

Programming Students for Academic Success: The PLS an Alternative to Traditional Tracking

George Ansalone

Charlotte Ming

St. Johns University

Clearwater Middle School, Bermuda

In the past, attempts to explain the disparity in academic achievement between advantaged and disadvantaged students have generally focused on the ability, aptitude and motivation of the youth themselves. Some theorists have even suggested that heritable differences in intelligence among students from different social origins may account for this disparity. These presumptions significantly limit the possibility that schooling can substantially reduce the existing academic inequalities that exist between students of different social origins. This paper rejects these simplistic solutions and investigates the effects of one learning style instructional resource – the Programmed Learning Sequence (PLS) on the social studies achievement and ability of a group of Bermudian seventh graders. It suggests that educational structures operating within the school may be at least partially responsible for the academic achievement of students. Further, it suggests that a school structure that employs tracking, the grouping of students by ability, may help to create a social construction of failure, especially for disadvantaged children. Finally, it suggests that one alternative to tracking, the programmed learning sequence [PLS], may provide an effective alternative. Accordingly, it is predicted that the fault lies less with the socio-cultural makeup of the student than with the educational structures and policies operating within the schools.

Introduction

For the greater part of the last century, educational sociologists have debated why students from different social origins differ significantly in their academic performance. Early attempts to explain this disparity focus almost entirely on the characteristics of the disadvantaged and seemingly blame the very victims of poverty for their academic failure. In the past, these explanations have ranged from the possession of cultural deficiencies which limit the cultural capital required to function within the social organization of the school [Lewis, 1966] to the more recent and controversial explanations of heritable differences [Herrnstein & Murry, 1994]. Clearly, these explanations do little more than shift attention away

from the school and its structures to the perceived shortcomings of the disadvantaged. More recently, attention has focused on educational structures and practices operating within the schools as a primary cause of this disparity. The primary benefit of this approach is that it frees us from the deterministic theories of the past and calls attention to processes in the schools that help create academic failure in children, especially children from disadvantaged homes who often lack the strong family support structure needed to succeed in school.

James Coleman (1966) was perhaps the first to identify the presence of these processes in contemporary schooling by revealing that academic differences within the same school were sometimes greater than the difference between schools. His research underscores the very existence of these processes and suggests that they may have a significant impact on the academic achievement of students. The Coleman research also notes that disadvantaged children begin school with small but measurable differences in academic skills compared with children from advantaged homes and that this difference increases significantly with each successive year of schooling [Coleman, 1966]. Clearly, the school may be responsible for this latter educational outcome and the presence of educational structures within the system may intensify this academic disparity. One such structure is Tracking, or the separation of students by ability and sometimes curriculum.

Tracking is a reality in American schooling and it impacts on all aspects of a student's educational experience. Research has uncovered an association between class / race and a student's track position and more recent research has underscored the fact that faculty more often assign less-advantaged students to lower tracks. By segregating students according to track, tracking influences the race and social class composition of students' friends. It affects student self-concept and self-efficacy and may even result in the label of mischievous being applied to some students. In so doing, it impinges on the achievement and life chances of all students especially the less-advantaged [Ansalone, 2001].

Tracking may also have an accompanying stratifying effects on teachers' expectations for students' academic success. It may affect the quantity and quality of student-teacher interactions (Riordan, 1997) which are an important part of the socio-cultural process that impact on the prospects for equitable education. As the prime arbiter in the classroom, teachers interpret students' skills, comment on their language and dress, and evaluate the correctness of their responses (Wheelock, 1992). Their

accumulated perceptions often cause them to relegate students to specific ability groups which, in turn, determine curricula and possibly even career options. In so doing, tracking has a powerful impact on the creation of academic success or failure.

However, in spite of the growing body of literature which underscores the negative effects of tracking on students' academic achievement, tracking continues to be the educational delivery system of choice with approximately 60% of all elementary and over 80% of secondary schools organizing some instruction according to tracks [Ansalone, 2001]. Additionally, recent research attempting to understand why teachers and administrators continue to favor this structure suggests that instructors are generally unwilling to consider change since they believe that tracking reduces the wide range of academic diversity within classes. Many instructors also remain uncertain about the effectiveness of other teaching methodologies in managing this degree of diversity in classrooms.

The current research suggests that educational structures and delivery systems operating within the schools can have a marked impact on academic achievement. It explores how one learning-style instructional resource, the Programmed Learning Sequence (PLS), offers an effective alternative to tracking and provides an educational experience that promotes academic achievement and equity for all students. Finally, it is possible that the fault lies less with the socio-cultural makeup of the student and that the task ahead is not to "fix" the child but rather to change some of the ideas and processes within the schools.

The Programmed Learning Sequence: An Innovative Educational Alternative

Learning style refers to the different ways students retain and process difficult material and current research underscores the belief that each individual has a unique learning style. Researchers also agree that personal learning style evolves from inherited and developmentally determined characteristics and that teaching students according to their learning style often maximizes learning potential (Dunn & Dunn, 1992). One technique used in responding to students' learning style is the Programmed Learning Sequence [PLS]. Considerable research suggests that this method is an effective strategy in meeting the needs of diverse learners in contemporary schools (Fleming, 1989; Gremli, 2001; Miller, 1998). Additionally, utilizing a PLS enables the class material to be learned in relatively simple steps, often with little direct supervision or intervention from the instructor. Each PLS is designed around preselected

concepts and skills- objectives. The objectives range from simple to complex and are sequenced so that, after completing a pretest, students are assigned only those that they have not achieved prior to using the particular program. Students proceed through an identical sequence but may pace themselves so that they use the program when and where they prefer to study. Generally, the presentation begins globally, thus appealing to the greater percentage of young children who learn globally. Tactile devices are gradually introduced thus assisting low auditory and low visual learners to reinforce their learning through one other sense. The PLS presentation is also sequential and is accompanied by a tape which reads material to the student and directs them to listen and record their responses. In sum, the PLS emphasizes:

- Individual active participation of the students;
- Self-pacing;
- Clearly-stated objectives;
- A short introductory story containing illustrations that relates the PLS content to the learner's interests;
- Short definitions of topic-related vocabulary accompanied by pictures or drawings; and immediate reinforcement.

Programmed Learning Sequence instruction is generally not recommended for all children. The PLS is most suited to those who prefer to work alone without the interaction of others. It is ideally suited for the persistent and motivated learner- the one who might use the material until the program has been completed. It is also advantageous in that it provides a learning experience without the pressure that evolves when one has difficulty achieving among one's peers. Research indicates that the PLS increases the knowledge and word recognition abilities of visual and tactual students in need of structure by responding to their *learning-style strengths* (Dunn & Dunn, 1992).

The Study

The current research investigated the effects of a Programmed Learning Sequence [PLS] on the social studies achievement and attitudes of Bermudian seventh grade students. The sample consisted of 71 randomly assigned seventh graders from four classes of between 16-19 students within the same school. A repeated measures design was used in which each group received two PLS and two traditional social-studies unit presentations in a counterbalanced sequence.

All four classes were administered a learning style inventory in order to assess their learning style (Dunn & Dunn, 1992) at the beginning

of the study. Price Systems of Kansas scored the inventory. The same instructor taught all four social-studies classes and students remained in their regular classrooms. During the two-week instructional-treatment period—one week for each of four units, students were administered a pretest at the beginning of each week and a posttest at the end of each week. Traditional methods consisted of instructor led lessons, completion of worksheets, note taking and some class discussions. Finally, the *Semantic Differential Scale* (SDS) (Pizzo, 1981) was administered to each student after the initial two week exposure to the PLS or traditional method, to determine students' attitudes toward learning with the PLS versus learning traditionally. Unit examinations measured achievement for content mastery. Classes were taught first in a traditional mode, then using the PLS, followed by another traditional lesson, followed by a second PLS in a counterbalance research design. Each lesson focused on different social studies topics. A posttest, similar to the pretest was administered at the completion of each of the four instructional units to compare traditional and PLS learning.

Table 1. Instructional Units

	Week # 1	Week # 2
Class # 1	PLS—Rain Forest	Traditional—Egypt
Class # 2	Traditional—Rain Forest	PLS – Egypt
Class # 3	PLS – Egypt	Traditional –Rain Forest
Class # 4	Traditional –Egypt	PLS –Rain Forest

Statistical Analyses

This research utilized multiple statistical procedures. Factors included achievement scores with traditional methods versus scores generated from teaching with a PLS. Post achievement test scores were collected and compared. An Anova examined any differences between the classes on the pretests and posttests. Appropriate post hoc tests were performed and *T*-tests were used to analyze the SDS scores. Achievement data were analyzed using analyses of variance to examine differences that may have existed between the classes on the pretests and posttests. Appropriate post hoc tests were performed, and *T*-tests were used to analyze the SDS scores.

In all four classes, achievement-test scores were statistically higher ($p < .005$) with the PLS compared with the traditional grouped instruction, with a large effect size of .75, indicating the impact of this

strategy. In addition, poor achievers' [as identified by Terra Nova achievement tests] test scores were significantly higher with the PLS than with traditional teaching ($p < .005$). Attitudes surveyed with the SDS documented a significant difference favoring PLSs versus traditional instruction ($p < .001$).

Findings

Our research investigated the impact on achievement-test scores of the classes using the PLS in social studies versus the achievement-test scores of the classes using Traditional methodology. Examination results indicated that instruction using a PLS was statistically more beneficial for most students than instruction using Traditional methodology. The within-subjects effects were significant with an eta-squared (η^2) = .755; indicating that the units' test scores were significantly different from each other. It must be noted that an eta square of .755 would be greater than .14, which is a large effect size. According to Cohen's definitions [Cohen, 1988], all averages for effect sizes indicate that these analyses were large. This indicated that students performed significantly better with the PLS than with Traditional treatments.

Another interesting aspect of this research explored the impact on attitude-test scores of seventh-grade social-studies students instructed with traditional instructional methods versus when instructed with teacher-constructed PLSs. Simple t-tests indicated a general preference toward the PLS. The means were significantly different from 3.0, the neutral score, for most responses at the $p < .001$ significance level. These data revealed the highest mean of 4.50 under the bad/good category and the lowest mean 3.73, under the energetic/tired category, indicating that most students preferred the teacher-constructed PLS.

Given the SDS composite scores of 36 being neutral, four students responded to the SDS below the neutral level. This means that four students believed that the Traditional methods were more beneficial to them, with the remaining 67 favoring the learning-style instruction over Traditional Instruction

Implications for Educational Policy

The current research suggests that it is possible for the disparity in academic achievement between children of different social origins to be related to the type of educational delivery system employed within the schools rather than the socio-cultural make-up of the students.

It is also possible that the PLS can be a more efficacious instructional resource than Traditional instructional methodology.

While limited in scope, this research further suggests that a learning styles approach to learning, especially one that utilizes Programmed Learning Sequences may be an effective alternative to the traditional tracking of students, especially for those who have not enjoyed academic success in tracked classes. Clearly, additional research in this area is needed and welcomed.

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