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Education, teacher training

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1967
THE DIFFERENTIATING EFFECT OF A QUESTIONNAIRE
BASED ON LEARNING PERSPECTIVES

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

George Eley, Jr., B.S., M.Ed.

* * * * * * *

The Ohio State University
1966

Approved by

Lorley W. Harding
Adviser
Department of Education
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CHAPTER I

THE PROBLEM

I. Introduction

Teaching and learning, when positively stated, are complementary terms. Teaching, used in the positive sense, occurs only if learning also occurs. This is not to say that an "other person" teacher is requisite to learning, for a person may "teach" himself or may be "taught" by that nebulous entity, experience. It is reasonable, therefore, to postulate that an understanding of the learning process increases the effectiveness of the teacher. Teacher education institutions apparently act upon such a premise by including educational psychology courses in their curricula. The learning process is also touched upon informally in most, if not all, education courses. It could, therefore, be expected that teachers should have an understanding of the learning process—but do they?

There are several reasons to suspect that teachers actually may not understand the learning process, or that all may not understand it in the same way. Consider the situation in learning theory. There have been varying theories about learning, even in this century. None of these theories has yet been accepted as explaining learning in a comprehensive way. Consider the effect of ordinary life experience. Everyone has been a learner and has, perhaps, synthesized
rather unique concepts about the nature of learning out of his experience. The individual has also normally been exposed to some given body of colloquialisms about learning, such as "He who learns slowly, learns well." To what extent does this affect concepts about the learning process? Consider the diversity of most school staffs in relation to time and place of teacher preparation. When this is coupled with the normal interplay of ideas about educational theory and practice, what might be the end result? In view of these, and possibly many other factors, can one be assured of the effect of formal instruction about learning upon teachers' understandings of the learning process? What, then, is the nature of teacher beliefs about the learning process? This would seem to be an important question to be asked in teacher education institutions. It is the question that motivated the writer to undertake this study.

II. Introduction of Special Terms

The purpose of this section is to introduce two terms that are used extensively in this report.

Learning perspective

The term learning perspective was selected as a means of signifying a particular way of looking at, or thinking about, learning. Orientation is sometimes used in defining perspective, and seems appropriate here. For example, were one to ask three persons what learning is, the first might respond that it is difficult and unpleasant; the second that it is mastering subject matter; and the third that it is acquiring the ability to solve problems. Each of
the three persons has a different orientation toward learning. Presumably, each could possess a number of other attitudes consistent with his initial response. These attitudes would comprise a learning perspective. Thus, a learning perspective was conceived as a somewhat impressionistic interpretation of learning, rather than the more structuralized interpretation of the learning theorist. The reader will find further clarification and justification of this term in Chapter III.

**Differential response**

A differential response to the questionnaire was deemed to have occurred when a score range was equal to or greater than six points on the twenty-four point scale used to tabulate responses. Six points was equivalent to the distance between any two adjacent responses that the respondent could make, such as agree, strongly agree, and so forth. A score range of six points or more was called a differential score. The varied applications of differential scores and their statistical treatment are described in Chapter V.

**III. Statement of the Problem**

The purpose of this investigation was to determine whether an instrument based on six learning perspectives would elicit, from teachers, differential response patterns. To accomplish this purpose, the writer—

1. Formulated a broad sample of descriptive statements of behavior associated with learning and instruction, representing six different perspectives according to which learning may be explained.
2. Constructed a questionnaire composed of approximately equal numbers of statements that seemed to represent each perspective, while also discriminating that perspective from the others.

3. Administered the questionnaire to 214 practicing teachers.

4. Analyzed questionnaire data to determine whether differential response patterns did occur.

IV. Limitation of the Problem

1. The orientation of this investigation was more educational than psychological, inasmuch as the investigator's professional preparation and experience had been as an educator. It may be, therefore, that the results of this investigation will be of more interest to educators, especially those in teacher education, than to psychologists specializing in the area of learning.

2. The investigator did not attempt to establish either the content of teacher beliefs about learning, or that the instrument employed actually measured beliefs about learning. While it is true that the larger goal of identifying teacher beliefs about learning did motivate this study, the investigation was limited to determining whether the instrument employed elicited differential response patterns, without reference to what the patterns signified.

V. Assumptions

1. Teachers do have beliefs about the nature of the learning process.

2. Teachers' beliefs about learning, or a portion of such
beliefs, can be subsumed within the set of perspectives developed for this investigation.

3. There are discernible differences among teachers in their beliefs about the nature of the learning process.

VI. Hypothesis

The hypothesis of this investigation was that an instrument consisting of expository statements derived from six learning perspectives will elicit from the teacher sampling data that will reveal different patterns of indicated agreement with the six perspectives employed.

VII. Organization of Remaining Chapters

Chapter II discusses learning theory and the status of teacher beliefs about learning. The intent of this chapter is to establish the need for more evidence of teacher beliefs about learning.

Chapter III describes the evolution and the meaning of learning perspectives in this investigation.

Chapter IV describes the development and the administration of the questionnaire employed in this investigation.

Chapter V explains the analysis and statistical treatment of the data yielded by the questionnaire.

Chapter VI summarizes the findings, presents conclusions, and lists recommendations that seem to follow from the results of this investigation.
CHAPTER II

THE FIELD OF INVESTIGATION

The purpose of this chapter is to establish the base from which the questionnaire of this study evolved, and to which it may eventually contribute. The two major topics dealt with in this chapter are, learning theory and teacher beliefs about learning.

I. Learning Theory

This investigation was motivated by an interest in the nature of teacher beliefs about learning. The writer proposes that an understanding of the history of learning theory can contribute to an understanding of teacher beliefs about learning. This section, therefore, will present an interpretation of certain important events in the evolution of learning theory. Limitations of space preclude discussing the content of learning theory except where it is needed to explain the events themselves. Books by English,¹ Heidbreder,² and Hilgard³ have been especially helpful in developing a background.


for this section, and are recommended to the reader who desires more information about the events discussed.

The evolution of learning theory

Learning is traditionally one area of psychology. Psychology, however, is deeply rooted in philosophy, so that learning, too, has philosophical roots. The writer begins with a philosophical event of major importance in Western culture.

Plato's mind-body distinction. Plato formulated the construct that all things could be classified as either mind or matter. In terms of man, there was a dual aspect—mind and body. This has become known as the mind-body distinction and referred to as dualism. Mind and body were viewed as being definitely unlike, somewhat independent, and perhaps even opposing entities. Ideas were the stuff of the mind, whereas matter was known to the mind via senses of the body. The implication was that while the body aided the mind, the workings of the mind were somehow remote from, and superior to, the workings of the body. Plato thus established a mode of thought that dominated consideration of man's nature into the nineteenth century. Psychology did not emerge as a science until scholars learned to take a naturalistic view of both mind and body. Before this latter event occurred, however, a second event in the evolution of learning theory was to take place.

Early psychological schools. The Renaissance marked the beginning of a reconsideration of man's nature that led to the formation of several schools of thought that were to prove significant for learning theory.
Associationism, the major early psychological school of thought, was well formulated by the middle eighteenth century. It adopted an atomistic concept of mind whose basic units were the single sensation and the single idea. Complex sensations or ideas were simply combinations of their more singular correlates. The major point, and the one for which this school was named, was that ideas become associated so that the recurrence of one tends to result in the recurrence of the other. Learning was, therefore, a process of acquiring associations. The mind was still considered as being distinct from the body, but the preliminary understanding of the nervous system then available, helped conceptualize sensation as being the intermediary between mind and body that leads to ideation. The mind became, in the process, a bit more knowable and was viewed more naturalistically. Associationism, dominated by British and Scottish scholars, was "the" major early school of psychology in terms of advocates, longevity, and sophistication of concepts. One other school is now added, however, because of its special impact on educational thinking.

Faculty psychology originated in Germany under the leadership of Christian Wolff. Wolff postulated that mind consisted of a number of powers or faculties related to functions such as reasoning, remembering, imagining, and so forth. To learn was to develop these powers through use. This school was not widespread, and was soon refuted, but has nevertheless continued to influence educational practice.

In conclusion, psychological thought had developed to the point that the workings of the mind were theorized rationally and/or
empirically. Psychology had a base from which to become experimental.

Experimentation applied to learning theory. The application of experimental methods to problems of learning was as significant an event for learning theory as it was for psychology generally. It marked the advent of psychology as a science, and, of course, established a scientific basis for learning theory. Hermann Ebbinghaus and Edward L. Thorndike were two pioneers in this field.

Ebbinghaus's experimentation with the memory function was the first with cognitive processes, and among the earliest of psychological experiments. His use of nonsense syllables and of the memory drum constituted a modus operandi still in use, and his findings were later verified.

Thorndike's invention of the problem box was important in two respects. First, it was a technique for studying learning problems with animal subjects, and second, it dealt with motivation, reward, and punishment for the first time. The problem box, like the memory drum, was widely adopted in psychological laboratories. Thorndike also studied the effect of reward and punishment with human subjects, using vocabulary items. One of Thorndike's other experimental contributions to learning theory was his disproof of the doctrine of mental discipline, which had been derived from faculty psychology.⁴⁵

⁴⁵Reported in 1885.

⁵E. L. Thorndike, "The Influence of Improvement in One Mental Function upon the Efficiency of Other Functions," Psychological Review, VIII (May, 1901), pp. 247-61.
Experimentation produced data, which generated more experiments, and eventually more theorizing. This pattern persisted through the first two decades of this century, at which time theory differences became sufficiently prominent that the next event in learning theory was underway.

The era of competitive learning theories. Disagreement was not new to psychology. Prior to the 1920's, however, debate had not centered specifically around learning theory, but around the general content and method of psychology. As a matter of fact, learning theory differences, when they did become more crystallized, still did not dominate psychological thinking. Why, then, is this era thought of as a period of debate? Three reasons are suggested— all somewhat speculative.

The first reason is that the emergence of Gestalt psychology at this time tended to result in a cleavage into what Hilgard later classified as stimulus-response and cognitive families of psychology. The situation in learning theory, therefore, was conducive to the development of a "choice orientation" attitude toward learning theories. This cleavage centered mostly around the two issues of atomistic vs. holistic, and mechanistic vs. cognitive interpretations of learning. The seeds of division actually had been sown much earlier, as the associationists had postulated an atomistic conception of mind, and William James had viewed mental processes holistically in his "stream of consciousness." We might think of the atomistic-mechanistic

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position as having been perpetuated in Thorndike's connectionism and Watson's behaviorism, while the holistic-cognitive position had been perpetuated in functionalism. Still, debate had not been too apparent prior to the 1920's.

The second reason is that psychology was experiencing what might be called a period of youthful optimism. Experimentation had yielded a quantity of data, theoretical systems were becoming more complex, and, perhaps, psychologists and laymen alike felt that we were on the verge of a satisfactory explanation of learning. Such a feeling could well have generated loyalty and enthusiasm for the various theoretical systems, enhancing a competitive atmosphere in learning theory.

The third reason is that this was a time of change in America—especially so in education. A renewed dedication to democracy was the spirit of the times. The educational leadership was then viewing the schools as a means of bringing about a more democratic society. In addition, man was viewed as an independent agent, able to work changes upon his environment. Stimulus-response psychology acquired a negative, and cognitive psychology a positive, valence in the light of these philosophical constructs. The two families were viewed as conflicting, rather than complementary, and talked about in that light. Thus, in a sense, the debate was intensified to some extent by those outside psychology.

The era of competitive theories was also one of continued growth of data and theory. Learning theory, possibly as a result of this growth, evolved toward the next, and current event in learning theory.
The integration of learning theory. Two articles7,8 appeared in 1935 decrying the tendency for advocates of particular learning theories to adopt a mutually exclusive attitude. The NSSE yearbook on learning, appearing in 1942, was written with the expressed purposes of showing that "... systems possess many fundamental points of agreement..." and that "... theoretical positions are to a considerable degree complementary..."9 Finally, Hilgard declared that "... the era of the 'great debate' among the major theories is over."10 What factors led to this decline of debate?

In the first place, psychologists and educators came to realize that a fully satisfactory theory of learning had eluded formulation. In the second place, the various learning theories were yielding respected data. In the third place, experimentation did not always support previous theory. Thorndike found it necessary to modify his laws of exercise and effect. Lashley, a behaviorist, concluded from his research involving destruction of cortical tissue, that the cortex acts as a whole rather than in separate parts, as had been postulated

10Hilgard, Theories of Learning and ..., 417.
These and possibly other factors raised the following questions:

1. Had terminological differences been given too much importance in the interpretation of other learning theories? Had terms been interpreted as representing real entities rather than operational constructs?

2. Was learning a complex process, with different theories actually relating to particular aspects of learning?

3. Was a "conflicting learning theory" orientation tending to reduce openmindedness, and thereby restricting the development of learning theory?

Regardless of reasons, the conflict among learning theories did begin to abate during the 1940's, and this condition has persisted to the present. What has happened in the interim?

There has been a broadening within the stimulus-response family. Hill concludes: "Perhaps the most striking trend that we observed in recent learning theory was the effort of connectionist theorists to broaden their systems so they could predict the flexible, insightful behavior of most interest to cognitive theorists." The opportunity for reciprocity in the cognitive family is somewhat lacking because the bulk of American psychology is of the stimulus-response type. However, Tolman, a cognitive theorist, did concede that stimulus-response explanations were probably appropriate for the motor aspect of learning. The net result seems to be that the two-family cleavage is breaking down. The cognitive family has lost much of its

11 Heidbreder, 265.


13 Ibid., 124.
identity, but its cognitive and holistic foundations have been incorpo-
rated, to some extent, into stimulus-response psychologies.

A second dimension of the integration of learning theories has
been a renewed interest in integrating learning theory more adequately
into educational practice. This has been a long-term interest of
Hilgard's, and more recently Gage has been advocating such an inte-
gration.* Theories of teaching and theories of education, both
utilizing learning theory, seem to be increasingly mentioned in
educational literature.

Summary and postscript. This discussion of the evolution of
learning theory has proceeded from the mind-body distinction, through
the early psychological schools, the application of experimentation
to learning, the era of debate, and, finally, the integration of
theory. So it is that the present status of learning theory repre-
sents the culmination of over 2,000 years of Western man's thinking.
We are obviously still in the course of that evolution. There is,
for example, a proliferation of data in learning theory as in most
areas of science. New approaches are being investigated and some old

14 Gage suggests that teacher education programs have previously
tended to infer teaching methods from learning theory. He advocates
translating theories of learning into theories of teaching which will
serve as a basis for planning and guiding teaching behavior. (Hilgard,
Theories of Learning and..., pp. 268-85.)

15 Hilgard, Theories of Learning and..., 268-85.

16 N. L. Gage (ed.), Handbook of Research on Teaching (Chicago:
ones reexamined. This, in itself, may represent a new event in learning theory, or it may initiate some new event. And so the original question, "How does man learn?", has not been fully answered. In dealing with this question, ideas have tended to recur. Heidbreder notes:

Thus while psychology was still a part of philosophy, many of the patterns of thought that were to become prominent later had already appeared. This means neither that the later modes of thought were consciously borrowed from the earlier, nor that the discoveries of modern science were implied in ancient speculations. It means rather that the same problems were perceived in the same ways, and that they gave rise to the same methods of attack.

Hopefully, consecutive attacks have been at higher levels. Out of this evolution of theory, then, has come a gradually enlarged understanding of the problems that the original question poses. Perhaps these constitute a residue, some of which will eventually be a portion of that "ultimate residue" that Heraclitus believed to be truth.

II. Teacher Beliefs About Learning

This section is concerned with three aspects of the topic, teacher beliefs about learning: (1) the evidence of teacher beliefs, (2) restrictive factors, (3) the need for more evidence.

The evidence of teacher beliefs

A review of the literature reveals a scarcity of research providing direct evidence concerning the nature of teacher beliefs about

17 Some examples are, mathematical models, cybernetics, neurological research, RNA research, computer theories, and communication theories.

learning. It is possible, of course, that related research has been reported, but is not identifiable from research or article titles. Surveys of educational practices might serve as a basis for inferring the existence of particular beliefs about learning. However, no study was discovered that related the findings of such surveys specifically to learning theories or beliefs.

A review of the literature did locate one writer who has had a longterm interest in teacher understanding of learning theory. Weber apparently became interested in this subject as a result of an investigation of inservice practices. His doctoral dissertation and a report to the North Central Association apparently resulted from that investigation. Referring to the same study, Weber states:

A few years ago a study was made of problems discussed by teachers in faculty meetings, including general meetings, departmental meetings, and all other types of meetings, formal and informal. It is significant to note that "how children learn" was almost never studied.

Weber more recently reports on the findings of a class of graduate students who asked 156 teachers the question, "What is your understanding of the nature of the learning process; how, in your opinion,

---


do children learn? The eight categories into which answers were grouped are reproduced in Table 1. The categories in Table 1 seem to have been determined by the answers obtained, and are of interest in themselves. The finding that 33 percent of the teachers are grouped in the category, "Do not know; had not thought about it" (italics not in the original), seems particularly noteworthy.

TABLE 1
How Children Learn—Results of a Teacher Survey

<table>
<thead>
<tr>
<th>Rank</th>
<th>Category</th>
<th>Number Replies</th>
<th>Percent Teachers Giving This Reply</th>
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<tr>
<td>1</td>
<td>Children learn through drill and repetition</td>
<td>73</td>
<td>47</td>
</tr>
<tr>
<td>2</td>
<td>Children learn by imitating others</td>
<td>59</td>
<td>38</td>
</tr>
<tr>
<td>3</td>
<td>Do not know; had not thought about it</td>
<td>51</td>
<td>33</td>
</tr>
<tr>
<td>4</td>
<td>Children learn by hard work</td>
<td>40</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>Children learn by following directions of teachers</td>
<td>33</td>
<td>21</td>
</tr>
<tr>
<td>6</td>
<td>Children learn by trial and error</td>
<td>27</td>
<td>17</td>
</tr>
<tr>
<td>7</td>
<td>Children learn by maturation</td>
<td>19</td>
<td>12</td>
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<tr>
<td>8</td>
<td>Miscellaneous</td>
<td>11</td>
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</table>

Total number of replies from 156 teachers 313


In summary, there is only sparse evidence concerning the nature of teacher beliefs about learning. The limited evidence that is

available does not generate a great deal of confidence in teachers' abilities to verbalize their beliefs about learning.

Restrictive factors

This section is devoted to a presentation, or case, advocating the hypothesis that certain factors tend to restrict the development, by teachers, of more adequate understanding of learning theory.

The presumptive factor. The presumption that the learning process is comprehensively understood is one of the original restrictive factors. This need not take the form of a feeling of personal proficiency in relation to learning theory. Rather, one may assume that such knowledge is available in the literature for the person who would do the necessary research. What is the source of this presumption?

Perhaps the source is in what English23 refers to as an orthodox doctrine of learning held in Western culture. This is a rather nebulous belief that traces back to the mind-body distinction and generally reflects the evolution of learning theory up through Thorndike's connectionism. An orthodox doctrine, such as this, would tend to perpetuate, among the general public, the notion that learning is understood. Then, too, teacher education programs do not challenge this assumption. Teachers and textbooks, naturally enough, stress those aspects of learning on which there is relative agreement, which tends to elicit greater confidence in our knowledge of learning than learning theory can necessarily justify.

23English, 16.
The language factor. Psychology has inherited an essentially prescientific terminology, sometimes referred to as mentalistic. Heidbreder, in discussing the psychology of William James, referred to this language problem:

Our words were forged by common sense, not by science; they were made to serve the practical needs of everyday life, not to mirror thoughts and feelings. Consequently, no reliable correspondence exists between words and the facts of consciousness, and words distort our vision of psychological material. If there is no word for a mental fact, we tend to overlook the fact itself; we find it hard even to believe that such a fact exists. On the other hand, if there is a word that purports to denote a mental process, we tend to believe in the process even if there is no introspective evidence of its existence.²⁴ Terms such as, mind, thinking, and learning are difficult to define, yet have had a very long and widespread usage in society. Psychologists and teachers alike begin with some sort of "common sense" meaning of these terms which English²⁵ suggests may rest on unrecognized and unquestioned sets of philosophical assumptions. It is reasonable to expect that this language problem, which has tended to cause problems for psychologists, may also restrict teachers' understandings of the learning process.

The philosophical factor. The somewhat overlapping concern of philosophy and psychology is a recurring point in the consideration of learning theory and teacher beliefs about learning. Psychology did emerge out of philosophy; psychological terms do tend to be value laden; and at least two well known psychologists (William James and

²⁴Heidbreder, 174.

²⁵English, 2.
John Dewey) did shift from psychology to philosophy. There is also
the suspicion that particular psychological theories did not always
develop completely independently of philosophical orientations toward
man's nature.

Regardless of whether psychologists can avoid blending phil-
osophy and psychology, teachers apparently cannot; for education is
a moral enterprise. Teachers commonly believe that the type of
schooling a person receives is likely to affect not only his scho-
lastic success, but the kind of person he will become. Teachers'
feelings about the nature of man and his role in society (rooted in
philosophical assumptions) are apt to affect their openness to psycho-
logical concepts. The tendency for educators to prefer cognitive to
stimulus-response theories of learning, during the period of com-
petitive theories would seem to illustrate this point.

The expectancy factor. The expectancy factor, here postulated,
operates once a teacher is certificated. The teacher, at that point,
is recognized as something of an authority on learning. This expec-
tsancy operates not only with the general public, but within the pro-
fession. Weber's findings (see p. 16, quote 21) would seem to support
the latter point. In terms of graduate education courses, seldom is
the question posed, "How do we learn?" or "What is learning?" The
consternation that such questions might evoke can be imagined by
students of the late H. Gordon Hullfish, who achieved a certain
notoriety at The Ohio State University for his question, "What is
mind?" The point here is not that teachers are unable to answer
these questions, or that the inability to do so should be a cause for
chagrin. The point, instead, is that the expectancy factor tends to reduce the chances that teachers will reexamine their beliefs about learning. To that extent, the expectancy factor restricts the opportunity for continued growth.

The need for evidence

This discussion of teacher beliefs about learning suggests at least two thoughts. The first is that the nature of teacher beliefs is not clearly established, and the second is that there is some reason to question the adequacy of teacher beliefs. The validity of the second thought can be examined through research. It is commonly assumed that an understanding of learning is essential for teachers. If this be so, there are proper grounds for an investigation of teacher beliefs about learning.

III. Summary

This chapter has presented three theses. The first is that there is reason to question the adequacy of teacher beliefs about learning. The second is that the difficulties teachers experience in developing an understanding of learning are, in part, contingent from the history of learning theory. The final thesis is that there is a need for more evidence concerning the nature of teacher beliefs about learning.
CHAPTER III

THE HISTORY OF THE INVESTIGATION

This investigation was concerned with exploring the possibility of identifying teacher beliefs about learning. It involved the development and limited testing of an instrument based on learning perspectives. The evolution of the concept, learning perspectives, consumed the major period of this investigation and is the subject of this chapter.

The search for a reference structure of learning concepts that could be used to examine teacher beliefs about learning was the major task of this investigation. Learning perspectives, elements in the structure that evolved, are, in the writer's view, its major accomplishment. This is not to say, of course, that they will prove to be effective in terms of the fundamental concern. This chapter first describes the evolution of learning perspectives, and then presents each of the six perspectives.

I. The Evolution of Learning Perspectives

H. Gordon Hullfish's question, "What is mind?", initiated an interest in mind that was eventually broadened to include learning, the initial objects of this investigation. It occurred to the writer, at some point, that teachers are seldom if ever asked to explain how children learn. In fact, there is very little direct evidence in the
literature of teacher beliefs about learning except as might be infer-
rable from surveys of present practices. Yet "good" practices do not
necessarily signify understanding of learning. They may merely
represent technical proficiency without any real understanding of
learning. So the question arose, "Is the nature of teacher beliefs
about learning a problem in education?" The position here is that we
cannot know until that "nature" has been identified.

The search for a conceptual reference

The writer assumed from the start that teachers do have beliefs
about the ways in which learning occurs. He did not assume, however,
that these beliefs would be easy to measure. The problem was to develop
some sort of a conceptual reference structure to which teachers could
be asked to react. Of course, the obvious restriction of such a
structure is that teachers are limited to responding in terms of what
the structure presents. Thus, there was a dual concern to develop a
structure that would be meaningful to teachers, and still would have
some relationship to learning theory. This search passed through four
preliminary phases before the accepted structure, learning perspectives,
evolved.

Mind-learning relationships. The writer originally considered
the hypothesis that there is a relationship between teachers' con-
ceptions of mind and their conception of learning. This hypothesis is
advocated by Bode.1 It was decided to explore the possibilities of

1B. H. Bode, How We Learn (Boston: D. C. Heath and Co., 1940),
Preface.
this hypothesis by asking teachers to compose answers to the following questions:

Choose between 1 and 1a

1. What are the educational implications of "mind"?

1. (a) What, if any, relationships are there between "mind" and the learning process?

2. What are some of the alternative theories of how learning occurs? To what extent do you agree or disagree with each one?

A second question sheet, relating to learning only, was simultaneously prepared to further explore the usefulness of this method of collecting data. It asked:

1. Briefly describe an unusually good (or bad) learning experience that you have had. Include information such as on the setting, the content learned, your relationship to other people in the situation, etc.

2. List any factors that you believe may have contributed to the success (or lack) of this experience.

Fourteen teachers who were attending summer school generously cooperated in this exploratory phase. The information that their answers provided, however, was rather limited. It seemed that their conceptions of mind were particularly vague, which led to the decision to limit this investigation to beliefs about learning. It was also concluded from this experience that a one- or two-question instrument was not going to provide a sufficient basis upon which teachers could reveal their beliefs.

Two other approaches were then considered. The first was to develop a sequence of perhaps from five to ten penetrating questions about learning, to which teachers could respond in writing or in a personal interview. The second was to develop a larger number of
items to which teachers could be asked to make a more structured response. The more structured approach appealed more strongly to the investigator and was selected.

**Learning theories.** Consideration was next given to the possibility of comparing teacher beliefs with contemporary learning theories. This approach was rejected, however, because it became apparent that particular theories are not always related to specific practices and because learning theories are now regarded as more complementary than conflicting. As a result of his own teaching experience, the investigator also believed that teachers are more interested in finding things that work with children than in conceptualizing a theoretical basis for their actions.

Thus it was that learning theories were rejected as an exclusive basis for the present effort to examine teacher beliefs. However, they might still contribute to some other structure for examining teacher beliefs.

**Learning theory-orientation.** The next major step was the postulation of divergent points of view about learning, called theory-orientations. These are visualized as having an impact on teachers in the field and being related to learning theory, but not representing specific learning theories. The three orientations selected were the classic, the behavioral, and the current professional orientations.

The classic orientation was conceived as being rooted in the classical view of man and of knowledge. It was an intellectualistic
orientation deriving its theoretical justification to some extent from faculty psychology and the doctrine of formal discipline. Educational critics, such as Mortimer Adler, Arthur Bestor, and John Keats were considered to represent the power structure of this orientation.

The behavioral orientation, represented by programmed instructional materials, was a direct outgrowth of Skinner's work with operant conditioning. The writer thought of this orientation as being related to conditioning theory. The power structure here was largely in the form of commercial programmed materials.

The current professional orientation was conceived as being a consensual body of beliefs about learning held by those in teacher education institutions. This was to be determined by scanning educational texts, noting assumptions about learning, and selecting those that seemed to be widely held. It was expected that emphasis on cognitive interpretations, student purpose, interaction with environment, maturation, and individual differences would be apparent. The power structure here was represented by teacher education institutions and professional organizations.

The problem that developed with theory-orientations, as they were conceived, was that the three orientations were not equivalent types of structures. The behavior and classic orientations represented rather distinct positions, but the current professional orientation was a broad, eclectic one, and might even overlap the other two in some respects. Thus, it was decided to reject this approach.

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The rejection of structures. The discovery of a structural base for examining teacher beliefs had been so elusive that it was decided to abandon this goal and simply collect a series of statements about learning that represented a broad spectrum of thought. Teachers could be asked to react to these statements on an agree-disagree basis, and the results could be examined for the existence of patterns or trends.

The primary sources used by the investigator for the selection of statements about learning were the NSSE yearbooks devoted to learning, a book by Lumsdaine, and critics. Occasionally a statement would be taken from miscellaneous sources, such as newsletters, educational and psychological articles, and so forth. No

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4Hilgard, *Theories of Learning and*...


attempt was made to record the source of statements. They were sometimes extracted verbatim and sometimes paraphrased from the literature. Occasionally the investigator would compose a statement that had been suggested by a particular passage or expression of thought. The criteria for selection were that statements be related to assumptions about learning and that they seem meaningful from a teacher's point of view. Statements selected related to learning in general, to curricula, and to methodology. Over two hundred statements were compiled in this fashion.

As the statements accumulated, it became increasingly apparent that a selective system would have to be devised in order to reduce the number of items. At this point, the investigator's need for organization became operative and led to the rejection of the unstructured approach.

Learning perspectives. The investigator cast about for a structural reference for categorizing the statements to help in making a final selection. The idea of general viewpoints about learning kept recurring, although it had once been rejected. The thought finally arose that perhaps the difficulty was not inherent in the concept of general viewpoints so much as in the concept of theory-orientation. The theoretical structures underlying the three orientations had been of different styles. Perhaps one could examine beliefs in relation to viewpoints about learning without attempting to equate their theoretical structures. They might, for example, be equated on the basis that they are impinging upon teachers. Their theoretical foundations, derived from learning theory, social values, systematizations of
knowledge, or some other source, need not be equivalent. Their basis of equivalence would lie, not in their assumptions, but in their prescriptiveness for school practice. This may have been skirting the issue, but other, more fundamental approaches had eluded the investigator. General viewpoints, termed learning perspectives, seemed to offer a means of proceeding and were adopted.

Summary

The evaluation of thought that produced the concept designated by the phrase "learning perspectives," can be traced through the searching phases just described. The mind-learning phase produced the decisions to limit the investigation to learning, and to use an objective device. The consideration of learning theories led to the idea that general viewpoints about learning could provide an investigative structure. The influence of the behavioral and classic theory-orientations will be recognized in two of the learning perspectives. The unstructured phase yielded a quantity of statements that made it necessary to develop a structure. This, in turn, led to the reconsideration of the adequacy, and the eventual adoption, of learning perspectives.

II. Presentation of Perspectives

Definitions sometimes create more problems than they solve. The writer prefers, therefore, to present a list of specifications for a learning perspective rather than attempt to define the term adequately. The specifications for a learning perspective will be followed by a description of each perspective.
Specifications for a learning perspective

1. A learning perspective is a particular way of looking at, or thinking about learning. This implies not only that there may be more than one way to look at learning, but also that a single perspective may not be all inclusive. It may be, too, that particular perspectives are not mutually exclusive, but overlapping.

2. The term, learning perspective, is an abstraction. It refers not to an entity, but to an operational construct. It is conceivable that a teacher might strongly agree with all statements attributed to a given perspective; yet never have thought about learning in the way which that perspective purportedly represents.

3. A learning perspective is a general viewpoint about learning. General, as used here, refers not to its being widely held, but to the fact that it cannot be precisely described.

4. A learning perspective is formulated, and described, somewhat intuitively. This does not mean that there is no evidence to support it. The investigator's professional preparation, teaching experience, and study of learning all contributed to the synthesis of each perspective.

The learning perspectives selected

The six perspectives employed in this investigation probably do not exhaust the list of possible categories of perspectives. However, these six seemed to meet three important requirements:

1. They "made sense" to the investigator.

2. They were believed to be exerting a force on the educational scene.
3. They represented a relatively broad spectrum of thought about learning.

The disciplinary perspective. Learning is concerned with the training and disciplining of the mind. This is a difficult and sometimes aversive task which requires discipline, either from the self, or others, or from both. It is a perfectionistic approach to learning that calls for tough courses, rigorous training, and standards of excellence. Teachers function as taskmasters who set high standards and see that they are met.

This perspective is something of a synthesis of faculty psychology and the classical view of man, but with certain omissions. It is consistent with faculty psychology in the sense that the mind is considered an entity to be trained, but without the muscular analogy or postulation of separate faculties. It is classical in that the intellect is the superior dimension of human nature, but without mandating a "great books" curriculum or necessitating the repetition of the great thoughts of Western Civilization.

The mechanistic perspective. Learning is a mechanical operation in that it is a process of building up associations between stimuli or associating particular stimuli with particular responses. These responses are fixed through reinforcement in the form of external rewards or simply knowledge of correctness of the response. Learning thus becomes a step-like procedure with content fragmented and presented in an orderly sequence. Because teaching is a process of presenting stimuli and reinforcing responses, it is at least theoretically possible to use automatic devices to perform some teaching tasks.
This perspective is derived from stimulus response psychologies, including concepts from both connectionist and conditioning theories. Psychologists have spelled out the educational implications of this perspective more explicitly than any of the others used in this study. E. L. Thorndike and B. F. Skinner have probably been the outstanding contributors in this respect.

The subject matter perspective. Learning is ultimately a process of mastering subject matter. Regardless of the efforts that are, and must be, made to stimulate interest and encourage favorable attitudes toward content, education has failed if the material to be learned has not been understood. This is a future-oriented perspective in that what is being learned need not be of immediate value to the student except as it qualifies him for the acquisition of future subject matter. Of course, there is eventually some goal to be attained. The teacher's task is to present subject matter to the students as effectively as possible. The purpose of evaluation is to measure the extent to which students have understood the subject matter covered.

This perspective is somewhat utilitarian and is derived from no particular psychology. Its strength lies largely in the weight of tradition, though essentialism has been increasingly a factor as a result of the Cold War competition of the postwar years.

The structural perspective. This perspective is derived from the nature of the learner and the nature of knowledge. In the case of the learner, there is a natural tendency to seek for and perceive order in environmental events, and to do so is satisfying. In the
case of knowledge, each field of knowledge has a natural order or structure, understanding of which enables the student to have a "feel" for the field without necessarily knowing all the lesser details. Furthermore, grasp of the structure enables the student to put into place the various pieces of the cognitive puzzle that constitute a field of knowledge.

Learning, therefore, is a process of recognizing structure. It is an exploratory process, with data and objects being manipulated for the purpose of student discovery of natural relationships. It proceeds intuitively and understanding may occur suddenly, resulting in considerable saving of time. Learning is a pleasant or even exciting process for the student, which tends to be self generative. Teaching is a process of arranging materials and experiences in a way that will best insure discovery.

This perspective is conceived by the writer as a fusion of Gestalt psychology with the more recent concepts of structure, especially as advocated by J. S. Bruner and his supporters.

The problem perspective. Learning is a natural outgrowth of living. In the process of living, humans are confronted with problems which they wish to solve. School learning is organized so as to help students deal with the problems that are real to them. The special concern that is traditionally shown for motivation, skill, development, and evaluation, are unnecessary because they are inherent to learning associated with genuine problem solving. Skills, for example, are tools to be used in solving problems. School authorities and students cooperatively determine the curriculum, which tends to be very flexible.
The teacher is a leader and facilitator of group and individual action, assisting in the formulation and attainment of individual and group goals.

This perspective reflects the influence of John Dewey and his supporters, especially in relation to the emphasis on problem solving and scientific thinking. However, it does not include the reconstructionist concepts that are sometimes associated with that group.

The personality perspective. Learning is intimately involved with the self. It is a complex process involving feelings, attitudes, and commitment, in addition to conceptualization. The prevailing factor in the learning situation is the self. It screens all incoming data with the result that one sees about what he expects and performs about as he expects, according to self concepts acquired from his life experience. While this perspective places great emphasis on the individual, it also stresses group relationships because self concepts are acquired through, and in relation to, others.

Education becomes a task of nurturing the self so that it will become increasingly open to all environmental data. Learning proceeds in an exploratory and heuristic fashion. It is made possible by the dynamic quest of the individual for identity and meaning. Dynamic as this quest is, however, the self is tender and easily stunted during the growing years. If threat is perceived, it tends to withdraw behind defense mechanisms, thereby eliminating contact with a portion of the environment. Teaching calls for great skill in human relations. It is concerned with maintaining an atmosphere of trust between the teacher and the students, as well as among students. Within such an atmosphere,
teaching becomes a process of facilitating individuals and the group in their search for meaning.

This perspective is, in some respects, a therapeutic conception of the learning process. It consists of a unique synthesis of concepts derived from the fields of child development, learning viewed as a reconstruction of experience, and non-directive counseling psychologies such as that of Carl Rogers.

III. Summary

This chapter has presented, in chronological order, the events leading to the conceptualization of learning perspectives as a means of investigating teacher beliefs about learning. These six learning perspectives were the end product of evolutionary thought processes, and were believed to represent a major accomplishment of this investigation. However, their usefulness in terms of their stated purpose was not known. Chapter IV describes the development of the questionnaire that was used to test one aspect of their usefulness.
CHAPTER IV

DEVELOPMENT AND TESTING OF THE QUESTIONNAIRE

The original intent of this investigation was to develop an instrument that would measure teacher beliefs about learning. This remained the purpose through the first two preliminary administrations of the questionnaire. It was realized at that time, however, that the investigation could be limited to establishing whether the instrument would elicit differential responses. This was viewed as an important preliminary step in achieving the major goal of identifying teacher beliefs. It was, therefore, decided to determine whether the questionnaire would elicit differential response patterns, without reference to what beliefs these patterns might imply.

This chapter first presents the guidelines that shaped the format of the questionnaire. The subsequent description is organized around the four questionnaires that were produced and administered during the course of this investigation.

I. Guidelines

As the concept of learning perspectives evolved, guidelines began to emerge for the construction of the questionnaire. These were:

1. The questionnaire would consist of statements about instruction and learning.
2. Teachers would be asked to choose between the responses: strongly disagree, disagree, undecided, agree, and strongly agree.

3. Fifty items would be the maximum number for a questionnaire. It was thought that this would reduce fatigue and increase the percentage of returns.

4. Each perspective would be represented by an equal number of items on the final questionnaire.

5. An effort would be made to have a broad sampling of teachers for the final questionnaire.

II. The First Questionnaire

The reader will recall that over 200 items had been collected prior to the decision to build the questionnaire around perspectives. These statements were categorized under the headings of learning, instruction, and curriculum. The attempt was made on all forms of the questionnaires to have these three categories similarly represented. Four perspectives were originally visualized: the disciplinary, mechanistic, subject matter, and problem perspectives. The structural perspective was added just prior to the first administration of the questionnaire, while the personality perspective was not yet conceived. For the sake of brevity, this description of the first administration, as well as later ones, will be organized around similar headings.

The questionnaire

This section describes the general style of the questionnaire in some detail. Since the style remained essentially the same
throughout the investigation, this information will not be re-
peated.

A portion of the first page of the questionnaire is reproduced
here for purposes of illustration:

**HOW DO WE LEARN?**

The purpose of this survey is to obtain information as to the nature of teacher beliefs regarding the learning process.

You are asked to consider carefully each statement and then circle the one response that most nearly represents your attitude toward that statement. You will note that there is a place for comments on each question if you care to explain your answer or comment on the question itself.

1. **SA** Learning refers to the training and disciplining
   **A** of the mind.
   **U**
   **D** Comment:
   **SD**

The title and directions were intended to establish the purpose without suggesting that various viewpoints were represented or that teachers should or should not attempt to be consistent. The comment section was provided in the hope that teachers would point out weaknesses in the questions. This proved to be helpful, as about one-third of the teachers did make use of this section. An unexpected dividend of the comment section was that several teachers indicated that, by being able to qualify answers, they were more willing to take a stand on statements. The comment section was retained, therefore, on all questionnaire forms, and proved to be a source of much additional data. The nature of comments did not alter the recording of the
marked response although, in a few cases, the two seemed contradictory.

The scores assigned to each response were:

- Strongly Disagree: 1 point
- Disagree: 7 points
- Undecided: 13 points
- Agree: 19 points
- Strongly Agree: 25 points

The first questionnaire was produced in two forms because there were fifty-six items to be tested. The first 27 items were identical on both forms. These included statements from all five perspectives under the category of learning. The statements concerning instruction were then placed on one form of the questionnaire, and those concerning curriculum on the other form. Equal numbers of each form were distributed.

The population sample

The population sampled was a class of thirty-eight summer school graduate students. Since the purpose was, at that time, to identify beliefs, the following data was collected on the respondents:

<table>
<thead>
<tr>
<th>Teaching Level</th>
<th>Teaching Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>K - 6</td>
<td>3 years or less</td>
</tr>
<tr>
<td>K - 9</td>
<td>4 years or more</td>
</tr>
<tr>
<td>Age Bracket</td>
<td>Education</td>
</tr>
<tr>
<td>18-29</td>
<td>Bachelor's Degree</td>
</tr>
<tr>
<td>30-50</td>
<td>Bachelor's Degree plus 20</td>
</tr>
<tr>
<td>Over 50</td>
<td>Master's Degree</td>
</tr>
</tbody>
</table>

The results

Thirty-three questionnaires were returned, representing 84 percent of the population sample. The results, reported in Appendix A,
include perspective scores for each of the teacher variables, such as age bracket, and so forth.

**Questionnaire refinement**

The pattern of refinement developed at this time was followed for each preliminary questionnaire.

The responses of each teacher were recorded on a separate sheet. From these responses, a mean score was produced for each perspective—five scores in all. The score sheets of the five teachers scoring highest on a given perspective were grouped separately. The responses to each item in that perspective were then recorded from those five sheets. The items with the highest scores were considered to be the most discriminating items for that perspective. They were ordinarily given highest priority for inclusion in the next questionnaire. This same process was repeated for each perspective.

**III. The Second Questionnaire**

The personality perspective was added prior to the construction of this questionnaire, completing the list of perspectives employed in this investigation.

**The questionnaire**

Items were added to the second instrument, and some old ones were reworded because of comments on the first questionnaire. The large number of items to be evaluated, due partly to the addition of the sixth perspective, necessitated again having two forms for the questionnaire. This time, each form contained all items for a given perspective, but only included three perspectives. The two forms were
Each form contained thirty-nine items, evenly distributed. The items were selected on the basis of their high discrimination score, and their "fitting" the perspective.

The population sample

The second questionnaire was given to an off-campus class of approximately sixty elementary teachers from the Ross County schools. The probabilities were that the first teacher sampling was predominantly from city schools. This group provided an opportunity to sample teachers primarily from rural schools.

The results

Thirty-seven questionnaires were returned, representing about a 65 percent response. Results were not tabulated according to teacher variables, as had been done with the first questionnaire, because the purpose now was limited to identifying discriminating items.

Questionnaire refinement

The refinement pattern used with the first questionnaire was repeated here, with the exception that the nine highest-scoring returns were used to develop discrimination scores.

Item judging was introduced at this time as a second means of refining the questionnaire. The judges were nine instructors in elementary education at The Ohio State University. Each judge was given descriptions of three perspectives, plus the items from those perspectives
that had been used on the second questionnaire. They were asked to place each item with the proper perspective, or with a card labeled, "No Apparent Category."

The scoring of the judges, plus the discrimination scores, plus the investigator's judgment were the combined bases for the selection of items for the third questionnaire.

IV. The Third Questionnaire

This was the last testing of the instrument prior to its final administration. The purpose now was both to further refine it, and to test administrative procedures that would probably be used for the final questionnaire. Consequently, permission was obtained from administrators of the Southwestern and the Upper Arlington school systems in Franklin County, to distribute the third and fourth questionnaires among certain of their elementary and secondary school staffs. The following procedures had been considered by the investigator and were agreed upon at that time:

1. The investigator would solicit the cooperation of individual teachers by telephone. The request would be made on a teacher-to-teacher basis and no pressure would be applied to secure their assistance. The general procedure would be to identify the caller, explain that the questionnaire was for a dissertation, and that its purpose was to collect information on teacher beliefs about learning.

2. Principals of the teachers involved would be informed of the nature of the investigation prior to contacting teachers.
3. Questionnaires would be placed in a stamped envelope for teachers to return by mail.

4. There would be no follow-up to increase the percentage of questionnaire returns.

5. A few school staffs would be sampled as a block, rather than to attempt to sample cross sections of the school systems involved.

The questionnaire

The questionnaire was again prepared in two forms with three perspectives on each form, arranged as follows:

<table>
<thead>
<tr>
<th>Form 1</th>
<th>Form 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disciplinary</td>
<td>Mechanistic</td>
</tr>
<tr>
<td>Structural</td>
<td>Personality</td>
</tr>
<tr>
<td>Problem</td>
<td>Subject Matter</td>
</tr>
</tbody>
</table>

The reader will note different combinations of perspectives here than were used on the second questionnaire. There were thirty items on each form, evenly distributed. The judges agreed with the appropriateness of the items in each perspective to the extent shown in Table 2.

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Percent Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disciplinary</td>
<td>90</td>
</tr>
<tr>
<td>Mechanistic</td>
<td>80</td>
</tr>
<tr>
<td>Subject Matter</td>
<td>67</td>
</tr>
<tr>
<td>Structural</td>
<td>76</td>
</tr>
<tr>
<td>Problem</td>
<td>86</td>
</tr>
<tr>
<td>Personality</td>
<td>92</td>
</tr>
</tbody>
</table>
The population sample

Seventy-three questionnaires were distributed. The distribution can be analyzed according to school system, and to educational level. These breakdowns are:

<table>
<thead>
<tr>
<th>School System</th>
<th>Educational Level</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Arlington</td>
<td>Elementary</td>
<td>45</td>
</tr>
<tr>
<td>Southwestern</td>
<td>Secondary</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>73</td>
</tr>
</tbody>
</table>

Elementary and secondary teachers were sampled from both systems. More secondary than elementary teachers were sampled here because previous samplings had been almost exclusively of elementary teachers.

The results

Fifty-four questionnaires were returned, comprising a 74 percent return. Since no problems had become apparent in the procedure for distributing questionnaires, and the return was good, it was decided to use the same plan for the final questionnaire.

Questionnaire refinement

Discrimination scores were determined from the ten highest scoring teachers on the various perspectives.

A second, and similar, judging of the items occurred at this time. The judges were four instructors in educational psychology at The Ohio State University. This time the judges were given items that had been on the third questionnaire. The items for the fourth questionnaire were again selected on the basis of judge rating, discrimination scores, and investigator judgment.
V. The Fourth Questionnaire

This was in a single form, with six items for each perspective—thirty-six items in all. The items were selected from the third questionnaire according to their discrimination scores, the combined results of both judgings, and the investigator's judgment. The results of the combined judgings are summarized in Table 3.

**TABLE 3**

Combined Judging of Items
On Final Questionnaire

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Percent Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disciplinary</td>
<td>94</td>
</tr>
<tr>
<td>Mechanistic</td>
<td>89</td>
</tr>
<tr>
<td>Subject Matter</td>
<td>92</td>
</tr>
<tr>
<td>Structural</td>
<td>79</td>
</tr>
<tr>
<td>Problem</td>
<td>83</td>
</tr>
<tr>
<td>Personality</td>
<td>91</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>88</strong></td>
</tr>
</tbody>
</table>

The items were arranged according to a table of random numbers. The reader may refer to Appendix B for a reproduction of the questionnaire, but the items are presented here by perspectives:

Disciplinary Perspective

1. We want to teach the student to think by challenging him with hard materials.

2. Drill is useful because it both increases skill and exercises the mind.

---

3. Courses such as Latin, algebra, and physics are especially valuable because of the rigorous mental training they provide.

4. The acquisition of exact knowledge is apt to be wearisome, but it is essential for excellence.

5. The mind is strengthened by having the student work at difficult mental tasks.

6. Learning refers to the training and disciplining of the mind.

Mechanistic Perspective

1. The function of drill is to build up habitual responses.

2. Learning refers to the acquisition of responses for particular stimuli. These responses are then ready to function under specific conditions.

3. Learning is best achieved in small sequential steps with immediate knowledge of results: a correct response being required before advancing to each succeeding step.

4. An automatic device that would present subject matter step by step and immediately inform the student of accuracy of response would be an effective teaching instrument.

5. In the learning situation, responses that bring pleasant results are retained, while those that bring unpleasant or no results are discontinued.

6. In the learning situation the stage should be set so as to be reasonably certain that the student will be able to provide the correct answer on the first attempt.

Subject Matter Perspective

1. Teaching includes presenting or assigning content to be learned, and later determining the extent to which it was learned.

2. Teaching is a process of selecting and organizing content, plus presenting it as interestingly as possible.

3. The backbone of the curriculum is subject matter. Activities related to the subject matter are secondary.
4. Learning refers to the acquisition of knowledge and skills.

5. Subject matter learning, aimed at future use, is properly the main activity of education.

6. Students should generally acquire the same facts or information in mastering a subject, but their rate of progress will vary according to their ability.

Structural Perspective

1. Organizing subject matter in terms of principles and ideas from which facts may be inferred reduces the rate of forgetting.

2. Subject matter should be presented so that it will emphasize relationships. This will prepare a place into which details, when encountered, can be put.

3. Learning refers to a mental restructuring of the elements in a situation into a more meaningful pattern.

4. The foundations of any subject may be taught to any normal school child at any grade in some form that is honest.

5. Learning occurs through insight: by the sudden understanding of relationships. This may occur either on initial or after repeated exposure to content, but when it happens, it is sudden.

6. School curricula should be geared to the teaching of fundamental ideas in whatever subject is being taught.

Problem Perspective

1. The problem type unit or assignment is superior to the subject matter unit or assignment if other things are equal.

2. Students who are in real contact with life problems wish to learn, want to grow, seek to find out, hope to master, and desire to create.

3. Learning should proceed whenever possible in relation to student goals.

4. Learning is integrative: involving skills, attitudes and appreciations in some situation rather than dealing with each separately and in isolation.
5. The school has failed if it has imposed routine tasks instead of presenting problems, and if it has neglected to set up the condition for the active use of what is being learned.

6. In the secondary school, a block of time should be provided for studies, dealing with problems of living, that cut across subject matter lines.

Personality Perspective

1. Learning refers to the discovery of the personal meaning of events for the individual.

2. Learning occurs when something happens inside the individual, and this is in his, more than the teacher's control.

3. What a well adjusted and secure person wants and enjoys is apt to be just what is good for him.

4. We want to look especially at how the individual sees himself, because it is not so much what you are as what you think you are that determines your actions.

5. The critical factor in the learning situation is the way the people involved relate and feel toward each other, rather than the specific teaching method used.

6. The motivation for learning springs from the dynamic quest for identity and for meaning that are inherent in human nature.

The population sample

The distribution of the 214 questionnaires is shown in Table 4.

<table>
<thead>
<tr>
<th>School System</th>
<th>Number</th>
<th>Educational Level</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southwestern</td>
<td>109</td>
<td>Elementary</td>
<td>104</td>
</tr>
<tr>
<td>Upper Arlington</td>
<td>105</td>
<td>Secondary</td>
<td>110</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>214</strong></td>
<td><strong>Total</strong></td>
<td><strong>214</strong></td>
</tr>
</tbody>
</table>
These figures illustrate that the returns should have been reasonably representative of teachers, at least in the school systems sampled. The purpose of this wide representation was not to compare responses of particular groups, but to increase the probability of reaching teachers of varied backgrounds and viewpoints; i.e., to provide a reasonable test of the questionnaire's differentiating effect.

The results

The detailed results of this questionnaire will be presented in Chapter V. However, 185 questionnaires were returned, representing 86 percent of those distributed. The return was probably enhanced by the fact that the investigator was then teaching in the Upper Arlington schools, as there was a 93 percent return from those teachers. The return from the Southwestern schools was also quite good, being 79 percent.

VI. Summary

This chapter has presented some of the thinking behind the steps that were involved in developing a reasonably sensitive instrument intended to measure teacher beliefs about learning.

The shift was noted from the original intent of identifying beliefs, to the subsequent goal of testing the differentiating effect of the instrument.

The content of the final questionnaire was presented, along with the manner of its distribution. The analysis of the data that it produced is the subject of Chapter V.
CHAPTER V

THE DATA AND THE FINDINGS

I. Introduction

The reader will recall that the overall return of the final questionnaire was 86 percent, and that the teachers sampled generally represented whole-building staffs. A detailed breakdown of the questionnaire distribution is presented in Appendix C. Questionnaires were unnumbered, but it was possible to identify the school system and educational level from the manner in which the return envelope was addressed by the investigator. As the questionnaires were received, they were numbered and the responses were transferred to a score sheet.

The data was processed through the IBM computer at The Ohio State University Computer Center, using a Bio-Medical Computer program.\footnote{The program was selected by Earl Raley. The programming was accomplished by Terri Scott.} Specific data produced by the computer will be introduced at appropriate points in the examination of the hypothesis. However, the types of data that were made available were:

1. Whole-group mean scores and standard deviations, representing each of the six perspectives.
2. Individual-teacher mean scores, representing each of the six perspectives.

3. Split-half correlations for each of the six perspectives.

Before proceeding to the analysis of the data, the hypothesis and differential response will be further clarified.

Hypothesis

The hypothesis of this investigation was that an instrument consisting of expository statements derived from six learning perspectives will elicit, from the teacher sampling, data that will reveal differential patterns of indicated agreement with the six perspectives employed.

This section examines the hypothesis in relation to two dimensions: (1) the group dimension, and (2) the individual dimension. The relationship of these dimensions to the hypothesis is presented by means of two questions:

1. The group dimension.

   Did the questionnaire elicit differential responses among the population sample as a whole?

2. The individual dimension.

   Did the questionnaire elicit differential responses among individual members of the population sample?

Before examining these two dimensions of the hypothesis, the term, differential response, needs further clarification.
Differential response

A differential response was judged to have occurred when a score range equalled or exceeded six points. The scoring scale is illustrated in Figure 1.

![Score Values For Each Response](image)

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>13</td>
<td>19</td>
<td>25</td>
</tr>
</tbody>
</table>

FIGURE 1

Score Values For Each Response

It can be seen from this illustration that adjacent responses are six points apart. The logic of the six point requirement, therefore, was that it represented a response shift equivalent to one complete position on the scale. This was considered by the investigator to be a significant shift. A score that represented a differential response (six point range or more) was called a differential score. Conversely a score range of less than six points was called a non-differential score.

II. Analysis of the Data

The data was organized around the group and individual dimensions of the hypothesis.

The group dimension

This section is concerned with whether the questionnaire elicited differential responses among the population as a whole. The
structuring of the data is described first, and then the statistical analysis.

Data structuring

Individual mean scores for each perspective were always whole numbers, and potentially could range from one to twenty-five. One teacher's scores are presented in Table 5. A frequency table, based

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disciplinary</td>
<td>9</td>
</tr>
<tr>
<td>Mechanistic</td>
<td>8</td>
</tr>
<tr>
<td>Subject Matter</td>
<td>9</td>
</tr>
<tr>
<td>Structural</td>
<td>17</td>
</tr>
<tr>
<td>Problem</td>
<td>12</td>
</tr>
<tr>
<td>Personality</td>
<td>12</td>
</tr>
</tbody>
</table>

on individual mean scores, was constructed for each perspective and these were converted to histograms for easy reference. The histograms are presented in Graphs 1-6 on pages 54-6.

Statistical treatment

The purpose here is to establish whether the questionnaire did elicit differential responses among the teachers as a group. This analysis is presented in relation to: (1) responses within each perspective, and, (2) responses among the six perspectives.

Responses within each perspective. A glance at the histograms (pp. 54-6) reveals that each perspective did exceed the six point
GRAPH 1
Disciplinary Perspective Histogram

GRAPH 2
Mechanistic Perspective Histogram
GRAPH 3

Subject Matter Perspective Histogram

GRAPH 4

Structural Perspective Histogram
GRAPH 5
Problem Perspective Histogram

GRAPH 6
Personality Perspective Histogram
score range that was defined as a differential score. But a six point score range is not necessarily a six point true score range.

To deal with the problem of true scores, the standard error of measurement (S.E.\textsubscript{m}) was computed for each perspective, using the standard deviation (S.D.) and the reliability coefficient (r).\textsuperscript{2} The formula, 
\[ S.E.\textsubscript{m} = S.D. \sqrt{1 - r}, \]
produced the data summarized in Table 6.

<table>
<thead>
<tr>
<th>Perspective</th>
<th>S.D.</th>
<th>r</th>
<th>S.E.\textsubscript{m}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disciplinary</td>
<td>4.04</td>
<td>.70</td>
<td>2.20</td>
</tr>
<tr>
<td>Mechanistic</td>
<td>3.47</td>
<td>.64</td>
<td>2.08</td>
</tr>
<tr>
<td>Subject Matter</td>
<td>3.45</td>
<td>.57</td>
<td>2.51</td>
</tr>
<tr>
<td>Structural</td>
<td>2.67</td>
<td>.62</td>
<td>1.85</td>
</tr>
<tr>
<td>Problem</td>
<td>2.57</td>
<td>.42</td>
<td>1.95</td>
</tr>
<tr>
<td>Personality</td>
<td>3.18</td>
<td>.58</td>
<td>2.06</td>
</tr>
</tbody>
</table>

Annexing 2 S.E.\textsubscript{m} to each end of the differential score enables one to predict the probable limits of the true score range.\textsuperscript{3} Figure 2 illustrates the point for the disciplinary perspective. The probability that Scores A and B (2 S.E.\textsubscript{m} beyond the differential score) could have true score values less than six points apart, is .0005 (.023 x .023). The actual range of the disciplinary perspective,

\textsuperscript{2}Reliability coefficients were computed for each perspective by the split-half method. The correlations between perspective halves were converted to reliability coefficients by use of the Spearman-Brown prophecy formula. (Appendix D)

\textsuperscript{3}This strategy was suggested by Wallace C. Fotheringham, The Ohio State University.
Figure 2

The Effect of Annexing 2 S.E. to Each End of the Differential Score

however, is greater than 2 S.E., plus six points, plus 2 S.E., as shown in Figure 2. It is, instead, 2.73 S.E., plus six points, plus 2.73 S.E.. The question arises, then, as to how large a true score range could be hypothesized at the .01 level of confidence for each perspective. It was found that the addition of 1.29 S.E. to each end of the differential score interval of any perspective assures that the true score range this produces is at least equal to the differential score at the .01 level of confidence. The differential score was, therefore, expanded until the 1.29 S.E. coincided with the actual response limits of the perspective. This "expanded differential score" represented the probable true score range limit of that perspective.

Applying this logic to all perspectives produced probable true score ranges reported in Table 7. Note that all perspectives elicited a true score range greater than six points, acceptable at the .01 level of confidence (p. 59).

The conclusion was that all perspectives did yield a differential response greater than six points at the .01 level of confidence.

Responses among the six perspectives. The total population mean scores for the six perspectives are presented in Table 8.
TABLE 7

True Score Ranges of all Perspectives
At the .01 Level of Confidence

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Actual Range</th>
<th>Less S.E.m Adjustment</th>
<th>Probable True Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disciplinary</td>
<td>18</td>
<td>5.68</td>
<td>12.32</td>
</tr>
<tr>
<td>Mechanistic</td>
<td>19</td>
<td>5.36</td>
<td>13.64</td>
</tr>
<tr>
<td>Subject Matter</td>
<td>19</td>
<td>6.48</td>
<td>12.52</td>
</tr>
<tr>
<td>Structural</td>
<td>13</td>
<td>4.26</td>
<td>8.74</td>
</tr>
<tr>
<td>Problem</td>
<td>13</td>
<td>5.04</td>
<td>7.96</td>
</tr>
<tr>
<td>Personality</td>
<td>17</td>
<td>5.30</td>
<td>11.70</td>
</tr>
</tbody>
</table>

TABLE 8

Total Population Mean Scores
For The Six Perspectives

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>18.6</td>
</tr>
<tr>
<td>Structural</td>
<td>17.4</td>
</tr>
<tr>
<td>Personality</td>
<td>16.6</td>
</tr>
<tr>
<td>Subject Matter</td>
<td>14.8</td>
</tr>
<tr>
<td>Mechanistic</td>
<td>14.0</td>
</tr>
<tr>
<td>Disciplinary</td>
<td>13.0</td>
</tr>
</tbody>
</table>

The maximum difference between perspective mean scores occurred in relation to the disciplinary and the problem perspectives. This difference, of 5.55 points, was less than the defined differential score. Therefore, an hypothesis that there was a differential response in terms of perspective means for the group, is not supported by the data.

The question arose as to whether there was a statistically significant difference of any sort between the various mean scores.
To determine this, the critical ratio (C.R.) was computed for all possible combinations of perspectives and is reported in Table 9. The reader will note that there was a significant difference in 6/15, or 40 percent, of the possible combinations.

**TABLE 9**

Critical Ratios Between Perspective Mean Scores

<table>
<thead>
<tr>
<th></th>
<th>Mechanistic</th>
<th>Subject Matter</th>
<th>Structural</th>
<th>Problem</th>
<th>Personality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disciplinary</td>
<td>.68</td>
<td>1.22</td>
<td>2.72**</td>
<td>3.32**</td>
<td>2.26*</td>
</tr>
<tr>
<td>Mechanistic</td>
<td>.55</td>
<td>2.06*</td>
<td>2.69**</td>
<td>1.61</td>
<td></td>
</tr>
<tr>
<td>Subject Matter</td>
<td></td>
<td>1.52</td>
<td>2.16*</td>
<td>1.08</td>
<td></td>
</tr>
<tr>
<td>Structural</td>
<td></td>
<td></td>
<td>.66</td>
<td>.42</td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.06</td>
</tr>
</tbody>
</table>

* significant at .05
** significant at .01

The conclusion is that while the differences between the means of the various perspectives were not differential, as defined, they were large enough to be statistically significant in the following cases:

- Disciplinary - Structural
- Disciplinary - Problem
- Disciplinary - Personality
- Mechanistic - Structural
- Mechanistic - Problem
- Subject Matter - Problem

There were, of course, differences between the mean scores of all possible perspective pairings, but those above were the only ones that
had at least a 95 percent chance of being real differences rather than differences attributable to measurement errors.

A second type of data was available that seemed relevant. This is in relation to the consistency with which the perspective mean scores have maintained the same rank-order relationships throughout the investigation. Four forms of the questionnaire have been used in the course of this investigation, and with varying populations. Twice, the questionnaires contained all perspectives. Twice, there were two forms, with only half the perspectives on each. The questions varied, and the perspectives have been used in different combinations. In spite of these variations, the rank-order position of the perspectives, based on mean scores, has been nearly identical. This is shown in Table 10. These results tend to suggest that there was, through the investigation, a noticeably stable rank-order preference by the population for the options of the various perspectives.

Summary

This section examined the question, "Did the questionnaire elicit differential response patterns from the population as a whole?"

It was found that the response pattern for each perspective was differential in excess of the defined six point range, even in terms of true score ranges.

It was found that the range was not differential between the group means of the six perspectives, although there were six comparisons of group mean scores that yielded statistically significant differences.

Finally, the rank-order preference for the various perspectives
has been relatively stable in spite of variability in both the questionnaire and the population.

TABLE 10

Rank-Order Preference For Perspectives On All Four Questionnaires

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Questionnaire Number</th>
<th>Questionnaire Number</th>
<th>Questionnaire Number</th>
<th>Questionnaire Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1  Score  Rank</td>
<td>2  Score  Rank</td>
<td>3  Score  Rank</td>
<td>4  Score  Rank</td>
</tr>
<tr>
<td>Problem</td>
<td>18.4  1</td>
<td>19.1  1</td>
<td>17.9  1</td>
<td>18.6  1</td>
</tr>
<tr>
<td>Personality</td>
<td>*</td>
<td>18.4  2</td>
<td>17.4  2</td>
<td>16.6  3</td>
</tr>
<tr>
<td>Structural</td>
<td>16.9  2</td>
<td>17.8  3</td>
<td>16.8  3</td>
<td>17.4  2</td>
</tr>
<tr>
<td>Subject Matter</td>
<td>14.5  3</td>
<td>16.4  4</td>
<td>15.3  4</td>
<td>14.8  4</td>
</tr>
<tr>
<td>Mechanistic</td>
<td>13.0  4</td>
<td>16.2  5</td>
<td>14.2  5</td>
<td>14.0  5</td>
</tr>
<tr>
<td>Disciplinary</td>
<td>10.6  5</td>
<td>13.8  6</td>
<td>12.9  6</td>
<td>13.0  6</td>
</tr>
</tbody>
</table>

*Not included on the first questionnaire

The individual dimension

This section presents several quantitative analyses of the differential responses within individual score patterns. This is followed by a graphic portrayal of several types of individual score patterns.

Quantitative analysis of score patterns

This section presents a sequence of increasingly rigid applications of differential score standards to individual score patterns. A histogram showing the "individual score range" frequencies in the
total population, is presented in Graph 7 for reference during this section of the report.

Graph 7

Score Range in Points

Score Range Frequency Distribution Within Individual Score Patterns

First, using the actual six point score range requirement, as defined and without applying statistical methods, the result is that the score patterns of 153 teachers, or 83 percent of the population, did contain a differential response.

Second, disregarding the six point requirement for the moment, let us consider whether one can reject the hypothesis that scores, in individual score patterns, were not really different, but appeared to
be different due to measurement errors. The standard error of measurement is used for this purpose. The chance of two scores, ±1 S.E.\textsubscript{m} apart, being really the same is .026. Therefore, the occurrence of score ranges of ±1 S.E.\textsubscript{m} is cause for rejecting the hypothesis at the .05 level and concluding that there is a real difference of some amount. The largest S.E.\textsubscript{m} for any perspective on the questionnaire was 2.51 points. Thus, a 5.02 point score range (±1 S.E.\textsubscript{m}) would be sufficient to conclude that true score differences had occurred at the .05 level of confidence. Applying this standard to individual score patterns yielded the finding that the score patterns of 165 teachers, or 89 percent of the population, did contain measurable differences.

Finally, how many of the individual score patterns had a sufficient range to conclude, at the .05 level, that their true score range was at least six points? The reader may recall that the annexation of 2 S.E.\textsubscript{m} to each end of a differential score range produced a true score range of at least six points at the .01 level of confidence (p. 53). Similarly, the annexation of 1 S.E.\textsubscript{m} to each end of the differential score produces a new score range in which the extreme scores are at least six points apart at the .05 level of confidence. Numerically, this is 2.51, plus 6 plus 2.51, or 11.02 points total range required to establish the existence of at least a six point true score range at the .05 level. There were forty-five teachers, or 24 percent of the population, whose score ranges equalled or exceeded eleven points. These teachers' score patterns were therefore differential, as defined, at the .05 level of confidence.
The results of these three quantitative analyses of individual score pattern ranges is summarized in Table 11.

### TABLE 11

<table>
<thead>
<tr>
<th>Standard</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Six point actual range</td>
<td>153</td>
<td>83</td>
</tr>
<tr>
<td>2. Statistically measurable score differences in some amount</td>
<td>165</td>
<td>89</td>
</tr>
<tr>
<td>3. True score ranges of six points at the .05 level of confidence</td>
<td>45</td>
<td>24</td>
</tr>
</tbody>
</table>

The conclusion was that differential scores did occur among the population sample in reference to score ranges within individual score patterns. This refers only to the range between an individual's highest and lowest scores. The response pattern for all six scores is, perhaps, really more significant and is the subject of the next section.

**Individual Score Patterns**

The statistical analysis of individual score patterns in relation to their six mean scores is deemed impractical for the purposes of this report. It is believed, however, that the kinds of response patterns teachers made is an area that justifies more comprehensive analysis. What follows here is for the purpose of suggesting the validity of that conclusion.
Visual scanning of the score patterns suggested three conclusions:

1. There was considerable variety among the individual patterns.
2. There were repetitions of pattern styles, called trends.
3. There were occasional instances of unusual patterns.

This section presents two of the pattern trends and two examples of unusual individual score patterns.

Pattern trends. The two trends reported here are the non-

differential and the norm-pattern trends.

It was noted in a number of cases that individual mean scores were very similar for all perspectives. Sometimes the score values were high and non-differential, and sometimes medium and non-differential. A score range of less than six points was determined to be non-differential. There were thirty-two teachers whose score patterns fell within that limit. One teacher's scores are illustrated in Graph 8.

![Graph 8](image)

**GRAPH 8**

Example of a Non-Differential Score Pattern
The norm-pattern trend refers to a score pattern that closely parallels the mean score pattern for the total population. The group mean pattern is illustrated in Graph 9.

![Graph 9](image)

**GRAPH 9**

Mean Score Pattern For The Total Population

These two steps were involved in classifying patterns as norm-patterns.

1. The six scores could not cumulatively deviate from the norm pattern more than nine points. (an average of $1\frac{1}{2}$ points per score)

2. Visual scanning must verify that the score pattern actually approximated the "spirit" of the norm.

There were thirteen teachers whose responses met these two requirements. One score pattern is illustrated in Graph 10.

**Unusual patterns.** The occurrence of unusual patterns may or may not be significant. If the questionnaire really measured beliefs about learning, unusual patterns would seem to be significant, even though representing isolated cases. Two patterns are shown here to
emphasize that there were instances of noticeably different response patterns among the population.

The first, considered to be an inverted-norm pattern, is illustrated in Graph 11.

This was the most extreme example of norm inversion. Lesser examples did occur, but even they were rare.
The second unusual pattern was the highly agreeable non-differential pattern, illustrated in Graph 12.

GRAPH 12

Unusual Pattern—Highly Agreeable Non-Differential

III. Summary

Analysis of the data revealed that the questionnaire did elicit differential response patterns that were statistically significant. This was true in terms of both total population and individual response scores.

Graphs were presented to illustrate some of the kinds of individual response patterns that occurred, and to suggest the need for more comprehensive analysis of this class of data produced by the questionnaire.

Chapter VI summarizes the findings that were reported in this chapter.
CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

I. Introduction

This investigation was motivated by an interest in teacher beliefs about learning. The major problem encountered was that of finding a conceptual reference structure to which teacher beliefs could be compared. Learning perspectives, the structure that evolved, served as a basis for developing a questionnaire. The specific purpose of the investigation became that of determining whether the questionnaire would elicit differential response patterns among teacher populations without reference to what beliefs these patterns might signify.

The questionnaire was administered and refined three times before emerging in its final form. The final questionnaire was completed by 185 teachers in the Upper Arlington and Southwestern city school districts in Franklin county.

II. The Findings

Hypothesis

An instrument consisting of expository statements derived from six learning perspectives will elicit, from the teacher sampling,
data that will reveal differential patterns of indicated agreement with the six perspectives employed.

Differential response

A differential response was defined as occurring when there was a six point score range. Six points was equivalent to the distance between adjacent responses on the questionnaire, such as agree and undecided. The differential response criterion was applied to—

1. Total population score ranges for each perspective.
2. Total population mean score ranges for the six perspectives.
3. Individual mean score ranges for the six perspectives.

Findings supporting the hypothesis

Analysis of the data yielded two types of findings that supported the hypothesis. These were classified as statistically significant findings, and non-statistical findings.

Statistically significant findings

1. Each of the six perspectives yielded at least a six point true score range from the total population (.01 level).

2. The questionnaire did elicit a true score range of at least six points within individual score patterns from 24 percent of the population (.05 level).

3. The questionnaire did elicit statistically measurable score differences of some amount within individual score patterns from 89 percent of the population (.05 level).

4. The differences between the various perspective mean scores for the total population were each less than six points, and were thus
not differential, as defined. However, the following combinations of perspectives did have statistically different mean scores:

<table>
<thead>
<tr>
<th>Disciplinary</th>
<th>Structural **</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disciplinary</td>
<td>Problem **</td>
</tr>
<tr>
<td>Disciplinary</td>
<td>Personality **</td>
</tr>
<tr>
<td>Mechanistic</td>
<td>Structural *</td>
</tr>
<tr>
<td>Mechanistic</td>
<td>Problem **</td>
</tr>
<tr>
<td>Subject Matter</td>
<td>Problem *</td>
</tr>
</tbody>
</table>

* .05 level  
** .01 level

These mean score differences seem to signify that the teacher population did perceive at least a degree of difference between the above perspective pairings. There were, of course, differences between the mean scores of all possible perspective pairings, but those above were the only ones that had at least a 95 percent chance of being real differences rather than differences attributable to measurement errors.

Non-statistical findings

1. Actual, but not statistically reliable, six point score ranges did occur within individual score patterns among 83 percent of the population.

2. A relatively stable rank-order preference for the six perspectives was noted on the four questionnaires. The order of preference was:

   1. Problem  
   2-3. Structural  
   3-2. Personality  
   4. Subject Matter  
   5. Mechanistic  
   6. Disciplinary

3. Individual score pattern trends and unusual individual score pattern styles were observed in the population sample.
III. Conclusions

1. The questionnaire did elicit statistically significant differential responses from the teacher population as a whole, and from some individual teachers.

Differential responses from the teacher population were interpreted as signifying differential interpretation of questionnaire items, and/or differential agreement with the six perspectives, as represented by the questionnaire.

Differential responses in relation to individual score patterns were interpreted as signifying that at least some of the teachers perceived sufficient differences among the six perspectives to make varied agreement responses.

2. The questionnaire did elicit a variety of individual score patterns that may be subject to comparative analysis.

Such analysis may lead to hypotheses as to the nature of these differences. Analysis may, for example, result in the identification of score pattern modes. Factors may eventually be associated with these hypothetical modes, conceivably even causal factors.

The unusual individual score patterns were suggestive in some cases of inconsistencies in relation to the six perspectives, and, in others, simply of divergence from the responses of the bulk of the teacher population.

The significance of the various types of individual score patterns is that they may have implications for teaching behavior.

3. Learning perspectives appear to provide a basis for discriminating differences among teachers.
It was assumed in this study that there are discernible differences in teachers' beliefs about learning. This conclusion was therefore of interest, although the investigator did not attempt to establish that the questionnaire actually measured beliefs about learning.

4. The results of this investigation seem to indicate that further development and testing of the questionnaire are warranted.

IV. Recommendations

1. It is recommended that more evidence be obtained as to the nature of teacher beliefs about learning.

   Such evidence is particularly relevant for the planning and evaluation of teacher education programs. This report has presented evidence to support the thesis that teacher beliefs about learning are not clearly established, and may be inadequate. Two findings of this investigation that seem to support this thesis are—

   a. The finding that 17 percent of the teacher population had non-differential score patterns for the six perspectives.

   b. The finding of unusual patterns such as the norm-inversion and the highly agreeable non-differential patterns.

   The evidence is limited, but the centrality of learning to the educational process justifies further clarification of the nature of teacher beliefs about learning.

2. This instrument, or at least this investigative approach, seems to discriminate differences of some kind, and in some amount. Research seems to be warranted to further test this instrument. Two questions that might be examined are—
a. Do particular types of response patterns correlate with teacher variables, such as teaching level, education, age, or experience?

b. Do particular types of response patterns correlate with particular teaching behaviors—i.e., do response pattern differences actually matter?
APPENDIX A

RESULTS FROM FIRST QUESTIONNAIRE
RESULTS FROM FIRST QUESTIONNAIRE

I. Population Sample

Classification of respondents

1. Elementary Teacher Variables.

<table>
<thead>
<tr>
<th>Age</th>
<th>Experience</th>
<th>Education</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 29</td>
<td>3 years</td>
<td>B.S.</td>
<td>9</td>
</tr>
<tr>
<td>18 - 29</td>
<td>3 years</td>
<td>B.S. + 20</td>
<td>5</td>
</tr>
<tr>
<td>18 - 29</td>
<td>4 years</td>
<td>B.S. + 20</td>
<td>7</td>
</tr>
<tr>
<td>30 - 50</td>
<td>3 years</td>
<td>B.S. + 20</td>
<td>2</td>
</tr>
<tr>
<td>30 - 50</td>
<td>4 years</td>
<td>B.S.</td>
<td>1</td>
</tr>
<tr>
<td>30 - 50</td>
<td>4 years</td>
<td>B.S. + 20</td>
<td>6</td>
</tr>
<tr>
<td>30 - 50</td>
<td>4 years</td>
<td>M.A.</td>
<td>1</td>
</tr>
</tbody>
</table>

2. Junior High School Teacher Variables.

<table>
<thead>
<tr>
<th>Age</th>
<th>Experience</th>
<th>Education</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 29</td>
<td>4 years</td>
<td>B.S. + 20</td>
<td>1</td>
</tr>
</tbody>
</table>

II. The Findings

Questionnaires returned

1. Number = 32
2. Percent = 84

Results in mean scores

<table>
<thead>
<tr>
<th>var.</th>
<th>no.</th>
<th>Disc</th>
<th>Mech</th>
<th>Subj</th>
<th>Stru</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 yr</td>
<td>16</td>
<td>10.7</td>
<td>12.7</td>
<td>15.2</td>
<td>17.4</td>
<td>18.5</td>
</tr>
<tr>
<td>4 yr</td>
<td>16</td>
<td>10.9</td>
<td>12.6</td>
<td>14.0</td>
<td>16.5</td>
<td>18.4</td>
</tr>
<tr>
<td>B.S.</td>
<td>10</td>
<td>11.4</td>
<td>13.1</td>
<td>15.9</td>
<td>17.2</td>
<td>18.6</td>
</tr>
<tr>
<td>B.S. + 20</td>
<td>21</td>
<td>10.7</td>
<td>12.9</td>
<td>13.8</td>
<td>17.0</td>
<td>18.3</td>
</tr>
<tr>
<td>M.A.</td>
<td>1</td>
<td>7.0</td>
<td>9.0</td>
<td>13.0</td>
<td>13.0</td>
<td>15.0</td>
</tr>
<tr>
<td>18-29</td>
<td>22</td>
<td>10.7</td>
<td>12.7</td>
<td>14.0</td>
<td>17.1</td>
<td>18.8</td>
</tr>
<tr>
<td>30-50</td>
<td>10</td>
<td>11.4</td>
<td>13.4</td>
<td>15.0</td>
<td>16.3</td>
<td>17.8</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>10.6</td>
<td>13.0</td>
<td>14.5</td>
<td>16.9</td>
<td>18.4</td>
</tr>
</tbody>
</table>
APPENDIX B

THE FINAL QUESTIONNAIRE
HOW DO WE LEARN?

Circle the one response that most nearly represents your attitude toward each statement.

1. SA The function of drill is to build up habitual responses.
   A U D SD
   Comment:

2. SA The problem type unit or assignment is superior to the subject matter unit or assignment if other things are equal.
   A U D SD
   Comment:

3. SA Students who are in real contact with life problems wish to learn, want to grow, seek to find out, hope to master, and desire to create.
   A U D SD
   Comment:

4. SA Learning refers to the discovery of the personal meaning of events for the individual.
   A U D SD
   Comment:

5. SA Organizing subject matter in terms of principles and ideas from which facts may be inferred reduces the rate of forgetting.
   A U D SD
   Comment:

6. SA We want to teach the student to think by challenging him with hard material.
   A U D SD
   Comment:

7. SA Subject matter should be presented so that it will emphasize relationships. This will prepare a place into which details, when encountered, can be put.
   A U D SD
   Comment:

8. SA Teaching includes presenting or assigning content to be learned, and later determining the extent to which it was learned.
   A U D SD
   Comment:
9. SA Teaching is a process of selecting and organizing content, plus presenting it as interestingly as possible.
Comment:

10. SA The backbone of the curriculum is subject matter. Activities related to the subject matter are secondary.
Comment:

11. SA Drill is useful because it both increases skill and exercises the mind.
Comment:

12. SA Learning refers to the acquisition of responses for particular stimuli. These responses are then ready to function under specific conditions.
Comment:

13. SA Learning occurs when something happens inside the individual, and this is in his, more than the teacher's, control.
Comment:

14. SA Courses such as Latin, algebra, and physics are especially valuable because of the rigorous mental training they provide.
Comment:

15. SA What a well adjusted and secure person wants and enjoys is apt to be just what is good for him.
Comment:

16. SA Learning refers to the acquisition of knowledge and skills.
Comment:
17. SA Subject matter learning, aimed at future use, is properly the main activity in education.
   Comment:

18. SA Students should generally acquire the same facts or information in mastering a subject, but their rate of progress will vary according to their ability.
   Comment:

19. SA Learning should proceed whenever possible in relation to student goals.
   Comment:

20. SA Learning is integrative: involving skills, attitudes, and appreciations in some situation rather than dealing with each separately and in isolation.
   Comment:

21. SA Learning refers to a mental restructuring of the elements in a situation into a more meaningful pattern.
   Comment:

22. SA Learning is best achieved in small sequential steps with immediate knowledge of results: a correct response being required before advancing to each succeeding step.
   Comment:

23. SA An automatic device that would present subject matter step by step and immediately inform the student of accuracy of response would be an effective teaching instrument.
   Comment:

24. SA The foundations of any subject may be taught to any normal schoolchild at any grade in some form that is honest.
   Comment:
25. SA  The school has failed if it has imposed routine tasks instead of presenting problems, and if it has neglected to set up the conditions for the active use of what is being learned.
   A
   U
   D
   SD  Comment:

26. SA  Learning occurs through insight: by the sudden understanding of relationships. This may occur either on initial or after repeated exposures to content, but when it happens, it is sudden.
   A
   U
   D
   SD  Comment:

27. SA  The acquisition of exact knowledge is apt to be wearisome, but it is essential for excellence.
   A
   U
   D
   SD  Comment:

28. SA  We want to look especially at how the individual sees himself, because it is not so much what you are as what you think you are that determines your actions.
   A
   U
   D
   SD  Comment:

29. SA  In the learning situation, responses that bring pleasant results are retained, while those that bring unpleasant or no results are discontinued.
   A
   U
   D
   SD  Comment:

30. SA  In the secondary school, a block of time should be provided studies, dealing with problems of living, that cut across subject matter lines.
   A
   U
   D
   SD  Comment:

31. SA  The mind is strengthened by having the student work at difficult mental tasks.
   A
   U
   D
   SD  Comment:

32. SA  The critical factor in the learning situation is the way the people involved relate and feel toward each other, rather than the specific teaching method used.
   A
   U
   D
   SD  Comment:
33. SA  In the learning situation the stage should be set so as to be reasonably certain that the student will be able to provide the correct answer on the first attempt.
SD  Comment:

34. SA  Learning refers to the training and disciplining of the mind.
SD  Comment:

35. SA  School curricula should be geared to the teaching of fundamental ideas in whatever subject is being taught.
SD  Comment:

36. SA  The motivation for learning springs from the dynamic quest for identity and for meaning that are inherent in human nature.
SD  Comment:

THANK YOU!

Any general reactions you may have to this survey would also be appreciated.
APPENDIX C

DISTRIBUTION AND RETURN OF THE FINAL QUESTIONNAIRE
### TABLE 12

**Distribution and Return of the Final Questionnaire**

<table>
<thead>
<tr>
<th>School System</th>
<th>Educational Level</th>
<th>Distributed</th>
<th>Returned Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Arlington</td>
<td>Senior High</td>
<td>53</td>
<td>51</td>
<td>96</td>
</tr>
<tr>
<td>Upper Arlington</td>
<td>Elementary</td>
<td>52</td>
<td>47</td>
<td>90</td>
</tr>
<tr>
<td><strong>Subtotals and average for Upper Arlington</strong></td>
<td></td>
<td>105</td>
<td>98</td>
<td>93</td>
</tr>
<tr>
<td>Southwestern</td>
<td>Senior High</td>
<td>28</td>
<td>23</td>
<td>82</td>
</tr>
<tr>
<td>Southwestern</td>
<td>Junior High</td>
<td>29</td>
<td>25</td>
<td>86</td>
</tr>
<tr>
<td>Southwestern</td>
<td>Elementary</td>
<td>52</td>
<td>39</td>
<td>75</td>
</tr>
<tr>
<td><strong>Subtotals and average for Southwestern</strong></td>
<td></td>
<td>109</td>
<td>87</td>
<td>79</td>
</tr>
<tr>
<td><strong>Totals and average for both systems</strong></td>
<td></td>
<td>214</td>
<td>185</td>
<td>86</td>
</tr>
</tbody>
</table>
APPENDIX D

SPLIT-HALF CORRELATIONS AND DERIVED RELIABILITY COEFFICIENTS
TABLE 13

Split-Half Correlations and Derived Reliability Coefficients

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Correlation</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disciplinary</td>
<td>.53</td>
<td>.70</td>
</tr>
<tr>
<td>Mechanistic</td>
<td>.47</td>
<td>.64</td>
</tr>
<tr>
<td>Subject Matter</td>
<td>.40</td>
<td>.57</td>
</tr>
<tr>
<td>Structural</td>
<td>.45</td>
<td>.62</td>
</tr>
<tr>
<td>Problem</td>
<td>.26</td>
<td>.42</td>
</tr>
<tr>
<td>Personality</td>
<td>.41</td>
<td>.58</td>
</tr>
</tbody>
</table>
BIBLIOGRAPHY
Books


Periodicals


Thorndike, E. L. "The Influence of Improvement in One Mental Function upon the Efficiency of Other Functions," *Psychological Review*, VIII (May, 1901), 247-61.


Unpublished Material