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ABSTRACT

This article attempts to apply mastery learning theory to research on full- and half-day kindergarten. It is proposed that the application of mastery learning theory would greatly aid in the understanding of relationships between important program variations and predicted outcomes, and demonstrably enhance research efforts to identify differences between full- and half-day programs. It is further argued that, in a more general fashion, the use of mastery learning theory would help quantify essential dimensions of kindergarten classroom practice, and thereby might contribute to a resolution of what many regard as the unclear role of kindergarten education. The discussion includes a brief review of key concepts of mastery learning, and focuses on the qualities which make the theory especially suitable for application to kindergarten issues. A reconceptualization of strategies for full- and half-day kindergarten research is presented. Potential criticisms or reservations are discussed. (Author/RH)

Application of Mastery Learning Theory To Full- and Half-day Kindergarten Research

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RUNNING HEAD: Mastery Learning and Kindergarten

Abstract

This article pursues an effort to apply mastery learning theory to full- and half-day kindergarten research. It is proposed that the application of mastery learning theory would greatly aid in understanding relationships between important program variations and predicted outcomes, and demonstrably enhance research efforts to identify full- and half-day differences. In a more general fashion, it would help quantify essential dimensions of kindergarten classroom practice and thereby possibly contribute to a resolution of, what many regard as, an unclear role of present-day kindergarten.

A brief review of key concepts of mastery learning is undertaken, its special qualities which make it especially suitable to this problem are presented, and a reconceptualization of strategies for full- and half-day kindergarten research is offered. Potential criticisms or reservations with the present proposal are also discussed.

Application of Mastery Learning Theory To Full- and Half-day Kindergarten Research

A significant limitation of the research on full-day kindergarten is its virtually complete lack of a theoretical foundation (Puleo, 1987). Studies of full- and half-day kindergarten, in fact, have a paucity of conceptual tools while the factor of time, despite the full- and half-day schedules, remains obscure. For example, program outcomes are typically unrelated to systematic variation in time. Similarly, in extended-day kindergarten research it is not uncommon for time to be indicated as merely "more than a half day" with equally little recognition of any potential differential effect. The consequence of this lack of a theoretical foundation is not surprising: much of the work is redundant and there is little progression of accumulated knowledge. For practitioners, despite almost 20 years of field investigation, the research has not provided adequate direction (Evans & Marken, 1983; Gullo, Bersani, Clements, & Bayless, 1986; Puleo, in press-a).

This article pursues an effort to apply mastery learning theory to full- and half-day kindergarten research. It is proposed that the application of mastery learning theory would greatly aid in

understanding relationships between important program variations and predicted outcomes, and demonstrably enhance research efforts to identify full- and half-day differences. In a more general fashion, it would help quantify essential dimensions of kindergarten classroom practice and thereby possibly contribute to a resolution of, what many regard as, an unclear role of present-day kindergarten (Glazer, 1985; Gullo et al., 1986; Herman, 1984; Jalongo, 1986; Puleo, in press-a).

In the following, a brief review of key concepts of mastery learning will be undertaken, its special qualities which make it especially suitable to this problem will be presented, and a reconceptualization of strategies for full- and half-day kindergarten research will be offered. Potential criticisms or reservations with the present proposal will also be discussed.

Review of Key Concepts of Mastery For Learning

A brief exposition of mastery learning theory is needed to establish its essential components and to distinguish it from similar approaches.

Mastery learning has been described as "a philosophy of teaching" (Block & Anderson, 1975, p.1). It ascribes to the belief that under appropriate instructional conditions virtually all students will learn most of what they are taught. Mastery learning

has its recent origin in the work of John B. Carroll (1963) who conceptualized it as a model of school learning. It was then formalized and extended by Benjamin S. Bloom (1968). Bloom also incorporated the use of learning objectives and criterion-referenced evaluation.

While there are a range of different strategies for implementing mastery learning (Block, 1975; Guskey, 1985), it is important to understand that it is a group approach to instruction. This fact distinguishes it from other, similar individualized methods.

Its framework involves five main factors. The first is that aptitude is viewed as the amount of time required by the learner to attain mastery of a learning task. If this is taken into account, it is proposed that approximately 95% of the students can learn to a high level of mastery. Second is the quality of instruction. Carroll defines this as the degree to which the teacher's presentation, explanation, and ordering of elements of the learning task approach the optimum for a given learner. Next is the ability to understand instruction. This is determined principally by verbal ability and reading comprehension. Bloom (1976) concentrates on this factor because of its limits for change. Most change, he advocates, can be produced at the preschool and elementary levels, with

progressively less change as the student grows older. Perseverence is the fourth factor. This is the time the student is willing to spend in learning. It is related to motivation, interest, and self-concept. Perseverence is not fixed; it is capable of being significantly changed based on the frequency of reward and evidence of learning success. Time allowed for learning is the last factor. It is estimated that in the beginning some students need to spend six times as much time as others to master a particular learning task. This ratio tends to decrease, however, with extended successful experience under mastery learning conditions.

Details regarding the implementation of mastery learning are amply described by Block (1971), Block and Anderson (1975), and Guskey (1985). A good introductory article to the subject is provided by Guskey (1980).

Particular Suitability of Mastery Learning Theory

There are a number of factors which support the application of mastery learning theory to full-day kindergarten research.

Role Of Time. As indicated, mastery learning theory draws directly on Carroll's (1967) model of school learning. The central variable in this model is time. Carroll's revolutionary contribution was his proposition

that students differ in the amount of time to learn a given unit of learning to some set criterion of mastery. Bloom (1974) recognized the importance of this approach to learning: "In setting time as the central variable in school learning, Carroll produced a major shift in our thinking about education and educational research" (p.683). Full- and half-day kindergarten research carries particular promise precisely because of its potentially wide variation in time allocation, that is, different schedules.

Value At An Early Age. Bloom (1968, 1974, 1976a) further argues for the introduction of mastery learning at an early age. Early intervention, when learning is "highly malleable and alterable," in Bloom's terms, helps students become more effective in their learning, and consequently they need less and less help and time to reach the criterion of mastery. In other words, "help at an early stage in the learning sequence has a different effect than an equal amount of time and help at a later stage in the learning sequence" (Bloom, 1974, p.685). In addition, "early learning units contribute to the student's better motivation and improved cognitive entry behaviors (prerequisite learning for the later learning units in a sequential series)" (Bloom, 1974, p.685). Early introduction of mastery learning therefore is particularly effective in reducing

individual variation in learning rate. This vastly facilitates implementation of corrective techniques at higher grade levels and reduces the number of failures.

An Effective Instructional Strategy. Further, mastery learning offers an effective instructional strategy. Many full-day kindergarten programs are implemented for students who are academically weak. While there are no research studies of mastery learning at the kindergarten level known to this writer, it has shown its effectiveness in grades one through graduate school (Block & Burns, 1976) and it is especially suitable to weaker students (Guskey & Gates, 1986; Stallings & Stipek, 1986). In this connection, after a thorough review of recent research, Guskey and Gates conclude "learning rate does appear to be alterable, and mastery learning procedures may be one way slow learners can be helped to increase their learning rate" (p.77). At the same time, there is support for its effectiveness in the earlier grades (Guskey & Gates, 1986) and with affective learning objectives (Anderson, Scott, & Hutlock, 1976; Bloom, 1974, 1976b; Stallings & Stipek, 1986).

A Bridge To Elementary Grades. Has the reader ever wondered why there is so little research involving the combination of kindergarten and first grade? Or, kindergarten, and grades one and two?

Mastery learning theory applied to kindergarten

would establish a direct conceptual and instructional link to other elementary grades. Kindergarten would then undeniably become a full participating member in the scope and sequence of elementary education. With a bridge to the elementary grades, researchers would be free to entertain the marriage of learning technologies and strategies that have proved effective at other levels of education. Also, rather than the prevailing tendency to employ an intervention of one year of full-day kindergarten, a program design involving multiple years beginning with preschool becomes a natural possibility.

Reconceptualization of Full- and Half-day Kindergarten Research

The application of mastery learning to full- and half-day kindergarten research would give the subject of time management an entirely new meaning. The issue would no longer be full-day versus half-day. Time allocation would be directly and causally linked to a continuum of desired skill acquisition. This causal relationship could now be studied with much greater clarity and confidence.

In addition, research would advance from asking questions as "Does full-day result in greater gains than half-day?", to "What amount of time is needed to effect

what degree of gain with what learning objectives?" Educational planning and decision-making would reflect greater control over major intervention variables and the specification of program objectives would be clarified. Further, in full- and half-day kindergarten research, as with research at other levels, the basic task would become the definition of what we mean by mastery of a subject, and to discover the methods and materials to help the largest proportion of our students reach it. As a corollary, outcomes would be more clearly described through criterion-referenced measures rather than the present practice of dependence on norm-referenced tests.

In short, mastery learning offers full-day kindergarten research a causal system. It "makes explicit the notion that present learning is an outgrowth of previous learning and learning conditions, and that, in turn, the present learning will have consequences for future learning" (Bloom, 1976a, p.202). Learning becomes predictable, and under the control of the educator. Testable hypotheses can be formulated, and plausible explanations offered for variation in performance. These are exactly the conditions lacking in present full- and half-day kindergarten research.

In the use of time as a systematic variable there are other advantages. First, it could be measured with

as much precision as the investigator desires. Second, it can be put into economic and resource costs for the individual student, for groups of students, the orogram or the school. Third, it is possible to use time as an index of effectiveness of methods of teaching, and the quality of the instructional material. Bloom (1974) sums up the advantages of time this way:

> It forces us to look again more directly at aspects of learning that have long been buried under a mass of publications and dogma about education in the schools. It once again raises questions for which we thought we had most of the answers, but for which we had developed a mythology that served to dull our perceptions of phenomena taking place before us (p.684).

Arguments Against the Application of Mastery Learning Theory to Kindergarten

Mastery learning theory has not proceeded free of criticism. Important theoretical issues remain open, e.g., regarding the reduction of individual differences (Arlin, 1984). But the focus here is on the applicability of the approach.

Stallings and Stipek (1986) provide a useful summary of such criticisms. First of all, mastery

learning might be questioned on the grounds of fairness to brighter students. Would they have to wait while additional instruction is given to low-ability students? Stallings and Stipek respond that other investigators have suggested this can be avoided by a more individualized approach with an open-ended curriculum. This issue has not been fully resolved, and would present a greater challenge at the kindergarten level.

Another concern deals with the ideological view that implicit in mastery learning is a too-narrow view of education. It is claimed there is a cognitive emphasis, and reliance on school subjects that can be broken down into discrete units. Bloom (1974) anticipated this reaction in presenting mastery learning as a "value neutral system" (p.204). That is, mastery learning is neutral regarding the particular area of learning stressed; it does not dictate a program's educational goals and objectives. The narrowness or breath of the curriculum, therefore, is determined by the initiative, skill, and creativity of those designing it. In addition, we have already seen that there is a range of theoretical and research support for the effectiveness of mastery learning with affective objectives.

Stallings and Stipek (1986) note that on a practical level, it has been criticized for being "too

structured and rigid, even mechanistic" (p.745). This criticism is similar for all criterion-referenced management systems. With mastery learning, it is essential to keep in mind that teachers have considerable flexibility in the way they present material, the textbooks they use, and the evaluation devices they use- as well as with other aspects of their instruction. At kindergarten, however, it is acknowledged that this is a sensitive issue.

Other criticisms raised by Stallings and Stipek include the practical concern that, under mastery learning, students would become too test oriented. There may also be additional anxiety created by the emphasis on evaluation. Finally, it is claimed that mastery learning places "unrealistic" demands on teachers. In addition to the instructional demand, considerable time is needed for the preparation and processing of evaluation instruments. In relation to teacher preparation, the present writer's experience (Pulec, in press-b,c) with a rigorous criterion-referenced program in the elementary grades indicates that appropiate forms of support, i.e., personnel and technological, can completely neutralize this problem. This experience also reveals no additional student anxiety in relation to testing procedures.

In their concluding comments on the subject, Stallings and Stipek address a significant portion of these criticisms. They comment, first of all, on a portion of the preschool compensatory research, focusing specifically on the University of Oregon Direct Instruction Follow Through Program. After recognizing the effectiveness of this project, these authors add "there are some impressive longitudinal sets of data that suggest that children experiencing these early intervention programs demonstrated a particular brand of success in upper elementary and secondary school" (p.750). Stallings and Stipek then comment "there is a similarity in theory and practice between Direct Instruction ... and the Mastery Learning,..." (p.750). Observations regarding similar characteristics of effective preschool programs have been made by other investigators (e.g., Berrueta-Clement, Schweinhart, Barnett, Epstein, & Weikert, 1984; Lazar, Darlington, Murray, Royce, & Snipper, 1982; McKey, et al., 1985).

Finally, Guskey (T. R. Guskey, personal communication, February 12, 1987) raises an issue from a broader perspective:

> The major criticism of mastery learning I have encountered among those involved in early childhood education programs . . . is somewhat different. Many researchers and

> practitioners in early childhood education advocate what is called a 'developmental' or 'Piagetian' point of view. They believe that children are 'naturally' inclined to learn and develop higher levels of sophistication in dealing with their environment. The imposition of externally (teacher) developed learning objectives, such as is typically done in mastery learning, may not, and usually does not, correspond to these more natural inclinations. As a result, conflict arises and children suffer, perhaps irreparable damage.

Guskey's concluding thoughts on the subject are noteable as well:

> Personally, I do not believe this issue is as black and white as some have sketched it to be. In fact, it is my opinion that a balance of these two perspectives is possible and likely to have powerful implications for all types of kindergarten and other early childhood education programs.

In conclusion, this discussion identifies no criticisms or limitations that are sufficient to deter attempts of careful field study. The potential benefits for full and half-day kindergarten research, by contrast, are considerable.

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