

Active vs. Passive Time on Task of
Spectrum and non-Spectrum Students

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Purpose and Rationale

The purpose of this study is to compare the proportion of active, on task time spent by Spectrum and non-Spectrum students, that is, those students of teachers who do or do not use the Spectrum of Teaching Styles. It has been reasonably well documented (Berliner and Rosenshine, 1977), that active observable involvement in classroom activities is associated with higher levels of achievement than passive involvement. Presumably more attention, or deeper cognitive processing, is being devoted when students are seen to be actively engaged with the subject matter than when they “passively” listen to a lecture or similar presentation. The word passively is in quotations since most of us have experienced more cognitive “activity” as a result of listening to a dynamic lecture or reading an intriguing idea than any observer could have seen. Disclaimers aside, it does not seem unreasonable to advocate teaching strategies which initiate higher levels of observable, subject matter related activity on the part of the learner. Good and Brophy (1973) sum up the feeling of many educators: “Now that we have identified student attention to and active involvement in work as a key to learning we can ask, “What can a teacher do to increase student involvement in work?” (pp. 300).

Teachers trained in implementing the Spectrum of Teaching Styles provide, it is claimed, more opportunity than non-Spectrum teachers for students to be actively engaged in academic tasks. This study investigates whether the proportion of time on task in an active manner is actually greater for Spectrum than non-Spectrum students. The reader should note that we will be able to say nothing directly about the relative quality of learning of Spectrum and non-Spectrum students, only whether one group exceeds the other in proportion of active time on task.

The Spectrum of Teaching Styles has been described elsewhere (Mosston, 1972) and has been evaluated previously (Pichert, Anderson, Armbruster, Surber & Shirey, 1976). We will, therefore, not go into the details of the program in this paper.

Hypotheses

1. Spectrum students will spend proportionately more active time on task than non-Spectrum students.
2. Spectrum teaching styles lend themselves to different proportions of active on-task time. Therefore, there will be differences among the various styles in terms of active time on task.

Evaluation Strategy

The evaluation technique used to measure time on task utilized a systematic analysis of videotapes of actual classroom sessions. The design of the study was quasi-experimental (Campbell and Stanley, 1966) since it was impossible to randomly assign teachers to conditions and students to teachers. Great pains were taken to get control teachers and students comparable to the Spectrum-trained groups. A detailed description of how this was done is contained in the evaluation by Pichert, et al. (1976). As this study constitutes a reanalysis of the videotapes used in that larger evaluation, the reader should refer to it for greater detail if needed.

Videotape Chronometric Analysis

One purpose of the original videotape analysis was to determine whether there were differences between Spectrum and non-Spectrum classes on student time spent on subject matter, on procedures and time wasted. In that study we found that Spectrum students spent more time in non-academic, role related behaviors, but wasted less time

than their non-Spectrum counterparts. Percentage on time on task, however, did not differ between groups. Thus the original analysis did not appear to identify differences in the way student's from both groups were spending their subject-matter-related time. The purpose of the following videotape analysis was to determine whether there were differences between Spectrum and non-Spectrum classes on the proportion of active to total time on task. Also investigated were differences in active time on task among the various Spectrum styles themselves.

Method

Subjects. Seventy six randomly selected Spectrum students and 80 randomly selected Control students served as subjects.

Equipment. Data on use of classroom time were obtained by recording entire class periods of both Spectrum and Control classes on Sony V-32 ½ inch videotape. Tapes were viewed on Sony CVM-950 Monitors driven by Sony AV-3600 Video-recorder decks. Time intervals were recorded on two pairs of Marietta 14-15D, .01 sec cumulative interval timers switched by two pairs of DPDT-center off switching devices operated by the first author of this report.

Using this equipment the trained tape viewer continuously monitored student behavior for entire class periods. Every second of student time on task was accounted for. No reliability check was made this time, but in the previous videotape analysis the reliability between tow viewers was $r = .92$.

Design and Procedure. The dependent variable of interest was the proportion of active to total time on task. This was computed for each student by dividing his/her

amount of active time on task by the sum of his/her active and passive time on task. Type of classroom (Spectrum vs. non-Spectrum) was the between subjects factor.

At least two videotaped episodes of each classroom for one class period of about 40 minutes were made. In the case of non-Spectrum classes, which had not been videotaped before, three tapes were made and the first discarded to minimize reactive effects of taping. Two video-recorders and two cameras were used in each classroom, one on the teacher and the other on four randomly selected students. Dummy microphones were placed about the room. Only the microphone in the midst of the randomly selected students was “live”. This procedure was intended to minimize the chance that the target students would realize they were the subjects of interest.

The four students from each classroom were randomly chosen by matching the first four numbers obtained from a random generator to the number next to each student’s name in the teacher’s class roster. Of these four students, two were randomly selected for chronometric analysis. A different set of randomly generated numbers was used for each classroom.

Definition of Dependent Variables

Academic Behavior. Academic behavior is defined as any on-task, subject matter related activity on the part of the learner. This included attending to a teacher’s lecture, asking a subject matter related question, listening to and working with other students on that day’s lesson, obtaining feedback on the lesson, engaging in a remedial session with the teacher on work incorrectly completed. These activities can be classified into two categories: active time on task and passive time on task.

Active Time on Task. Academic behaviors which can directly observed and have an impact on the classroom environment are considered active time on task. Three categories emerged:

1. Oral activities, e.g. answering and asking questions, subject matter related discussion, oral reading of text;
2. Writing answers to questions during and after reading of text;
3. Creating, e.g. drawing, painting, constructing, writing reports or original stories.

Passive Time on Task. Academic behavior which seems to have no observable effect on the classroom environment is classified as passive. Beyond apparently attention listening, watching or reading there is no academic behavior that is directly observable.

Two categories which illustrate passive time on task were distinguished:

1. Silent reading from an assigned text;
2. Observing (listening and/or watching), e.g. watching and/or listening to the teacher, another student, tapes, films or demonstrations.

Results

Proportion of Active to Total Time on Task. Spectrum students spent a significantly greater proportion of their time on task in an active fashion than Control students, $F(1,154) = 36.9, p < .001$. Of the total academic time, Control students averaged 30% active time on task. Spectrum students averaged 66%.

Expressing the results another way, during a 40 minute class period both Spectrum and Control students spend about 24 minutes on-task. The present analysis shows that Spectrum students spend approximately 16 of these 24 minutes engaged in active academic behaviors, whereas Control students are actively involved only about 9

minutes. It is clear that Spectrum students spend much more of their time on task doing something as opposed to watching or listening.

These data confirm Hypothesis 1. Spectrum students spent proportionately more active time on task than non-Spectrum students.

Proportion of Active Time by Spectrum Style. There are great differences among the Spectrum styles in terms of the proportion of students' active academic behaviors $F(4, 71) = 13.2, p < .001$. The proportion of active to total academic time for each Spectrum style is presented in Table 1.

Table 1
Proportion of Active to Total
Academic Time for Each Spectrum Style*

Spectrum Style	Proportion of Active Time on Task
A	.21
B	.49
C	.85
D	.98
F	.62

* A description of each style may be found in Mosston (1972).

That student task-related behaviors vary by style is not surprising; that was part of the program developer's intent. These data merely add evidence that the styles look different from one another in practice. These data confirm Hypothesis 2. There data confirm Hypothesis 2. There are large differences among Spectrum styles in terms of the proportion of active time on task.

Conclusions

Hypothesis 1 is decisively confirmed. Spectrum students spend proportionately more active time on task than Control students. Spectrum styles generate active student

involvement in their work. By contrast, the primary activities employed in non-Spectrum classrooms seemed to be lectures, going over assignments, etc., in which the teacher did virtually all of the talking while students listened. Even Spectrum Style B, which is a “lecture and give seatwork” style, produced more active time on task than many Control teachers’ lessons. The conclusion is: Spectrum students appear to spend more of their subject matter related activities in an active, rather than passive, manner.

A word of caution is in order. While Spectrum students spent more active time on task, this study provides no evidence that their learning was superior to Control students’. The design of this evaluation did not permit a test of relative amount of learning. However, if one assumes that active involvement in classroom activities is directly related to academic achievement, then one may infer an influence of the Spectrum on learning.

Hypothesis 2 was also supported. There are differences between styles in the proportion of active to total time on task. This means that teachers may choose and vary the level of active academic behavior they desire from their students by implementing a particular Spectrum style for any given lesson. Conclusion: Spectrum styles vary in the proportion of active student time on task elicited.

The Spectrum of Teaching Styles has shown itself to be associated with characteristics of classrooms known or believed to be desirable. We believe that many teachers would like to see more active involvement in lessons on the part of their students. As a result, we believe that these data, taken along with those in the original evaluation, are strong enough to warrant continuation of this program.

References

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