

Research on Teaching: Time, Instructional Processes and Classroom Environment

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*Abstract*

*This paper presents findings and educational implications of the Beginning Teacher Evaluation Study under three categories - time, instructional processes, and classroom environment. Implications of instructional time are discussed regarding the common sense limits of allocated and engaged time, methods to increase below optimum engaged time including attention to instructional quality, and the importance of viewing broadly the content-outcome congruence within academic learning time. Implications of instructional processes are discussed regarding diagnosis, structuring, and academic and task engagement feedback. Implications of classroom environment are discussed regarding certain interpersonal and affective variables being complementary with academic achievement.*

This paper centres on one of the major studies of teaching effectiveness, the Beginning Teacher Evaluation Study (BTES). The paper includes a brief description of the purpose and methodology of BTES but has as its focus the major findings and educational implications under the three categories of time, instructional processes, and classroom environment. Though BTES is reviewed elsewhere (Denham and Leiberman, 1980; Coatney, 1983), this paper will expand further on implications, especially as a result of the author's recent hosting of and dialogue with David Berliner, Director of BTES (The aforesaid does not necessarily imply Dr. Berliner's total agreement with interpretations in this paper).

The title Beginning Teacher Evaluation Study is actually a misnomer as the purpose of the study changed to include teachers of all levels of experience. The main purpose of the study was to identify instructional variables that predicted student academic achievement. BTES had several stages but this paper centres on the main stage and one finding from an earlier stage.

In the main stage, reading and mathematics in Years 2 and 5 were studied. There were 25 Year 2 teachers and 21 Year 5 teachers. The sample of students comprised six students (3 boys and 3 girls) in each class. Each student had scored between the thirtieth and sixtieth percentile on standardised tests of both reading and mathematics.

Teachers kept logs on time spent on specific content areas within the two broad content areas of mathematics and reading. Observers also recorded time spent and also teacher and student behaviours using a coding system. Students were administered achievement tests and attitude scales (A full description of the methodology and stages of BTES is found in Powell, 1980).

Time

The BTES was a main catalyst in the use of instructional time (time on task) to study teaching. In the study three kinds of time were found to be predictors of student academic achievement: allocated time, engaged time and academic learning time. Allocated time is the amount of time devoted to a content area and engaged time is the amount of time the student actually attends to (is engaged with) the content area. For both of these measures it was found that within common sense limits the greater the amount of time the greater the achievement.

BTES also revealed enormous variations in these two kinds of time between classrooms. For example, with regard to allocated time, in Year 2 minutes per day allocated to reading ranged from 47 in one class (about three-quarters of an hour) to 118 in another (almost two hours). The range for mathematics was 16 minutes per day to 51 minutes per day. In Year 5 the range in minutes per day for reading was 68 to 137 and for mathematics 20 to 73. With regard to engaged time, the percentage of time students were engaged in Year 5 mathematics classes ranged from 50 percent in one class to 89 percent in another (These data are summarised in Berliner, 1979 and 1982a). This variation in engaged time existed even though transition time (time taken between tasks) was coded separately.

Academic learning time (ALT) is a more refined measure of engaged time in that two other variables are included, success rate and content-outcome congruence. ALT is thus the amount of time a student is engaged in a task that is not difficult (student success rate of approximately 80 percent or higher) and is congruent with outcome measures (what is taught relates to what is tested). The finding on success rate is qualified in that older students of middle or high ability seem to need more challenging tasks than younger students or students of any age at a low ability level. However, regardless of age or ability level, success rates that are too low are negatively correlated with academic achievement. That content and outcome are not always congruent was shown by Freeman et al. (1980) who found that the congruence between three national US textbooks and three national US achievement tests in mathematics ranged from 47 percent to a high of only 71 percent. What was taught and what was tested did not match well.

There are several implications regarding the use of time in instructional settings. As noted earlier, the finding that increased allocated or engaged time leads to increased achievement should be viewed within common sense limits. There is an optimal amount of allocated time for a content area, determined by criteria set for achievement in that area and by individual and societal priorities for that area compared to other areas.

There is also an optimal amount of engaged time. One should have time away from the task as well as on task. One need only apply engaged time to one's own working life to see the need for optimum rather than complete engaged time. Just what is the optimal level of engaged time needs to be determined by teachers based on their understanding of their students. Such a statement emphasizes the importance of the art of teaching as well as the scientific basis for teaching. The scientific basis establishes that engaged time is a variable that correlates with achievement and that it is often unnecessarily low while the artistic side - the wisdom, common sense, and empathy of the teacher - determines how much to increase engaged time.

A second implication of instructional time focuses on the unnecessarily low rate (below optimum) of engaged time in many classes. Berliner (1982a) notes that engaged time is often too low because of inefficiency where students' time is wasted. One way for this inefficiency to be reduced is for teachers and teacher educators to recognize the importance of the teacher having managerial skills, in the broad sense rather than in the narrow sense of maintaining control (see Berliner, 1982b; Coatney, 1982; Duke, 1982; Kounin, 1970). Teachers are continually making managerial decisions such as assigning and monitoring tasks that affect the flow of the lesson. By making such decisions wisely and skillfully, teachers can reduce wasted time, such as wait time (time that students wait to be recognized by the teacher) and transition time.

A second way to reduce this inefficiency is to improve the system in which the teacher works. No matter how effective teachers are as managers, they still need a supportive system. For example, teachers need support with regard to class size. There is a greater chance that wait and transition time will be longer and the range of teaching methods more narrow for larger than for smaller classes. Another example concerns such policies as least restrictive environment. Though admirable, they lead to a greater variation among students. If the teacher is not given adequate support for such variations then one would again predict a decrease in engaged time.

Besides reducing inefficiency, teachers can increase engaged time by attending to variety and quality. With regard to variety, methods need to be selected that are most appropriate for a particular content area or group of students. Also, the most appropriate method may lose its effectiveness if continually repeated to the exclusion of other methods. If teachers, then, vary their methods intelligently, student engaged time should increase. Joyce, Weil, and Wald (1981) emphasize the importance of such variety. "Our view is that the models for teaching are best viewed by the teacher as potential strategies which are applicable to a wide variety of purposes. Since no single teaching strategy can accomplish every purpose, the wise teacher will master a limited repertoire of strategies which can be brought to bear on specific

kinds of learning problems" (p.139).

With regard to quality, if the content is appropriate and relevant, if the methods are interesting, and if the teacher communicates clearly, engaged time should be improved. Time alone is not a meaningful variable; one has to examine what fills the time. The BTES researchers have recognized this point in three ways. First, though often ignored, two other areas are included in BTES, instructional processes and classroom environment (to be discussed later). Second, allocated time refers to the choice of appropriate content so that the focus is on, as Berliner points out, not just time on task but time on the right task. Third, academic learning time incorporates besides engaged time the qualitative variables of success rate and content-outcome congruence.

The final implication of instructional time concerns the variable of content-outcome congruence. Academic learning time appears to be a reasonable framework so long as the congruence is not viewed too narrowly. The outcome associated with academic learning time is acquisition of knowledge. It is important, relatively easy to measure, and can be linked to content through a test-text match. Though important, other outcomes need also to be recognized, such as skills in thinking, in relating to others, and in understanding oneself.

Such a broad view of outcomes is possible if one accepts that the relation between content and outcome can be established logically as well as empirically. For example, one can examine the match between an outcome of increased oral communication skills and the opportunity for students to speak or an outcome of increased self-awareness and the degree to which the content relates to the students' own experiences. An example where content and outcome are not matched is an outcome of increased thinking skills and a content that emphasizes factual knowledge only.

With the congruence between content and outcome viewed broadly, academic learning time can then be used to focus on the question of whether the teacher and administrator are practicing what they are preaching. If a teacher values an outcome, are the students spending time on content related to that outcome? If an administrator values an outcome, is there sufficient time and are there appropriate activities related to the outcome? As Berliner has stated, academic learning time can become a measure of one's commitment to a philosophy.

#### Instructional Processes

The following instructional process variables were positively and significantly correlated with student academic achievement. Teachers were effective who were able to diagnose accurately their students' level of skill, who prescribed appropriate tasks, who interacted with students with regard to academic content (e.g. discussing and valuing academic goals and providing academic feedback), who discussed the structure of the lesson with their students and who gave clear directions to their students.

A variable that was negatively correlated with student academic achievement was the amount of task engagement feedback given by teachers. Task engagement feedback is information given to the student on whether his or her behaviour is acceptable or unacceptable. Usually it is a reminder to the student to get back to work. Such feedback, then, was a predictor of low academic achievement. Also the study showed that students were often off task because the material was too difficult.

The implications of such findings are important and, as mentioned, have been often overshadowed by the findings on time. First, teachers should determine to what extent they are prescribing tasks based on their diagnosis of the level of student knowledge and skill. Is the content being taught boring because the students already know it or too confusing because a level of knowledge or skill is assumed that is too high? Teachers can answer such questions by obtaining a baseline measure, though one has to be careful how such a measure is devised. If students have virtually no knowledge, a pretest of specific knowledge may be demoralizing. Surveys or observations may be better procedures. The important point, though, is for teachers to be continually aware of not only whether they are teaching the appropriate content but whether students are grasping it.

Teachers should also determine to what extent they are interacting with their students about the lesson itself. Are directions clear? Do teachers ever state why the content is important? Are teachers ready to discuss the content with their students, showing that it is valued and interesting? Teachers' own enthusiasm and involvement with the content affects their students' attitude toward it. Thus, one of the most important functions of teaching is to engage students in appropriate and interesting content and to be enthusiastic and willing to discuss that content.

The finding on task engagement feedback does not mean that such feedback causes low achievement. Rather, it is an indicator of a fault, either with student motivation or with the instruction itself. The fault may be with student motivation, especially if education is compulsory. Students may simply not want to be in school. But the fault may also be with the instruction. For example, a finding from BTES suggests that the content may be too difficult. Also, the content may be presented in such a way that does not involve students or is not related to their own experiences. Thus, teachers who are constantly telling their students to get back to work need to examine the context in which they and their students are working.

#### Classroom Environment

An effective classroom environment was characterized by an academic focus or orientation and by student responsibility for academic work and cooperation on academic tasks. "In classes where students took responsibility for their class work and belongings and where students helped each other, shared materials, and worked together, achievement was generally higher" (Fisher, Berliner, et al, 1980, p.22).

In an earlier stage of BTES, there was another important finding with regard to classroom environment. Berliner and Tikunoff (1976) found that a classroom environment characterised as warm, democratic and convivial was significantly related to student academic achievement. The belief that an authoritarian and stern atmosphere best promotes academic achievement was not supported.

There are two important implications from the research on classroom environment. First, academic achievement is promoted when students are given responsibility and where they cooperate, as long as the focus remains academic. A common image of a classroom where students are highly engaged in academic work is one of the teacher directing all activities and the students sitting quietly at their desks, listening or working individually. Though teachers can be directive and assume responsibility and students can work at times individually, the research suggests that teachers should also encourage students to assume responsibility themselves for completing their work and should also encourage among students an atmosphere of cooperation and sharing. Academic achievement, self-discipline, and cooperation are thus complementary.

The second implication is that academic achievement is promoted when classroom environments are warm, democratic, and convivial. Another common image of a classroom that promotes high academic achievement is one where teachers and administrators are cold, stern, and authoritarian. Though structure and firmness are important, the research suggests that teachers should also establish an atmosphere of caring and friendliness and allow students to express themselves about rules rather than expect unquestioning obedience to the rules. So one can add to those variables with which academic achievement is complementary that of caring and democracy.

#### References

- Berliner, D.C. Instructional variables. In D.E. Orlosky (Ed.), Introduction to Education. Columbus, Ohio: Charles E. Merrill, 1982a.
- Berliner, D.C. The executive functions of teaching. Paper presented at the meeting of the American Educational Research Association, New York, March, 1982b.
- Berliner, D.C. Tempus educare. In P.L. Peterson and H.J. Walberg (Eds.), Research on Teaching: Concepts, Findings, and Implications. Berkeley, California: McCutchan, 1979.

- Berliner, D.C., and Tukunoff, W.F. The California Beginning Teacher Evaluation Study: Overview of the ethnographic study. Journal of Teacher Education, 1976, 27 (1), 24-30.
- Coatney, R.P. Recent classroom research and its implications for teaching. The Australian Journal of Teacher Education, 1983, 8 (1), 25-31.
- Coatney, R.P. Classroom management: Managerial functions in teaching. The Australian Journal of Teacher Education, 1982, 7 (1), 43-56.
- Denham, C., and Lieberman, A. (Eds.) Time to Learn: A Review of the Beginning Teacher Evaluation Study. California Commission for Teacher Preparation and Licensing and the National Institute of Education, 1980.
- Duke, D.L. (Ed.) Helping Teachers Manage Classrooms. Alexandria, Virginia: Association for Supervision and Curriculum Development, 1982.
- Fisher, C.W., Berliner, D.C., Filby, N.N., Marliave, R., Cahen, L.S., and Dishaw, M.M. Teaching behaviors, academic learning time, and student achievement: An overview. In C. Denham and A. Lieberman (Eds.), Time to Learn: A Review of the Beginning Teacher Evaluation Study. California Commission for Teacher Preparation and Licensing and the National Institute of Education, 1980.
- Freeman, D., et al. The Fourth Grade Mathematics Curriculum As Inferred From Textbooks and Tests. East Lansing, Michigan, Michigan State University, Institute for Research on Teaching, Report Number 82, 1980.
- Joyce, B.R., Weil, N., and Wald, R. A structure for pluralism in teacher education. In B.R. Joyce, C.C. Brown, and L. Peck (Eds.), Flexibility in Teaching: An Excursion into the Nature of Teaching and Training. New York: Longman, 1981.
- Kounin, J.S. Discipline and Group Management in Classrooms. New York: Holt, Rinehart, and Winston, 1970.
- Powell, M. The Beginning Teacher Evaluation Study: A brief history of a major research project. In C. Denham and A. Lieberman (Eds.), Time to Learn: A Review of the Beginning Teacher Evaluation Study. California Commission for Teacher Preparation and Licensing and the National Institute of Education, 1980.