administered. Correlations between the twenty seven (27) items and various modes of

instruction are done. A Pearson Correlation is used and .95 and .99 confidence levels examined.

Part III. Six (6) faculty took the TLSI several years ago: two (2) three (3) years ago and four (4) ten (10) years ago. These faculty are part of this study . Although it is a small sample, it provides some direction for future research. Comparison of learning styles over time is measured by a chi square on each of the six sections of the TLSI.

C H A P T E R   V

DATA ANALYSIS

Twenty-eight (28) faculty participated in all five (5)
instruments for parts I and II. Six (6) participated in part
III. All faculty responded to all parts of the instruments.
There are no missing data. The SPSS (Statistical Package for
the Social Sciences) was used on the University of
Massachusetts Cyber system. Seventy-five (75) variables were
used: twenty-seven (27) from the TLSI, nineteen (19) from the
Canfield, four (4) from the TSQS, one (1) from PALS, and
three (3) variables were coded for school, sex, and
discipline.

Data analysis for Parts I and II were done using a
Pearson moment correlation. Of the options available, none
was chosen since there was no missing data and the default
option gave a one tailed test of statistical significance.
One statistical option was chosen giving the means and
standard deviation. A second statistical option, that would
have given cross product and covariance, was not chosen since
it was not going to be used in this study. A chi square was

run on the data from Part III in order to compare the TLSI of faculty over a period of time.

Means and Standard Deviation

TLSI. The TLSI has six (6) sections: theoretical cognitive processes, the sensory system, motor processes, socialization processes, relationship patterns, and methods of reasoning. The means and standard deviations of each variable by section are given in Tables 1A to 1F.

TABLE 1A

Theoretical Cognitive Processes

Range 8 - 40

Element	Means	STD
T(AL) Theoretical Audio Linguistic	21.8	2.8
T(AQ) Theoretical Audio Quantitative	20.9	4.5
T(VL) Theoretical Visual Linguistic	31.1	4.3
T(VQ) Theoretical Visual Quantitative	26.2	4.2

Preference is for theoretical input through the visual or reading particularly for words rather than numbers and

symbols. The least preferred is listening to numbers and symbols.

The five sensory elements are given in Table 1B.

Although preference for theoretical input is through the visual, from a sensory standpoint this population attends more to the senses of touch, taste, and hearing than to the visual.

TABLE 1B

Sensory System

Range 8 - 40

Element	Means	STD
Q(A) Audio	29.7	3.4
Q(O) Olfactory	28.3	5.3
Q(S) Savory	30.9	3.7
Q(T) Tactile	31.2	4.0
Q(V) Visual	28.5	4.5

The two motor processes are given in Table 1C.

Proprioceptiveness or doing several tasks at once is preferred slightly to kinesthetics Q(CKH) or gross motor functions.

The means and standard deviations of the eight (8)
elements in the socialization processes are shown in Table
1D.

Four of these processes stand out as important in this
population: esthetics, empathy, sense of self and ethics or
sense of commitment. The low value of histrionics or role
playing is unexpected in a population whose position is to
teach and influence.

TABLE 1C

Motor Processes

RANGE 8 - 40

Element	Means	STD
Q(P) Proprioceptiveness	28.7	3.9
Q(CKH) Kinesthetics	26.8	5.6

TABLE 1D

SOCIALIZATION PROCESSES

Range 8 - 40

Elements	Means	STD
Q(CEM) Empathy	31.6	3.0
Q(CES) Esthetics	32.5	3.6
Q(CET) Ethics	30.6	3.7
Q(CH) Histrionics	25.5	3.9
Q(CK) Kinesics	27.4	3.7
Q(CP) Proximics	27.8	3.1
Q(CS) Sense of self	31.5	3.5
Q(CT) Transactional	28.5	3.3

Of interest in Table 1E. is the importance of
independent learning and of the unimportance of associative
or peer learning. Both of these elements have small standard
deviations meaning that the sample clustered closely around
their means. Whereas the element of family or learning from
an authority is between the other elements, its larger

TABLE 1E

Relationship Patterns

Range 8 - 40

Element	Means	STD
A Associative	23.9	2.8
F Family	28.0	4.1
I Independent	30.3	2.9

standard deviation shows the population did not cluster around the mean but varied greatly.

It is not surprising that a population of faculty would find independent learning of most importance. However, it is interesting to note that learning from peers is so unimportant. This may have implications concerning difficulty faculty committees have in reaching a consensus.

The prevailing method of reasoning, as shown in Table 1F., is magnitude or sequential reasoning followed closely by reasoning in relationships. Appraisal reasoning is only important when all methods of reasoning are similar since

TABLE 1F

Methods of Reasoning

Range 8 - 40

Element	Means	STD
D Difference	28.8	3.2
L Appraisal	30.7	37
R Relationship	30.6	3.8
M Magnitude	31.4	3.9
K Deductive	25.9	4.3

appraisal reasoning indicates an ability to use all reasoning patterns equally well. Difference or reasoning by comparing and contrasting is relatively unimportant. In fact, only one faculty member had a strong difference reasoning. Deductive reasoning or reasoning from the general to the particular is also not a widely used reasoning pattern. A closer look at the difference and deductive reasoning patterns shows only one faculty member in the behavioral science department with a strong difference reasoning pattern, but several faculty in the mathematics and science departments with a strong deductive reasoning pattern. The small STD of the difference

element and the larger STD of the deductive element bear this out.

CISI. Tables 2A to 2D give the variables, means and standard deviations of the four parts of the Canfield inventory.

TABLE 2A

CONDITIONS

Range 0 - 99%ile

Element	Means	STD
Affiliation-Peer	33.1	22.9
Structure-Organization	63.7	21.9
Achievement-Goal Setting	50.1	27.8
Eminence-Competition	51.4	29.3
Affiliation-Instructor	41.8	21.5
Structure-Detail	61.0	28.8
Achievement-Independence	50.8	28.9
Eminence-Authority	47.6	27.1

Since this is a forced choice of four elements, these eight (8) elements can be looked at in two categories. In both categories structure was the most important element, i.e., organizing course materials logically and providing

specific information on assignments and requirements. In both
categories affiliation was least important, i.e., having good
relations among students and encouraging the students to know
the instructor personally.

TABLE 2B

Content

Range 0 - 99%ile

Element	Means	STD
Numeric	53.2	29.5
Qualitative	62.9	23.6
Inanimate	28.0	20.8
People	62.6	31.3

Two elements of curriculum content appear as strong,
qualitative or working with words and working with people. Of
note is the very low score of inanimate or working with
things.

TABLE 2C

Mode

Range 0 -99%ile

Element	Means	STD
Lecturing	49.9	35.2
Reading	62.4	33.0
Iconics	52.9	31.4
Direct Experience	34.5	25.8

Of most importance is providing written words for instruction and least importance is direct experience in laboratories, field trips and shop.

TABLE 2D

Responsibility for Learning

Range 0 - 99%ile

Element	Means	STD
I Instructor	39.8	27.7
I/S Instructor More	60.3	28.9
S/I Student More	42.3	30.6
S Student	49.4	27.8
Responsibilty Locus	41.4	28.0

Although these faculty thought that the instructor has more responsibility in the learning process than the student, they clearly reject the idea that the instructor is totally responsible.

PALS. The means score for the PALS was 26.3 with a STD of 21.5.

TSQS. Table 3 gives the four (4) means for the TSQS and their STD.

TABLE 3

TSQS

Range 7 - 49

Element	Means	STD
Social Interaction	27.1	7.1
Information Processing	27.7	6.0
Personal	31.0	5.6
Behavior Modification	27.2	9.0

The means for TSQS show an emphasis on the personal development of the student as a source of educational ideas.

Survey Instrument. Table 4 gives the variables, means and standard deviations of the survey instrument.

Table 4 shows individualized instruction was the most often used followed by use of audio tapes, demonstrations, learning center, and programmed instruction. It should be noted that these data were collected from faculty at a school where these are stressed as a matter of college policy.

TABLE 4

Results of Survey Instrument

Element	Means	STD
Audio Tapes	2.4	.6
Individualized Instruction	2.6	.7
Lecture	2.3	.8
Discovery Method	2.1	.7
Student Recitation	1.8	.7
Overhead Projector	1.6	.7
Demonstrations	1.6	.7
Student Role Playing	1.7	.8
Assign Papers	1.7	.8
Laboratory Use	1.9	.9
Tutors	2.1	.8
Learning Center	2.4	.7
Programmed Instruction	2.4	.7
Clinical Work	1.4	.8
Simulations	1.8	.8
Discussion Groups	1.9	.8
Video Tapes	2.5	.6
Projects	2.3	.7

Correlation of the TLSI with CISI, PALS, and TSQS

TLSI vs. Canfield. A Pearson correlation was run on the
data from the TLSI and the CLSI. Confidence levels of .95 or
better and .99 or better were examined.

TABLE 5

Correlations of the TLSI with the Cisi, rho <.01

Elements	Corr.	Rho
T(AQ), Independence	-.4765	.005
T(VQ), Numeric	.4466	.009
Q(KH), Qualitative	-.4375	.010
D, Authority	.5167	.002
K, Numeric	.5479	.001
T(VQ), People	-.4448	.009
T(VQ), I	.4386	.010
Q(A), Reading	-.4619	.007
Q(A), S	-.5448	.001
Q(O),S/I	-.5224	.002
Q(S), I	.4411	.009
Q(S), S/I	-.4559	.007
Q(V), Direct Experience	.4629	.007
Q(V), I	.5190	.002
Q(V), S/I	-.4499	.008
Q(CES), I	.4508	.008
Q(CES), S/I	-.5196	.002
I, Inanimate	-.4623	.007
M, S/I	-.4556	.007
T(VQ), Responsibility Locus	.5312	.002
Q(S), Responsibility Locus	.4923	.004
Q(V), Responsibility Locus	.4641	.006
Q(CES), Responsibility Locus	.5285	.002

Fifty eight (58) correlations of the five hundred sixty seven
(567) correlations were at a confidence level of .95, and of
these 23 were at a confidence level of .99. These are shown
in Table 5.

Two theoretical elements show strong correlations.
Preferring to hear numbers [T(AQ)] and symbols correlates
negatively with Independence or encouraging students to work
independently. Preferring to read numbers and symbols [T(VQ)]
correlates positively with numbers and logic, positively with
instructors being totally reponsible for the learning, and
negatively with working with people.

Four sensory elements show strong correlations. Hearing
[Q(A)] correlates negatively with providing reading for
instruction and negatively with students being totally
responsible for learning. Sense of smell [Q(O)] correlates
positively with the student being more responsible than
instructor for learning. Sense of taste [Q(S)] correlates
positively with instructor being totally responsible for
learning and, as would be expected, negatively with the
student being responsible for learning. Visual sense [Q(V)]
correlates positively with having students learn by direct

experience such as laboratories and field trips. Q(V)
correlates in the same way as Q(S).

Esthetics [Q(CES)] correlates in the same way as Q(S)
and Q(V).

One element, independent learning (I), correlates
negatively with working with things.

Three reasoning patterns have important correlations.
Difference reasoning (D) correlates positively with
maintaining classroom discipline; magnitude reasoning (M)
correlates negatively with student being responsible for
learning; and deductive reasoning (K) correlates positively
with working with numbers and logic.

Sense of gross motor skills [Q(CKH)] correlates
negatively with working with words and language.

TLSI vs. PALS. The TLSI and the PALS were compared using a

Table 6

Correlations between elements of the TLSI and the PALS

Element	Corr.	Rho
Q(CH), PALS	.4253	.012
R, PALS	.3911	.020

Pearson moment correlation. There were no correlations of .99 or better, but there were two (2) at a confidence level of .95 as shown in Table 6.

TLSI vs. TSQS. Comparison between the TLSI and the TSQS was measured by a Pearson moment correlation. Sixteen (16) correlations were at a .95 confidence level and seven (7) were at a .99 level. The latter is shown in Table 7.

TABLE 7

Correlation between TLSI and TSQS, Rho <.01

Elements	Corr.	Rho
T(AQ), Social Interaction	.4984	.003
T(AQ), Information Processing	.4416	.005
Q(A), Behavior Modification	.4824	.005
Q(CET), Information Processing	.4644	.006
Q(CP), Information Processing	-.4710	.006
F, Social Interaction	.4734	.005
F, Information Processing	.5198	.002

One theoretical element, listening to numbers [T(AQ)], correlates positively with social interaction and information processing. Listening [Q(A)] correlates with behavior

modification. Esthetics [Q(CET)] correlates positively with information processing. Sense of distance [Q(CP)] correlates negatively with information processing. Learning from an authority figure (F) correlates positively with social interaction and information processing.

TLSI vs. TLSI. The twenty-seven (27) elements of the TLSI were correlated with themselves giving seven hundred twenty-nine (729) correlations of which twenty-seven (27) are self correlations. Of the remaining seven hundred two (702) pairings, each has an identical repeat. This leaves three hundred fifty-one (351) unique pairings. Of these, sixty-six (66) correlations were at the .95 level of confidence and of these twenty (20) were at a confidence level of .99. These correlations are shown in Table 9. Forty (40) correlations are shown but these are duplicates so that the six (6) sections of the inventory are shown.

TABLE 9

TLSI correlated with the TLSI, Rho < .01

Elements	Corr.	Rho
T(AL), T(VL)	-.5703	.001
T(AQ), F	.4562	.007
T(VL), T(AL)	-.5703	.001
T(VL), Q(CP)	.4976	.004
T(VL), I	.4823	.005
T(VL), R	.5772	.001
T(VQ), K	.6293	.001
Q(V), Q(CES)	.4620	.007
Q(V), Q(CP)	.4947	.004
Q(V), L	.4573	.007
Q(V), R	.4637	.006
Q(P), Q(KH)	.5908	.001
Q(P), Q(CP)	.4573	.007
Q(CEM), Q(CK)	.4673	.006
Q(CES), Q(V)	.4620	.007
Q(CES), Q(CS)	.5048	.003
Q(CES), L	.5065	.003
Q(CK), Q(CEM)	.4673	.006
Q(KH), Q(P)	.5908	.001
Q(CP), T(VL)	.4976	.004
Q(CP), Q(V)	.4947	.004
Q(CS), Q(CES)	.5048	.003
Q(CS), I	.5216	.002
Q(CS), L	.4759	.005
Q(CS), R	.5270	.002
F, T(AQ)	.4562	.007
I, T(VL)	.4823	.005
I, Q(CS)	.5216	.002
I, M	.5085	.003
L, Q(V)	.4573	.007
L, Q(CES)	.5065	.003
L, Q(CS)	.4759	.005
L, M	.6520	.001
R, T(VL)	.5772	.001

R, Q(V)	.4637	.006
R, Q(CS)	.5270	.002
M, I	.5085	.003
M, L	.6520	.001
K, T(VQ)	.6293	.001

All correlations are positive except one, that of T(AL) with T(VL), showing clearly that those faculty who prefer to read words almost never prefer to hear words.

Study with Methods of Instruction

The twenty-seven (27) elements of the TLSI were correlated with eighteen (18) methods of instruction using a Pearson moment correlation. The twenty-seven (27) by eighteen (18) matrix gives four hundred eighty-six (486) correlations. Of these, forty one (41) correlations were at the .95 confidence level and twelve (12) correlated at a .99 confidence level. The latter is shown in Table 10.

Of the twelve, five (5) involved the F element showing a strong positive correlation between learning in an authoritive mode and an instructional format of lecturing, group discussions, and projects and showing a negative correlation using audio tapes and learning center.

TABLE 10

Correlations of the TLSI with Methods of Instruction

Elements	Corr.	Rho
T(AL), Individualized Instr.	.5356	.002
Q(S), Student Recitations	-.4571	.007
F, Audio Tapes	-.5373	.002
F, Lecturing	.5321	.002
I, Demonstrations	-.4916	.004
D, Discovery	.4634	.007
K, Lecturing	-.4498	.008
Q(CKH), Simulations	-.4761	.005
Q(CP), Learning Center	.4926	.004
F, Learning Center	-.5079	.003
F, Discussion Groups	.4941	.004
F, Projects	.4563	.007

Two mehods of reasoning show strong correlations. D or difference reasoning correlates strongly with discovery method of instruction. Deductive reasoning (D) has a strong negative correlation with a lecture format.

One theoretical element, preferring to listen [T(AL)] to words, has a positive correlation with individualized instruction. One sensory element, that of taste [Q(S)], correlates with student recitations. Q(CKH) kinesthetics or perception of motor skills and simulations as a method of instruction correlate strongly. Finally, sense of distance

[Q(CP)] correlates with a learning center mode of
instruction.

Longitudinal Study. Four (4) faculty had taken the TLSI
when the college opened in 1973 and two (2) faculty had taken
it three years ago. There was no significant change (at a
level of greater that .90 possibility of chance) in any of
the six (6) sections with the exception of one of the faculty
who was studied over a ten (10) year period. For this
faculty, the theoretical cognitive processes changed (.69
possibility of chance) and the relationship patterns changed
(.12 possibility of chance). The scores on the individual
elements remained remarkably similar.

Summary of Significant Findings

The descriptive statistics of the elements of all the
instruments gave a profile of these twenty-eight (28)
faculty. As learners, these faculty prefer to read rather
than to listen to either words or numbers; they prefer their
sensory input through the sense of touch; they are
empathetic, have a strong sense of esthetics, are committed

to their values, and have a solid sense of self. In their relationship patterns they are basically independent learners, but if they need to learn from someone else they prefer an authority figure rather than a peer. They reason in two ways: first, linearly and methodically, and second, in relationships. Inductive reasoning is preferred to deductive reasoning.

As teachers these faculty look foremost at the structure of a course, paying attention to detail and organization, and least considered is having students learn from each other. This could come from their own desire not to want to learn from peers, and thus believe that students will learn best this way too. These faculty do not believe that learning will occur by personal interaction between student and teacher. However, the faculty are people-oriented rather than things-oriented and prefer working with words rather than numbers. Their teaching style is a reflection of their learning styles. In providing instruction these faculty rely heavily on readings for instruction with a secondary emphasis on pictures and graphs. Direct experience is the least used for course work. As teachers these faculty believe that instructors have more responsibility for student learning

than students but not totally. This would be congruent with the attention faculty give to the structuring of a course and with the lack of emphasis on using peer relationships to learn.

These faculty are not committed to the basic principles of adult learning theory as espoused by Knowles (1970) and Houle (1963). Perhaps these principles are too tied to the affective or emotional aspects of these principles. This could be reflective of a low consideration of affiliation which also has an emotional base among peers and faculty.

However, even though there is a lack of regard for principles of adult learning and lack of affiliative modes of instruction, there is a belief in personal development as a source of educational ideas. This may seem contradictory at first, but these faculty believe in giving instruction that is clear and well ordered with a definite responsibility of the instructor to provide the process for learning. There may be a hope that out of this ordering the student will develop in a personal way and become an independent learner. In a sense, to go through the psychological development from the child through a crisis of adolescence to become an independent learner.

In comparing learning styles and teaching styles of
faculty, several significant correlations were found. Some
are tautological, such as faculty who use deductive reasoning
frequently like to work with numbers. Others show the
limitations of statistical measurement as reflective of cause
and effect, such as a strong sense of taste correlating with
total responsibilty of learning lying with the instructor.

However, some of the correlations give insight into what
is happening in the teaching/learning interaction. Learning
style, as measured by the TLSI, and teaching style, as
measured by the CISI, show many high correlations at the .01
level of significance. Of the theoretical elements in the
TLSI, hearing numbers and seeing numbers have significant
correlations both positive and negative. Those who prefer to
listen to numbers do not encourage students to work alone.
Those who prefer to read numbers prefer to work with logic,
computing, and mathematical problems, a not too surprising
result since this is problably where they had academic
success .

In addition, those who prefer to read numbers do not
like to work with people and believe the instructor is

totally responsible for the learning process. These faculty
have rejected the affective parts of the learning process.
Their reasoning pattern is deductive. In this study these
faculty are the mathematicians and scientists.

The difference reasoners are highly authoritative in the
classroom and do not encourage students to work alone. Part
of the description of difference reasoners is that they are
always asking what something is not. They want a comparison
or contrast. Thus, they tend to be difficult as students in
school. This correlation would suggest that when difference
reasoners become teachers, they attempt to tightly control
the environment.

Those faculty who attend to hearing are reluctant to use
readings as part of their instruction. There is certainly a
logic to this. However, four sensory elements correlated both
negatively and positively with instructor vs. student
responsibility. Without further analysis, no explanation is
possible.

Independent learners in this sample do not like to work
with things. Magnitude reasoners tend to have a high sense of
esthetics and believe instructors have a a greater
responsibility for learning than their students. It may be

that strong difference reasoning and high esthetics are the parts of the profile of a very controlling instructor in the sense of the physical environment.

The only learning characteristics of faculty committed to principles of adult learning theory are role playing and relationship reasoning. The ability to pull varied ideas together allows faculty to include student experiences in the learning process.

In viewing the connection between learning and teaching styles, as measured by the TLSI and the TSQS, the faculty member who prefers to hear numbers and learn from an authority figure emphasizes the relationships of persons to their society. At first glance it would seem that learning in an associative pattern would foster an emphasis on social interaction, but looking a little deeper one who believes strongly in a family pattern may well foster clear social relationships to continue that family pattern. Learning in a family pattern also emphasizes information processing as does hearing numbers, sense of ethics, and proprioceptiveness or mediating many stimuli. This profile is not suggestive except perhaps for the family learning pattern in which the child receives information from the parent.

Attending to sound is the only learning element that fosters behavior modification, which relies on changing external behavior. No easy explanation can be given for this. Also, no elements of a learning profile emphasize personal development as a source of educational ideas.

At this point the internal correlations of the TLSI show so many relationships that it can only be handled by further statistical evaluation through a factor analysis, which is beyond the scope of this study. It is included in the findings not as part of this study but as clues to future research.

Of the twelve (12) significant correlations of the TLSI with methods of instruction, five involved the family pattern both negatively and positively. As would be expected, faculty who have a strong family learning pattern prefer lecturing and do not use audio tapes or the Learning Center. They prefer discussion groups and use of projects which would indicate that discussion groups are considered controlled by the faculty and projects directed by faculty.

Preference for learning by listening to words gives rise to use of individualized instruction perhaps because much of individualized instruction uses listening. Faculty who attend

to the sense of taste do not use student recitation. No conclusion can be drawn from this except that correlations use a statistical tool to draw attention to certain relationships, but do not guarantee a real world explanation.

Faculty who are independent learners do not use demonstrations. It might be that demonstrations are seen as too instructor controlled and student experiments would be more appropriate.

Two reasoning methods correlate strongly with methods of instruction. Difference reasoning faculty prefer to use discovery in instruction. Difference reasoners are often very creative and it is not surprising to see that they would use a creative form of instruction. It is easy to see the connection with strong negative correlation of deductive reasoning and with lecturing since the deductive reasoners in this sample were mathematics and science teachers who have a serious commitment at this college to alternate forms of instruction.

Mediating many stimuli at one time (propriceptiveness) gives rise to faculty who use the Learning Center. In this population, learning center means the model at BHCC which

uses all modes of instruction including video, films, and slide presentations, all with written interactive packages. Thus, a proprioceptive learner would feel comfortable in this environment.

No explanation is given for the negative kinesthetics correlation with simulations. It may have some inverse relationship with gross motor control, but no conclusion is drawn here.

C H A P T E R   VI

CONCLUSIONS, SUMMARY, FUTURE RESEARCH

Part I

The first part of the study dealt with a comparison of the TLSI and three teaching style inventories: the CISI, the PALS, and the TSQS. As part of the statistical analysis, means and standard deviations were run. These gave interesting results in and of themselves. On the TLSI the six (6) sections gave a profile of the faculty. It is not surprising that the preferred way of obtaining theoretical information is through reading rather than hearing. After all, faculty have been successful in life by excelling in school which uses reading as the primary way to learn. It should be noted, however, that the primary preference for sensory input is through touch. At this time no explanation is given for this.

Motor processes are not of great importance. Again, faculty have been successful through intellectual pursuits rather than through athletic ones.

Of the eight (8) elements stressing the socialization process, it is not unusual to find community college faculty empathetic, committed to their work, and having a strong sense of self. However, it was not expected that the element of histrionics or role playing would be the lowest of the socialization processes. Good faculty are often noted for their fine performances. Indeed, forms for administrative evaluations of faculty in the classroom ask for a rating of good performance. Possible explanations will be given in the discussion of Part II when the methods of instruction of these faculty are considered.

In the three (3) elements on relationship patterns it is astounding to note the absence of associative learning. That faculty wish to learn on their own or from an authority figure gives rise to many questions in the managing of educational institutions. Traditionally, the governance model for community colleges has stressed collegiality, and, indeed, even in the era of collective bargaining colleagial rights have been maintained as part of negotiations. This implies governance by peers, decision making by peers, cooperation with peers, and learning from peers. The lack of

strength of this element may be the reason why collegial
governance has had so much difficulty.

In the methods of reasoning, magnitude and relationship
reasoning are the preferred inductive reasoning patterns.

In the CISI it is important to note that detail and
organization are far more important to faculty than an
emphasis on affiliation. Of further interest is the desire to
work with people and words rather than things. This is in
keeping with the traditional image of community college
faculty. Also in concurrence with that image is the idea that
responsibility for learning is more with faculty than with
students.

These community college faculty are not totally
committed to the principle of adult learning, as evidenced by
a low score on the PALS.

Means and standard deviations of the TSQS did not yield
much information not obtained previously.

Of these three instruments the most impressive
correlations with the TLSI are with the CISI and the TSQS. Of
the possible five hundred sixty-seven (567) correlations with
the CISI, fifty-eight (58) or 10.2% were at the .95
confidence level and twenty-eight (28) or 5% were at the .99

confidence level. Of twenty-seven (27) correlations with the PALS, no elements correlated at the .99 level and two (2) or 7.4% at the .95 level.

It can be concluded that there are significant correlations between the TLSI and other self perception instruments that measure teaching styles. There is significant evidence that a profile of faculty learning style is an indication of teaching style, to warrant further study. Indeed, the reasearch does show strong correlations on the way faculty learn and teach. Factor analysis may be helpful in determining underlying learning/teaching factors. Correlation studies should also be done with teaching inventories of a different sort such as those involving observation of teaching by students or peer professionals rather than self perception instruments.

Part II

Although an attempt was made to choose the population randomly and from a variety of programs, these faculty did come from one community college, and that college has a strong commitment to innovative modes of instruction. This

can be seen in the means of the survey instrument. The most highly used method of instruction was individualized instruction followed closely by use of video tapes, audio tapes, Learning Center, and programmed instruction. Fifth on the list was the traditional lecture method. Since a good lecturer must make use of good role playing, it would be expected that this population would not have this as a strong element of their style. Indeed, this is the case as evidenced by the low score for the element of histrionics Q(CH) on the TLSI.

Of interest on the correlation of learning style with methods of instruction is the strong appearance of the F element on the TLSI with five methods of instruction, three positive and two negative. Learning from an authority figure (F) gives rise to lecturing, discussion groups, and projects on the part of faculty, and not learning well from an authority figure gives an emphasis on the use audio tapes and use of learning center.

This may seem to be a skewed group of faculty tending towards nontraditional forms of education; nevertheless, it is not untypical of faculty in community colleges where programmed instruction, learning centers, and audio tutorial

courses have become the norm. In this sense, the population is not skewed.

Clearly, however, future research should include institutions that have a more traditional instructional approach. In fact, during the course of this study seventy (70) faculty from other Massachusetts community colleges were given the TLSI and the survey instrument but not the teaching style inventories. Two items were noted. First, these faculty, as with the faculty in the study, showed the same preference for learning independently and from an authority figure and also a clear preference for not learning from peers in an associative pattern. Second, in contrast, the prevailing method of instruction was the lecture followed closely by use of discussion groups. Thus, there is evidence to suggest that the population used for this study is both typical in their relationship patterns and atypical in their choice of instructional methodology.

Part III

It was certainly serendipitous that learning style profiles taken in the first years of the college are still

extant. Although the sample is small, there are amazingly few
changes over time. The one exception was the youngest faculty
member of the six (6). In the ten (10) year span he had gone
through formal study, the only one of the six to do so.
Further research with a bigger population is clearly needed
before more generalized results can be seen. Since, for the
purposes of the study, learning is defined as a change in
behavior, it can be expected that learning styles will change
over time. Future research should include time studies of age
groups in a much more flexible time of life. In this study
the youngest age span was 25 to 32. It would appear that
learning styles do not change but future research should
include changes in teaching styles over time.

Summary and Future Research

This study has been basically an exploratory study. At
the beginning there seemed to be a plethora of inventories
that might be helpful in looking at teaching styles, but it
turned out that only three were suitable because of their
content and data of validity and reliability. It seemed that
the kinds of instruction faculty used would be important to

the teaching/learning interaction. The research for this study indicates that this is so, but that finding is not conclusive. However, the basic model is beginning to emerge. In Chapter III, a topological model is given for the formal learning space. The center part of it is repeated here in Figure 11.
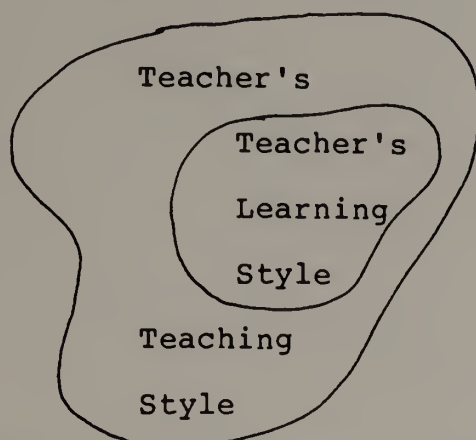
Teacher's

Teacher's

Learning

Style

Teaching

Style

Figure 11. Subspace of student life space

In Chapter II Kuchinskas (1979) was quoted as saying:

> The teacher's cognitive style determined how students would learn. The teacher's cognitive style influenced the learning environment more than any other factor.

Bennett (1976) in the same section was quoted:

> Teaching style was statistically and educationally significant in all the attainment areas tested in this study.

Thus, this area shown in Figure 11. is the one that influences the educational process the most. Although some studies have been done investigating this area, the focus has been either on the teaching style or on the learning style of the faculty member but not on the interaction of the two. The present study holds promise for further research on this very critical area. Factor analysis could give clear indications of elements important in the teaching/learning connection.

It may be asked why the study of this area is important. In their teaching most college faculty in higher education work in a highly isolated way. Except for an occasional classroom visit by an administrator for evaluation purposes, professional observation of the teaching/learning process is rare. Thus almost nothing is known about this process or the interaction, even by faculty themselves. Consequently, in general, faculty continue to teach as they were taught, modifying only occasionally when necessity demands it.

Many faculty are introspective and do look at themselves in connection to their students learning but really do not know how to evaluate the process. By using inventories that give them feedback about their own learning and teaching, that allow them the opportunity to learn about other faculty,

and that give teaching/learning factors, faculty will have a framework in which to look at their own situations and to judge in what ways the learning environment, influenced by their styles, can be enhanced.

The modes of instruction for the future are now not certain. But what is certain is that it will not be as it is now. The powerful new technologies will bring new ways to learn. It has been well documented that the traditional teacher will change and be more of a facilitator of learning than a deliverer of a body knowledge. Of course, there will have to be an accomodation on the part of the learner, but there will be an even greater accomodation on the part of faculty. This study has explored the ways in which faculty teaching style is influenced by their learning style. The task now at hand is how to use faculty learning style to emphasize different characteristics of their teaching style. How can the many facets of style be used to design instruction that faculty find comfortable and effective.

The next decade will see more changes in instruction than we have seen in the last 25 years. Faculty will no longer be able to teach as they were taught. It is this author's belief that faculty will accept this challenge and

will do so by understanding the ways in which their teaching is affected by their own learning patterns. The many and varied learning styles of faculty can be used to develop new modes of instruction. Thus, it is hoped and expected that the area of the students' psychological space occupied by the teacher's styles will become an asset in the learning process.

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APPENDIX

Survey of Mehtods of Instruction

Name   Date

College   Position

If teaching, please answer below.

Discipline

In your instruction do you

                              Often? Some-   Never?

                                     times?

1. use audio tapes

2. use individualized

instruction

3. lecture

4. use discovery method

5. use student recitations

6. use an overhead projector

7. use demonstrations

8. have students role play

9. assign papers

10. have students use a lab

11. use tutors

12. have students use a

learning center

13. use programmed instruction

14. have students in clinical

15. use simulations

16. have students in discussion groups

17. use films or video tapes

18. assign projects

19. use other instructional techniques (specify)