

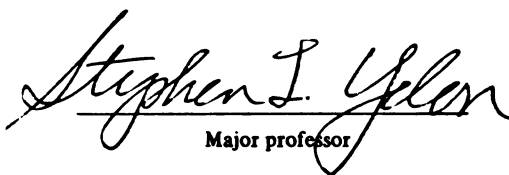


THESIS

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EFFECTS OF INSTRUCTIONAL OBJECTIVES ON THE
EXPERIENTIAL LEARNING OF IN-SERVICE TEACHERS IN
MEXICO
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Esther J. Weitzner de Shwede

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EFFECTS OF INSTRUCTIONAL OBJECTIVES ON THE
EXPERIENTIAL LEARNING OF IN-SERVICE TEACHERS
IN MEXICO

By

Esther J. Weitzner de Shwedel

A DISSERTATION

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ABSTRACT

EFFECTS OF INSTRUCTIONAL OBJECTIVES ON THE EXPERIENTIAL LEARNING OF IN-SERVICE TEACHERS IN MEXICO

By

Esther J. Weitzner de Shwedel

Professional training programs in general and in-service teacher education in Mexico particularly, lack well designed instruction in field applications. One way to improve instructional design for the development of practical skills and attitudes is to provide carefully guided real experiences for learners.

This study explored the effects of one approach to provide guidance for in-service teachers in their practice, by giving them instructional objectives for an experiential assignment and for textual learning. Other variables examined were: (1) learner evaluation of the learning experience, (2) likelihood of learner-generated objectives, (3) sense of efficacy, and (4) demographic data.

One hundred and twenty in-service teachers in Mexico participated in the experiment. They worked mornings and attended a higher normal school in the afternoons. The design consisted of four groups, two for control purposes and two which received objectives as experimental treatment. One control and one treatment group were pretested on content covered by the objectives. The four groups were intact school classes randomly assigned to conditions. The materials used were: (1) instructional objectives, (2) a pretest on content related to the objectives (3) a text with an experiential assignment in it also based on the

objectives, (4) a posttest which was an alternate form of the pretest, (5) a questionnaire on evaluation of the learning experience, and (6) a questionnaire on sense of efficacy. It was hypothesized that the groups receiving objectives would perform better in carrying out the assignment and on the posttest, as well as evaluate their experience more favorably than the control groups. Additional research questions were as follows: what is the likelihood that learners provided with objectives would generate their own objectives; and are there relationships among the demographic, attitudinal, and learning variables.

Major results were:

1. Learners provided with objectives performed better on the practical assignment than learners without objectives.
2. Learners with objectives did not perform better on the posttest related to text content than learners without objectives.
3. Some support was found for the hypothesis that the provision of objectives is related to a favorable evaluation of the learning experience.
4. Some of the evidence suggested that adult learners initially given objectives are more likely to state their own objectives.
5. Sense of efficacy was not related to assignment performance, but some data seemed to indicate that it predicted text-based test scores.

6. Sense of efficacy did not vary with sex. It was also not related to teaching experience for the men, but for the women it tended to decrease with teaching experience.

The results indicate that some of the problems that learners have with experiential learning may be diminished at the beginning stages by the provision of instructional objectives. The results also suggest that the structure given by objectives to learning does not prevent learners from eventually stating their own learning objectives. And finally, the results suggest that the structure provided by objectives is likely to aid in achievement in experiential tasks even for groups with a relatively strong belief in their ability to control their environment.

A Kive y Eva Weitzner, mis padres. El, con fe superior a la
mía. Ella, con valor, generosidad y trabajo, mi oportunidad.

and

To the blessed memory of Moishe and Sore Feigue Jonas, my
grandparents and two among six million teachers of Jewish history.

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This study was conducted under the auspices of a grant from the Ford Foundation and of the Centro de Estudios Educativos, A.C. (CEE) in Mexico.

Enrique González Torres and Carlos Muñoz Izquierdo, general and technical director of the CEE, respectively, provided the institutional base and opportunity to carry out the study. Thanks are due to the staff of the CEE who reviewed and discussed portions of the work, especially Pedro Gerardo Rodríguez and Lourdes Casillas, who added warmth to a work environment. Special gratitude is expressed to María Teresa Nava for her collaboration in the gathering of data, her useful suggestions and generous assistance in typing the first draft. Also appreciated are the hospitality and cooperation of the staff and students at the Escuela Normal Superior where the experiment was conducted.

The contribution of Dr. Stephen L. Yelon, thesis advisor, is warmly acknowledged. His generous guidance and cheerful patience throughout this research were enhanced by the fact that most of the time he offered them by long distance. Deeply appreciated are also the patience, encouragement and assistance given by Dr. S. Joseph Levine, more than committee chairman. Thanks are also due to Dr. Howard Hickey, member of the thesis committee for his help. And an acknowledgment to the thinkers and doers whose work throughout centuries has made possible this small contribution.

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To my sister, Rosa Weitzner de Tavel, special acknowledgment for her constant fellowship and support.

Para Rosita Giberstein K., mi renovado voto de amistad en respuesta a la suya.

Para Marielos Fonseca Tortós, compañera íntegra: la insuficiencia del verbo y lo necesario del acto.

The technical cooperation in long working hours, the companionship, humor and generosity of Ken, my husband, were indispensable. To him, "gracias jarocho".

In learning from time to time what this human being needs and does not need at the moment, the educator is led to an ever deeper recognition of what the human being needs in order to grow. But he (sic) is also led to the recognition of what he, the "educator", is able and what he is unable to give of what is needed- and what he can give now, and what not yet.

Martin Buber

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CHAPTER 1
INTRODUCTION

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INTRODUCTION

This study is a field experiment comparing the effect of instructional objectives on two types of learning among adult professional students.

The research was conducted in Mexico, and the students in it are in-service teachers. In this chapter, the general problem is stated in terms of the considerations that suggested the need to carry out the study. Those considerations are then expressed within the Mexican educational context, where the problem is actually observed in the training of pre-service as well as in-service teachers. After the context of the problem has thus been presented, the purpose of the study is stated along with a succinct presentation of its main hypotheses and research questions. An overview of the study is provided as a conceptual guide for the reader. Finally, the main terms used throughout the study are formally defined so as to clarify their meaning.

Statement of the general problem

One of the central issues in professional adult education today, be it in law, teaching, medicine, or other endeavors, is the question of whether the resulting professionals are competent in their respective occupations (Argyris & Schön, 1974; Sher, 1974). One reason for such a doubt is that training programs usually lack the best designed instruction and do not provide good training in applications to the field. As a result, these training programs for professionals do not help students acquire

and/or develop the skills, perhaps even the attitudes essential to their competence in practicing their occupations.

The Problem in Mexico

The need for well designed instruction which can provide practical training seems even more acute in Mexico, as part of the larger Latin American context. Professionals in fields such as medicine and law can attempt to remedy the deficiency through in-service education. Teachers, although exposed to innovations and usually obliged to apply them in the Mexican centralized educational system, are in fact not trained to understand and use them.

The training of elementary-school teachers in Mexico has been almost exclusively carried out in "normal schools" since the beginning of the nineteenth century. Professionals desiring to teach in secondary education settings (equivalent to the United States junior high school) have been traditionally trained in "higher normal schools" (Normales Superiores). The latter are considered within the realm of higher education in the Mexican educational system. Usually, most of the students at higher normal schools are graduates of a normal school seeking higher professional accreditation in order to move up to a higher income bracket. Of the 35 such schools distributed throughout the country, the majority are federally or state-funded (Secretaría de Educación Pública, 1978; Sotelo Marbán, 1978); and their staff, as well as most of the students, are therefore part of a large bureaucracy. Their socioeconomic stratum is that of the "petite bourgeoisie" (owners of small business enterprises, employees of middle and high levels). They are usually subordinated to the State through position, salary, and benefits, and quite often this takes place via the teachers' union (Calvo, 1980).

Most normal and higher normal schools have a centralized administration, but state funded schools have been able to implement their own programs. Even in the latter case, however, they have not had staff specifically trained to become teacher educators, but instead have fed on their own graduates for such endeavors (Alvarez García et al, 1977). The creation of a Pedagogic University (Universidad Pedagógica) in 1979 was conceived with the propose to train educators.

Where curriculum is concerned, most teacher education institutions in Mexico have placed a very strong emphasis on academic coursework, to the almost practical neglect of supervised student teaching and training in educational technology. The programs are in turn overloaded with long and superficial courses, which limit, among other factors, the time necessary for study outside the classroom. The term superficial means that a great percentage of course content is general culture content and very little is more professional subject matter (Alvarez et al, 1977).

In a study commissioned by the government (Alvarez et al, 1977), it was concluded that among the important problems common to all teacher-education institutions in Mexico, there were: lack of established theoretical bases for many curricular changes; lack of foresight about the future needs in the social and educational context of teacher training, which is currently based more on past answers to future problems than on training teachers in attempting answers to the problems of the future society; lack of socio-economic and professional incentives to promote self-improvement among teachers; a tendency for teacher-education institutions to be isolated from their immediate environment; and other administrative problems as well. Such a picture seems rather distant from the official intention to prepare teachers who are change agents and promoters of community development.

What happens with teachers once they are in the classroom? A comprehensive study (Muñoz Izquierdo & Rodríguez, 1976) found that most teachers in elementary schools still use methods deemed obsolete by educational research, alongside innovative approaches. One reason for the use of obsolete methods may be attributed to a general lack of in-service training to accompany educational innovations when the latter are introduced, usually by decree (Alvarez et al, 1977).

Teacher education and service do not take place in a social vacuum. Research on education in Mexico and other Latin American countries has established that schooling is not a generalized road to social and economic mobility (Morales-Gómez, 1979; Muñoz Izquierdo, 1973; Pescador, 1979). Between 1970 and 1974, 18% of those enrolled in elementary school deserted or failed; of those who remain up to high school, approximately one third have poor reading comprehension (Muñoz Izquierdo & Lobo, 1974; Muñoz Izquierdo & Rodríguez, 1976). These facts are partly related to inappropriate teaching, which in turn underlines the urgent need for improvement in the field.

Thus, as one step toward improving the practice of teaching in Mexico, it is necessary to study methods for making the training received by teachers at both the pre-service and in-service stages most effective. Because in-service teachers in Mexico have had no training in the use of the new approaches that they often must implement by governmental decree, their professional plight seems more urgent than that of pre-service teachers.

Improving in-service teacher training

In order to improve the training of teachers to use and understand new approaches in their field, they need to be provided with carefully

guided, real experiences. Guidance here can best be provided by making explicit to the learners what it is they must learn from those practical experiences. This dissertation explores one approach to provide such a guidance for adult learners in their practices, namely, by stating instructional objectives. The importance of an experiential component in the Latin American educational context is underlined in the work of Paulo Freire, who sees education as praxis, namely, "reflection and action upon the world in order to transform it" (Freire, 1970, p. 36). The world in this context, refers to the reality in which the learners live.

The type of instruction which focuses on real experiences, that is, on the "action" component in Freire's praxis, is known as experiential learning. This type of educational process is conceived as learning by doing, as opposed to learning from books or from other material. In order to get such a process started, it seems necessary to combine it with such techniques of the educational process as the use of clearly stated instructional objectives. The combination of instructional objectives and experiential learning could become a case of guided discovery.

Neither experiential learning per se nor the indiscriminate use of instructional objectives can or should be conceived as a panacea for all effective learning. But to experiment in combining them, on the basis of established research and with the qualifications arising from it, may prove to be a fruitful endeavor, and one which may therefore contribute to both learning theory and practice.

Well employed instructional methods and techniques, crucial as they are in the educational process, are not the only factors which determine learning. The attitudes and personalities of adult professional

learners may serve to debilitate or to enhance approaches used in their training. Learning from experience, even when some guidance for it is provided via objectives, requires certain attitudes toward change, which is the ultimate evidence of learning. Learners are required to feel as if they can have control over the environment, rather than as if the environment controls them. Because such learner attitudes interact with training approaches, they are a variable which is included in this study.

Purpose of the study

The aim of this study is to determine the effects of providing objectives on two types of learning in the case of adult professional students. The main hypotheses are that adult professional students provided with clearly specified instructional objectives: (a) will achieve higher scores on a practical assignment involving experiential learning, (b) will achieve higher scores on a test based on text learning, and (c) will evaluate their learning experience more favorably, than students not provided with those objectives.

The main research questions are: (a) whether there is a relationship between experiential learning, text learning, and student evaluation of the learning experience.

Objectives have been judged by educational professionals to make students passive about their learning when others provide objectives for them. Because of such an issue, a second question is included in this study: (b) whether the original provision of instructional objectives to students increases the likelihood that they generate their own objectives.

Given that learner characteristics, such as attitude toward control over their environment, may interact positively or negatively

with training approaches, two more questions are researched here: (c) whether there is a relationship between the provision of instructional objectives and demographic variables in resulting learning; and (d) whether student sense of efficacy is related to any of the learning and demographic variables mentioned in the previous questions.

Overview of the study

This study used an experimental design to determine the effects of providing instructional objectives on two types of learning. It was conducted in Mexico with a sample of elementary-school teachers who worked mornings and attended a teacher-education institution in the afternoons. The sample was divided into four groups, of which two were used for control purposes, and the remaining two received instructional objectives thus functioning as experimental groups. One of the control groups and one of the experimental groups were pretested on content covered by the instructional objectives. All four groups were then provided with a text which included a practical assignment in it; both text and assignment were based on the instructional objectives used in the study. A period of eight school days was allotted for studying the text and for carrying the assignment in it. After that period of time, all four groups answered a posttest, which was an alternate form of the pretest. Additionally, all four groups answered two questionnaires: one on student evaluation of the learning experience, which also provided an opportunity for the respondents to state their own learning objectives; the second questionnaire was on the demographic characteristics of the sample, as well as on their sense of efficacy or sense of control over the environment.

A review of the research and theoretical literature pertinent to the issues covered here is found in chapter 2. The methodology followed and the statistical results are covered in chapters 3 and 4, respectively. An interpretation of the results obtained, a discussion on the limitations of the study, its possible implications for further research, and the conclusions drawn from it are stated in chapter 5. A series of appendices show the materials used in the conduct of this study.

Definitions used throughout the study

The following is an alphabetical list of the main terms used throughout this study, along with their formal definitions in order to clarify their meaning for the reader.

<u>Experiential learning</u> --	Learning by doing, as opposed to learning from books.
<u>Guided discovery</u> --	A process in which a learner is provided with some guidance for the purpose of discovering either the rule(s) or the solution(s) to a problem.
<u>Higher normal school</u> --	Teacher-education institution in Mexico for service in the secondary schools. Equivalent to a post-secondary (post-high school) level of education.
<u>Instructional objectives</u> --	A description of the behavior expected of a learner after instruction. Used in this study as

synonymous with the terms "objectives", "behavioral objectives", and "learning objectives".

Sense of efficacy --

The belief of individuals in their ability to control their natural and social environment.

Transfer of learning --

The process whereby something learned in one task influences performance on another task.

CHAPTER 2
REVIEW OF THE LITERATURE

CHAPTER 2

REVIEW OF THE LITERATURE

The focus of this study considers the effects of the provision of instructional objectives on experiential and textual learning. Therefore, the first two topics to be reviewed here are research on instructional objectives --which has largely been related to textual learning--, and research on experiential learning. Because the combination of objectives with experiential learning may be considered an example of an instructional approach called guided discovery, that topic is included in this review. The effects of instructional strategies, such as the use of objectives in experiential learning, are influenced by characteristics of the learners, as in the case of their attitudes toward controlling their environment. That type of attitude, called sense of efficacy in this study, is therefore the final major topic of this review. A summary of the research review, the conclusions drawn from it, and the hypotheses and questions of this study to which the review leads, are presented in the final section of this chapter.

Instructional objectives

The basic criteria of what constitutes a behavioral instructional objective were established by the seminal work of Mager (1962). In the present study the terms instructional objectives, behavioral objectives, and learning objectives are used as synonyms, reflecting the vast literature on the topic and of which major reviews have been carried out (Duchastel & Merrill, 1973; Hartley & Davies, 1976; Melton, 1978).

Davis, Alexander & Yelon (1974) have defined a learning objective as "a description of the behavior expected of a learner after instruction" (p. 29). Following in the tradition established by Mager (1962), the same authors have stated that the components of a learning objective are the statements of: 1) terminal behavior relative to instruction, namely, the observable student performance that will be accepted as evidence of learning; 2) test conditions, i.e., the description of a situation in which the student will demonstrate the terminal behavior; and 3) standards, that is to say, the minimal level of performance for the terminal behavior.

An objective serves various functions, as can be determined by analyzing its parts. The specification of terminal behavior as evidence of learning points to an orienting function, in that the objective orients the learner toward that which is to be learned. Both the description of testing conditions for learning and the standards for acceptable performance serve to provide guidelines for evaluation of learning. These functions in turn pave the way for the use of objectives in directing teaching and in facilitating learning.

Many arguments have been documented on the value of using such specific, atomistic, and operational devices to describe the outcomes of instruction (Kapfer, 1971). The controversy has remained mostly at the philosophical level, and given that this study is empirical, a serious philosophical discussion of the issues is beyond its scope. What will be emphasized at this point is that, as Davis, Alexander & Yelon (1974) have stated, learning objectives are not a substitute for a philosophy of instruction, even though they are the offspring of empiricism and therefore of a specific epistemology which emphasizes induction.

Behavioral objectives have empirically been shown to be effective as an aid to learning in some cases and not in others. Due to the vast literature on the topic, only studies which bear direct relevance to the focus of this study are brought here to attention.

Variables that influence the effect of objectives

The literature will be discussed in terms of four main contexts, namely the use of instructional objectives in connection with: (a) types of teaching strategies, (b) learning task, (c) learner characteristics, and (d) the characteristics of the objectives themselves. However, those contexts will not be treated as separate subheadings, because there are instances where more than one factor was found pertinent to the results. For example, Smith (1967) evaluated the effect of behavioral objectives on learning a semi-programmed unit in mathematics in the case of slow learners. The posttest showed no differences between control and experimental groups. One of the reasons for the findings may be the level of ability of learners, since low and high ability students do not seem to benefit from the provision of objectives as much as learners of middle ability (Hartley & Davies, 1976). This relates objectives to learner characteristics. Yet another reason for the lack of effects in the Smith study, and which bears more on the teaching strategy used than on learner characteristics, may be the use of semi-programmed instruction in that study. As Hartley & Davies (1976) have concluded from their review on the topic, it seems that the structure which objectives lend to learning material is rendered superfluous when the material itself is closely structured, as is the case with programmed instruction and the like.

Research has been conducted on the effect of providing students with objectives where the learning situation did not depend exclusively on a text (Weinberg, 1970). In this case, the learning task interacted with objectives. No significant differences were obtained, and a possible explanation may be that the tasks were a motor skill (bowling) and a cognitive one of lower level calling for knowledge. Both tasks were highly structured.

Commenting on the Smith study mentioned before, Melton (1978) has pointed out that it is not enough to provide learners with objectives, but awareness and use of them must be also ensured. Teaching strategy becomes a relevant variable here. Staley & Wolf (1979) trained some of their subjects in the use of objectives, and found that, whereas objectives led to greater learning regardless of training, in the case where training was added there was a savings in study time over a no objectives condition. This finding shows contradictory evidence to previous research where no advantage was obtained from training students in the use of objectives (Hartley & Davies, 1976). There is evidence also that the training of teachers in the use of objectives as a guide to teaching has resulted in enhanced student achievement (Hartley & Davies, 1976).

Somewhat related to the issue of structural degree in teaching strategy used, is how salient the objectives are to the instructional task. This question has been studied under the rubric of relevant vs. incidental learning (Duchastel & Brown, 1974; Kaplan, 1976; Kaplan & Rothkopf, 1974; Rothkopf & Billington, 1975). Briefly, the adjective relevant is conferred on learning to which the learner is directly oriented by corresponding instructional objectives; incidental learning then, would be the mastery of the remaining subject matter in a given unit of instruction not directly covered by objectives.

The evidence has been conflicting on these terms. Whereas for example, Kaplan & Rothkopf (1974) and Rothkopf & Billington (1975) have found that instructional objectives enhance both intentional and incidental learning, Duchastel (1977) and Duchastel & Brown (1974) have obtained data suggesting that while instructional objectives enhance relevant learning they depress incidental learning. Taking into account that the research reviewed has dealt with learning material in the form of texts, Melton (1978) has suggested that the conflicting findings may find their synthesis in the differential functions of objectives as they relate to their location in the text. Placed just before the text, presumably they have an orienting function regarding what is to be learned, and a reinforcing function is likely to take precedence when the objectives are located after the instructional material. It seems that this explanation is most useful when dealing with methodological research considerations. In actual practice, students may use objectives in both the functions mentioned, since there is no control over the number of times they may use their objectives upon studying, regardless of where in a text those objectives are located. What seems more useful about the explanation is the proposition that objectives may be not only orienting stimuli for learning, but may also serve as reinforcers.

Rothkopf (1976) has cited evidence to support the notion of objectives as orienting stimuli where some learners were given directions to identify text segments about which they were not to learn, and other learners were given directions identifying target sentences for learning (Frase & Kreitzberg, 1975). Only the latter condition was found to help learning. However, the same results could be interpreted in terms of the reinforcing function of directions to learn if learners are aware, through instructional objectives, that they are learning whatever they

are expected to learn (Duchastel & Merrill, 1973). That objectives function as orienting stimuli seems to find support also from evidence that they direct students to learn information which the latter would not classify as likely to be tested (Duell, 1974).

There are considerations on the characteristics of objectives themselves. A study in which objectives revealed no significant difference in performance on cognitive and affective outcomes, was judged a posteriori by the researcher as having used objectives that were too difficult to attain, this fact probably having influenced the outcome (Brown, 1970). Melton (1978) has suggested that examining the structure of readability of instructional material may provide some control over the degree of difficulty of the objectives used. An additional index of the characteristics which instructional objectives may have that could influence performance outcome would be the users themselves (Berliner, 1975). That is, learners provided with objectives could be asked to judge the degree of difficulty and clarity of the instructional material they use. This judgement would be used in conjunction with a pilot test of the same material with similar learners in terms of their knowledge of subject matter. This is an issue that relates mainly to the characteristics of text and objectives themselves.

With respect to the relationship between instructional objectives and learning task characteristics, Hartley & Davies (1976) have suggested in their topical review that objectives do not seem useful in learning tasks that, in the taxonomy elaborated by Bloom et al (1956), call for knowledge and comprehension, as measured by posttests. Their utility seems more obvious regarding higher level learning tasks, although a study by Yelon & Schmidt (1971) showed that objectives may even decrease

performance in problem-solving tasks. Hartley & Davies have therefore concluded that behavioral objectives, used as a preinstructional strategy, are likely to be optimal when what is to be learned can be articulated with what has already been learned, i.e., the case of meaningful learning vis-a-vis rote learning.

Furthermore, instructional objectives are characteristically instruments for a deductive epistemology as they point to particulars to be learned in order to gradually arrive at the general. That being the case, then, it would seem that instructional objectives are also likely to be optimal in reception-learning situations.

The qualifications for the use of objectives do not end at this point. Although it has been pointed out that the Yelon & Schmidt study dealt with a type of problem-solving task that is hardly found in public schools (Duchastel & Merrill, 1973), a factor which may have influenced outcome could be such relevant learner characteristics as cognitive style and locus of control. For instance, cognitive style differences have been shown to explain performance in analytic skills (Witkin et al, 1977); and locus of control differences have also been found to explain performance when structure has been manipulated as learning task characteristic (Daniels & Stevens, 1976; Parent et al, 1975; Pines, 1973).

Structure may be reflected not only in the use of instructional objectives themselves but also in the type of learning situation itself (teacher control and programmed instruction for example). These considerations lead to the issue of the possible relationship between discovery learning, meaning an emphasis on inductive learning methodology, and the use of instructional objectives for it, a topic that is treated here, following a statement of conclusions about what has been presented so far on instructional objectives research.

Conclusions concerning research on instructional objectives.

As Schwab (1969) and Snow (1979) have suggested, no single concept has proved to be nor is likely to be the panacea for learning. Instructional objectives are no exception. Their effectiveness for improving learning seems to be optimized when used in association with a variety of factors, among them:

(a) Learners of middle ability who manifest certain personality characteristics such as independence at work. This conclusion suggests the need to study such characteristics in learners when they are provided with objectives, as it is done in this research.

(b) Loosely structured instructional material or situations. One example of this case is experiential learning. Thus the need to include it as a variable in this study.

(c) Higher level learning tasks, such as application and analysis. For this reason, there arises the hypothesis that the combination of objectives with experiential learning would be most effective when it includes higher level learning tasks.

(d) Meaningful-reception learning. This conclusion leads to the suggestion that the sequential combination of objectives with experiential learning in instruction is a case of guided discovery. Such a concept is argued by itself in a later section of this chapter.

(e) A degree of difficulty in the objectives themselves that is not too high relative to their users. There is a need to investigate how learners who are provided with objectives perceive the degree of difficulty of those objectives.

(f) Where the use of objectives is intended to lend organization, orientation, and reinforcement to studying. These types of factors lead to a hypothesis suggested in connection with (b). Namely, that objectives

should be most effective when applied to a loosely structured situation such as in the case of experiential learning, by providing organization and orientation to it; and that they would reinforce such learning precisely because objectives would organize and orient it.

A second hypothesis arises in this context. If objectives help to organize, orient and reinforce learning, then learners who use objectives in this manner should evaluate their learning experience favorably.

Objectives also seem to optimally improve learning when savings in study time is desired, and when their use is for the purpose of aiding teachers as a guide to teaching. Because these factors are not of direct interest in this study, notwithstanding their importance they are not discussed further.

Experiential learning

There is no clear-cut definition of what constitutes experiential learning. Current attempts to define it are a sign that it is only beginning to become established as an educational strategy in its own right (Druian, Owens & Owen, 1979; Keeton, 1976; Owens & Owen, 1979). The common attribute of experiential educational activities is the conduct of learning experiences outside the classroom (Keeton, 1976). Therefore, experiential learning is associated with, for example, student teaching (Gage & Winne, 1975; Stephens, 1979); field experience (Dressel & DeLisle, 1969; Nosow, 1975; Quinn, 1972); internships, and cooperative education among other educational approaches (Gordon, 1976).

The practice of learning in an experiential context, however, is deeply rooted in the history of education and in learning theory research. The apprenticeship system, so popular in the Middle Ages (Houle, 1976), is almost entirely based on experiential learning.

John Dewey (1963), dean of U.S. philosophers, postulated that among the principles of his concept of education was that learning should take place through experience, as opposed to learning from books. The concept of "learning by doing" has been an essential component of behavioral learning theory (Hilgard & Bower, 1966); behavioral concepts such as exercise, trial and error, reinforcement and extinction are examples of the interaction of the organism with the physical environment. The laboratory for example, has been conceptualized as a stimulus situation for direct student contact with objects and events (Gagné, 1970). From an epistemological emphasis, Piaget (1968) has placed the role of experiential learning as a key one in his developmental theory.

Several main concepts underlie the theoretical importance of experience in learning. One basic concept is the reinforcing value of practice on learning, which is strongly emphasized in behavioral paradigms (Hilgard & Bower, 1966). Another concept is the association of learning with motivation, specifically, that tasks strongly tied to real-life interests produce better learning than tasks otherwise meaningless (Nuttin, 1976). A definition is in order at this point. The concept of meaningful learning has been extensively used in psychological research (Ausubel, 1968; Hartley & Davies, 1976; Nuttin, 1976; Rozeboom, 1974; Underwood & Schulz, 1960). Yet the notion of the concept of "meaning", or as known in the jargon of philosophy of science, "cognitive significance" (Hempel, 1965), does not have a universal definition. Recognizing the problem as such, the sense given to meaningful learning given here follows that of Gagné (1968), namely, the articulation of new material with what the learner has demonstrated to have already learned.

An assumption in the theory behind experiential learning is that experience is one way of developing knowledge. In this respect, two learning theorists who have represented opposing views, Gagné (1970) and Bruner (1966), agree in that the most important goal of education should be the processes whereby knowledge is developed and used, as opposed to subject matter knowledge (Ausubel, 1968). One of these processes is the concept of transfer of learning, which in the final analysis would be one of the most important processes for benefitting from experiential learning. Succintly, transfer of learning is a process whereby something learned in one task influences performance on another task. As Shulman (1970) has pointed out, without transfer, learners would not be expected to apply that which they have been taught in situations other than those actually encountered during instruction.

Shulman (1970) has noted the agreement of both Gagné and Bruner that the transfer of intellectual or process skills is more important than that of verbalizable knowledge. Specifically referring to training in teaching, Cole & Musser (1977) have advocated the use of experiences that serve as the vehicle by which a myriad process skills are learned. Such an advocacy is closely associated with the problem of relevance in the training of teachers. The strong emphasis on theories and concepts in teacher training at the expense of diminishing the role of skill, may be one of the reasons why Jackson (1968) found that teachers have indicated their low retention and use of those theories and concepts once on the job. The same situation of lack of relevant, supervised experiential teacher training has been pointed out in the Mexican context (Alvarez et al, 1977; Lara Rosano et al, 1978).

It must be pointed out, however, that the mere exposure of the teacher-in-training to actual classroom experience assumes that the

process will be enough to automatically learn appropriate or "good" teaching. Obviously this is not enough (Peck & Tucker, 1973), and a relative, deliberate structure has to be provided for experiential learning to be fruitful in terms of teacher efficacy. The writer W. Somerset Maugham (1969) has acutely expressed the humorous side of the issue of relevant learning in the English school context: "...having learned little but a cheerful effrontery in the distortion of truth, which was possibly of greater service to (the students) in afterlife than an ability to read Latin at sight" (p.67).

Learners commonly report their satisfaction when evaluating experiential learning (Owens, Almond & Eder, 1979; Owens & Owen, 1979; Quinn, 1972). At the same time, those learners have consistently pointed out the need for clear objectives in carrying out their experiential learning, and this complaint has been voiced across knowledge areas (Nosow, 1975; Quinn, 1972). It seems necessary then to study whether the provision of clear objectives for carrying out experiential learning results in both, achievement of those objectives and a concomitant satisfaction on the part of the learners. That is one of the purposes of this study.

One way to analyze instruction is by the degree of guidance provided to the learners as they proceed to learn something. This study is about the effects of providing guidance to learners in the form of objectives, as they proceed to learn in a loosely structured situation, which is the methodology of experiential learning. Such a combination of guidance with a loosely structured learning environment is discussed next.

Guided discovery

The concept of instructional objective as a teaching-learning strategy has previously been characterized in this review as an instrument for deducing what is to be learned. This in turn has served as the basis for the argument that, as a teaching strategy, it is likely to be optimal in a meaningful-reception learning situation (Hartley & Davies, 1976). Usually, receptive learning has been associated with expository teaching, where supposedly the entire content of what is to be learned is presented to the learner in its final form (Ausubel, 1968). Reception learning, in turn has been presented as the antithesis of discovery learning (Ausubel, 1968; Shulman & Keislar, 1966). At this point it becomes necessary, for argumentative purposes, to define or explain the concept of discovery learning. But the task is difficult because there has been no agreement on the definition of the term. With that qualification, it will be said that an essential characteristic of discovery learning is that the main content of what is to be learned is not given, as it is in the expository or receptive situation. What is to be learned is presented as a problem in discovery learning. The solution must be discovered by the learner through a process of inquiry in a Socratic tradition.

One of the main arguments at the core of attempts to define discovery learning is the varying degrees of guidance provided to the learners as they proceed to discover. As Shulman (1970) has noted with respect to discovery learning, guidance is conceived as a continuum. At the highest extreme of guidance there would be expository teaching, and at its lowest end would be discovery learning.

If guidance is considered a continuum, then one may find along it a combination of both its extremes which is called guided discovery.

Namely, a learning situation where there is some guidance provided but allowing the learners to discover by themselves some of the content to be learned in that situation. For example, a learning situation can be approached as a problem for the learner. Guidance may be provided by supplying the learners with the solution(s) to the problem, but their task would be to discover the rule(s) leading to the known solution. This is an example of guided discovery where inductive thinking is required.

A second example of guided discovery is a problem situation in which guidance for learning is given by showing the rule(s) to solve the problem. The learners would then have the task of discovering the solution(s) to that problem by using the rules provided to them as guides. Because the task in this case is to proceed from the general (rules) to the particular (solution), the example described here is a case of deductive guided discovery.

By analyzing instruction from the perspective of sequence, it may be said that if behavioral objectives, a deductive device, are given at the beginning of instruction, and the learning task relative to those objectives is characteristically inductive, then the entire situation could be classified as one of guided discovery. It is the author's contention that the combination of instructional objectives with an experiential learning task that includes a potentially problematic situation is an example of deductive, guided discovery. The objectives, in this larger context, would constitute the rules conducive to the solution of the problem; but the problem itself and its solution, as in many significant situations encountered in human endeavors, would have to be formulated by the learners (Shulman, 1970). The author's contention relates two concepts traditionally considered

antagonistic.

The manner in which a problem and its solution are formulated is a function not only of the rules followed in the process, but also of the way in which the problem is perceived. One of the factors that determine perception in people is the extent to which they feel in control of their environment. That is the topic which follows next.

Sense of efficacy

Sense of efficacy refers to the issue of whether individuals believe in their ability to control their natural and social environment (Jordan, 1972). Persons high in sense of efficacy are those who believe that they can manipulate the environment.

A sense of efficacy scale has been used, as one measure among several, in a study to estimate the attitudes of people working in education (teachers, principals, supervisors) toward educational change in Mexico and six other Latin American countries (Jordan, 1975). In the Latin American study, the Mexican male teachers had a higher sense of efficacy than their female counterparts, although not statistically significant, as well as a broader job experience and a more favorable attitude toward educational change (Jordan, 1975). The present study includes a measure on sense of efficacy because of its relationship to favoring educational change, and the possibility that it may be an aid when confronting difficult learning situations. Given that people vary in the causal attributions for success or failure in achievement, a brief discussion of attribution theory follows.

In a schooling context, attribution theory has been used to study the types of causes to which individuals attribute their achievement and their failure (Weiner, 1976). Research done in the

United States and in Israel (Bar-tal, 1978) has shown that the causes to which achievement and failure have most frequently been attributed are: (a) ability, (b) effort, (c) task difficulty, (and (d) luck. Weiner (1976) has pointed out that of those attributional factors, ability and effort are perceived as internal to the individual, whereas task difficulty and luck are sensed as external causes.

According to Bar-Tal (1978), it has been found that two variables distinguish most acutely between people who attribute results to causes either external or internal to themselves. Persons with a tendency to seek for internal causes attribute success to skill or ability. Persons who tend to seek for external causes attribute success to luck. It can thus be seen that there is a close relationship between sense of efficacy and causal attribution in achievement contexts, such as in school. The relevance of such a relationship is further enhanced by what Weiner (1979) calls the stability dimension of causal attribution. Briefly, this dimension addresses the issue that both internal and external causes can each be stable or unstable. For example, an internal stable cause for achievement or failure may be ability; an unstable one would be mood. In the area of external causal attribution, a stable cause may be task difficulty, whereas luck would be unstable. Depending on the type of causal attribution, a learner's expectancy of success and of failure at a task may be anticipated with some degree of certainty.

Some logical conclusions seem to follow the information on both sense of efficacy and attribution theory. It may be that sense of efficacy is related to how people perceive the degree of difficulty in carrying out a task, and to the causes to which they may attribute their success or failure at that task. Thus the importance of examining the relationship between sense of efficacy and learner evaluation of the

learning experience, as well as actual achievement in that experience. These are characteristics to be considered whenever learning is being assessed, in order to avoid a fruitless oversimplification of the object of research.

The risk of oversimplification when dealing with human endeavor is hardly overemphasized. For example, even if such a concept as sense of efficacy has been culturally validated in Latin America --as it is discussed in chapter 3--, its dichotomized criteria (either the individual or the environment as causes of change) are too simplistic a view of the interaction between human beings and the world. In his analysis of philosophical thought in Latin America, Sciacca (1964) points out that such a thought is resistant to the easy optimism of human happiness placed in the hands of scientific progress; the same trend of thought, however, neither denies the value of science and technology as areas of knowledge and human endeavor. Such a philosophical orientation is not necessarily followed by attitudes and values totally congruent with it. Taking into account the socioeconomic and political factors of Mexican reality, one finds for example, a tendency among young teachers with relatively high incomes, working in schools of high socioeconomic status (SES), to favor changes such as "increasing the strength of independent popular groups to deal with government power" (Duplá, 1975). In contrast to that finding, Díaz-Guerrero (1972), defining "stress" as the implied wear and tear in facing life's problems, has pointed out that Mexicans are passive acceptants of stress; that is, they accept it, not modifying the environment but themselves. More than proof of error somewhere in the research previously mentioned, it is likely that their contradictory evidence may reflect processes of Mexican

reality, which like that of Latin America is characterized by contradiction (Morales-Gómez, 1979).

Summary and conclusions for the present study

The main factors included in the conduct of this study have been presented in this review. Those factors are: (a) instructional objectives, (b) experiential learning, (c) guided discovery, and (d) sense of efficacy. In the present study an attempt is made to examine the effects of objectives on experiential and textual learning, and the influence that sense of efficacy may have on such effects.

It has been argued that experiential learning is a type of instruction which when carefully monitored constitutes an important, fruitful way of learning and of particular relevance to teacher training. The need for clear instructional objectives has been voiced by participants in experiential learning programs and others. Taking into account that experiential learning usually tends to be less controllable than other educational contexts, the use of instructional objectives may help to enhance such learning. Such objectives may lend orientation, structure, organization, and reinforcement to the process of learning, when additional conditions are met. Among such conditions there are learner characteristics such as a middle level of ability and independence at work; instructional strategic characteristics as in the case of loosely structured material or situations, and meaningful reception learning; and educational tasks that demand higher level processes for learning.

These findings lead to hypothesize that learners such as in-service teachers who are provided instructional objectives for experiential (i.e., meaningful) learning, should achieve a higher

performance in it than similar learners without such objectives. For the same type of learners a second hypothesis arises from the research review. If objectives lend orientation to learning, then their use of textual learning should increase the performance of learners over others who do not use objectives for textual learning.

It is mentioned in this review that the degree of difficulty in the objectives themselves, relative to their users, may influence the effect of objectives on learning. A corollary of that statement would be that if objectives are not perceived as too difficult by their users, such users would evaluate the objectives favorably. Therefore, an additional hypothesis in this study should be supported. Namely, that learners who use objectives, which are not too difficult for them should evaluate favorably the use of those objectives.

The research review points out that there may be two cases of guided discovery, depending on whether the learning task requires inductive or deductive processes. This leads to the statement of a theoretical question concerning the use of objectives for experiential learning. Namely, whether providing objectives at the beginning of an experiential learning task that requires inductive processes constitutes a case of guided discovery. This proposition may serve to synthesize two traditionally antagonistic views of instruction.

Finally, this review included an attitude variable regarding learners that may influence the effect of objectives on learning. Such an attitude variable is sense of efficacy. It is argued on the basis of logic that persons with a high sense of efficacy may achieve better in instructional situations that have a loose structure. Those with a high sense of efficacy have more confidence in their ability to manipulate the environment. When faced with a challenging task such

as making sense of a loosely structured situation, these people may believe they can successfully meet the task. Experiential learning generally consists of loosely structured situations, and providing objectives for it should lend it structure. This leads to the research question of what the effect of objectives on experiential learning may be for people with a certain sense of efficacy.

Those hypotheses and research questions then, are the focus of this study.

CHAPTER 3

METHOD

CHAPTER 3

METHOD

The thrust of this study was to compare the effects of providing instructional objectives on the experiential and textual learning of adult learners. Research has indicated that the use of objectives is optimal for learning under certain conditions, such as characteristics of the objectives themselves as well as those of the learners who use them. Many of the conditions that enhance the effect on learning by the use of objectives were included in the methodology of this study.

The sample consisted of Mexican in-service teachers who attended a teacher-education institution, in addition to their work in elementary schools. The design used in this study was an experimental one applied in a field setting. The sample was divided into four groups, two of which were used for control purposes, while the remaining two groups received instructional objectives as the experimental treatment. One of each, the control groups and the experimental ones were pretested on a text whose content was based on the objectives. All four groups were then provided with a text which included a practical assignment in it, and which provided an experiential learning setting. Both text and practical assignment were based on the objectives used as treatment. After the learners had eight days for studying the text and carrying out the practical assignment, they were administered a posttest on the content of the text. Their completed assignments were also collected then. Additionally, the learners answered two questionnaires; one on their evaluation of the learning experience, i.e., studying the text, use of

objectives, carrying out the assignment; and the possibility to state their own objectives. The second questionnaire was on the demographic characteristics of the sample, and on the respondents' sense of efficacy.

In this section, information will be presented on: a) the characteristics of the subjects who participated in the study; b) the design and instruments used; c) the procedure followed to obtain the data; d) the empirical hypotheses and exploratory research questions of concern here; and 3) the type of statistical analyses carried out to test the hypotheses and exploratory questions.

The hypotheses, to be stated formally later on in this chapter, were that students using instructional objectives would: 1) have higher scores on an experiential assignment, 2) have higher scores on a post-test of information given in a text, 3) evaluate their learning experience more favorably, and 4) specify their own learning objectives, to a larger extent than students who did not use instructional objectives. The research questions of an exploratory nature consisted in whether the students in either treatment condition (i.e. use or no use of objectives) differed in terms of age, sex, teaching experience, civil status, grade point average and the attitudinal variable called sense of efficacy. Additional questions concerned whether there was a relationship of the effects of objectives on the assignment, textual learning, evaluation of the learning experience, and sense of efficacy.

Subjects

A total of 178 elementary school teachers were originally selected to participate in the experiment. They all taught in the mornings and attended an Escuela Normal Superior (higher normal school) in the afternoons, in pursuit of certification as secondary school teachers. The higher normal school is located in Toluca, capital of the state of Mexico, and it is funded

by the state government. With an enrollment of 1538 students, it is one of the two in that state. There are 35 such schools throughout the country, and those which are funded by the states contribute 55% of the total national enrollment (Sotelo Marbán, 1978). The school was chosen for two reasons: (a) the students were also in-service teachers, and therefore could use their practice as the experiential setting for the experiment; and (b) the school is located in the Mexican province, which has seldom been the object of studies like this one, having been neglected in favor of the country capital.

The program at the higher normal school is divided into several teaching specialty areas, such as mathematics, natural sciences, and social sciences. Such structure is common to schools of that kind throughout the country. Those specialty areas which had a course in common throughout one semester constituted the groups which participated in this study. There were four such groups, two in their second year and two in their first one, all taking a course dealing basically with concepts of measurement and evaluation in education. Each group had a different instructor for the course, but the program content was the same for all.

A number of teachers were dropped from the original selection due to lack of attendance; as far as could be ascertained, the attrition was not systematic; this was ascertained with the instructors, who explained that absences were not infrequent throughout the term and that they were generalized because: most students had to travel long from their workplaces to the normal school, and often they were delayed by administrative chores at their workplaces. The final sample consisted of 65 women and 55 men, comprising a total of 120 teachers, some in first year and others in their second year of study. Their ages ranged from 20 to 45 years, 35% of them were married (18% of the women, and 55%

of the men), and the range of teaching experience was from 2 to 16 years. In the chapter on results, evidence will be presented on the fact that the groups were not equivalent with respect to grade point average and other concomitant variables.

Design

Each group was randomly assigned to either the experimental condition (use of objectives) or the control one (no instructional objectives), thus obtaining two groups in each condition. As it turned out, the experimental groups were the first-year psychology students and the second-year natural science students; the control groups were constituted by the students in first-year mathematics and the second-year social science.

Because intact classes rather than individuals were assigned to conditions, the advantages of randomization were reduced. In such cases, the possibility of sampling error is most effectively included in the results by using the group and not the individual as the unit of analysis. Therefore, the basic unit of analysis in this study was the group mean.

The design used in this experiment is an approximation to the Solomon Four-Group Design (Campbell & Stanley, 1967); namely, untreated control groups with pretest and posttest, with a replica of each condition. The groups participating in the study were intact and there was no random selection of individuals; in this context, the study constituted a quasi-experiment. However, as mentioned before, the assignment of groups to conditions was random.

This format can be illustrated in the following manner:

Groups

Natural Science	O_1 X O_2
Mathematics	O_1 O_2
Educational Psychology	X O_2
Social Science	O_2

where O refers to a measurement, and X represents an experimental variable; the Xs and Os in a single row are applied to the same persons.

A design of this sort controls for such threats to internal validity as main effects of history, maturation, instrumentation, testing, and the interaction of testing and treatment. Briefly, internal validity refers to whether the results obtained in an experiment are in fact the consequence of the experimental treatment, which is the experiment's goal. History as a threat to internal validity relates to events that are not an experimental variable and which occur between the first and second measurements. Maturation includes processes within the sampled individuals taking place as a function of time, i.e., growing tired. Instrumentation threats relate to the possibility that changes in the measuring instruments used may cause changes in the obtained measures. Testing weaknesses refer to the effects that taking a first test may have on the scores of a second test. The interaction of testing and treatment may be a threat in that it combines the weaknesses of testing and confusing them with the effects attributed to the experimental treatment. In the present case the control is only partially achieved since the groups were originally self-selected.

Limitations to this design arise from the lack of randomization in the assignment of individuals to groups, because the latter were originally self-selected. Thus, results could be due to initial

differences between the groups, and not necessarily the effect of the independent variables. Much educational research gains in external validity when it is carried out in natural settings, as is the case in this study; given that it is seldom possible to fully randomize in natural settings, it has been recommended in such cases that there be at least random assignment of groups to experimental conditions (Campbell and Stanley, 1963; Kerlinger, 1973). In order to control for the self-selection of the groups in this study, a number of concomitant measurements were included in addition to the pretest. In this manner, it can be made explicit whether indeed there were relevant and statistically significant differences between the groups, and thus take them into account upon analyzing the experimental results.

MATERIALS

The information on the materials used in this study will be divided into that concerning: (1) the independent variables, and (2) dependent ones.

Independent variables

The four groups were given a text for study which included an experiential assignment; accompanying the text were instructions for its use. Two of the four groups were additionally provided with objectives which were relevant to the text as well as to the experiential assignment. These materials constituted the independent variables of the study. A fuller description of the entire treatment is presented under the subheading procedure.

Text. The learning material was a passage on evaluation and related concepts elaborated by the experimenter (see Appendix A). It was derived from content of the course program which had not yet been

covered and based on a general objective for that content. It contains 25 paragraphs, of which the longest has 125 words (in Spanish). The text is entitled "What is Evaluation?" and its topics are: (a) evaluation, (b) measurement, (c) validity, (d) reliability, (e) guidelines for elaborating a test, and (f) assignment. The latter includes instructions concerning how to carry the assignment out in detailed form, as well as a date for turning in a report on it. The assignment report by itself constituted one of the dependent variables in the study. Therefore, a more detailed account of it will be presented in the appropriate section. The text was pretested for clarity, meaning, coherence and reading time, as well as correspondence to the learning objectives.

The pretesting was carried out with a sample of students in a different higher normal school who had a similar program as those in the experiment. They read the text and were asked to specifically evaluate it in terms of how clear and coherent its concepts were, and to ask questions about their meaning. They were also invited to offer general comments on it that were not included in the evaluation guidelines. Notes were taken on the evaluative comments and on their frequency. Revisions were then incorporated in the new version of the text. It must be noted that these students had already taken a course on the content covered by the text. The experimental instrument was then the version which was modified after twice pretesting it with the equivalent sample.

Instructional objectives. Seven learning objectives were developed for the text (see Appendix B). They are stated in terms of what the learner should be able to do after studying the text, which includes the carrying out of the assignment. Therefore, the objectives refer not only to classroom learning but experiential as well. The objectives used in the

study were the following:

1. You will define in written form and in your own words, the main concepts included in the text.
2. Given a learning objective and various questions, you will select those which are valid for the attainment of that objective.
3. Given a learning objective and various procedures to measure its attainment, you will select those which are most reliable.
4. Given various learning objectives, you will select those which most contribute to "analysis" as a cognitive process.
5. Given a sample test and various evaluation concepts, you will select those used to elaborate the test.
6. Given various examples of evaluation procedures, you will select those which are correct.
7. Given a learning objective, the student will construct a valid and reliable test to measure the attainment of that objective, and will evaluate its results.

The objectives were pretested twice with a sample equivalent to the experimental one, in an effort to enhance clarity, meaning, reading time, and correspondence to the text once the latter had been developed.

The objectives were created by the experimenter. However, this was done, as throughout the entire research process, in close collaboration with the instructors of the experimental groups. The process was as follows: The experimenter reviewed the course program which was common to all four groups, and chose a pool of terminal course objectives. From that pool, the instructors were asked to select

the one terminal objective of any given unit from which the experimenter was to derive the enabling objectives for the experiment. The unit was one not yet covered, and it was agreed that it would not be covered until after the experiment was over. After such an agreement was reached among the instructors, the enabling objectives were formulated and then presented to the instructors for their approval.

Instructions for use of the material. Instructions are stated in four short paragraphs, concerning use of the text and objectives when these were included. Since all four groups received the same instructions, no specific mention of either text or objectives was made (see Appendix C). Briefly, the students were requested to read the material carefully, to study it and to keep it until a specific date, when they would have to return it. They were also allowed to underline it if they wished to do so, and notified that they would be tested on it in the near future.

Procedure for Administration of the Independent Variables

The experiment was carried out at the higher normal school during regular class hours in groups of over 30 each. A basic assumption of the procedure was establishing a partnership between experimenter and normal school instructors. In order to strengthen such a relationship, the instructors affected by the research were kept informed of every stage and consulted when appropriate and necessary.

The procedure entailed a pretest, two experimental conditions, an assignment, a posttest, and the administration of the questionnaires. Such a method was carried out for a period of three weeks during the second half of the semester.

Each of the four groups participated in their respective classrooms; thus, although the experimental sessions were not simultaneous,

they were all carried out within the same week. The situation lent itself for contamination among the teachers in the different groups; however, there was little opportunity for contact between groups due to (a) their tight schedule, having to work in different schools in the mornings, and traveling to the normal school from varying distances in the afternoons; (b) each group belonging to a different specialty area, thus sharing a greater range of academic interests among themselves than with the other groups. The alternative to this situation would have entailed a laboratory setting, which in addition to being unfeasible in this case, would have presented the much criticized problem of school-learning research being done in an artificial situation with a consequent decrease in validity.

The administration of the independent variables took place two days after an objective-relevant pretest was administered. (The procedure for administration of the pretest, that is, of the prerequisites for the experimental task, will be covered under the heading of Pretest.)

Therefore, two of the groups were already familiarized with the researcher. For the unpretested groups, the respective class instructor, as had been the case with the pretested groups, presented the researcher and her assistant to the class. A few brief statements explained the purpose of their presence there, requesting the cooperation of the teachers. After providing this information, the instructor left the room.

Attendance was recorded and the learning material was handed out in what is standard procedure (Duchastel, 1979; Kaplan, 1976); the teachers received a manila envelope with the following set of materials; (a) instructions, (b) objectives (only for the experimental groups), and (c) text. The experimental groups were specifically asked to use the objectives in studying the text and in carrying out the assignment. After a few minutes allotted for familiarization with the material, the

teachers were notified that they would be tested on it one week later, and not to share it during that period.

Dependent Variables

The measurement of the dependent variables took place on the third and fourth experimental sessions. Such variables were: (1) performance on the experiential assignment that accompanied the text; (2) scores on an objective-relevant (post)test; (3) scores on a questionnaire concerning student evaluation of the learning experience, namely, of the experimental treatment; and (4) the statement of student-originated objectives. In addition to the dependent variables, measurements were taken of attribute variables such as age, sex, teaching experience, civil status and grade-point average. These variables were measured in order to examine whether or not the groups were equivalent on those attributes, since individuals had not been randomly assigned to groups, and those factors may have relevance to performance on the dependent variables. Additionally, a measurement was taken of the attitudinal variable called sense of efficacy. All these measures will be described in terms of their operationalization, development, validity and reliability, following an account of the measurement of prerequisites to the experimental task, namely, the pretest.

Pretest. Prior to the experimental treatment a measurement of the prerequisites for the content of the experimental text was taken in the form of a pretest. Based on the objectives used for the experiment, the pretest consists of 14 questions, two for each objective. That is, using the experimental objectives as the criteria, two questions were formulated to test for each of those objectives. For example, one of the experimental objectives (see Appendix B) is stated in the following

terms: "Given a learning objective and various questions, you will select those which are valid for the attainment of that objective." A corresponding question in the pretest is (see Appendix D): "In order to find out if the students attained the objective of learning to write a short story, which of the following is a valid measurement?" (Four possible answers are stated for choice). A second question related to the same objective is the following: "A valid question to measure the level of application of principles is:" (Again, this is a multiple-choice question).

In order to select the items for final inclusion in the pretest, the instrument in turn was pilot-tested with an independent sample of teachers studying at another higher normal school. The teachers in the independent sample were familiar with the concepts included in the pretest. Indices of difficulty and of discrimination were calculated for each item (Ebel, 1972); those items which had both, a difficulty index of at least .30 and a discrimination index greater than .20 were included in the final version of the instrument. The index of item difficulty is a proportion of incorrect responses to a given item, obtained from tests with high total scores and with low total scores. The index of item discrimination is a difference in proportions of correct response between upper and lower groups of test scores. Selection of the minimum indices for item inclusion was based on the recommendations mentioned by Ebel (1972¹).

¹A "moderate degree of difficulty of (an) item is indicated by (...) 26 percent of incorrect response in the two groups (low and high test scores) combined" (p. 385). According to Ebel, a discrimination index of .20 to .29 for a given item means that the item is usable but needing improvement.

A measurement of internal reliability was obtained using the K-R₂₀ formula. The reliability index for the pretest is $r(58) = .251$, $p < .05$, which although statistically significant is rather low. Low reliability is a risk in that the measure cannot be wholly depended upon to register true changes in the stability of the measure. Low reliability affects the statistical difference between the means of different treatment groups. One way to control for this problem is to use groups and not individuals as units of analysis, because a group mean will be more stable than individual scores (Cook & Campbell, 1979). This study used the group as the unit of analysis. Furthermore, the K-R₂₀ formula is considered the best method for estimating reliability for the type of test used here, because it reduces the sources of error to those of (1) sampling, and (2) random error within the test (Mehrens and Lehmann, 1973).

Administration of the Pretest. The pretest was administered on the first session devoted to the study. The respective class instructor presented the experimenter and her assistant to the group, briefly explained that they were conducting a study on learning techniques, and requested the cooperation of the teachers. The instructor thereafter left the room.

The teachers were informed that they would be administered a test on a topic which they had not yet covered in the course, and was therefore only for diagnostic purposes; they were requested to answer it independently, without worrying about a grade since it was anonymous. Attendance to class was recorded. As the presence of each teacher was noted, a number was written next to that name on the list, and the same number was written on the pretest before handing it out. In this way a code was obtained for later correlation with other dependent measurements

on the same individual. The teachers were asked to sit at greater distances from each other than usual, and they answered the pretest in approximately 20 minutes in both groups. While the test was being answered, attention was given to prevent possible occurrences of communication between the respondents.

In order to score the pretests, each correct response received two points, and each incorrect one was assigned one point.

Assignment. This variable was designed to test the effect of using the objectives in an experiential learning situation, in contrast to their use for textual learning. It was given the form of an assignment that demanded the application of the concepts explained in the experimental text which it followed (see "Assignment" in Appendix A). More specifically, it calls for the administration and evaluation of a test by the teachers (the students in the experiment). The test was to be based on an instructional objective specified in the assignment. The evaluation of the test by the teachers was to be done according to five criteria which were also specified by the experimenter on the assignment. (See "Assignment" in Appendix A). These five criteria, and the two additional ones included in the instructions for the assignment (i.e., use of text guidelines and inclusion of 15 questions) were used as the basis for scoring it. One point was given for the attainment of each criterion. The coding of the assignment was done in the same manner as the rest of the dependent variables. The completed assignment was collected in the fourth and last session of the study.

Posttest. Consisting of ten multiple-choice questions and four open-ended ones, based on the experimental objectives, the posttest is an alternate form of the pretest. That is, posttest construction followed

the same procedure and covered the same content as the pretest (see Appendix E). For instance, a posttest question that is an alternate form of the two examples from the pretest quoted previously, is: "In order to see if the students attained the objective of learning to play songs on the piano, which of the following is a valid measurement?" (Four response choices follow). The item-total reliability of the posttest was calculated with the $K-R_{20}$ formula, and the index obtained was $r(58) = .98$ $p < .05$. This is a high reliability coefficient in addition to being statistically significant. The Pearson product-moment correlation coefficient between the pretest and the posttest was also high and statistically significant, $r(58) = .82$, $p < .05$. The posttest was coded, administered and scored in the same manner as the pretest.

Administration of the Posttest. The administration took place eight school days after the text, assignment (and objectives in the case of two groups) had been distributed. The instructions for answering it were exactly the same as those for the pretest, that is, emphasizing its anonymity and lack of connection with a grade, so as to encourage independent responses. After the posttest was answered, which lasted approximately 20 minutes, the teachers were reminded to bring the assignment to the next session together with the material in order to turn it all in at that time.

Student evaluation of learning. This variable was designed to measure the opinion that the teachers had of the experimental objectives, text and assignment. It was operationalized in the form of 23 multiple-choice items and one open-ended, forming a questionnaire (see Appendix F). Its construction integrated several factors which previous research has indicated to affect the efficacy of learning in experiments with the use

of objectives (Melton, 1978). These factors, concerning the objectives and the text, are: (a) use, (b) clarity, (c) difficulty, (d) usefulness, (e) importance, and (f) interest. Examples of questions which reflect each of those factors are presented next. (See Appendix F)

FACTOR	QUESTION
Use of objectives	Did you use the learning objectives for the text when you studied it?
Clarity of objectives	The objectives were stated in a clear way.
Clarity of text	The text was clear.
Difficulty of objectives	The objectives were difficult to attain.
Difficulty of text	The text was difficult.
Usefulness of objectives	The objectives were useful in learning the text.
	The objectives were useful in carrying out the assignment accompanying the text.
Usefulness of text	The text was useful in learning the subject covered.
	The text was useful to carry out the assignment.

FACTOR	QUESTION
Importance of objectives	The objectives were relevant to the text.
	The objectives were relevant to the assignment.
	The objectives were relevant to the test.
Importance of text	The text was relevant to the assignment.
	The text was relevant to the test.
Interest of objectives	The objectives were interesting in relation to the theme.
Interest of text	The text was interesting.

In addition to those questions, the instrument inquires about the interest of the learning experience, the appreciation of learning with objectives, and the likelihood of the teachers in their role as students of proposing their own learning objectives, at both, a hypothetical level and an actual one. These two levels are included in order to examine whether or not the experience of having learned with the aid of objectives provided by others was associated with the motivation to state them independently. Finally, information is requested concerning the level of education attained prior to attendance at the higher normal school. This question is included because there was, in principle, a possibility that the teachers may have attended either an elementary normal school, high school only, technical school, or a university. The difference in immediate educational background may result in different types of aptitudes

for learning at the higher normal school, and therefore this potential difference may be reflected in the posttest and assignment scores.

Administration of the Student Evaluation Questionnaire.

The evaluation questionnaire was administered on the last session under the same conditions as the tests, and the answering of it lasted 15 minutes.

Teacher sense of efficacy. This questionnaire, used in the present study as a single instrument, constitutes a section within a series of scales built for measuring attitudes toward different objects (Jordan, 1975). Its creation is based on the facet theory of L. Guttman (CEMIE, 1976). Essentially, the use of facets enables a researcher to define the sets of variables or concepts used in inquiry in terms of sets of more basic concepts (Bar-On and Perlberg, 1973). Such a characteristic of facet theory provides clearly defined areas of research for cross-cultural comparisons (Levy, 1974²).

The content validity of the questionnaire used in the study was checked in an earlier inquiry that applied it on a Mexican sample of 1520 individuals working in the educational field, of which 1321 were teachers (Jordan, 1975). That study was carried out in the capital of Mexico, in addition to two other cities, one the small capital of a state and the other, although small too, an international cultural center. The questionnaire has also been applied in 12 other Latin American countries, controlling for the problems of cultural relevancy of the concepts, their

²Facet theory provides the researcher with an a priori test of logical coherence among the variables under a given investigation; it cannot ultimately replace the theory, philosophy of science and world view which determine the choice of variables by the researcher.

equivalency and comparability across cultures and nations (Jordan, 1975; CEMIE, 1976).

In the present sample the item-total reliability coefficients for the questionnaire were obtained by use of Cronbach's Alpha and were all statistically significant: $r(118) = .42, .47, .44, .50, .17, .53, .46, \text{ and } .43, p < .05$ (See Appendix G). These coefficients are in the middle range, but high enough to include the items in the instrument.

The same questionnaire presents the items concerning demographic and academic variables, namely: age, sex, and teaching experience.

Administration of the questionnaire on sense of efficacy.

Its administration took place on the fourth and last session, lasting approximately 10 minutes, after the evaluation questionnaire had been answered. Following standard procedure, the scores in the upper third of the scale were considered as those with high sense of efficacy.

Grade point average. This attribute variable was collected from the records of the sampled teachers at the higher normal school.

All the data collected were coded for analysis with the use of the Statistical Package for the Social Sciences (SPSS) for computers.

EMPIRICAL HYPOTHESES

1. Students in an experiential learning situation provided with objectives will perform better on an experiential assignment than students in a condition without objectives. The formal statement of the hypothesis is:

$$H_0 : \mu_1 = \mu_2$$

$$H_1 : \mu_1 > \mu_2$$

where H_0 represents the null hypothesis; H_1 is the empirical hypothesis; μ_1 is the population mean receiving objectives, and μ_2 is the no-objectives population mean. The symbols retain their meaning throughout the formal presentation of the hypotheses in this study.

Reason: If objectives serve an organizational function with respect to subject matter, then their use should facilitate performance on a task that calls for the application of principles, such as the experimental assignment, by adding structure to it.

Statistical tests. Analysis of variance should indicate the presence or absence of significant differences. The use of t -tests would be contingent on the ANOVA results for detection of the group(s) where differences may be found.

2. Students in the objectives condition will perform better on a test based on those objectives (i.e., an objective relevant test), than students in a condition without objectives. The formal hypothesis statement is:

$$H_0 : \mu_1 = \mu_2$$

$$H_1 : \mu_1 > \mu_2$$

Reason: If objectives lend direction to learning, then their use should facilitate discrimination by the learners between relevant and illustrative content, as that found in the experimental text.

Statistical tests. Since equivalence between the groups must be established with use of the pretest, the latter scores would be used in an ANOVA to test for the presence of differences. Regression analysis of the posttest scores on the pretest ones would be carried out, to

establish whether there is a significant prediction of the posttest by the pretest. If no regression effect were found, then an analysis of covariance would be done on the posttest scores using the pretest as covariate (Cook & Campbell, 1979³). The ANCOVA, more precisely than a gain score analysis, should detect possible main differences, as well as a testing-by-treatment (i.e., use of objectives) interaction effect (Campbell & Stanley, 1963; Cook & Campbell, 1979; Kerlinger & Pedhazur, 1973). Furthermore, the ANCOVA here used adjusted gain scores, rather than the more unreliable raw gain scores, to test the hypothesis on learning growth (Borich, 1977).

3. Students in the objectives condition will evaluate their treatment condition (i.e., use of the objectives) for learning more favorably than students in the no-objectives condition will evaluate their own.

$$H_0 : \mu_1 = \mu_2$$

$$H_1 : \mu_1 > \mu_2$$

Reason: If objectives add organization and direction to learning, then their use should make learning easier than their non-use, and therefore elicit a favorable predisposition to objectives.

Statistical tests. Analysis of variance should allow for detection of significant differences here. If the ANOVA results were significant, then t-tests were used for examination of differences between the experimental and the control groups.

³In ANCOVA "the relevant question is whether the experimental group outperformed the control group on the posttest by more than should be expected on the basis of initial selection differences" (p. 155).

The exploratory research questions were:

4. Is there a relationship among the dependent variables, i.e., assignment, posttest, and student evaluation of learning?

Reason: Given that the assignment and the posttest were influenced in two groups by the availability of objectives, there may be a correlation between the scores on those variables. Additionally, the performance scores on them may have been related to the manner in which the sampled teachers perceived the independent variables, i.e., the objectives and the text.

Statistical tests. Regression and correlation analyses were done to check for prediction and relationship between the variables.

5. Do students in either experimental condition differ in terms of the following variables:

Attitudinal consequences of using objectives for learning

a) Likelihood of generating their own learning objectives. This question was operationalized by an item in the student evaluation questionnaire. The item invites the respondents to state their own objectives if they are not already included in the program of studies at the higher normal school (see Appendix F).

$$H_0 : \mu_1 = \mu_2 ; \text{ and } \rho^2 = 0$$

$$H_1 : \mu_1 \neq \mu_2 ; \text{ and } \rho^2 \neq 0$$

where ρ^2 is the population index of determination of one variable by another.

Reason: If the students found that learning with objectives is preferable to learning without them, then they may be inclined to develop additional objectives on their own. This especially if the objectives were instrumental to experiential learning, which is supposed to be more meaningful than classroom learning.

Statistical tests. Analysis of variance, and t -tests were used when significant results were obtained in the ANOVA. The same tests were used for the remaining variables.

Demographic

- b) Age.
- c) Sex.
- d) Teaching experience.

These three demographic variables were asked from the respondents in the questionnaire on sense of efficacy (see Appendix G).

e) Grade point average. This variable was collected from the records of the sampled teachers in the higher normal school.

Reason: Due to the fact that individuals had not been randomly assigned to the sampled groups, it was considered that comparisons between them on the demographic variables would indicate whether or not they were equivalent for the purposes of this study. Age, sex, and teaching experience are relevant especially to the attitudinal variable, sense of efficacy. The first two variables have been found not to be relevant to learning with objectives, and at the time that this study was being conducted, it was not known whether teaching experience would be theoretically significant. Measurement of the grade point average was additionally important because, not being able to administer a general ability test to the sample, the academic record was used as a proxy

measure for ability in conjunction with entrance requirements for higher normal school (completion of previous schooling).

Statistical tests. In order to detect possible differences between the experimental and the control groups, t -tests were appropriate. Additionally, in order to examine the possibility of these variables having a predicting effect on the dependent ones as well as on the attitudinal aspect, regression analyses were conducted.

Efficacy

f) Teacher sense of efficacy. This variable was operationalized by self-report of agreement with statements concerned with the possibility to control change of events (see Appendix G).

$$H_0 : \rho^2 = 0$$

$$H_1 : \rho^2 \neq 0$$

Reason: Sense of efficacy may be related to achievement behavior. Thus, the sense of efficacy that the sampled teachers have, may be associated with the dependent variables as well as with the demographic ones.

Statistical test. For the detection of prediction effects of sense of efficacy over the other variables, regression analysis was used.

Summary

The sample used in this experiment consisted of 120 in-service teachers attending a higher normal school in addition to their work. The design consisted of four groups, two for control purposes and two which received objectives. The four groups were intact school classes randomly assigned to conditions.

The materials used were a pretest, a text with an experiential assignment, instructions for its use, learning objectives, a posttest which was an alternate form of the pretest, and two questionnaires; one on student evaluation of learning, and the other on teacher sense of efficacy.

All four groups studied the same text, carried out the assignment in it, and answered the posttest in addition to the questionnaires. Only two groups were additionally provided with learning objectives for the text and the assignment, and only one control and one experimental group answered the pretest. This meant that each condition was replicated within the design.

It was hypothesized that the groups receiving treatment would perform better in carrying out a practical assignment and on the posttest, as well as evaluate their condition more favorably than the control groups. Possible differences in attitude and demographic variables were investigated.

CHAPTER 4

RESULTS

CHAPTER 4

RESULTS

Analyses of the data will be presented following restatement of the corresponding hypotheses.

It is important to remember that not all statistically significant results have scientific importance; and that not all scientifically important data reach statistical significance (Carver, 1978). Therefore, given that this chapter reports the study results in a statistical context, and in order to avoid repetition of terms, the reader is asked to remember that reports of significance or lack of it refer exclusively to statistical terminology. The relevance of statistical tools to research notwithstanding, it does not substitute for scientific methodology and theory.

H_1 : Students in a teacher specified (TS) objectives condition will perform an experiential assignment better than students in a condition without TS objectives.

Table 1 shows the main results with respect to performance on the assignment.

Table 1
Mean Experiential Assignment Scores of the
Objectives and No-Objectives Groups

<u>Group</u>	<u>n</u>	<u>M</u>	<u>SD</u>
Pretest-treatment-posttest cond.	30	6.60	.28
Pretest-posttest condition	30	6.23	.50
Treatment-posttest condition	30	6.20	.48
Posttest-only condition	30	5.67	1.01

Note. Maximum score = 7

An analysis of variance showed significant differences which supported the experimental hypothesis, $F(3, 116) = 32.93, p < .001$. Further analyses yielded significant differences in favor of the two treatment groups when compared with their respective controls; the pretest-treatment-posttest group, $t(58) = 3.29, p < .005$, and the treatment-posttest group, $t(58) = 2.55, p < .01$.

H_2 : Students in an experiential learning situation provided with objectives will perform better on an objective relevant test than students in a condition without objectives.

In order to establish equivalence among the groups with respect to the experimental treatment prior to its administration, two of the groups received an objective relevant pretest. There was a significant difference in favor of the treatment group, $t(28) = 3.23, p < .05$.

However, the analysis of variance on posttest scores for the same two groups did not yield significant results.

In order to do an analysis of covariance on the posttest scores, with the pretest scores as covariate, a regression analysis of both was

carried out first; this was in order to establish whether the two variables were related, in order to justify their use as covariates in further analysis.

As shown in Table 2, there was a regression effect between the two sets of variables for the control group only.

Table 2
Regression Analysis of Posttest on Pretest Scores
of the Objectives and the No-Objectives Groups

<u>Group</u>	<u>R²</u>	<u>F</u>
Pretest-Treatment-Posttest	.003	.09
Pretest-posttest	.700	65.57*

* $p < .001$

Given that a regression effect was found only in one of the two groups, it would not have been justified to do an analysis of covariance which would include the posttest scores of both groups. Therefore, the mean posttest score of the control group was adjusted, and a subsequent t-test of the difference between that mean and the one of the corresponding treatment group was performed, yielding non-significant results. Nor was a significant difference obtained between the posttest means of the unpretested groups. Table 3 shows the pretest and posttest mean values.

Table 3
Pretest and Posttest Scores on Text Content

	<u>n</u>	<u>Pretest</u>		<u>Posttest</u>	
		<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Pretest-treatment-posttest	30	20.88	1.01	20.77	2.33
Pretest-posttest	30	20.00	2.20	19.90	2.18
Treatment-posttest	30			20.80	2.55
Posttest-only	30			19.83	2.96

Note. Maximum score = 28

H_3 : Students in the objectives condition will evaluate their treatment condition more favorably than students in the no-objectives condition.

This variable was operationalized by means of several questions (see Appendix F). The item that most directly evaluates it is question number 19: "The learning experience regarding the text and assignment was interesting." An analysis of variance showed significant differences among the groups, $F(3, 116) = 4.38, p < .05$; the comparison between the group in the pretest-treatment-posttest condition and its control, the pretest-posttest group, showed a more favorable evaluation among the former, $t(58) = 2.12, p < .05$. No significant difference was found between the treatment-post and posttest-only groups. Table 4 exhibits the scores of each group on this variable.

Table 4
Mean Scores in Student Evaluation of Learning Experience
(Question 19)

<u>Group</u>	<u>n</u>	<u>M</u>	<u>SD</u>
Pretest-treatment-posttest	30	3.20	.75
Pretest-posttest	30	2.63	1.16
Treatment-posttest	30	3.37	.75
Posttest-only	30	3.30	.74

Note. Maximum score = 4.

Focusing on the evaluation of the specific objectives used in the treatment condition, as expressed in questions 2 through 9 (see Appendix F), the pretest-treatment-posttest group reached 78% of the maximum favorable score, while the treatment-posttest group gave the subject 81%. More specifically question 2 concerned the clarity of the treatment objectives; question 3, their difficulty; question 4, their usefulness to learn from the text; question 5, their usefulness to carry out the assignment; question 6, their relevance to the text; question 7, their relevance to the assignment; question 8, their relevance to the (post)test; and question 9 concerned their interest in relationship to the topic. Table 5 shows the scores for each of those questions.

Table 5
Group Scores in Student Evaluation of Objectives

<u>Question</u>	<u>n</u>	<u>Pretest-treatment-posttest</u>		<u>Treatment-Posttest</u>	
		<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Clarity	30	3.13	.51	3.23	.50
Difficulty	30	2.27	.78	2.67	1.03
Usefulness for test	30	3.10	.84	3.53	.51
Useful for assignment	30	2.93	.83	3.00	1.11
Relevant to text	30	3.30	.59	3.33	.55
Relevant to assignment	30	2.83	.69	2.77	1.00
Relevant to posttest	30	3.27	.64	3.20	.92
Interesting	30	3.10	.92	3.17	1.02

Note. Maximum score = 4.

Comparing the mean scores of the treatment groups on their evaluation of the objectives, it was found that the pretest-treatment-posttest group perceived the objectives to be significantly less difficult than the treatment-posttest group, $t(28) = 1.70$, $p < .05$, but more useful for learning the text, $t(28) = 2.40$, $p < .05$. No other significant differences were detected.

Another aspect of the evaluation focused on the text which preceded the assignment (see Appendix F). Question number 11 inquired about the text being useful for answering the test; number 12, about its usefulness to carry out the assignment; number 13, asked whether the text was clear; number 14, whether it was difficult; number 15, whether it was relevant to the assignment; and number 16, whether it was relevant to the test. The group scores are presented in Table 6.

Table 6
Group Scores in Student Evaluation of Text

<u>Question</u>	Pretest-treatment-posttest-group		Treatment-posttest group		Pretest-posttest group		Posttest-only group	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Useful for test	3.03	1.03	3.23	1.01	3.13	0.45	2.80	0.61
Useful for assignment ^a	3.20	0.80	3.33	0.92	3.07	0.64	3.27	0.58
Clarity	3.27	0.69	3.23	0.97	3.43	0.57	3.20	0.71
Difficulty ^b	2.70	0.84	2.93	1.08	2.17	0.87	1.93	0.69
Relevant to assignment	2.77	0.73	2.57	1.01	2.80	0.85	2.97	0.61
Relevant to test ^c	3.40	0.67	3.07	0.94	2.90	0.84	3.30	0.53

Note. Maximum score = 4.

^aThe higher the score, the less useful.

^bThe higher the score, the less difficult.

^cThe higher the score, the less relevant.

There were some significant differences between the groups with respect to the text questions, as shown in the following list, where the text was considered:

1. More useful for answering the test by the treatment-posttest group than by its control, the posttest only group $t(28) = 1.98, p < .05$.
2. Less difficult by both treatment groups than by their respective controls; pretest-treatment-posttest, $t(28) = 2.36, p < .05$; and treatment-posttest, $t(28) = 4.20, p < .05$.
3. Less relevant to the experiential assignment by the treatment-posttest group than by its corresponding control group, $t(28) = 1.84, p < .05$.

4. Less relevant to the test by the pretest-treatment-posttest group than by its control, $t(28) = 2.51, p < .05$.

There were no significant differences concerning the questions on the usefulness of the text to carry out the assignment, and on its clarity.

In addition, there were no significant differences between the treatment groups and their respective controls with respect to their evaluation of the enhancement of learning with the aid of objectives (questions 20 and 21, Appendix F).

Next, the results on the exploratory research questions are presented.

Q₁: Is there a relationship among the dependent variables, i.e., assignment, posttest, and student evaluation of learning.

Assignment and posttest. No significant regression effect was found between those two variables in any of the groups.

Assignment and stated use of objectives. Question 1 in the measure on student evaluation of learning (see Appendix F), asked whether the respondent used the learning objectives when studying the experimental text (only the treatment groups were asked to respond to it). In both treatment groups there was a significant regression effect of the assignment score on the use of objectives as observed in Table 7.

Table 7

Regression Analysis of Assignment on Use of Objectives

<u>Group</u>	<u>R²</u>	<u>F</u>
Pretest-treatment-posttest	.888	224*
Treatment-posttest	.865	179.2*

* $p < .001$

Posttest and stated use of objectives. In contrast to the results with the assignment variable, no significant regression effect nor correlation was found between the posttest scores and the use of objectives in either treatment group.

Assignment and evaluation of objectives. Of the treatment groups, only the pretest-treatment-posttest condition showed significant correlations between the assignment score and some of the evaluative questions on the treatment objectives. Specifically, there was a significant correlation between assignment and question number 2 (see Appendix F), concerning the clarity of the objectives (the higher the score, the less clear were considered the objectives), $r(28) = .472$, $p < .05$; and with question number 3, on the difficulty of achieving the objectives (the higher the evaluation score, the more difficult were considered the objectives), $r(28) = .397$, $p < .05$. Neither treatment group had significant correlations between assignment and the questions concerned with the usefulness, relevance, and interest of the objectives.

Posttest and evaluation of objectives. Again, of both treatment groups, only the pretest-treatment-posttest condition showed significant correlations between the posttest score and questions number 5 in Appendix F (the higher the score, the more useful for the assignment were considered

the objectives), $r(28) = .406$, $p < .05$; number 7 (the higher the score, the more relevant to assignment were considered the objectives), $r(28) = 3.09$, $p < .05$; and question number 9 (the higher the score, the more interesting the objectives), $r(28) = .401$, $p < .05$.

Assignment and evaluation of text. The main evaluative questions concerning the text and its possible relationship to the assignment scores asked: whether the text was clear (number 13); whether the text was difficult (number 14); and whether the text was relevant to the assignment (number 15). The results are listed below:

1. On text clarity there was a significant negative correlation for the posttest-only control group, $r(28) = -.385$, $p < .05$.
2. On text difficulty (the higher the score, the less difficult), there was again a significant correlation for the posttest-only control group, $r(28) = .517$, $p < .05$. That is, for this group, the less difficult the text, the higher the assignment scores.
3. On text relevance to the assignment, the same posttest-only control group showed the single significant result, $r(28) = .860$, $p < .005$.

There were no other significant correlations in this topic.

Posttest and evaluation of text. In addition to the questions concerning the clarity and difficulty of the text, question number 16 asked specifically whether the text was relevant to the test. No significant correlation was found for the clarity question and the test in any of the groups. Only control group pretest-posttest showed a significant relationship between the difficulty of the text and the test score, $r(28) = .480$, $p < .005$.

and between the perceived relevance of the text to the test and the latter, $r(28) = .480$, $p < .005$ (the higher the score, the less difficult and relevant).

Q₂: Do students in either experimental condition differ with respect to the likelihood of generating their own learning objectives?

Two questions in Appendix F related to this issue. Question 22 was stated in hypothetical terms: "If as a student I could propose my own learning objectives, I would do it." There were no significant differences between any of the four groups in this case. In question 23, the respondents are invited to state any learning objectives that they may find lacking in their own program; no significant difference was found between the treatment-posttest group and its respective control, but there was a significant difference between the pretest-treatment-posttest group and its control, $t(58) = 1.81$, $p < .05$, favoring the treatment group.

The hypotheses concerning demographic and scholastic variables were stated in general as follows:

Q₃: Do students in either experimental condition differ in terms of: sex, age, teaching experience, and grade point average in the higher normal school. The results for each variable will be presented in that order.

Sex. There was no significant difference on this variable between groups pretest-treatment-posttest and pretest-posttest. There were significantly less men in the treatment-posttest group than in the posttest-only group, $t(58) = 4.57$, $p < .00003$. The raw data are presented in Table 8.

Table 8
Sex Distribution by Group

<u>Group</u>	<u>Men</u>	<u>Women</u>	<u>Total</u>
Pretest-treatment-posttest	15	15	30
Pretest-posttest	18	12	30
Treatment-posttest	4	26	30
Posttest-only	18	12	30

Age. No significant difference was found between pretest-treatment-posttest group and its control, pretest-posttest group. However, treatment-posttest group was significantly younger in the average than its control, posttest-only group, $t(58) = 2.91$, $p < .005$. The higher the score, the older the age bracket (see question 2 in Appendix G). The mean scores for age, teaching experience and grade point average are shown in Table 9.

Teaching experience. Groups pretest-treatment-posttest and pretest-posttest showed no significant difference concerning this variable. However, group treatment-posttest had a significantly lower mean teaching experience than its control, posttest-only group, $t(58) = 4.36$, $p < .00005$. The higher scores correspond to the longer teaching experience brackets. (See question 3 in Appendix G).

Grade point average. Group pretest-treatment-posttest had a significantly lower mean grade point average than its control, $t(58) = 3.00$, $p < .005$. No significant difference was found between the other two groups along this variable. The scores on this variable reflected those in the range used by the school, 1-10 in direct proportion to the grade point average.

Table 9
Mean Scores in the Demographic and Scholastic Variables

<u>Group</u>	<u>n</u>	Age ^a		Teaching Exp. ^b		Grade Point Av. ^c	
		<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Pretest-treatment-posttest	30	1.97	0.18	2.20	0.41	6.50	2.39
Pretest-posttest	30	1.90	0.40	2.00	0.28	7.87	0.70
Treatment-posttest	30	1.83	1.62	1.80	2.55	6.92	1.71
Posttest-only	30	2.37	0.85	2.63	0.81	7.48	1.47

Note. Maximum scores:

a 5

b 5

c 10

The question with respect to the attitudinal variable was stated in the following terms:

Q₄: Do students in either experimental condition differ in terms of their sense of efficacy (as operationalized in the corresponding questions 4-12 in Appendix G) and in its relationship to the other variables?

No significant difference was found on this variable between either treatment group and its corresponding control group. The mean scores are shown in Table 10.

Table 10
Mean Scores in Sense of Efficacy

<u>Group</u>	<u>n</u>	<u>M</u>	<u>SD</u>
Pretest-treatment-posttest	30	25.40	3.58
Pretest-posttest	30	25.23	2.69
Treatment-posttest	30	25.33	2.48
Posttest-only	30	24.47	3.81

Note. Maximum score = 36

Regression analyses were further made between sense of efficacy and assignment, posttest, pretest, and some of the demographic variables as well. Those results are presented next.

Sense of efficacy and assignment. No significant correlation was found between these two variables in any of the four groups.

Sense of efficacy and posttest. Only the pretested treatment group did not show a significant relationship between the two variables. The results are shown on Table 11.

Table 11
Regression Analysis of Posttest Scores on Sense of Efficacy

<u>Group</u>	<u>R²</u>	<u>F</u>
Pretest-treatment-posttest	.117	3.77
Pretest-posttest	.440	50.00**
Treatment-posttest	.245	8.17*
Posttest-only	.213	7.10*

* $p < .02$

** $p < .0005$

Sense of efficacy and pretest. In both the groups where the pretest was administered, the attitudinal variable significantly predicted some of the pretest variance, as can be observed in Table 12.

Table 12

Regression Analysis of Pretest Scores on Sense of Efficacy

<u>Group</u>	<u>R</u> ²	<u>F</u>
Pretest-treatment-posttest	.475	25.39**
Pretest-posttest	.431	21.21*

* $p < .008$

** $p < .002$

Sense of efficacy and student evaluation of learning. The most relevant relationships to examine here were those concerning the judged clarity and difficulty of the objectives by the learners and their sense of efficacy. Of both treatment groups, only the pretested one showed a significant regression effect of the perceived clarity of the objectives on sense of efficacy, $R^2 = .271$, $F = 10.42$, $p < .005$ (with a positive correlation of $r = .520$; that is, the less clear the objectives were judged, the greater the sense of efficacy). No significant results were obtained between the perceived difficulty of the objectives and the attitudinal variable. As for finding the learning experience interesting (question 19 in Appendix F), only in the pretested control group there was a significant regression of that question on sense of efficacy, $R^2 = .235$, $F = 8.70$, $p < .01$.

Sense of efficacy and statement of own objectives. No significant relationship was found between these two variables for any of the groups.

Sense of efficacy and sex. No significant correlation was found for any of the groups. However, when sex was used as a constant, there were different results for either sex in terms of sense of efficacy and its correlation with other demographic variables. For that purpose, the tests used all the members of each sex across groups. The 55 men had a mean sense of efficacy of 25.36, with a standard deviation of 2.75; the 65 women had a mean of 24.89, and a standard deviation of 3.46. No significant difference was found between the sexes on the variable.

The relationship between teaching experience and sense of efficacy was different for each sex. No significant correlation was found between those two variables for the men. However, for the women there was a significant regression effect of sense of efficacy on teaching experience, $F(1,63) = 18.06$, $p < .05$, $R^2 = .222$. The correlation coefficient was $r = -.47$, $p < .05$.

Sense of efficacy was the only variable along which there could be detected significant differences among the sexes. Neither the assignment, pretest, posttest, and evaluation values, nor the demographic variables as well as the grade point average could be significantly differentiated in terms of sex.

Summary

This study used an experimental design to research the effects of instructional objectives on the experiential and textual learning of in-service teachers in Mexico. Additional hypotheses and research questions concerned a favorable evaluation of the learning experience by users of objectives, the likelihood that the learners state their own objectives, and the influence that the learners' sense of efficacy may have on the effects of objectives. Demographic data of the learners were

also gathered and analyzed in terms of their relationship to the other variables in the study.

Four groups of learners were randomly assigned to either a control or a treatment condition, thus having two groups under each condition. One control and one treatment group were pretested on content derived from the objectives used in the study. The entire sample answered a posttest and carried out an experiential assignment, both based on the same content as the pretest.

The results were as follows:

Hypothesis 1

1. Learners provided with instructional objectives performed better on an experiential assignment task than learners not provided with objectives. This was supported by both treatment groups, one with a pretest and the other without a pretest.

Hypothesis 2

1. Learners with objectives did not perform better on a posttest derived from the objectives than learners without objectives. This was found in both treatment groups.
2. Learners with objectives performed better on a pretest derived from the objectives than learners without objectives.

Hypothesis 3

1. Learners with objectives found their learning experience more interesting than learners without objectives. The evidence was supported by only the pretested treatment group.

2. Learners with objectives judged those objectives favorably in terms of their clarity, difficulty, usefulness, relevance, and interest.
3. Learners with objectives who were pretested judged those objectives as less difficult and more useful for learning a text than unpretested learners with objectives.
4. Learners with objectives found the text useful for answering the posttest more so than learners without objectives. The evidence was supported by the unpretested treatment group.
5. Learners with objectives found the text less difficult than learners without objectives. This was supported by both treatment groups, one pretested and one without a pretest.
6. Learners with objectives found the text less relevant to the experiential assignment than learners without objectives. This was supported by the treatment group without a pretest.
7. Learners with objectives found the text less relevant to the test than learners without objectives. This was supported by the pretested treatment group.

Research Question 1

1. Evidence was found that there was no relationship between performance on the assignment and on the posttest in any group.

2. For learners with objectives, performance on the experiential assignment was predicted by their use of objectives. This was supported by both treatment groups, the pretested and the unpretested one.
3. For learners with objectives, no relationship was found between performance on the posttest and the use of objectives. These results were similar for both treatment groups.
4. For learners with objectives, the better their performance on the assignment, the less clear and the more difficult were judged the objectives. This was supported by the pretested treatment group.
5. For learners with objectives, the better their performance on the posttest, the more interesting were judged the objectives. This was supported by the pretested treatment group.
6. For learners with objectives it was found that there is no relationship between assignment performance and text clarity. For learners without objectives, the better their assignment performance the less clear was the text judged to be. This was found in the unpretested control group.
7. For learners with objectives there was no relationship between assignment performance and text difficulty. For learners without objectives, the better their assignment performance, the less difficult was the text judged to be. This was supported by the unpretested control group.

8. For learners with objectives, there was no relationship between assignment performance and the relevance of the text to the assignment. For learners without objectives, the better their assignment performance, the more relevant to the assignment was the text judged to be.
9. For learners with objectives there were no relationships between posttest performance and evaluation of the text. For learners without objectives, the better their posttest performance, the less difficult and less relevant to the test was the text judged to be.

Research Question 2

Learners provided with objectives stated later their own objectives more often than learners who were not provided objectives. This was supported by the pretested treatment group.

Research Question 3

1. There were less men among the unpretested learners with objectives than among the unpretested learners without objectives. There was approximately the same proportion of men and women in each of the remaining groups.
2. The unpretested learners with objectives were younger and had less professional experience than the unpretested learners without objectives. There was no significant difference in any of the other groups on those variables.

3. The pretested learners with objectives had a lower mean grade point average than pretested learners without objectives. The other two groups had approximately a similar mean grade point average.

Research Question 4

1. Learners with objectives were similar to learners without objectives.
2. There was no relationship between sense of efficacy and assignment performance.
3. For learners with objectives, sense of efficacy predicted posttest performance. This was supported by the treatment group without a pretest. For learners without objectives, sense of efficacy predicted posttest performance, This was supported by both groups without objectives.
4. Sense of efficacy predicted pretest performance. This was supported by both groups, one with objectives and one without objectives.
5. For learners with objectives, the greater their sense of efficacy, the less clear were the objectives judged to be. In this case, sense of efficacy predicted the judged clarity of objectives.
6. For learners with objectives there was no relationship between sense of efficacy and judging the learning experience as interesting. For pretested learners without objectives, sense of efficacy predicted judging the learning experience as interesting.

7. There was no relationship between sense of efficacy and the learners stating their own objectives.
8. Sense of efficacy was similar for men and women.
9. For women, teaching experience predicted sense of efficacy. The longer their experience, the smaller their sense of efficacy. There was no relationship between teaching experience and sense of efficacy for the men.

CHAPTER 5
DISCUSSION

CHAPTER 5

DISCUSSION

The problem which stimulated the present study is the frequent lack of good professional training when it comes to its applications in the field. More specifically, in the case of Mexican teacher education, the training programs do not help learners to develop the practical skills and attitudes essential to their competence in practicing their occupation. This fact is most acutely observed when in-service teachers must implement new approaches and techniques. The best designed instruction for professionals should include carefully guided real experiences, which would in turn elicit satisfaction with such learning experiences on the part of the learners. Yet it is not all a matter of only instructional factors. Learner characteristics and attitudes themselves influence, as they are in turn influenced by the effects of instruction. One such attitude is sense of efficacy, namely, the belief of individuals in being able to control their environment, rather than the environment controlling them. Therefore, learner characteristics should be considered when examining the effects of instruction.

This study explored the effects of one approach to provide guidance for adult learners in their practices, by stating instructional objectives for an experiential assignment and for textual learning. For such purpose, an experimental design was used with a sample of in-service teachers, who after work were attending a teacher-education institution in Mexico. The sample was divided into four groups, of which two were controls and two received instructional objectives as

treatment. One control and one treatment group were pretested on content covered by the instructional objectives. All four groups were then provided with a text that included a practical (experiential) assignment in it. Both text and assignment were based on the instructional objectives used in the study. After studying the text and carrying out the assignment in it, all four groups answered a posttest, which was an alternate form of the pretest. Additionally, all the groups answered two questionnaires: one on their evaluation of the learning experience, which also provided an opportunity for the respondents to state their own learning objectives; the second questionnaire was on the demographic characteristics of the sample, as well as on their sense of efficacy.

In this chapter the results of the study are discussed on the basis of the theoretical framework, hypotheses, and research questions stated in previous chapters. Additionally, the major factors which limit the study will be considered, as well as the implications that it may have for further research and the conclusions that are derived from it.

Each hypothesis and research question formulated in this study precedes the corresponding interpretation of results:

H₁. Students in an experiential learning situation provided with objectives will perform better on an experiential assignment than students in a condition without objectives. Results for both treatment groups supported that hypothesis. This finding is in line with the body of research that postulates the organizational function of instructional objectives (Duchastel & Merrill, 1973; Hartley & Davies, 1976) when they are studied in conjunction with task characteristics. That is, the objectives were relevant to a rather tightly structured text and an experiential assignment (see Appendix A) that entailed the application of

the concepts introduced in the text. Because the assignment is not as easily discernible as the text itself, the provision of objectives for the assignment lent organization to the task, thus facilitating for the learners the integration of various units of information in the text, and providing a general structure to the assignment. This explanation is in concordance with the suggestion by Hartley & Davies (1976) that behavioral objectives appear to be useful in learning tasks which are of higher order in Bloom's taxonomy (Bloom et al, 1956), i.e., tasks requiring analysis, synthesis, and evaluation. The assignment in this study called for at least a process of analysis.

H₂. The second hypothesis, concerning the superior performance on a posttest on text material by learners provided with objectives over the control groups was not supported. Two related lines of research may serve as explanations for this result. As mentioned previously, instructional objectives are not especially useful with lower order tasks requiring knowledge and comprehension (Duchastel & Merrill, 1973; Hartley & Davies, 1976). The posttest demanded lower order tasks, and that is possibly one reason for not obtaining an effect in this case. Additionally, the posttest closely reflected the structure of the text on which it was based, and that fact probably rendered the objectives superfluous, as well as their function of providing direction to learning for the posttest. This explanation is supported by evidence that: objectives direct the students to learn information which they would not classify as likely to be tested (Duell, 1974); incidental learning has resulted from text segments which resemble objectives (Rothkopf & Billington, 1975); and that learners provided with objectives have taken notes relevant to the objectives in greater proportion to learners not provided with objectives

(Staley & Wolf, 1979). All these findings demonstrate that objectives direct attention to material that may not be considered as likely to be tested. Given that the text used in this study parallels the objectives, and that the learners were notified that they would be tested on it, the objectives in this case were probably of little use regarding learning for the test. These considerations, however, do not exhaust the argument for the utility of objectives in learning. Other possible functions are yet to be considered, such as one of activating and maintaining a task reinforcement (Duchastel & Merrill, 1973). That is, objectives let students know that they are learning as they progress through a learning task, and this is a source of reinforcement in addition to a grade at the end of instruction.

H₃. The hypothesis which predicted that the students provided with objectives would evaluate their treatment condition (i.e., provision of objectives) more favorably than their controls, was partially supported. The question that the learning experience was interesting with respect to text and assignment, was significantly responded in the affirmative by the pretested treatment group, but not by the unpretested one. A possible explanation for the partial result will be stated after other findings are considered.

When comparing the treatment groups with respect to the objectives used in this study, the pretested group found them less difficult, but more useful for learning the text, than the unpretested treatment group. There was no significant difference between the treatment groups concerning the clarity, interest and importance of the objectives. Looking at the comparison between the treatment and control groups regarding evaluation of the text used in this study, the hypothesis was supported in that both treatment groups considered the text less difficult

than the controls, and the unpretested treatment group found the text considerably more useful for answering the test than its control. This latter finding could probably be due to the fact that the unpretested treatment group had the objectives to reinforce its learning of the text, and the same reason could be adduced for both treatment groups not regarding the text as difficult as the controls. If such is the case, then the question arises as to why the pretested group did not also find the text more useful for answering the posttest than its control. A likely answer, which is congruent with the explanation that objectives have a reinforcing function for learning, is that the pretested treatment group had the additional advantage over the other treatment group of relating the objectives to the pretest as well as to the posttest. This explanation finds support in the previously mentioned result that the pretested treatment group perceived the objectives as less difficult yet more useful for learning the text than the unpretested group. The same argument about objectives having a reinforcing function, is further supported by the finding that the pretested group considered the text as less relevant to the test than its control; that is, the group without objectives, although having had the pretest to relate to the posttest, had one input less to reinforce its learning than the treatment group, namely, the objectives themselves.

It must be emphasized that the importance attributed to the pretest in the explanation of results is based, not on a learning effect of the pretest on the posttest, for there was none in the case of the treatment group, but on the enhancement it produced on the reinforcing value of the objectives for learning the text. The levels of achievement motivation may have varied between the groups, and this in turn may have influenced and been influenced by the way in which they related to the

tasks of the learning experience in terms of their difficulty (Weiner, 1976). Returning to the result that of both treatment groups, only the pretested one judged the learning experience as more interesting than its control, the explanation may be related to the possibility that the pretest may have increased the motivation of this group, in association with the objectives.

Other findings may lend indirect support to the hypothesis that provision of objectives results in a more favorable evaluation of learning by students. For example, the unpretested treatment group judged the text as less relevant to the assignment than its control, which was the posttest-only group. The explanation for this finding may be that whereas the treatment group had the objectives as an aid to carrying out the assignment in addition to the text, its control had the text as the only learning material on which to rely.

The further lack of significant differences with respect to evaluating the enhancement of learning with the aid of objectives, may be due to the fact that no special emphasis was placed by the experimenter on using the objectives when they were distributed, and no feedback on performance was given. Thus, the importance of using objectives may have not been an object of reflection for the treatment groups.

To briefly summarize the discussion on results deriving from the third hypothesis, provision of objectives does seem to relate to a favorable evaluation of learning, as Melton (1978) suggested. Either one or both of the treatment groups judged some aspect of the learning experience as more interesting, and the learning material, i.e., the text, as easier than the controls.

Next, the results on the exploratory research questions will be discussed.

Q₁. Question one asked if there is a relationship among the dependent variables, i.e., assignment, posttest, and student evaluation of learning.

Relationships to the Scores on the Experiential Assignment.

This variable was not significantly related to the posttest, probably because they are two different types of tasks. The assignment was experiential and it asked for the application of principles from the text, whereas the posttest asked mainly for knowledge and comprehension in the context of a recognition task.

The use of objectives was found to predict assignment scores. This is coherent with, and lends support to, the explanation that the provision of objectives results in better assignment performance. As for the relationship between the assignment and the student evaluation of the objectives, it was found that only for the pretested treatment group the higher their assignment score, the more unclear and difficult were the objectives judged. This finding may again be related to the fact that the pretested treatment group was the only one which had the opportunity to relate the pretest experience to the objectives, and these to the posttest and to the assignment. Thus they were helped to see that there was a tighter structural relationship among pretest, objectives and posttest, than between them and the assignment. Finally, with respect to the student evaluation of the text, the assignment correlated with some items for the posttest-only control group alone. The higher the assignment scores, the more unclear, easier, and relevant to the assignment, was the text judged by that group. This finding may be related to the absence of objectives and the structure they could have lent to the text as it related to the assignment task, as well as to the

attitudinal factor, sense of efficacy, which will be discussed later on.

Relationships to the Scores on the Posttest. In contrast to the assignment variable, no significant relationship was found between the posttest and the use of objectives by the learners. The same argument may be applied here as given for not obtaining a significant effect on the posttest. That is, the objectives were probably of little help in studying for the posttest, given that it called for lower order tasks. Concerning a relationship between the posttest and the student evaluation of objectives, of both treatment groups only in the pretested one were significant results obtained. In this case, the higher the posttest scores, the more useful and relevant for the assignment, as well as more interesting were the objectives judged. These findings seem to support the previous explanations that the objectives, in the additional presence of a pretest, served rather a reinforcing function for learning and this in turn enhanced their value for performing the assignment task, while being of little use with respect to the posttest. The only group that showed a significant correlation of the posttest with student evaluation of the text was the pretested control group. Specifically, the higher the posttest scores, the easier and more irrelevant to the test was the text perceived to be. Yet, it should be remembered that this group also found the text to be more difficult and more relevant to the test when compared to its experimental counterpart, and that it did worse on the pretest as well. The finding then, in relationship to the posttest, may be due not only to the absence of objectives as a learning reinforcement, but also to a lower motivation toward the learning experience. Of both pretested groups, the control one was the single case where the pretest predicted the

posttest scores, which would seem to strengthen the tentative explanation offered previously. Namely that text learning and posttest performance were reinforced by the pretest. Furthermore, as Hartley (1973) has concluded, one condition necessary for pretest effects to be discernible is that students be of high ability. As will be discussed later, this group was found to have a significantly higher grade point average (a proxy measure of ability in this study) than its experimental counterpart.

Relationships to Student Evaluation of the Learning Experience.

The fact that the judged importance of the objectives was not significantly related to the dependent variables in either of both treatment groups, may be a consequence of the fact that no special attention to this was induced by the experimenter with the instructions. The multiple-choice aspect of the evaluation was also not the most conducive setting for in-depth reflection on the learning experience.

Q₂. The second exploratory research question inquired whether the groups provided with objectives would differ in the likelihood of generating their own learning objectives from their respective control groups. Of both treatment groups, only the pretested one proposed their own objectives in greater proportion to their control group. A possible explanation for this finding, taking into account that the unpretested treatment group did not significantly differ from its control on this relationship, may be due to the fact that the unpretested treatment group judged the objectives more difficult and less useful for learning the text than the other treatment group; given this evaluation of the objectives by the unpretested treatment group, it may be that they did not see the utility of stating further objectives even if they were their own (Nuttin, 1976). Another possibility may be that the

duration of the learning experience may have worked differentially on each treatment group with respect to motivating them to state their own objectives. The possibility that the age and teaching experience superiority of the control group over the unpretested treatment group may have been related to the lack of effect was discarded, since no significant correlation was obtained between any of those two variables and the statement of the learners' own objectives. It is necessary to carry out further research on the topic to explain this finding in a more authoritative fashion.

Q₃. The third exploratory research question inquired about possible differences between groups in terms of demographic and scholastic variables. The findings showed that the unpretested treatment group had significantly more women, and on the average, younger and less experienced teachers than its control. On the other hand, the pretested treatment group had a mean lower grade point average than its corresponding control. None of these variables were found to be related to the assignment and posttest scores, nor to the student evaluation of the learning experience.

Q₄. The final exploratory research question concerned the possibility of differences between groups regarding the attitudinal variable called sense of efficacy. The discussion of results for this variable is broken down in terms of its relationship to the other variables in this study.

Sense of Efficacy and Learning

The groups did not significantly differ in their sense of efficacy, and their scores were generally on the higher end of the scale; nor was this variable related to the assignment scores. However, it did predict up to 44% of the posttest scores of all but the pretested

treatment group. That sense of efficacy was related in most cases to the posttest, but not to the assignment, may be due to the possibility that the learners attached more importance to the posttest because it was an obvious testing situation, even if no grade was connected to it. The posttest therefore may have represented a challenge which simulated the higher sense of efficacy of the learners. Given that the assignment included elements that were familiar to the learners, such as testing their own pupils, it may not have been perceived as challenging as answering the posttest.

If the previous explanation is correct, then further research may show that people with a low sense of efficacy may require structured learning situations that are not perceived as challenges too great for the learners to meet.

That sense of efficacy did not relate to the posttest scores of the pretested treatment group is perhaps because it was the only treatment group that had established a relationship between prerequisites for the task, the learning material, and the testing on it. The posttest posed no great challenge for that group. This explanation seems to gain support from the additional finding that sense of efficacy did predict, for both pretested groups, a portion of their pretest scores. Whereas the pretested treatment group may not have been challenged due to the reasons just stated, the pretested control group may have not felt challenged for other reasons. Namely, the pretested control group had a higher grade point average than its treatment counterpart, and in answering the posttest, sense of efficacy was possibly not a relevant factor as it was for the pretest.

Sense of efficacy and evaluation of learning experience

Sense of efficacy was found to predict some of the judged clarity of the objectives for the pretested treatment group only. That is, the higher the sense of efficacy, the less clear were the objectives judged on the average by this group. There is no obvious explanation for this finding. Perhaps the perceived lack of clarity of the objectives elicited more effort at the task from this group and effort is one of the attributions that people with a high sense of efficacy may attach to the expectancy of success at a task (Weiner, 1979).

Such an expectancy of success may have been additionally heightened for this group because of the previously mentioned connection that they could establish between the pretest and the rest of the learning experience. That for the unpretested treatment group sense of efficacy did not predict the judged clarity of objectives, may be related to the possibility that not having been pretested, their expectancy of success at the task was not affected, as may have been the case with the other treatment group.

The approaches that people may have toward meeting difficulty may be not only a function of their sense of efficacy and of the causes to which they attribute success or failure. Those approaches may also be influenced by the cognitive style of individuals. The possible link of cognitive style with sense of efficacy is discussed after a brief presentation of the concept.

Witkin (1976) has referred to cognitive styles as cognitive characteristic manners of functioning that are revealed throughout individuals' perceptual and intellectual activities in highly consistent and pervasive ways. According to the concept and to perceptual research on it, people may be predominantly either field dependent or field

independent. In the first case, a person tends to perceive part of a perceptual field as embedded in the field. On the other hand, field independent individuals tend to perceive part of a field as discrete from the surrounding field as a whole (Witkin et al, 1977). There are other taxonomies of cognitive styles (Claxton & Ralston, 1978) which all seem to be interrelated, but the largest bulk of research on the topic has been done with the field dependence-independence continuum.

Among the findings relevant to sense of efficacy as studied in the present case, there is for example evidence that field independent persons tend to have less difficulty in learning material that does not have inherent structure. When it is already presented in an organized manner, field independent and field dependent persons are not likely to differ in their learning (Witkin et al, 1977). A finding in the present study which may link sense of efficacy with cognitive style research, is that sense of efficacy was found to predict the judged clarity of objectives for the pretested treatment group. Although no significant differences were obtained in the average sense of efficacy between the groups, the pretested treatment group had the highest mean score on this variable. For the same pretested treatment group, the higher the sense of efficacy, the less clear seemed the objectives to the group. Yet the fact is that, in spite of the negative relationship between sense of efficacy and clarity of objectives, the same group performed better on the loosely structured task of the assignment than did its control. This suggests that there may be a negative relationship between sense of efficacy and field independence. Further research that takes into account the effects of both, sense of efficacy and cognitive style differences relative to task characteristics in achievement contexts, seems needed to substantiate the previous suggestions.

It was found that only for the pretested control group, the higher the mean sense of efficacy, the more interesting the learning experience was judged by the learners. No explanation seems obvious for this result. A tentative one may be related to attribution theory. According to Weiner (1979), individuals expecting to control their environment (i.e., with a high sense of efficacy) have a high expectancy of success at a task. If those individuals are faced with failure, it is probable that they would ascribe it to unstable causes, such as mood, which may in turn decrease a subsequent expectancy of success.

Sense of Efficacy and Demographic Data

Looking at the performance of individuals in the pretested treatment group throughout the study, it will be noted that they did poorly on the pretest, which in turn predicted the posttest scores; and that this group had a significantly higher mean grade point average than its experimental counterpart. Relying on attribution theory, it may be that a high mean grade point average contributed to a high expectancy of success on the pretest for this group which had mainly a high sense of efficacy. Perhaps the group sensed that their pretest performance was not very successful, given that no feedback was provided on it. According to attribution theory, the expectancy of success by the group as a whole probably then diminished for performance on subsequent related tasks. Further research is necessary along these lines.

Sense of efficacy was not found to vary according to sex, in spite of the slightly higher scores of the men over the women. This finding supports that of a previous study carried out with elementary school teachers in three Mexican cities and several Latin American countries (Jordan, 1975). The finding has further support in research reported by Churnin Nash (1979) in that adult women and men tend to have

higher expectancies of success when they perform sexually appropriate tasks, according to socially established sex-appropriate areas. On that basis, it is proposed here that a significant sexual difference in sense of efficacy is more likely to be found between occupations; that is, women performing in sex-inappropriate areas may probably have a lower sense of efficacy than men performing in sex-appropriate areas, and vice versa. In the present study, both men and women are teachers, a traditionally "feminine" occupation. That still the men did not have a lower sense of efficacy than the women, may be due to the fact that both sexes in this study are functioning in a society at large that rewards the male sex to a greater extent and more pervasively than it does women (Chang & Ducci, 1977; Díaz-Guerrero, 1972; Elu de Leñero, 1977; Paz, 1969). The cultural and social conditioning of the feminine role is strong, and thus it is quite probable that women in such a society may tend to have a lower sense of efficacy than men by virtue of their sex. In the larger societal context, the single adult woman who is constantly present in the lives of most individuals is their mother, who is most frequently a housewife. It is likely in the Mexican society that a housewife would not have received a fair salary in the work market if she participated in it; and if she worked at home, her domestic labor was probably not remunerated on the basis of effort exerted, the number of children she bore, the quality of family education she gave them, the quality of house cleanliness, and so on (De Beauvoir, 1972; Markussen, 1977). School and mass media effects further reinforce the femine image (Fox, Tobin & Brody, 1979; Jennings (Walstedt), Geis & Brown, 1980).

Whereas no relationship was found between sense of efficacy and teaching experience for the men, the case was different regarding the women. For the latter, teaching experience predicted sense of efficacy.

The longer the women had been working as teachers, the smaller their sense of efficacy. This finding was rather puzzling, in that it was contrary to common sense, in addition to the fact that there was no effect between the same variables among the men. Again, a possible explanation may be related to the realities of work and society in which Mexican women teach. In the teaching profession women perform a job whose characteristic as the rendering of service to others is a factor it has in common with being a housewife. This similarity reinforces the concept of teaching as one of a traditionally feminine job. However, when considering the highest positions for Mexican teachers, it is noticed that there are proportionately fewer women occupying them than men (Jordan, 1975), even though there are more women than men teachers in the elementary schools of Mexico. Furthermore, men teachers have more education courses and their contact with educational change is greater and more diversified than is the case with women teachers in Mexico (Jordan, 1975). This again points to sex stereotyping in the work areas. Given then, that women teachers are not as frequently found in the higher level positions of the educational system, and that this fact may become a reality to them only as they spend more time in the profession, this may be a possible explanation for the decrease in their expectations for success and in their sense of efficacy as they increase their teaching experience (Weitzner de Shwedel, 1980).

In addition to the possibility of sex bias in work, a socially-oriented factor may also contribute to explain the finding. Women in general have been found to be more susceptible to social demands than men (Bar-Tal, 1978; Witkin et al, 1977). In a society which generally associates high occupational positions with being male, some women seem to systematically fear the social cost of competing for high occupational

levels with men (Anastasi, 1970; Fox, Tobin & Brody, 1979; Horner, 1972).

Limitations of the Study

A major limitation to the generalizability of the findings of this study is the sample composition. The sample was restricted to teachers studying in one higher normal school in Mexico. It may be that specific school-related factors such as personality criteria used for admission influenced the characteristics of the sample itself. Replications of the study in other such schools throughout the country or with different student populations could rectify this limitation.

Another limitation is that individuals were not randomly assigned to groups, even though the latter were randomly assigned to conditions. Although this state of affairs was considered necessary for the external validity gained by carrying out the research in real classrooms, the threat to internal validity must be acknowledged.

Although many experiments on objectives allot minutes for the entire treatment, this study included eight days before evaluating the results. Nevertheless, a limitation of this study is the short term learning it measured, having used one lesson in one subject matter.

Furthermore, the low reliability of the pretest also set a limit to the generalizability of this study.

Cognitive style measures, as they refer to dealing with the structure of the learning task, would have added to the interpretability of the results on assignment and posttest scores.

Implications for Further Research

The results of this study support the hypothesis that the specification of instructional objectives is useful for experiential learning in the case of teachers with some teaching experience and a

relatively high sense of efficacy. Yet the same objectives did not increase learning as measured in a posttest. It would be useful to research the impact that the successful contact with objectives by the teachers may have on their using them with their students.

Because the explanation of results was partially related to the pretest that some of the groups in this study were administered, it may be fruitful to research the judged utility by the subjects of adding a pretest to a treatment that includes objectives.

Only the members of the pretested treatment group in this study stated their own learning objectives in greater proportion than the control group. The unpretested treatment group not only failed to do this but also found the specified objectives to be more difficult and less useful for learning the text. Interested researchers may vary the difficulty and obviousness of the objectives to see whether these variables result in differential statement of the learners' own objectives. Another factor that may be related to the same finding is a differential effect of time. That is, some individuals may need more time than others to state their objectives. It may be fruitful then to manipulate the time spent on the entire treatment with respect to having the learners propose their own objectives.

The variable called sense of efficacy in this study was presumed to be related to attribution theory. It is necessary to carry out research that would establish their degree of correlation. Furthermore, because of the relationship between sense of efficacy and cognitive style differences, it would be necessary to establish that relationship in an experimental setting.

The men and women of this study were not found to differ in their sense of efficacy, even though the latter have consistently tended to have

a lower score on that variable. Given that the entire sample was drawn from a teaching population, it is suggested that a hypothesized sexual difference should be tested varying occupational groups.

Since the women but not the men in this study showed a lower sense of efficacy as their teaching experience increased, further research seems necessary concerning possible differences in the expectancy of success of both sexes in the teaching profession in Mexico.

Conclusions

1. The findings in this study lend support to the hypothesis that adult learners given instructional objectives are likely to earn more on an experiential assignment than those without objectives. This finding adds to theory on instructional objectives.

2. Evidence was found that adult learners given instructional objectives are not more likely to answer a textual test that closely reflected those objectives, than learners without objectives. This finding supports previous research.

3. Some support was found for the hypothesis that the provision of objectives is related to a favorable evaluation of the learning situation. The learning situation was judged as interesting and the learning material as relatively easy.

4. There was evidence that experiential learning and test scores were not related.

5. Some evidence was found suggesting that adult learners initially given objectives, are more likely to state their own objectives.

6. The data also seemed to suggest that learners who are more satisfied with their learning situation, are more likely to state their own objectives.

7. No relationship was found in the present sample between sex, age, teaching experience and grade point average on one hand, and experiential learning, test learning, and student evaluation of the learning experience on the other hand.

8. Sense of efficacy was not found to vary between the groups. There was no evidence that this variable was related to experiential learning, but some of the data seemed to indicate that it predicts text-based test scores.

9. Sense of efficacy was not found to vary with sex. The same variable was not found to be related to teaching experience for the men, but for the women it tended to decrease as teaching experience decreased.

The findings from this study indicate that some of the problems that learners have with experiential learning may be diminished at least at the beginning stages of learning, by the provision of instructional objectives. The findings also suggest that the structure which objectives lend to learning in this manner does not prevent learners from eventually stating their own learning objectives. And finally, the results obtained here suggest that even for groups with a relatively strong belief in their ability to control their natural and social environment (sense of efficacy), the control over their learning by objectives enhances their learning in experiential settings.

Implications For Practice

The results of this study support the use of objectives in the realm of teacher education. The results also suggest that real experiences should be used in the training of Mexican teachers as a way to improve their professional competence. To provide direction and structure for educational experiences, instructional objectives should be used.

For example, learners could be expected initially to learn concepts from a text. Then, they could be provided with instructional objectives to carry out an experiential assignment that requires applying the concepts from the text.

In addition, the negative relationship between teaching experience and sense of efficacy for female teachers enhances the need for textbooks and curriculum that teach concepts free of sex stereotypes.

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APPENDIX A

TEXT ON CONTENT COVERED BY OBJECTIVES

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What is evaluation?

Evaluation is a continuous process consisting of the compiling and interpretation of information to judge the decisions made in designing the teaching-learning process.

This definition has three important implications. First, evaluation is a continuous process, and not something done only upon completion of the course. It is a process which starts before beginning the teaching-learning part and continues throughout the end of it. Second, the process of evaluation is not casual; it is directed toward a specific goal. It intends to find answers for improving education. Third, evaluating requires the use of measuring tools which are accurate and appropriate for collecting the necessary data for decision making. The evaluation process involves the collecting of information which will help making decisions about the progress of the teaching-learning relationship, its results, how to improve for the next time.

Frequently the terms "evaluation" and "measurement" go together. Measurement determines the extent to which a student shows a certain characteristic, and its main function is to yield a quantitative description. Evaluation implies an interpretation of the measured characteristic in order to formulate judgements and make decisions.

Most teachers design their own measurement instruments on the achievements of their students, generally in the form of tests. Among the properties that a test should have in order to offer appropriate

information, an important one is validity.

Upon asking to what extent is a test valid? The answer being sought is whether or not a test measures what we want it to measure; that is, if the test measures the learning objectives for which the teaching was designed, then it is valid. For example, if a learning objective consists of solving problems of simple addition, a valid test for that objective will contain problems of simple addition.

Another quality that should be present in a measuring instrument is that of reliability. When we ask if a test is reliable, we want to know if the test would give us the same results every time we would apply it to the same person. We need to know if the test is consistent, stable.

One way to measure student achievement in a reliable manner, would be for the teacher to offer the student several opportunities to show that he/she has attained the learning objective; the teacher would make more than one test or more than one question regarding the objective in order to measure the degree of learning. If the student fulfills the minimum learning requirements every time he/she takes the test or answers the questions, then it can be said that the measuring instrument is reliable.

Tests are not the only means for evaluation. There are others such as observations, questionnaires, interviews, and role-playing. The forms of evaluation chosen will depend upon the objective to be evaluated and on who makes the evaluation.

One example of evaluation in education would be the following:

Some researchers have carried out studies from which they conclude that, due to the teacher-student relationship among other factors, education in Mexico is of a passive nature and does not induce

the student to be an active citizen during or after his studies. For example, many times children believe that the function of their representative in Congress is to pronounce speeches; many others trust the Law very little; others do not know what is produced in their own community, and do not know why there are rules for school life, or why people migrate from the country to the city.

One of the necessary conditions in order to become participative citizens is the development of a critical mind through education. In order to help students attain this objective, they should have information on their own reality and analyze it. The teacher, in order to contribute to the development of a critical mind in the students, needs also to know the reality, not only at a national level, but also that which surrounds the school and its students. Only with that knowledge on the part of teachers and students, will they be able to evaluate the reality in which they function.

GUIDELINES FOR ELABORATING A TEST:

1. In order to be able to base your questions on a specific content, you will have to consult the learning objectives for that content.
2. Be sure that the questions require answers such as those specified by you or the curriculum, in the learning objectives.
3. Include more than one question for each objective.
4. Choose the type of questions: multiple option, true-false, brief answers, fill-in blanks, etc.
5. Decide which way of grading you will use from the following: number of correct answers, or number of objectives attained through the corresponding questions.

6. Decide which criterion you will use to determine the minimum for passing: all answers correct; how many correct answers; all objectives attained, or, how many objectives attained.

ASSIGNMENT

Following the concepts of the text, elaborate and administer a test to your elementary school students. The learning objective which you will evaluate in this test will be: to know civic concepts which are appropriate for the level of your students, according to the Ministry of Education's texts, beside any social, educational, organizational, economic or political aspects in the community where they live.

Use the general guidelines for elaborating a test that are presented above as well as other concepts included in the text. The test should have 15 questions and should mention the school grade where you teach.

After correcting the tests, write a brief report evaluating the data obtained on your students' achievement through the test. The report should consider the following criteria:

1. Mention form of scoring used and explanation of why it was used.
2. Mention the minimum limit to pass the test which you used and explain why it was chosen.
3. Mention how many students passed the test and explain which may be the possible reasons for failure of some or all the students, as may be the case.
4. Propose some possible ways to help students learn better the objective tested in the test.

5. Mention, if you know it, what type of occupation do the students' parents have and explain if you consider that this aspect is related to the children's achievement and in which way.

You should hand in the corrected test and your report to your Educational Psychology teacher on Tuesday, December 5, 1978.

APPENDIX B

LEARNING OBJECTIVES FOR THE TEXT

APPENDIX B
LEARNING OBJECTIVES FOR THE TEXT

1. You will define in written form and in your own words, the main concepts included in the text.
2. Given a learning objective and various questions, you will select those which are valid for the attainment of that objective.
3. Given a learning objective and various procedures to measure its attainment, you will select those which are most reliable.
4. Given various learning objectives, you will select those which most contribute to "analysis" as a cognitive process.
5. Given a sample test and various evaluation concepts, you will select those used to elaborate the test.
6. Given various examples of evaluation procedures, you will select those which are correct.
7. Given a learning objective, the student will construct a valid and reliable test to measure the attainment of that objective, and will evaluate its results.

APPENDIX C

INSTRUCTIONS FOR USE OF THE INSTRUCTIONAL MATERIAL

APPENDIX C
INSTRUCTIONS FOR USE OF THE INSTRUCTIONAL MATERIAL

Please read carefully and silently the material you have received.
If you wish to do so, you may underline it.

A written test on its content will be given to you, at a date
not yet set, in the near future.

You may ask questions after you have read all the material.

You may keep the material to study it and carry out the assignment
mentioned in it. However, you will have to return everything, together
with your assignment, on December 5, 1978. Therefore, it is recommended
that you do not lend or spoil it.

APPENDIX D

PRE-TEST

APPENDIX D

PRE-TEST

PLEASE ANSWER THE FOLLOWING QUESTIONS BY WRITING AN "X" OVER THE NUMBER WHICH CORRESPONDS TO THE ANSWER YOU CONSIDER CORRECT,

1. Mark which is the most complete definition of "evaluation".
 1. It is the measurement of characteristics in the student.
 2. It is the process of collecting information continuously in order to objectively give grades to the student.
 3. It is the process of judging the student to determine the degree of knowledge attained.
 4. It is the process of compiling data and judging them in order to make continuous decisions over the teaching-learning process.
2. In order to measure the objective of learning how to compute square roots, the teacher presents ten questions which require that the square root of various numbers be determined; which of the evaluation concepts is he using in his test?
 1. Reliability
 2. Relativity
 3. Flexibility
 4. Correlation
3. Which of the following objectives promote analysis on the part of the student?
 1. Learn the names of the President's ministers and their responsibilities.
 2. Know the natural resources of the maya culture.
 3. Mark the relationship between the functions and the performance of a congressperson.
 4. Know the results of chemistry experiments appropriate to the student's level.

4. Mark which of the following is a sample of reliable measurement:
 1. A test with a time limit.
 2. Two tests over the same topic.
 3. Questions totally unknown to the student.
 4. One question for each objective.
5. A test is valid if:
 1. The teacher and the students consider it so by consensus.
 2. If it can be passed by any of the students who have taken the course.
 3. It is passed by most students taking it.
 4. It asks what is specified by the learning objectives.
6. In order to find out if the students attained the objective of learning to write a short story, which of the following is a valid measurement?
 1. From several literary forms, have them identify a short story.
 2. Have them write a short story.
 3. Ask them to report on five short stories they have read.
 4. All of the above.
7. Of "measurement" and "evaluation" it is said that:
 1. They have the same meaning.
 2. The first one includes the second.
 3. The second one includes the first.
 4. All of the above.
8. A teacher decides to make a weekly test besides a final in order to measure learning in the course. This is an example of:
 1. Consistency
 2. Reliability
 3. Both of the above
 4. Relativity

9. A teacher makes a visit with his students to the countryside and he asks, how is money obtained for seeds and working instruments in the country? This requires that the students:
 1. Make a critical evaluation
 2. Make mathematics exercises
 3. Make captious questions
 4. Better memorize the information
10. Which of the following questions requires an analysis of the relationship between the federal government and the states?
 1. What kind of government have the federative entities?
 2. Why do the states receive money from the federal government?
 3. Which among the states are main agriculture producers?
 4. Which is the function that the state representatives have before the federation?
11. Some requirements for a Biology course consist of an oral report, class discussions, assignments, written papers, and laboratory reports. This is an example of:
 1. Variance
 2. Extreme evaluation
 3. Both of the above
 4. Reliability
12. The objective of a teacher consists in understanding the social political and economic factors in the independence war. In the test he asks for the place of origin of the insurgent leaders; this question is:
 1. Subjective
 2. Not valid
 3. Not pedagogic
 4. All of the above

13. In a social science class the teacher shows drawings of two rural communities that have different agricultural products, and asks the students which of the two would be more prosperous according to their products. With this question, the teacher stimulates:
1. The interest for learning to draw
 2. Unfair comparisons
 3. Appreciation of urban resources
 4. The cognitive level of analysis
14. A valid question to measure the level of application of principles is:
1. What type of animal is a hound?
 2. Why is it more likely to get sunburnt at noon?
 3. What is the meaning of "respect for others' right is peace"?
 4. Which is the best method for determining the diameter of a star?

APPENDIX E

POST-TEST

APPENDIX E

POST-TEST

PLEASE ANSWER THE FOLLOWING QUESTIONS BY WRITING AN "X" OVER THE NUMBER WHICH CORRESPONDS TO THE ANSWER YOU CONSIDER CORRECT. THERE IS ONLY ONE RIGHT ANSWER FOR EACH QUESTION. PLEASE NOTE THERE ARE ALSO QUESTIONS WHICH REQUIRE MORE EXTENSIVE ANSWERS, FOR WHICH THE PROPER SPACE HAS BEEN PROVIDED.

1. Define in your own words the concept of reliability according to the material you received.

2. The definition of application objectives is: the utilization of principles, procedures and methods appropriate to the subject for solving a particular problem. Which of the following questions is valid for an application objective?
 1. What is the meaning of "respect for others' right is peace"?
 2. What is the name of the method used for determining the diameter of a star?
 3. Why is it more likely to get sunburnt at noon?
 4. What is the definition of a hound?

3. Which of the following objectives measures the cognitive process of "analysis" in the students?
 1. To know the natural resources of the country.
 2. To know the governmental powers of the country according to the Constitution.
 3. To mark the relationship between agricultural production and unemployment.
 4. To know the results of chemistry experiments appropriate to student level.

4. Define in your own words the concept of measurement based on the material you received.
5. Which of the following is a more reliable procedure for measuring attainment of the objective of knowing the main articles in the Constitution?
 1. To mark the main articles of the Constitution in a question.
 2. To mark the main articles of the Constitution in several questions.
 3. To mark at least two of the main articles of the Constitution.
 4. To read the main articles of the Constitution
6. In order to see if the students attained the objective of learning to play songs on the piano, which of the following is a valid measurement?
 1. From several musical forms, ask them to identify a song.
 2. Have them play songs on several instruments.
 3. Have them play a song on the piano.
 4. Ask them to attend a concert of songs played on the piano.
7. Mark which of the following is an example of reliable measurement:
 1. Several questions for each objective.
 2. A test where it is necessary to apply certain knowledge to a new situation.
 3. A test with time limit.
 4. One question for each objective.
8. Please define in your own words the concept of validity according to the material you received.

9. In order to see if the students attained the objective of describing the characteristics of mammals, which of the following is a valid measurement?
 1. Ask them to name examples of the mammals known in the world.
 2. Have them identify what mammals have in common.
 3. Ask them to describe five mammals they have seen.
 4. Given several animals, have them select a mammal.
10. Which of the following objectives measures best the cognitive process of analysis in the students?
 1. Define the form of government of the federal entities.
 2. Explain the reason why the states receive money from the federal government.
 3. Mention the post which the state representatives hold before the federal government.
 4. Define the process of electing congresspersons according to the recent Political Reform.
11. A test is valid if:
 1. It can be passed by any of the students who has attended the course.
 2. There is a consensus between teacher and students to consider it valid.
 3. It is passed by the best students in the group.
 4. It asks what is specified in the learning objective.
12. Define in your own words in the space below, the concept of evaluation based on the material received.

13. Which of the following is a reliable procedure for measuring the objective of applying the formula for the area of a triangle?
 1. In a test with ten questions include one with the correct application of the formula.
 2. Present several problems in which the formula should be applied in their solution.
 3. Given several formula, have them identify that of the area of a triangle.
 4. Have them solve a problem with application of the formula within a time limit.
14. A physics professor sets as requirements for his/her course that the students make an oral report, class discussions, assignments, written papers, and laboratory reports. This is an example of:
 1. Variance
 2. Validity
 3. Reliability
 4. Extreme evaluation
15. Did you answer a test with similar contents several weeks ago?
 1. Yes
 2. No

APPENDIX F

STUDENT EVALUATION OF LEARNING

APPENDIX F
STUDENT EVALUATION OF LEARNING

Recently you received a text on evaluation concepts over which you answered a test. The following questions refer to your learning experience with that text. If you did not receive any learning objectives for the text, please answer only from question 10 onwards. To answer, please write an "x" over the number which corresponds to the answer you consider most appropriate. This is not an examination and your answers will be anonymous.

1. Did you use the learning objectives for the text when you studied it?
 1. Yes
 2. No
 3. The text was not accompanied by any objectives.
2. The objectives were stated in a clear way.
 1. Always right
 2. Generally right
 3. Generally wrong
 4. Always wrong
3. The objectives were difficult to attain.
 1. Always wrong
 2. Generally wrong
 3. Generally right
 4. Always right
4. The objectives were useful in learning the text.
 1. Always right
 2. Generally right
 3. Generally wrong
 4. Always wrong

5. The objectives were useful in carrying out the assignment accompanying the text.
 1. Always wrong
 2. Generally wrong
 3. Generally right
 4. Always right
6. The objectives were relevant to the text.
 1. Always right
 2. Generally right
 3. Generally wrong
 4. Always wrong
7. The objectives were relevant to the assignment.
 1. Always wrong
 2. Generally wrong
 3. Generally right
 4. Always right
8. The objectives were relevant to the test.
 1. Always right
 2. Generally right
 3. Generally wrong
 4. Always wrong
9. The objectives were interesting in relation to the theme.
 1. Always wrong
 2. Generally wrong
 3. Generally right
 4. Always right
10. The text was useful in learning the subject covered.
 1. Always right
 2. Generally right
 3. Generally wrong
 4. Always wrong

11. The text was useful in order to answer the test.
 1. Always wrong
 2. Generally wrong
 3. Generally right
 4. Always right
12. The text was useful to carry out the assignment.
 1. Always right
 2. Generally right
 3. Generally wrong
 4. Always wrong
13. The text was clear.
 1. Always wrong
 2. Generally wrong
 3. Generally right
 4. Always right
14. The text was difficult.
 1. Always right
 2. Generally right
 3. Generally wrong
 4. Always wrong
15. The text was relevant to the assignment.
 1. Always wrong
 2. Generally wrong
 3. Generally right
 4. Always right
16. The text was relevant to the test
 1. Always right
 2. Generally right
 3. Generally wrong
 4. Always wrong

17. The text was relevant to the subject matter covered.
1. Always wrong
 2. Generally wrong
 3. Generally right
 4. Always right
18. The text was interesting.
1. Always right
 2. Generally right
 3. Generally wrong
 4. Always wrong
19. The learning experience regarding the text and assignment was interesting.
1. Always wrong
 2. Generally wrong
 3. Generally right
 4. Always right
20. Learning is better with learning objectives than without them, as long as they are clearly stated.
1. Always right
 2. Generally right
 3. Generally wrong
 4. Always wrong
21. It is clearer what has to be learned in school with objectives than it is without them.
1. Always wrong
 2. Generally wrong
 3. Generally right
 4. Always right

22. If as a student I could propose my own learning objectives, I would do it.
1. Always right
 2. Generally right
 3. Generally wrong
 4. Always wrong
23. Perhaps there are objectives which are not included in the general program; but if I would like to learn others besides those in the program, they would be the following:
(Write your answer in the space below).

24. Please mark the highest educational level you completed before starting your Secondary Normal training:
1. Elementary Normal School
 2. High School
 3. Technical training
 4. University

APPENDIX G

TEACHER SENSE OF EFFICACY

APPENDIX G
TEACHER SENSE OF EFFICACY

INSTRUCTIONS: The purpose in this questionnaire is to know some general opinions of elementary school teachers. Since the questionnaire is totally anonymous or confidential, you may answer all questions with complete freedom and without worrying about being identified. It is very important to get your answer to each of the questions.

Please read each question carefully and do not omit any of them. Kindly make a circle around the number which corresponds to the answer you choose. Mark only one answer for each question. If the answers do not fit in exactly with your opinion, choose the one you consider most "appropriate".

1. Please indicate your sex.
 1. Female
 2. Male
2. Please indicate your age as follows:
 1. 20 years old or less
 2. Between 21 and 30 years old
 3. Between 31 and 35 years old
 4. Between 36 and 45 years old
 5. More than 45 years old
3. Please indicate your teaching experience as follows:
 1. One year or less
 2. From 2 to 5 years
 3. From 6 to 15 years
 4. From 16 to 20 years
 5. More than 20 years

4. It should be possible to eliminate war once and for all.
 1. Strongly disagree
 2. Disagree
 3. Agree
 4. Strongly agree
5. Success depends to a large extent on luck and fate.
 1. Strongly agree
 2. Agree
 3. Disagree
 4. Strongly disagree
6. Some day most of the mysteries of the world will be revealed by science.
 1. Strongly disagree
 2. Disagree
 3. Agree
 4. Strongly agree
7. By improving industrial and agricultural methods, poverty can be eliminated in the world.
 1. Strongly disagree
 2. Disagree
 3. Agree
 4. Strongly agree
8. With increased medical knowledge it should be possible to lengthen the average life span to 100 years or more.
 1. Strongly disagree
 2. Disagree
 3. Agree
 4. Strongly agree

9. Some day the deserts will be converted into good farming land by the application of engineering and science.
1. Strongly disagree
 2. Disagree
 3. Agree
 4. Strongly agree
10. Education can only help people develop their natural abilities; it cannot change people in any fundamental way.
1. Strongly agree
 2. Agree
 3. Disagree
 4. Strongly disagree
11. With hard work anyone can succeed.
1. Strongly disagree
 2. Disagree
 3. Agree
 4. Strongly agree
12. Almost every present human problem will be solved in the future.
1. Strongly disagree
 2. Disagree
 3. Agree
 4. Strongly agree