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ABSTRACT

The effects of early family and school environments on the language development of young children are explored in this paper on developing literacy. It is stated that children's intellectual development can be detrimentally modified by such home conditions as: (1) poor prenatal nutrition, (2) low socioeconomic status, (3) poor language skills of family members, and (4) inadequate stimulation. In addition, schools implementing compensatory education programs often ignore the importance of applying learning theory and matching learning styles with teaching methods. The instructional implications of several learning theories (e.g., the behavioral-environmental view) are considered. Examples of teaching methods matched to appropriate learning styles are provided. An increased use of individualized instruction is suggested. (BRT)

SOME BEHAVIORAL SCIENCE IMPLICATIONS FOR DEVELOPING LITERACY THROUGH FAMILY AND SCHOOL INFLUENCES*

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The process of literacy (language and reading, for purposes of this paper) begins at birth with the mother usually serving as the most important teacher in the life of the child. In the mid-sixties, Benjamin Bloom[1] pointed to infancy and early childhood as the "critical years" for intellectual development. By age four, he concluded, as much as fifty percent of the child's intelligence has developed, and the rate of development thereafter begins to diminish. Not so widely quoted and known are the related findings from Bloom's analysis of eight major longitudinal studies showing that personality development, physical development, and achievement also take place most rapidly during infancy and early childhood.

> By an average age of about two, it seems evident that at least one-third of the variance at adolescence on intellectual interest, dependency, and agression is predictable. By about age five, as much as one-half of the variance at adolescence is predictable for these characteristics (p. 175).

Rapid physical development during the early years is obvious to all observers. In regard to achievement Bloom found that about fifty percent of general achievement at age eighteen had been reached by age nine (grade three).

These findings gain further importance with Bloom's conclusion that the effects of environment are most marked during the period of most rapid normal development, that is, during infancy and early childhood. Thus, culture, or the ways of living of human beings is assigned a central place in the development of the child. During the period from conception through the primary grades two major cultural forces assume the greatest responsibility for the development of the child--the family and the school.

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*The major substance of this paper was presented at the National Bilingual Education Conference, Austin, Texas, April 14, 1972.

[1]Benjamin Bloom. Stability and Change in Human Characteristics. New York: Wiley, 1964.

Prior to and immediately upon conception, genetics is a central force in the determination of the unborn child's future. At the moment of conception genetics, for all practical educational purposes, loses its significance. Educators do not currently exercise power over the inheritance of the child. They are environmentalists, nurturers, or acculturators by default, for the child has chosen his parents, and his genetic structure is established. Educators, then, are free to direct their undivided attention to the construction of an affective and intellectual environment for enhancing the inherited potentiality of the child. Efforts to fix the blame or the credit for child development upon the child's choice of parents, either from an intellectual or an ethnic point of view, is a senseless exercise in the family or school context.

The Family as Acculturator and Teacher

The ways of living, that is, the culture of the family, begins to affect the child even before he is born. The mother may be poorly nourished because of unavailability of food or because of unintelligent dietary habits. It is the result, not the reason, that harbors harm for the unborn child. Scientists may yet trace the reading deficiencies of many school age children to the improper diets of their pregnant mothers. Similarly, unavailability or failure to choose proper medical care during pregnancy may lead to a variety of physiological damages to the child.

The critical cultural variable, socio-economic status, thus becomes critical upon conception, for access to medical, legal, and educational resources is closely linked to income. Rodger Hurley[2] cites dozens of studies supporting a causal relationship between poverty and mental retardation and shows that ". . . fetal mortality, prematurity and its most serious consequence, infant mortality, all vary inversely with socio-economic status (p. 57)."

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[2]Rodger Hurley. Poverty and Mental Retardation: A Causal Relationship. New York: Random House, 1969.

Independent international studies have demonstrated that health and nutrition are closely related to learning.[3] Malnutrition is positively correlated with poverty, a condition common among minority groups of America because of societal discrimination. The preliminary findings of the Texas team of the National Nutrition Survey[4] show that certain nutritional deficiency diseases among Texans "are in the same magnitude as had been reported for the Montana Indians in 1961 and among rural communities in the six Central American countries in 1965 through 1967.[3]

Turning from such factors to an example of more specific family influences on child development, the work of Jerome Kagan and his associates[5] has shown that the competencies of the new-born infant--seeing, hearing, smelling, turning, sucking, crying, coughing, vomiting, chewing, reacting--are accompanied as early as twelve weeks of age by thinking about what he sees. Kagan's Harvard-based experiments with infants from low-, middle-, and upper-class families resulted in distinctive differences in performance between lower- and middle-class children. Using rate of heartbeat as the criterion (decelerations greater than six or seven beats per minute are most often associated with an attentive posture) the mother's face is a more distinctive stimulus for the middle-class child than for the lower-class child. The investigators believe that the former group of mothers are more likely to engage their children in frequent, distinctive, face-to-face contact.

The most dramatic differences between lower- and middle-class children of preschool or school age involve language skills, a conclusion supporting a host of pre-

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[3]Joe L. Frost and Billy L. Payne, "Hunger in America: Scope and Consequences." Nutrition and Intellectual Growth in Children. Washington, D. C.: Association for Childhood Education International, 1969.

[4]Texas Nutrition Survey Team. "Nutrition Survey in Texas." Texas Medicine, 65, (3), March, 1969, p. 49.

[5]Jerome Kagan, "The Child: His Struggle for Identity." Saturday Review, December 7, 1968.

vious studies (see review of studies by Cazden[6]). Kagan believes that this difference (favoring middle-class children) is due not so much to deprivation of parental vocalization as it is due to deprivation of distinctive vocalization.

Despite the compelling evidence of language deficiency of lower-class children, William Labov[7] believes that the concept of "verbal deprivation" of lower-class children is a myth. He contends that:

> The concept of verbal deprivation has no basis in social reality: in fact, Negro children in the urban ghettoes receive a great deal of verbal stimulation, hear more well-formed sentences than middle-class children, and participate fully in a highly verbal culture; they have the same basic vocabulary, possess the same capacity for conceptual learning, and use the same logic as anyone else who learns to speak and understand English.

At least three major strands of study and thought are appropriate to placing Labov's position in proper perspective: (1) studies of the effects of environmental conditions existing within various societies of the world; (2) studies of the usage of language within families; and (3) the views of those most affected by the implications of research.

In regard to the effects of environmental conditions within societies, Greenfield and Bruner[8] agree with Labov that it may be quite correct to contend that no human language can be shown to be more sophisticated than any other, but that people differ from each other in extracting the powerful tools for organizing thought from their language. Their work with schooled and unschooled Wolofs has useful implications for the present issue. Is it correct, as Labov contends, that ghetto children "use the same logic as anyone else who learns to speak and understand English"?

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[6]Courtney B. Cazden, "Subcultural Differences in Child Language: An Inter-Disciplinary Review." Merrill Palmer Quarterly, 12, (3), July, 1966. Reprinted in Joe L. Frost, Early Childhood Education Rediscovered. New York: Holt, Rinehart and Winston, 1968.

[7]William Labov, "The Logic of Nonstandard English." In Frederick Williams (ed.), Language and Poverty. Chicago: Markham, 1970.

[8]Patricia M. Greenfield and Jerome S. Bruner, "Work With the Wolof." Psychology Today, 5, (2), 1971, pp. 40-43, 74-79.

Greenfield and Bruner note that "no matter how rich the vocabulary, it is of limited use as an instrument of thought if it is not organized into a hierarchy that can be activated."

> . . . Some environments push a certain form of cognitive growth better, earlier, and longer than others. . . . Intellectual nurturing that fully develops language as a tool of thought requires years and complex training.

These conclusions from studies with the Wolofs cannot, obviously, be directly transferred to conditions of the ghetto dweller and other poverty groups. Nonetheless, assuming (tenuously) that the major poverty groups engage in a less technological and less schooled society than the typical American, the possibilities for long-term effect on cognitive growth are clearly sobering.

> Less technical societies do not produce so much symbolic embedding nor so many ways of looking and thinking. Whether one wishes to judge these differences on some universal human scale as favoring industrial man is a matter of one's values. But, however one judges, let it be clear that a decision not to intervene in the intellectual development of those who livein less technically developed societies cannot be based on the careless claim that it makes little difference (p. 79).

In regard to the usage of language within families, Bruner[9] supports the conclusions of Kagan and others that conditions of family life associated with socioeconomic status affect the development of language as a tool of thought.

> Again, the culture of poverty and the conditions of life that it creates, as well as the expectations it generates in parents and children, has the effect of leading some to use the instrument of language analytically and reflectively, while others are not so affected. The result of a failure to so use language is that it makes it difficult for the child to take advantage of the usual forms of thought and discourse employed in school settings. In effect, where the child, by background, has been kept from developing a typical middle-class analytic style, he is slowly but surely excluded from schooling, and thereby excluded from access to the powerful tools of the technology and of the mainstream culture. He is systematically made ineligible for jobs endowing him with either prestige or specialized skills. . . . Probably, we cannot change the plight of the poor without changing the society that has permitted such poverty to exist during a time of affluence (p. 104).

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[9]Bruner, Jerome, "Overview on Development and Day Care." Day Care: Resources for Decisions (Edith H. Grotberg, ed.). Washington, D. C.: Office of Economic Opportunity, 1971.

Hunt[10] also raises questions about the validity of Labov's views that the serious student should consider. He does not believe that the questions raised by Labov can be answered merely by examining the syntactical structure of bodies of verbal conversation.

> . . . Before we settle for asking each nursery school teacher to learn the dialect of each of her children, let us get far better evidence concerning this issue than the investigators from linguistics have supplied us. We have much to learn about the order in which these abilities come and the kinds of experience upon which the development of each successive ability depends before we can be maximally effective in early education.

The educator should also take into consideration the views of the audience toward which education is directed. Recent press releases, for example, report that the N.A.A.C.P. is opposed to teaching "black English to Negroes." In response to a Ford Foundation grant for this purpose, the N.A.A.C.P. described the project as a "cruel hoax" which could harm generations of Negroes. It pooh-poohed the idea that language differences, already prevalent among numerous segments of society, should be encouraged.

> It is colorful to hear someone speak in a strong accent complete with geographical colloqualisms. Emphasizing the difference to the point of promoting them hardly produces ease of communication.

The most compelling conclusions arising from studies of the effects of poverty tend to be negative in nature, emphasizing deficiencies rather than strengths. The awareness of deficiencies is an insufficient and commonly damaging base for teaching when used as the major criterion for educational planning and prescription. Self-fulfilling prophesies[11] appear to be more than rhetoric. The uncontrolled diet of deficiency determination by teachers influences negatively the achievement of their students. Consequently, diagnosis, a necessary strategy for effective teaching, must strike a balance between assets and liabilities or strengths and weaknesses. In sum,

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[10]J. McV. Hunt, "Parent and Child Centers: Their Basis in the Behavioral and Educational Sciences." The American Journal of Orthopsychiatry, 41, (1), January, 1971.

[11]Robert Rosenthal and Lenore Jacobson. Pygmalion in the Classroom. New York: Holt, Rinehart and Winston, 1968.

those responsible for educating children must base their policies on the most generous and promising assumptions about the children they teach, yet they must also recognize and deal with any debilitating forces that resist the development of the child.

The language and thought of the child, tempered by family influences during the preschool years, prescribes in large degree the success of failure of the child in the reading tasks of the school. It is critical that the teacher realize that family forces continue to exist and to influence the child's behavior throughout the early school years. Upon entry to school an additional set of cultural forces--e.g., teacher, methodology, materials--join family forces in shaping the child. Research from the behavioral sciences, including education, point up their nature and influence.

The School as a Cultural Agent

The literature is filled with indictments of contemporary educational practice for low-income and minority groups. To cite only one example, the Senate Subcommittee Report on American Indian Education, November, 1969 stated:

> We have concluded that our national policies for educating American Indians are a failure of major proportions. . . . They have not offered Indian children--either in years past or today--an educational opportunity anywhere near to that offered the great bulk of American citizens.

Only recently educators have realized that the cultural consistencies existing between home and school for the middle-class child promotes imperfect teaching methodology since middle-class children learn to read from systems that rest on undefined foundations.

> Basal readers, the presumed product of educational research and experimentation, do not reflect any consistent thread of research evidence, and the few promising threads of research evidence have not found expression in the basals. Most of the research in reading has been haphazard in nature, contributing minimally to practice, and in the confines of the reading world supportable theory is as rare as moon rocks. The reading world is one of mystics. It is rather unique in this regard, for no other educational discipline is so clearly fenced off into cults, each cult maintaining its superiority to all the others; each having the required evidence, a semi-controlled matching of methods with predictable results.

> Those who write about reading are saying that we must search for new directions in reading methodology and research; that the typical Method A vs. Method B research is wasteful in terms of time, money, and talent. Tax payers spent $1,000,000 on the U.S.O.E. First Grade Reading Studies to learn that there is no best method for teaching reading to all children and that the teachers is the most important factor. Indictments have persisted over the years. For example, "I have not been able to find the evidence to justify the assertion that the published findings of recent educational research (since 1916) have provided the basis of most of the modern reforms in reading instructions."[12] ". . . We are sore put to name even a few trustworthy generalizations or research-based guides to educational practice."[13] "Research (educational) is voluminous, but of poor quality and non-cumulative."[14] Chall's[15] analysis of studies of beginning reading, apparently one of the more carefully designed analyses, resulted in several specific conclusions regarding the teaching of reading, all based on studies which Chall herself (p. 88) refers to as "shockingly inconclusive."[16] (my italics).

Gordon's[17] conclusion from extensive analysis of compensatory education programs also rejects the notion of a "best approach."

> The search for the best or the generic treatment is clearly a futile search. Problems of human development and learning are so complex and conditions of life so varied that the chances of finding a curriculum which is universally superior is quite modest.

Setting aside the illusion of erecting a universally applicable program based on methodology research and turning to evidence from the behavioral sciences, the writer is drawn to the relevance of: (1) extracting instructional implications from learning theory, and (2) matching conceptual level characteristics with educational conditions.

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[12]Fries, C. C. Linguistics and Reading. New York: Holt, Rinehart and Winston, 1963.

[13]Levin, H, "Reading Research: What, Why, and for Whom?" Elementary English, 43, 1966, pp. 138-147.

[14]Barton, A. H. and D. E. Wilder, "Research and Practice in the Teaching of Reading: A Progress Report." In M. B. Miles (ed.), Innovations in Education. New York: Teachers College, Columbia University, 1964.

[15]Chall, Jeanne. Learning to Read: The Great Debate. New York: McGraw-Hill, 1967.

[16]Frost, Joe L. A paper presented at the National Conference of Teachers of English. St. Louis, Missouri, March 7, 1970.

[17]Gordon, Edmund W., "Compensatory Education: Evaluation in Perspective." IRCD Bulletin. ERIC Retrieval Center on the Disadvantaged, 6, (5), December, 1970.

Extracting Instructional Implications from Learning Theory

The body of learning theories that are probably most relevant to educators may be categorized normative-maturational, behavioral-environmental, cognitive transactional, and humanistic psychology.

The normative-maturational view, drawing heavily from the developmental schedules of Arnold Gesell[18] stresses chronological age--developmental stage relationships drawn from studies of middle-class children, using averages or normative statistics for scale construction. This view tends to place considerable emphasis upon biologically- or genetically-based maturation. Educational interpretations and misinterpretations of this point of view lend support to grade-level standards, ability grouping, letter grades, grade-age expectations, and a host of additional unfortunate practices. The developmental schedules of Gesell chart the growth of a mythical child, and the predeterministic view of development has given way to a more dynamic view that development is plastic and malleable by conditions of nurture.

The behavioral-environmental view drawing from the stimulus-response-reinforcement thoery of B. F. Skinner,[19] and exemplified in the cumulative curriculum model of Robert Gagne and the behavioral analysis approach of Donald Baer, views the child as a passive, receptive organism. The child is essentially a creature of his environment, primarily responsive to cues or stimuli to initiate behavior and reinforcement to ensure its repetition. Reinforced behavior is repeated, unreinforced behavior is extinguished. This view sets the base for systems approaches, behavioral objectives, hierarchies in learning and various reinforcement strategies--concrete and social.

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[18]Arnold Gesell and C. S. Amatruda. Developmental Diagnosis, Second Edition. New York: Paul B. Hoeber, Inc., 1947.

[19]Skinner, B. F. Beyond Freedom and Dignity. New York: Alfred A. Knopf, 1972.

The cognitive transactional view is drawn from the developmental psychology of Jean Piaget.[20] Piaget holds that all children develop through a series of developmental stages characterized by identifiable classes of learning tasks; that the sequence of development is invariant; but that the rate and timing of development is highly variant--different for every individual. Further, Piaget proposes that development cannot be forced (though it obviously can be retarded) by teaching. Consequently, teaching methodology would be geared to present developmental levels of children (diagnosis, presumably) and the pedagogical emphasis would be upon the broadening of mental structures rather than their vertical acceleration. The principal method, operations upon objects by the child, arises from the view that mental schema become increasingly complex through the child's inborn striving for equilibrium--a dynamic process characterized by the twin processes of assimilation and accommodation or matching of mental structure with environmental contingencies.

Finally, humanistic psychology, whose best known advocate was Abraham Maslow,[21] stresses the whole child, inner drives, and the affective dimensions of man. The "open school" and the "free school" typify this theory in practice--either implicitly or explicitly. Children are assisted in their development toward "self-fulfillment" by flexible guidance and an informal learning environment built around centers of interest, multiple age grouping, and attention to real-life problems through subject integration.

I will not attempt in the brief space alloted to trace the implications for literacy development of each theory, rather, I choose to emphasize from learning theory considerations, as I stressed earlier from curriculum methodology research,

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[20]Jean Piaget and Barbel Inhelder. The Psychology of the Child. New York: Basic Books, 1969.

[21]Maslow, Abraham. The Fartherest Reaches of Human Nature. New York: The Viking Press, 1971.

the futility of reliance upon one particular strand of thought. The myth that one strand of philosophical, psychological, or educational theory is sufficient in itself to account for the complex developmental needs of all children has, throughout the history of American education, led to unfortunate consequences.

In the estimation of the writer, the "normative-maturational" view of human development, alone among the four theories described, has little to offer for educational practice. The implications of this theory (in deference to Gesell, the misinterpretation) have led to irreparable harm to children in school. However, in regard to the remaining theories, the dispassionate studies of Skinner, though viewing the child as animal, have produced remarkable innovations in behavioral modification. The child-based experiments of Piaget made immeasurable contributions to developmental theory and practice. Maslow's studies of self-actualizing people focused our attention to the affective dimension of human development and stimulated the development of the flexible "open" and "free schools."

Principal proponents of these views, giants in their fields, set the direction for our energies.

> So many people insist on being either proFreudian or antiFreudian, prosci-entific or antiscientific, etc. In my opinion all such loyalty positions are silly. Our job is to integrate these various truths into the whole truth, which should be our only loyalty (Maslow in Goble).[22]

John Dewey,[23] perhaps America's greatest educational psychologist-philosopher, also rejected an either-or view in regard to the "ideal" school:

> Thus sects arise: schools of opinion. Each selects that set of conditions that appeals to it; and then erects them into a complete and independent truth; instead of treating them as a factor in a problem, needing adjustment.

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[22]Frank Noble. The Third Force: The Psychology of Abraham Maslow. New York: Grossman, 1970, p. 3.

[23]John Dewey. The Child and the Curriculum. The University of Chicago Press, 1902, p. 4.

Matching Educational Environments with Learner Characteristics

The issue of permissive versus structured or intensive versus informal instruction or one reading program versus another reading program can be evaluated only in relation to the developmental characteristics of the child toward whom instruction is directed. Drawing from the Conceptual Systems Theory developed by Harvey, Hunt, and Schroder[24] the following table summarizes the training conditions that are likely to be appropriate for certain conceptual level characteristics.

Stage	Conceptual Level Characteristics	Ideal Training Conditions
A	Impulsive, poorly socialized, egocentric, inattentive.	Accepting but firm; clearly organized with a minimum of alternatives.
B	Compliant, dependent on authority, concerned with rules.	Encouraging some independence within normative structure.
C	Independent, questioning, self-assertive.	Allowing high autonomy with numerous alternatives and low normative pressure.

The development of the child is presumably enhanced by matching conceptual level characteristics with certain training conditions. As the child grows from impulsiveness and inattentiveness toward independence and self-assertiveness the conditions of training become increasingly autonomous in nature, allowing increasing alternatives in an atmosphere of decreasing structure.

The concept of the same school structure, learning style, or instructional sequence for all has no reality in behavioral science data. In human behavior and biology diversity is the rule; to propose informality and permissiveness for all is no more defensible than teaching all children the same matter simply because they are

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[24] O. J. Harvey, D. E. Hunt, and H. M. Shroder. Conceptual Systems and Personality Organization. New York: Wiley, 1961.

all eight years old and placed in a third grade classroom. The view that a highly structured, specialized environment is best for all is equally unfortunate. Many children are so severly disturbed that carefully guided procedures are required to put them back on a "normal" track; considerable research[25] shows that "structured" learning schemes are often helpful for children from suppressive ghetto environments; children from ultra-permissive homes often arrive at school desperately needing adult guidance and controls. As developmental complexity increases, humans cope with data on increasingly abstract terms, experiencing concretely gives way to experiencing vicariously, needs for concrete motivation are modified by build-up of intrinsic motivation, and elaborate coding systems supplement firsthand observation. Thus, informal means for coping with reality are reinforced with formal coping strategies through the growth process. To limit students to exclusively informal instructional patterns or exclusively formal instructional patterns seems inconsistent with this process.

Summary and Implications

The related processes of learning language and reading begin at birth and are deeply affected by conditions of nurture which are mediated by adults, primarily the mother, in the young child's world. Certain factors, notably socioeconomic class-related variables deeply affect the preparedness of the child to accommodate to the regimen of the typical primary school eading to learning discontinuity for many children. Thus, it is essential that the school program for developing literacy build strong programs of parent involvement so that schools may come to understand patterns of home life and make program adaptations designed to preserve and enhance the strengths of the home and community culture to gain the support of the home for facilitating the mutual goals of the home and the school.

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[25]Solveiga Miezitis. "The Montessori Method: Some Recent Research." Interchange, 2, (2), 1971.

In building language programs for young children the school should take into account the probable effects of negative expectations of teachers on the achievement of low socioeconomic group and minority group children and develop programs based upon positive assumptions. The recent work of linguists showing "ghetto" language to be as complex structurally as "middle-class" language lends further support to the need for programs which build from existing linguistic forms.

Data from the behavioral sciences, including education, have shown repeatedly the futility of reliance upon, or the search for, a generic approach to learning theory, or curriculum practice. The theories of learning briefly described herein tell us what happened after treatment, that is, they are descriptive. The process of extracting curriculum theory from learning theory is tenuous, for instructional theory is prescriptive, telling us what we should do to effect learning and development, and the link between the two bodies of knowledge and practice is by no means absolute. The study of learning theories suggests a number of unifying principles essential for the construction of instructional plans; the identification of experiences which would cause the individual to want to learn (motivation), the description of a reinforcement system, the specification of ways in which knowledge and processes to be learned should be structured for most efficient learning, and the development of learning sequences.

The basic concepts of motivation theory may be categorized as external and internal systems. The external system places reliance upon the notion of response to external stimulation, reward and punishment. The typical reinforcers employed in classrooms to ensure continuity of desired behavior are concrete (tokens, candy, gold stars, etc.) and social (praise, physical contact, etc.). The internal system draws support from a number of eminent psychologists (Piaget, Hunt, Berlyne, Festinger). Homeostatis is the term commonly employed to describe the view which holds that the

learner is capable of generating or organizing sufficient internal energy so as to behave in ways not causally linked to immediate external reinforcement. The learner, in other words, appears to have an inborn drive or need to know or to learn and, under conditions of stimulation appropriate to his present mental complexity, learning will take place through the exploratory behavior of the individual.

There appears to be some individuals who are unable, perhaps from inappropriate opportunities and support for exploratory tendencies, to make "normal" progress under conditions designed for "learning for learning's sake." This may occur in the "free" or "open" classroom characterized by minimal structure, minimal teacher direction, self-selection of learning materials, and much independent activity. Youngsters who are not yet "hung up on learning" appear to profit from the systematic use of concrete and social (external) reinforcement. External systems must be individualized, specific to identified behavior to be promoted, and conditions should be systematically altered, as behavior allows, to promote increasing reliance upon conditions of learning more conducive to the development of intrinsic or internal motivation.

Turning to the curriculum components, structure and sequence, the evidence from learning theory suggests that certain prerequisite abilities are necessary for concept attainment. Since the development of intelligent behavior, in this context the ability to speak and read, is a cumulative process, the educator should be able to subdivide a specific task into its subordinate concepts or units necessary for mastery of a prescribed goal. The cognitive structure desired for mastery may be identified as terminal behavior and all ultimate conceptual goal behaviors are supported by subordinate concepts. Based on these assumptions, the teaching of language and reading may proceed in a controlled and planned manner of successive, cumulative mastery of subordinate concepts or skills. For hypothetical purposes or for purposes of developing reading curricula one may identify such major reading skills as power and speed of reading as "program goals." The elemental components of phonics or comprehension,

e.g., the identification of short vowel sounds, then, would be the behavioral change the educator seeks to effect through direct or indirect instruction. Successful mastery of each behavioral goal would in turn contribute to the attainment of the ultimate or "terminal" program goal.

Although the most obvious instructional process to accommodate cumulative learning would be a vertical, highly structured, step-by-step sequence, research on learning hierarchies[26] shows that individuals employ their own personal styles in achieving a given learning task. The use of specific instructional sequences, guided by specific objectives (behavioral) is not dependent upon placing the learner in a bite-size linear instructional sequence. The method of analysis of the task tells us nothing about the learner. A given learner may be able to skip subordinate tasks; another may approach the hierarchy of tasks with a set of skills from a different domain of knowledge which is not directly represented in the hierarchy but which influences learning the new task; another learner may engage in atypical combination of subordinate skills. Yet, the validity of learning hierarchies is not dependent upon learner style, for in either approach to learning, the simpler behaviors are components of the complex behaviors. The challenge to teachers, then, is to construct a diagnostically-based multi-media, multi-strategy approach to the teaching of language and reading. The introduction of controlled novelty (teaching) thus becomes multi-phased and individualized.

Any single approach to teaching oral language--modeling, cueing, experience referenced, verbal bombardment, etc.; or any particular approach to teaching reading--basal, individualized, linguistic, etc.--gets its power from its dynamic teacher-controlled linkage with learner attributes. This linkage becomes the universal or generic variable in instruction, replacing the common reliance on a single approach, method, or curriculum.

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[26]Robert M. Gagne. "Learning Hierarchies." Presidential Address, Division 15, American Psychological Association, August 31, 1968.

Placing groups of children into an instructional sequence with expectations for standard progress is a major error in current language and reading methodology. The instructional sequence established for a child or a group of children in advance of diagnosis is always approximate, a reflection on our present stage of knowledge about learning. And the rate and timing of movement through an instructional sequence differs from child to child. The simplest interpretation of perhaps the commonest error in developing literacy is the expectancy that any given group of children will follow an identical time pattern, or skills sequence, and that they will achieve similar proficiency from identical content. The plea is for individualization, not the rigidity in disguise of the basals nor the fun and frills of certain other misinterpreted approaches, but a scientific, diagnostically-based humanistically-oriented approach to the development of literacy.