

ESSAY

INTERBEHAVIORAL ANALYSIS OF ELEMENTS OF BASIC TEACHING

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Abstract:

This essay analyzes, from the perspective of interbehavioral psychology, some of the aspects of teaching: the curriculum, activities and materials, didactic discourse and the physical and social context of the classroom. Guidelines are given for improving teaching practices and the learning of Mexican students enrolled in basic education, taking into account that the basic system is suffering from problems of low quality and scholastic and social inefficiency. Problems have occurred in spite of psychopedagogical theories that have pointed to the need to orient teaching beyond the repetition of contents, and to conceive of teaching as an interactive process. Both inside and outside of the classroom, various aspects must be evaluated in an objective manner.

Key words: basic education, educational crisis, educational development, curriculum, learning activities, Mexico.

Introduction

The diverse statements found in psychopedagogical literature have been reached from different theoretical perspectives, which may be considered as premises or basic principles in the field of education.

The first of such premises refers to the need to orient teaching so that students can develop competencies beyond the repetition of the thematic content seen in class. Thus, from a constructivist perspective, it is said that students should participate actively in the construction of knowledge and be given access to multiple, varied opportunities to discuss and reflect on subject content, in order to have significant learning and “learn how to learn” (Coll, 1990; Hernández Rojas, 1998).

The behavioral school, on the other hand, emphasizes that teaching must be directed to promoting social competency (Howell, Fox and Morehead, 1993) and the development of functional skills that include comprehension, the development of concepts, and the generalized use of skills learned in academic situations (Salvia and Hughes, 1990). The most important interbehavioral ideas include those of Ribes (1990), which specify that intelligence should be understood as competencies that are developed through education and that instruction should be directed to exercising functional activities and developing competencies, because “being competent is not acquired by teaching *what*, but by teaching *how*”. According to this author, to consider behavior “intelligent”, it must be able to solve a problem efficiently and in varied, rather than repetitive form. Practice through repetition or habit, and teaching through imitation do not encourage the development of intelligent behavior. Other interbehavioral experts (Mares, 2001 and Martínez, 2001) emphasize the need for teachers to remember that learning at school should have implications in other settings—educational, professional, technical—and in daily life. Using the terminology of these writers, formal teaching must promote the transfer of learning.

The second premise accepted in generalized form in the various schools of psychology and pedagogy is to conceive of teaching as an interactive process, in which the teacher and the classroom play an important role in filling the function of education. From the perspective of constructivism, various authors indicate that these aspects form a scaffold for students to use to attain good achievement (Coll, 1993; Taylor and Nolen, 1996). Hernández Rojas (1998) assigns weight to the relations among teachers, students, and knowledge from the curriculum. Behaviorism suggests that students’ behavior must be analyzed from the situational context in

which they interact, and studies the effects of the physical and social settings on students' behavior (Mercer, 1997; Wallace, Larsen and Elksnin, 1992).

Interbehavioral theories indicate that the teacher's function is to develop and integrate linguistic, observational, manipulative, and procedural competencies in children—competencies that are interrelated and related to objects of knowledge—by programming activities and tasks. Teachers' exchanges with students are described and analyzed in terms of interactive episodes or interbehavioral segments in a context (Guevara and Plancarte, 2002; Mares *et al.*, 2004).

The third principle that is recognized by various psychopedagogical perspectives refers to the need for aspects related to education—the achievements of teaching, teachers' didactic practice, competencies developed in specific educational contexts—to be evaluated objectively with criteria of success, both inside and outside of the classroom.

Authors like Díaz Barriga and Hernández (1999) and Hewitt (1995) explain that use should be made of procedures and instruments that have clear criteria for evaluating students' abilities and the content of learning, as well as all teaching activities. Castañeda (1996) and López y Rodríguez (2003) emphasize the need to include systems for the objective evaluation of teaching within an instructional psychology aimed at designing educational models and instructional settings that favor learning. Such suggestions, made within a constructivist orientation, are not very different from those presented by various authors of a behavioral or interbehavioral orientation, who have been stating for several decades the need to have a student evaluation system and programs with objective and clearly defined criteria. A broad presentation of these ideas appears in the bibliographical revision reported by Guevara and Macotela (2005).

In spite of agreement involving the indicated aspects, Mexico's educational system is known to be experiencing serious problems: low quality, scholastic and social inefficiency, educational disjointedness, irrelevancy, deficient evaluation, and backwardness (Schmelkes, 1994,1999; Andere, 2003). Repeated statements have been made about the need to transform schools and their actors (Zorrilla, 2002), since schools do not provide children with fundamental knowledge nor do they develop the aptitudes and skills necessary for meeting the challenges of future life.

Such indications seem to be confirmed by the results of various academic evaluations of Mexican students:

- Mexico's National Institute for the Evaluation of Education (INEE, 2004) reports on the results of national tests taken by 48 thousand sixth-graders in 2002-2003. The figures show that only 37.2% obtained a satisfactory grade in reading, and an even lower percentage in mathematics (13.4).
- The International Programme of Student Assessment (PISA) carried out by the Organization for Economic Cooperation and Development (OECD) reports on the results obtained in the year 2000 by students taking academic tests in 42 countries. The results indicate that Mexican students obtained lower averages than the general average of participating nations in reading skills, mathematics and science, and in some cases averages lower than nations that share certain characteristics with Mexico, like Brazil, Chile, Argentina and Peru.
- The results of the PISA tests in 2003 were reported by the OECD in a report entitled "Panorama of Education 2005". Mexico obtained the lowest mean score on mathematics (385, Chart A4.3, p. 70); also reported is a relatively high proportion of fifteen-year-old students who have repeated a grade (22.6% in Mexico, compared with the OECD average of 7.2%) (Chart D6.1, p. 405), along with a teacher/student ratio of two times the average (Chart D2.2, p. 353). This ratio probably influences the level of attention given to each student, as well as the quality of results.

Scholastic failure and the low quality of education in Mexico have been the object of a large number of analytical texts of a sociological and pedagogical nature (Calvo *et al.* 2003; Cordero,

1999; Latapí, 2001; Márquez, 1999; Reimers, 2000; Tegido de Suñer, 1999). Such writings have clarified that Mexico's educational problems are extremely complex and encompass aspects ranging from the country's socioeconomic conditions—including income, the distribution of public spending, the historical context of teaching, and educational policies—up to the marginalization, health, hygiene, nutrition, and culture of numerous families and communities.

However, the impact that these and other factors can have on scholastic learning does not reduce the importance of the psychopedagogical aspects of teaching. The social function of educational psychology is to enrich daily didactic practice and to contribute to improving education. Therefore, given the panorama of low quality in Mexico, the obligatory question is: If theorists agree on various central aspects of the educational process, why does the nation have so many problems in attaining an efficient basic school system? Without attempting to give a response that envelops all the angles of the complex problem of quality, diverse aspects that lead us to that objective must be considered. Our interest is to analyze some of the conditions faced daily by direct actors in the educational process—students and teachers—in an effort to decrease the obstacles that may be present in developing the teaching and learning process.

Some of the basic elements of teaching are: the curriculum, group activities, teaching materials, didactic discourse, and the physical and social context of the classroom. The quality of teaching is related to each one of these aspects and thus requires analysis from the viewpoint of educational psychology. It is important to know if these elements are being handled well in schools to attain student learning in everyday teaching practice.

The objective of this article is to present a brief analysis of such constitutive aspects of teaching, from the perspective of interbehavioral psychology. To begin, the basic ideas of this psychological model are explained.

The Interbehavioral Model and Levels of Behavior

The interbehavioral model (Kantor, 1980; Ribes y López, 1985) is based on an interactive perspective of psychological development and learning. Psychological development refers to progressive changes of the specific forms of an individual's interaction with his physical and social environment, within specific contexts. Scholastic learning is defined as “a functional change in the interaction between the learner and the physical or conventional objects that are referents of didactic discourse” (Ibáñez y Reyes, 2002).

With such theoretical bases, a so-called formal education indicates that a student will develop progressive changes of an academic type—the development of skills and competencies—in specific contexts (typically classrooms), in particular situations (activities, educational materials and interactions with these materials and the objects of knowledge, as well as interpersonal relations between students and teachers). These elements, as a whole, will result in different levels of learning and behavior.

Interbehavioral psychology (Ribes y López, 1985) is dedicated to the task of making a functional taxonomy to present all types of human behavior that occur in individuals. Some of these behaviors are at such a simple level that they can be acquired by some animals; others can be considered exclusively human, such as complex linguistics. The taxonomy allows making a systematic analysis of behavior and a qualitative categorization of five different levels of an individual's interaction with his environment. The central element of this classification is the concept of “functional disengagement”. The simplest level of behavior (called contextual behavior) includes cases in which the individual acts in a manner that is absolutely dependent on the physical (contextual) circumstances; to the degree the individual disengages himself from the here and now, his levels of behavior will become more complex, until attaining behavior that completely transcends the here and now, and even objects; such levels are the so-called substitutive levels—the most complex behaviors and exclusive to humans (Table 1).

This type of analysis, taken to the field of basic education (Guevara *et al.*, 2005; Mares y Guevara, 2004) has been useful for distinguishing, for example, when a student does a task by copying or reproducing the discourse of a text or the teacher, and when his behavior is creative and original. This model considers five levels of interaction, as mentioned below along with examples from educational settings.

TABLE 1

Technical Note (Carpio, 2006)

The interbehavioral model postulates that psychological interaction is established between the total organism (O) and specific aspects of his physical, ecological and cultural environment (MA). Specifically, this interaction recognizes that the organism acts (R) in relation to objects, events and other organisms that in turn act (E) with regard to the organism. Analytical interest, however, is not concentrated on R and E, but on the interaction in which they develop specific *functions*. Expressed in another way, analytical interest is concentrated on the interaction of stimulus functions (FE) and response functions (FR) and not on either of them in an independent manner. The model also recognizes the physical or conventional conditions that are indispensable for the relation between the organism and the environment to be established (means of contact), as well as the conditions likely to affect the way this relation is established (dispositional factors), such as the organism's conditions (lesions, illness, privation-satiety or asleep-awake cycles, degenerative processes, effects of drugs, etc.), the situation (illumination, temperature, humidity, presence-absence of other objects or organisms, noise, etc.) or of interactive history (frequency of previous contacts, conditions of previous contacts, effects of previous contacts, etc.). Lastly, the model places the evolution of the function of stimuli and responses (reactive biography) within interbehavioral history (ontogeny).

The interbehavioral model is not based on internal entities to explain psychological phenomena. The relational nature of psychology, and the historical/ontogenetic evolution of the individual are based on the diverse elements that conform the interactive field, as well as on the interrelation of these elements. As a consequence, the explanation of the psychological field rests, according to this paradigm, on identifying the elements that form it and specifying the way those elements are organized.

Based on this general model, Ribes and López (1985) prepared a taxonomy—a systematic hierarchical classification—that identifies five general forms of organizing behavior, based on stimulus-response functions as fields of contingencies. Each form of psychological organization of the fields or functions was recognized in the taxonomy of reference, based on the criteria of *measurement* and *disengagement*. The first criterion refers to the process by which an element from the interactive field (called mediator) becomes critical in structuring the set of relations among the various factors in the field; the second describes the degree of relative autonomy of the responder with respect to the physical/chemical and spatial/temporal properties of the situation in which the behavior takes place.

Based on the different forms of mediation and disengagement identified through the observation of psychological phenomena, Ribes and López (1985) proposed five levels of functional organization of behavior as fields of contingencies: contextual, supplementary, selective, referential substitutive and non-referential substitutive.

Level 1 (contextual)

The contextual level is the most elementary level. The individual responds to the physical characteristics of the stimulus (the present context) without altering them, and only adjusts them to the requirements of the setting. At this functional level, the students participate in activities, adjusting to the stimuli the teacher presents. Since such activities require minimum disengagement from the here and now, students play the role of listeners or repeaters of information. A typical example would be when students hear the teacher's didactic discourse, when students are asked to repeat examples or definitions previously mentioned in class, or when they copy texts.

Level 2 (supplementary)

At this level, the individual modulates his behavior so that changes are produced in the situation of interaction by affecting the setting. The student becomes involved in practical and instrumental activities, producing changes in the physical or social setting. Since no model is present, this type of behavior implies a greater degree of disengagement from the here and now: the setting's regularities are modified by the individual. An example would be when the student asks the teacher or his classmates questions as part of class; another example would be the group's solving of a series of addition problems in class, followed by each student's solving of ten operations in individual form, based on the use of a specific procedure to do so as an "exercise", without a model present.

Level 3 (selective)

At the selective level, the individual must choose which procedure to follow and which rule to apply, according to criteria that can vary from one moment to the next. The student behaves linguistically or acts with regard to the object, mediated by the particular rule of correspondence of a situation. This implies disengaging from a fixed relation between one object and another or between one word and another, and selecting among various options—which in turn implies behaving by addressing previously learned conventional aspects that are not present in time and space.

For example, a student is involved in a task in mathematics. Next to the numbers 5 and 2 he can select the answer "7" if addition is required; if subtraction is required, the correct answer will be "3". There is no fixed relation between the numbers: behavior at the selective level will consist of adjusting the criterion (or rule) that the sign demands, according to the student's previous experience with the norm. In the above example, given two equal stimuli, the student will have a different answer, although the opposite case can also occur: given different stimuli, the student chooses the same answer. An example of the latter case would be using the same word to answer different questions. The student can select the word, "Juan", if he is asked to give a proper name, write a noun, select the subject of a sentence, give a schoolmate's name, give an example of a one-syllable word, an example of a word that begins with a capital letter or the letter *j*, or to answer a question such as "Who played with María?" after reading a story about these two characters.

In all of the mentioned cases, the criterion of the task determines the student's selection, which is therefore a selective behavior. This case encompasses many school tasks related to concepts and operations, as well as the classic "reading comprehension" activities.

Level 4 (referential substitutive)

In this case, the individual interacts with events, objects, and people, as well as with their properties, without their being present in the situation. Students have interactions that imply almost absolute disengagement from the present situation, referring to past or future events and describing absent situations; the role of language is essential in this type of exchanges. An example would be when students refer to events they know about and associate them with phenomena or concepts studied in class; another example can be when students describe objects, people, or events that are not present, or when they narrate a story, movie or lesson.

Level 5 (non-referential substitutive)

This level is the most complex behavioral level, in which the individual interacts with entirely conventional situations that are disengaged from concrete events because of their symbolic nature. In this case, linguistic interactions among participants are not limited to referring, narrating or describing objects, persons or events, but also to handling value judgments or explanations of the relations among events. The competencies related to the final level of disengagement include cases in which students discuss, justify, analyze, and form opinions based on criteria of various types, such as scientific and moral reasoning.

The Learning of Competencies

Competencies consist of a series of specific skills; in the school setting, they include speaking, writing, reading or doing a mathematical operation. A single competency can be developed at one or several of the five functional levels described above. Let us use the example of writing:

- A student can write by copying letters, sentences, paragraphs and even texts; all would be considered part of the first functional level (contextual).
- A student can also write a note to request something; this action would be considered within the supplementary level (second level) because the writing is directed to altering the student's setting.
- If what the student is doing is writing the answers on a test, and choosing those answers according to the criterion stipulated by the question, the writing activity is located at the selective level (third level).
- In the event the student is making a written description or summary of events he has experienced firsthand, observed or read, his writing activity would be considered to be at the referential substitutive level.
- And if the student writes a complete original composition that discusses, interprets and analyzes different events or phenomena, using technical terminology, the writing is considered within the non-referential substitutive level.

Continuing with the example: It is easier for a student to write an original composition with all the characteristics described for level 5 (non-referential substitutive) if he has already written descriptions and summaries (level 4), which in turn are facilitated by the previous development of skills for selecting literal responses that correspond to the third behavioral level, and so on. The ideal is for students to acquire writing within each and every functional level; thus it is useful for the teaching-learning process to be programmed in the group by directing students from the simple to the complex, and with various topics. Successive development can be helpful in establishing the different skills mentioned in a generalized manner.

In short, for a student to be able to write an original composition, which implies a high degree of analysis, synthesis and use of abstract concepts, it is useful (and probably indispensable) for him to have received previous training in easier skills that are more functionally simple. The number and type of specific skills that must be taught before expecting the student to write an original, complex composition will depend on the number and type of components desired in the composition. Consideration must also be given to how close these skills are related to those involved in other functional competencies (such as reading and oral language).

Studies carried out with students in elementary school (Mares, Guevara and Rueda, 1996; Mares *et al.*, 1997) contribute empirical evidence that when students develop reading and writing skills at simple functional levels (such as textual reading aloud or writing that copies a topic, which are activities in the contextual level), they are not able to make a written description of a topic at more complex levels (a description of characteristics and relations among events), even when the previously read text presents such aspects and deals with a similar topic. The authors report that even after learning to describe a topic orally and being able to structure their oral discourse with descriptions and relations among characteristics or events, the students continued writing compositions at simple levels (for example, "dogs bite") when presenting a similar topic in writing.

Given these results, the writers developed and tested diverse strategies to encourage students to practice reading at successively more complex levels (supplementary, selective and referential substitutive), through various activities that ensured students' contact with the aspects referred to in the text. Thus improved reading comprehension was attained, along with the development of skills to write about topics at referential substitutive levels.

In a more recent study, Carpio (2005) shows that university students who are asked to give a written description of the structure of complex problems can comply satisfactorily with this request if, and only if, they have been previously trained to give written descriptions of similar, less complex problems; while students who have not worked on such a task fail when attempting to write about complex problems.

The principle presented for the described cases can be applied to teaching each of the academic competencies hoped to be developed during the school year. For a student to master a competency at the more complex functional levels, he must have previously developed less complex levels within the competency or within a closely related competency.

The studies referred to above also provide evidence that if the competencies developed by students attain more complex levels of behavior, i.e., if they attain the referential and non-referential substitutive levels, then the students will be more likely to apply learning from a formal educational situation to daily life. Attaining such levels in learning is also associated with greater generalization towards other academic situations.

After explaining the interbehavioral indications upon which our analysis is based, we shall proceed to present the derived factors for each element—factors of importance for basic teaching.

The School Curriculum

The *school curriculum* refers to the content; i.e., *what will be taught*. Its delimitation is related to the conception of the teaching-learning process. One form of delimiting curriculum contents can be “the set of topics the school wishes to teach students in a particular school year”. Another definition would be “the planned set of skills for students to learn”. Implicit in both definitions is the desire for students to learn everything taught in the school year; yet although the definitions may seem to be similar, they are not. Each type of definition has different implications.

When an educational program or curriculum is designed, planners tend to take into account one or several of the following aspects: *a)* the thematic contents that will be covered in the course, *b)* the educational actions that the teacher must carry out to attain the students’ mastery of this content, and *c)* the competencies or skills that a student must have attained upon completing the course or a particular unit of study.

In the first case, when the thematic contents are taken into account, the defined curriculum objectives refer to general topics, concepts or theories. An example would be: “1. The Discovery of America”; “2. The Conquest of Mexico-Tenochtitlan”; “3. Colonial Times”, and so on. In the second case, when educational actions are used as the basis for attaining the mastery of content, curriculum objectives are written in terms of instruction procedures. From such a perspective, objectives like the following are established: “The class will discuss the difference between oviparous and viviparous animals.” Lastly, when consideration is given to the skills or competencies the school wishes to establish in students, a definition is normally made of certain actions that the student must know how to do by the end of the course. In this case, objectivess such as the following will be established: “The student will solve problems that imply doing addition.”

The possibility is not discarded that planners, when designing a school curriculum, have the three above-mentioned aspects in mind. But if the definition of objectives explicitly delimits only one of these aspects, problems can occur with those who must put pedagogical actions into practice to achieve the objectives.

When objectives are written exclusively in terms of the topics to be taught or educational actions (i.e., the aspects related to teaching), many problems may arise in practice in evaluating students’ learning. A teacher will not be able to determine if the student “masters topic 1 of the program”, or if “the class discussion was sufficient to allow distinguishing between oviparous and viviparous animals”. On the other hand, when the setting of curriculum objectives is based on the skills or competencies that students must attain, the educator can know when a student has met each objective.

To discover if a student has learned a particular competency or skill, *criteria of attainment* are desirable; i.e., an clearly defined and objective measure of the *level* of behavior that the student is expected to reach in each particular competency contained in the program. An objective could indicate that “the student is learning to write” but would not indicate how the child must write to show that “he has learned”. In the case of this competency, it can be very helpful for the course objective to indicate if the students are expected to write letters, words, phrases, sentences, or texts. It is also good to specify if students are expected to write by copying, taking dictation or producing a text personally; in this final case, it must be specified if messages or requests are to be written, questionnaires answered based on texts, summaries or descriptions written, or if original texts with precise terminology and arguments are expected.

A considerable proportion of the objectives in a school curriculum reveals two problems:

- 1) The objectives are written and placed in order by taking into account the topics and activities of teaching, or the children’s topics and “skills”. We use the quotation marks because curriculum objectives rarely refer to behaviors that can be directly seen.
- 2) The objectives do not have criteria for attaining or specifying the desired level of skill.

Diverse examples that illustrate the above can be seen in the program of studies of Mexico’s Secretariat of Public Education, especially in the documents called “program advances” that are designed for each grade in elementary school. In these documents many curriculum objectives are of the following types: *a)* “students should understand the importance of ...”, *b)* “identification and use of ...”, *c)* “children should recognize the main ...” *d)* “students should associate the topics ...”, *e)* “students should value the need to ...”, or *d)* “students should know the causes of ...” Some of these cases are part of the objectives for the Natural Science course and are contained in the program advance for the first grade (pp. 93, 99, 103, 111) and third grade (pp. 65, 69, 71 and 75), although similar cases appear throughout the program advances that correspond to different subjects in the curriculum.

The *Plan y programas de estudios para educación básica* (“Plan and Programs of Studies for Basic Education”) (edited by the SEP in 1993 and reprinted each year) includes the justification and structure of the entire elementary curriculum, according to the subjects of Spanish, Mathematics, Natural Science, History, Geography, Civic Education, Art Education, and Physical Education. Each teacher receives this general program, besides the teacher’s books and the program advance for that particular grade. This final document contains the purposes, blocks, topics, and contents for each subject, as well as the pages of the textbooks the teacher can use to attain the course objectives; thus it becomes the main didactic guide of the basic level.

In this case, our analysis is centered on the subject of Natural Science. The program advance organizes the contents of each subject into five thematic areas, which are the same for all six grades of elementary education: Living Beings; The Human Body and Health; The Environment and Its Protection; Matter, Energy, and Change; and Science, Technology, and Society. Here we include some specific objectives that correspond to particular blocks and lessons contained in the program advance for the second and fourth grades:

- 1) Second grade: Knowledge of the Environment. Block II: The Family. Objective 6: “Having students appreciate the importance of preventing accidents at home” (p. 103). Objective 13: “Understanding the importance of activities of cooperation and respect among family members, as a basis for family interaction” (p. 104).
- 2) Second grade. Knowledge of the Environment. Block III: We continue growing. Objective 2: “Identification of the relation between human nutrition and health” (p. 108). Objective 3: “Comprehension of the relation between neglect in personal hygiene and health risks” (p.

- 108). Objective 5: “Recognition of the main events in personal history, in relation to the physical changes of growth” (p. 109).
- 3) Fourth grade. Natural Science. Block I. Central topic: The Human Body and Health. Objective 2: “Having students reflect on elementary care and some preventive attitudes for maintaining the sense organs in good condition” (p. 73). Objective 3: “Having students value the importance of respecting and interacting with people who have visual or hearing deficiencies” (p. 73).
 - 4) Fourth grade. Natural Science. Block II. Central topic: Living Beings and Their Environment. Objective 4: “Having students become familiar with some examples of ecosystems in Mexico” (p. 77).
 - 5) Fourth grade. Natural Science. Block V. Integrating Area. Objective 1: “Having students associate some basic contents studied during the four previous blocks” (p. 85).

These examples show that teachers may have problems in defining how they should act so that students “appreciate the importance”, “recognize”, “understand”, “reflect on”, “value”, “become familiar with some examples” or “associate topics”. Worse still, teachers will find difficulties in evaluating if a student attains these objectives. One could ask for a definition of the criteria to confirm that a student “has understood, valued and associated topics”.

The above implies that programs ignore or do not clarify four fundamental aspects of curriculum programming:

- 1) The procedure to ensure that students attain each objective.
- 2) The specific academic behavior to be taught, stated in terms that the teacher can observe in the student’s actions or results (writing produced, operations solved, etc.); i.e., a student’s academic products.
- 3) The criteria for acquiring or attaining an objective.
- 4) The level of competence in a particular skill.

The specified aspects can be attained in the school curriculum—in any subject and grade—if the ideas of interbehavioral psychology with regard to human psychological development are used as a guide. Our proposal is to conceive of schools as a place for favoring students’ development, based on the way they can evolve through different functional levels, and in defined, successive competencies.

If one takes into account the theoretical and methodological ideas that interbehavioral psychology contributes to curriculum design, gradual student progress can be programmed, ranging from concrete and relatively simple skills (at contextual and supplementary levels) up to skills that imply complex levels of abstraction, analysis and synthesis (referential and non-referential substitutive levels), in each subject, grade, and particular competency.

An additional problem may occur with respect to the school curriculum, represented by the fact that objectives are not always related to the theoretical and technological aspects of the discipline being taught. If an example is taken from the Natural Science program, one could point out that the objective of “Having students value the importance of respecting and interacting with people who have visual or hearing deficiencies” (p. 73) does not seem to be a topic in the discipline of study. Similar examples can be found in several subjects.

We do not wish to deny the importance of the specific objective used as an example, but it is desirable for the design of a particular subject to consider the skills and specific knowledge that students are expected to acquire, and to ensure that such skills and knowledge are based on current developments in the discipline or subject of study. In the specific case of the natural sciences, various authors (Candela, 1999; García and Calixto, 1999; Mares and Guevara, 2004; Paz, 2001a and b) have stated the pertinence of modifying programs of study to orient them to teaching the

aspects considered central in the disciplines of natural science (biology, physics, chemistry, and health sciences). These authors clarify that teaching natural science requires a focus that prepares students for constantly increasing their mastery of concepts and scientific technologies; therefore emphasis must be placed on experimental activities as well as attaining adequate conceptual mastery of these disciplines.

Other authors of a behavioral and interbehavioral orientation have pressed for the need to improve programs for teaching various subjects in basic education, such as reading and writing (Mares and Bazán, 1996), Spanish (Guevara *et al.*, 2005), biological and social sciences (Santoyo and Martínez, 1999), and history (Varela, 2002). Such proposals state that academic programs should define the particular competencies students will attain, taking into account the discipline being studied; natural science classes will not be developing the same competencies as grammar classes, which in turn will have different competencies from mathematics and social sciences. Based on these arguments, we believe in the pertinence of analyzing the curriculum of each subject to define specific competencies, as well as the activities and materials that can help students to master successive functional levels in each grade.

Activities and Teaching Materials

Teachers do not have an easy job. Their work in the classroom encompasses a wide variety of educational actions: designing and organizing activities to be developed in and outside of class; promoting and orienting students in executing such tasks; directing forms of interaction among their own didactic discourse, the teaching material, and students; stating problems and criteria for their solution; identifying the competencies a task requires; and evaluating learning in the classroom. All the above implies making decisions on the teaching process that will be used with each student and with the group as a whole (Orlich *et al.*, 1994). Because of the above, it is important for teachers to be skilled in implementing situations that require students to use competencies and skills at various levels of interaction. In this way, students will be able to progress to more complex levels in each specific competency, with achievement criteria that are pertinent for each educational activity.

Regarding the curriculum, we believe teachers will enjoy greater probabilities of classroom success if the definition of the academic program they are to put into practice is based on the principles of psychological development. Teachers will be clearer in orienting activities and designing didactic materials if the curriculum defines the specific competencies to be developed in students, and if it programs successively more complex levels in this competency. It is also desirable for the curriculum to specify achievement criteria, based on behaviors that the teacher can observe in students.

Studies carried out in Mexican classrooms have contributed data on the type of activities and materials that are common during the teaching of various subjects in different grades of elementary school (Guevara and Macotela, 2005; Guevara *et al.*, 2005; Mares *et al.*, 2004). The findings of such research indicate that in the participating schools (with groups from the first to the sixth grade), most of the class time is dedicated to explanatory teaching: teachers read texts or give class and the students listen. The activities for having students participate individually or in teams, are often directed to oral or written copying of the aspects seen in class, or to repeating exercises. Classroom activities seem to be aimed at developing competencies at contextual levels; in the best of cases, selective levels are reached when students answer questionnaires or select examples of concepts. As indicated by Ribes (1990), learning by repetition does not encourage the development of intelligent behavior.

We believe that the described problem could be solved at least in part if the curriculum clearly specified why and how students should be directed in the successive development of specific academic competencies. If the teacher is clear about his role as promoter of the child's psychological development, as well as the specific actions that can be carried out to attain the

defined objectives, he will be able to comply better with the social responsibilities he has been assigned.

The teachers in the above-mentioned studies tend to use textbooks as teaching materials, along with illustrations or drawings. Other teachers may use various materials in their courses (materials that are well designed and pertinent for didactic practice), but there is no evidence that this is the norm in Mexican classrooms. What is certain is the use of the free textbooks edited by Mexico's Secretariat of Public Education each year, for each subject. A review of these textbooks shows that they are prepared with excellence to comply with a series of didactic characteristics: *a)* the use of titles and subtitles; *b)* the incorporation of vignettes that provide summarized information or data in addition to the lesson; *c)* the use of illustrations, frequently attractive; *d)* the presentation of examples of the concepts explained in the lesson; and *e)* the specification of activities to be developed in and outside of class.

However, since teachers tend to use such teaching materials within a dynamic that is explanatory and repetitive, student development may be limited to simple behavior levels. This limitation would not be problematic if the teachers planned, in a successive manner, activities to guide students to increasingly complex levels; yet such planning does not seem to be frequent in elementary school classrooms. Although some textbooks propose activities that could lead children to experimentation, group discussion, and in general to the development of substitutive behavioral levels, in practice, given the absence of adequate classroom materials and the limited importance attached to doing such activities in class, teachers may assign them as homework. Students will be instructed to "do the exercises on page 20 in your book"—homework that is graded later through "checks and exes" and a numerical grade. In contrast, during class time, the teacher and students limit themselves to reading the presentation in the book and writing the exercises. With such a system, many opportunities are lost for the group to become involved in experimental activities of discussion and analysis that have great value for academic development.

Didactic Discourse

This resource is used in all grades and is commonly classified as what interbehavioral psychology calls a set of conventional linguistic repertoires. Thus the first aspect that must be considered in analyzing the pertinence of discourse is related to the type of conventional linguistic rules the teacher uses, or the didactic text, upon addressing students. It is not easy to know what type of language must be used in class with students, who are at different levels of psychological development and come from varying social conditions. Nonetheless, the linguistic levels of the audience or reader should be taken into consideration as an initial step in making the content of didactic discourse attainable for the students enrolled in a particular course. As previously stated by Matute *et al.* (1995:259): "The elaboration of elementary school textbooks requires information [...] to know the type of language children use at each moment of their development."

Teachers and textbooks must meet double objectives through their didactic discourse: on one hand, their explanations need to use terms that are understandable for the student; and on the other, they should gradually encourage children to master the discourse of the discipline being taught. What is not recommendable, but likely to happen, is that the didactic discourse or the text uses words not fully known by students to explain technical aspects, or that technical aspects are explained by using the terminology of common language, without ensuring that the children have made a "translation" that permits their mastery of such terminology. To illustrate both problems, we present two cases. An example of the first type of problem would be:

The atmosphere. In space, Earth is surrounded by a gigantic invisible ocean. We are aware of its existence because it moves around us and shakes the leaves on the trees; because it howls in an impetuous way [...] hurling itself against houses [...] Normally we call it air, but air in fact is no more than the lowest layer of that gaseous covering: the atmosphere.

This paragraph was extracted from the *Libro para el maestro* (“Teacher’s Book”) for third-grade Natural Science (p. 52). Although the discourse is not directed to students, it is the basis teachers will probably use to elaborate their didactic discourse. If teachers use the terms from the quoted text, their third-grade students will probably not fully understand what the teacher is saying; children may have problems with words like *existencia* (existence), *desplaza* (moves, shifts, displaces), *en torno nuestro* (around us), *agita* (shakes, agitates), *brama* (howls, bellows), *impetuosa* (impetuous), *precipitándose* (hurling, throwing), *no es más que* (is no more than), *la capa inferior* (the lowest layer), and *gaseosa* (gaseous).

To illustrate the second type of problem, let us assume that we wish to explain the phenomenon as follows:

As you know, air blows and moves the leaves on the trees. Sometimes you can hear how it blows or moves things around us. We call that air the atmosphere.

In this case, the student can assume that *air* and *atmosphere* are the same thing, or that the terms are equivalent. This second type of error may not be committed by teachers, but by community instructors or others lacking in teacher training who are required to fill teaching positions.

What we wish to state here is that we must not lose sight of the importance of students’ “making contact” with the diverse aspects that make up a lesson. In other words, we must ensure that children understand the aspects referred to in lessons, and that once they understand them, that they make adequate use of the subject’s terminology. If either of these two conditions is not met, learning will probably not be adequate.

A review of modifications made to textbooks during recent years allows us to observe a decrease in the serious problems of previous versions, especially regarding the type of lexicon and extension (see Guevara, 2001). Current books pay attention to the length of texts and increase the difficulty of their lexicon the higher the grade in school; plus their illustrations are related to aspects of the reading. Yet in spite of these benefits, we believe that textbooks still need to adapt the vocabulary used and ensure that the teacher’s materials include guides that aid in structuring the didactic discourse at the linguistic levels pertinent for the target audience.

It would be desirable for teachers or instructors to have a guide of the real content that should be included in their didactic discourse, in addition to the activities to be carried out during this discourse. Explicit mention needs to be made of the importance of leading students to develop specific competencies at successive functional levels.

Physical and Social Contexts in the Classroom

Different educational trends agree that interaction between teachers and students is one of the central aspects of teaching because all situations of exchange play a key role in facilitating or discouraging the academic and personal development of students and even teachers. The social setting in the classroom can contribute to producing students who are insecure, rejected, and a failure, or students who are motivated, cooperative, and successful (Biehler and Snowman, 1992). What teachers say or do is known to have powerful effects on students: on their intent to learn, on what they learn, and on their academic commitment. “Students’ perception of classroom instruction is highly related to their motivation, their expectations, and their level of academic commitment” (Stefanou *et al.* 2004:97). The classroom’s physical condition and arrangement can also be factors of influence in favoring specific social and academic activities.

Several authors have taken these aspects into consideration in researching the physical and social conditions of Mexico’s classrooms, as well as situations of interaction that are favored in such contexts. Examples of this type of studies are those by Castillo, Leos and Loza (1998), carried out

with a pedagogical perspective, and those of a behavioral and interbehavioral nature (Guevara *et al.*, 1999 y 2005; Mares *et al.*, 2004).

With respect to the school's physical context, the reports indicate that in general, the classroom size observed was adequate, although the physical condition of the furniture and classrooms could be considered from fair to bad. The lighting conditions would be judged satisfactory but not ventilation. The distribution of the furniture complies with that of a "traditional classroom", with the desk and blackboard in the front and the students' desks in rows, meaning that the children in the back of the room do not see the teacher well as he explains. Groups tends to be large (up to 35 students). The reports also indicate that on various occasions the groups go outside in shifts (of thirty minutes or an hour) to practice dances, marching or sports—activities that imply that the students who remain indoors hear—during class—instructions over a loudspeaker, music, and outside noise. The students emphasize that none of the schools visited had laboratories or classroom materials for doing experiments.

In terms of the social setting, the reports state that in general: *a)* Students and teachers behave in a cordial manner, implying that the classroom's "social climate" is adequate. *b)* Teachers can be good guides for group activities, stimulating student participation, although most such activities are limited to questions and answers, writing on the blackboard, copying, taking dictation and using textbooks. *c)* Students receive little feedback on their academic performance, and homework is often left unchecked or simply assigned a grade without informing the students of their mistakes. *d)* Classroom work is individual or group work, seldom teamwork. *e)* Experimental and analytical work, as well as discussions, are neglected.

The report by Mares *et al.* (2004) indicates an interesting finding in relation to the level of interaction promoted during courses of basic education: The teachers participating in the study occasionally asked students questions aimed at having them associate the concepts seen in class with aspects of their daily life or with previous lessons; at times they even asked questions to motivate students to give supported opinions. Most of these attempts resulted in brief student responses, value judgments or no response, and seldom led to the substitutive levels at which the teacher was aiming. Given such episodes, the teachers lowered their requirement levels by answering their own questions or explaining the lesson once more.

Such low levels of student competency can have various explanations. First, experimentation is not frequent, and the students have referents only from the discourse of others, not from observation and analysis. Second, students notice that teachers do not persevere in their attempts to attain such linguistic and conceptions levels in their students. A third aspect, which does not exclude the other two, refers to the structure of the curriculum, which does not program the passage from simple levels of academic performance to successively more complex levels. All the above implies that students, accustomed to behaving at contextual and selective levels, will encounter difficulties in structuring behaviors at substitutive levels.

In brief, and as a conclusion, it can be stated that the diverse elements expressed here—all important for basic elementary teaching in Mexico—reveal a series of problems derived from a curriculum that is expressed in terms of thematic units that students must "master" and not a series of competencies that they should develop. The statement by Ribes (1990) regarding traditional teaching seems pertinent: that priority is given to the objectives established by thematic content, while the criteria of learning are ignored. Within a teaching system of explainers and listeners, it would seem difficult to believe that conditions are being provided for students to assume a commitment to their own education and to reaching an optimal academic level.

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