From: Anderson, L. W. (Ed.). Time and school learning: Theory, research and practice. London: Croom Helm, 1984

9 TIME AND INSTRUCTIONAL IMPROVEMENT: AN R AND D-BASED APPROACH*

William G. Huitt and Janet H. Caldwell

Several previous chapters have indicated that student engaged time, or time-on-task, is an important factor influencing student achievement. Thus, it seems reasonable for teachers and administrators to try to optimize students' use of time in school. How can this best be done? The answer to this question forms the basis of this chapter.

Time is one of several factors addressed by the Achievement Directed Leadership (ADL) programme, a research-based programme developed by Research for Better Schools, Inc. (RBS), a Philadelphia-based regional educational laboratory. The programme was developed in cooperation with over fifty teachers and administrators in schools in Delaware, New Jersey and Pennsylvania. The programme provides a means of helping educators translate into practice the important implications of recent classroom research on effective schools and school districts, as well as on educational change (RBS, 1976, 1978, 1979; Graeber, 1980; Helms, 1980; Huitt and Rim, 1980). In essence, the ADL programme provides an overall, district-wide approach to instructional leadership focusing upon the following four primary classroom teaching and learning variables:

(1) prior learning – knowledge students possess or acquire which helps their learning of a new subject matter;
(2) student engaged time – amount of time students actually spend working on and trying to accomplish assigned academic tasks;

*Preparation of this paper was supported in part by funds from the National Institute of Education (NIE). The opinions expressed do not necessarily reflect the position or policy of NIE, and no official endorsement should be inferred. This chapter discusses a strategy for managing instructional time in the classroom that is one element of a comprehensive training programme for administrators, supervisors, and teachers called Achievement Directed Leadership (ADL). David Helms and Anna Graeber conceptualized the programme and its major elements at Research for Better Schools, Inc. (RBS) and led development efforts. Development of the programme also benefited from the co-operative assistance of educators in Delaware, New Jersey and Pennsylvania. This work is recorded in RBS documents which have been submitted to the National Institute of Education and are listed at the end of this chapter.

(3) coverage of criterion content – students' opportunities to learn the content on which they are to be tested;
(4) academic performance – students' success with daily learning tasks, mastery of content units, and review of recently learned subject matter.

This chapter illustrates ways in which the ADL programme uses research findings on students' use of time to improve basic skills instruction. The programme draws upon two types of research: (1) correlational studies relating time and student achievement (see Chapter 6), and (2) correlational and experimental studies relating teaching behaviours to improved student engaged time (see Chapter 7). The first section of this chapter describes the process of managing students' use of time, and this is followed by one which explains the materials and procedures used in this process. In the third and final section of the chapter data relating to participants' experiences with the programme are presented, and the potential significance of the time component of the ADL programme is discussed.

Management Process

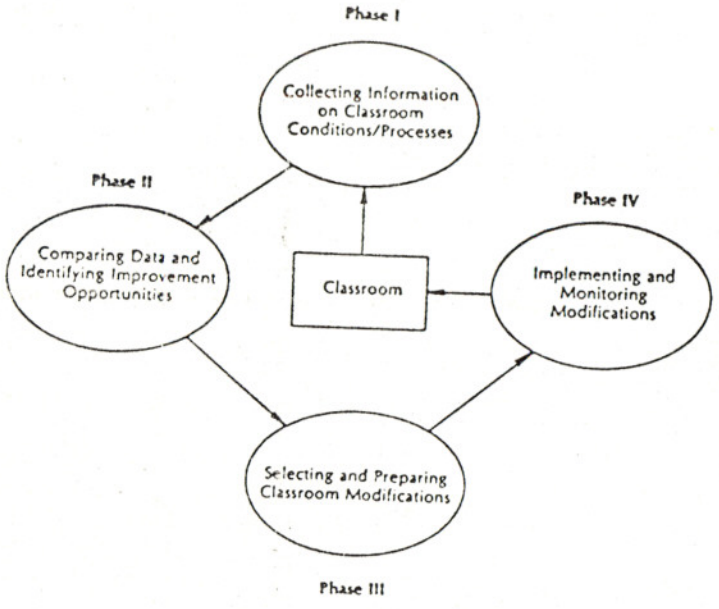
Recent research indicates that teachers need skills in decision-making as well as certain effective teaching techniques (McDonald, 1977). In the ADL programme instructional improvement is achieved through a knowledge-based decision-making process for managing critical schooling factors or influences. This process, a four-phase instructional improvement cycle, is used by classroom teachers to manage several critical classroom variables, one of which is students' use of time. The process (see Figure 9.1) relies on the collection of classroom data, the comparison of classroom data with relevant research findings, the making of decisions about appropriate instructional modifications, and the implementation of these modifications. Since the cycle is iterative, subsequent collections of classroom data permit the evaluation of the effectiveness of these instructional changes.

Information Collection

In order to make knowledge-based improvements in classrooms, educators must first be able to measure present levels of student engaged time. As a consequence, the first phase of the instructional improvement cycle calls for the collection of descriptive data on students' use of time.

Two types of data are collected. First, the teacher completes a log indicating the amount of time allocated for instruction in a subject area. Secondly, an observer systematically collects data on the extent to which students are actively involved in academic work during that allocated time. The data collection procedures were established by RBS in such a way as to assure the equivalency of the data collected in the selected classrooms with the data collected in a variety of relevant research studies (Huitt, Caldwell, Traver and Graeber, 1981).

Figure 9.1: Four-phase Instructional Improvement Cycle (RBS, 1979)



Comparison and Identification

If teachers are to treat instructional improvement as a decision-making process, they must be able to compare their own classroom instruction with available evidence obtained from other classrooms. Summaries of research that are readily available to teachers provide general information about the research, but seldom include sufficient detail to permit valid comparisons with existing classrooms. The complete reports of these studies, on the other hand, are usually voluminous and difficult to obtain. Furthermore, most of these studies report relationships between

classroom variables such as student engaged time and student achievement as correlation coefficients. These coefficients do indicate that there is a positive relationship between classroom variables such as student engaged time and achievement, but do not indicate the *levels* of the variable that are associated with the highest achievement gains.

While some researchers suggest that more student engaged time is appropriate for all classrooms, others (e.g. Rim and Coller, 1978) indicate that in some cases, moderate amounts of student engaged time are associated with the highest achievement gains. Thus, correlation coefficients alone are insufficient for determining whether or not the level of student engaged time in a specific classroom is appropriate or should be increased. In the comparison phase of the process teachers use graphs which have been generated from the original research studies of the relationship between engaged time and achievement to help them decide whether there is an opportunity or need to increase student engaged time in their classrooms. If a teacher decides to change student engaged time, the research findings are used to assist the teacher in setting appropriate goals.

Selection and Preparation

If a change in student engaged time is desired, then a teacher moves on to the third phase of the instructional improvement cycle. In this phase the teacher further analyzes the data collected in the classroom, and reviews research findings on teaching behaviours found to be related to improvement in student engaged time. The teacher then selects a modification that is appropriate to his or her classroom situation, and that reasonably can be expected to produce the desired change. A plan is then developed for implementing and monitoring the selected improvement strategy.

Implementation and Recycling

The planned modification is implemented by the teacher in his or her classroom and when monitoring indicates that the modification is properly in place data collection begins anew. On the basis of this monitoring teachers may decide to continue, modify or discontinue use of the selected modification.

Educators using the time component of the ADL programme make repeated observations of students' use of time over the course of an entire year. This information continually aids the teacher in making instructionally-relevant decisions. Such periodical recycling assists teachers in attaining and maintaining optimal levels of student engaged

time which, in turn, will hopefully have significant and positive effects on students' achievements.

Materials and Procedures

In order to use the improvement cycle to manage students' use of time, teachers and administrators need to acquire several skills. First, they need to learn specific procedures for collecting classroom data. Then, they must be able to compare those data with data obtained from other research studies. Finally, they must be able to select, prepare and implement appropriate improvement strategies. The materials and procedures used to accomplish these tasks are described in this section.

Procedures for Collecting Data

From the beginning of the project, the developers thought that the data collection instruments and procedures used in available research studies would probably need to be simplified if they were to be used by teachers and administrators. For example, the observers, using an instrument in the Stallings and Kaskowitz (1974) study, collected information on over one hundred variables by scanning the classroom every 15 minutes on three school days. A more practical, feasible observation system seemed needed. The first modification of the instrument involved simplifying the form so as to focus only on students' use of time; however, the complexity of the resulting calculations and the time requirements for observations necessitated further adaptation.

Re-examination of the procedures used in the original study revealed that student engaged time could be defined as a function of two separate variables: allocated time (that is, amount of time provided to students for instruction) and engagement rate (that is, the proportion of allocated time that students were observed to be actively involved in an assigned academic task). More specifically, student engaged time can be estimated by multiplying allocated time by engagement rate. Simplified instruments and procedures were then designed for collecting data separately on allocated time and engagement rate.

First, teachers collected data on allocated time for their own classrooms by completing a log (see Figure 9.2). Such data are essentially equivalent to those obtained by a trained observer (Marliave, Fisher and Filby, 1976) and, in addition, the log is fairly simple to complete.

A systematic observation process for collecting data on the percentage of students in the class actually working on assigned academic tasks

was then developed, using categories similar to those found in existing research studies. Observers were trained to use this system before they collected data in classrooms. The nature of the data, the collection process, and the local circumstances determined who collected the classroom process data. Peer teachers, principals, district personnel, substitute teachers, aides and student teachers were used as data collectors.

Figure 9.2: Complete Allocated Time Log

STATE Atlantic
DISTRICT Eastern
SCHOOL New Delpen
TEACHER Demetrios

ALLOCATED TIME LOG

STATE # 03 SCHOOL # 08 DATE 10-5 SUBJECT Reading/Lang.
DISTRICT # 47 TEACHER #x105 GRADE 3 NO. OF STUDENTS PRESENT 30

	ACTIVITY	BEGINNING TIME	ENDING TIME	TIME IN MINUTES
1	Reading groups	8:51	10:13	82
2	Reading groups & seatwork	10:30	10:57	27
3	Spelling	12:59	1:16	17
4	Sustained silent reading	2:30	2:50	20
5				
6				
			TOTAL	146

Observation training included both written and videotaped exercises, and required between three and five hours. Much of this time was spent coding videotapes of actual classrooms. Of more than 300 teachers and administrators trained in 18 different sessions, approximately 90 per cent were able to code selected videotapes at an acceptable criterion level by the end of training.

The observer used an Engagement Rate Form (see Figure 9.3) to code engagement rate, typically making about fifteen scans during each classroom observation at intervals of from 1 to 3 minutes. Students were coded as being engaged or not engaged. *Engaged* students were those involved in or attending to instruction. For example, an engaged

Figure 9.3: Completed Engagement Rate Form

ENGAGEMENT RATE FORM

SUBJECT Rdg/Lang

STATE Atlantic
DISTR OF Eastern
SCHOOL Newsplan
TEACHER Simmons
CODER Allen

STATE # 03 SCHOOL # 08 DATE 10-5
DISTRICT # 47 TEACHER # X105 CODER # K14

GRADE 3
STUDENTS PRESENT 30

PART OF CLASS OBSERVED
Beg. ✓
Mid. ___
End ___

TIME	1 9:01	2 9:02	3 9:03	4 9:04	5 9:05	6 9:06	7 9:07	8 9:08	9 9:09
ASSIGNED	30	30	30	30	30	30	30	30	30
MANAGEMENT/ TRANSITION	IIII	HH	II	II					I
SOCIALIZING	II						II		
DISCIPLINE	I								
UNOCCUPIED/ OBSERVING	I		I	I					I
OUT OF ROOM	I							I	I
TOTAL UNENGAGED	9	5	3	3	0	0	2	1	3
ENGAGED	21	25	27	27	30	30	28	29	27

TIME	10 9:10	11 9:11	12 9:12	13 9:13	14 9:14	15 9:15	TOTAL	ENGAGEMENT RATE
ASSIGNED	30	30	30	30	30	30	450	ENGAGED / ASSIGNED
MANAGEMENT/ TRANSITION	I	I		III	IIII		23	
SOCIALIZING				II	II		8	$\frac{360}{450}$ =
DISCIPLINE	II	III	III			HH HH HH HH HH	39	
UNOCCUPIED/ OBSERVING			III	IIII	III		14	80%
OUT OF ROOM	I	I	I				6	
TOTAL UNENGAGED	4	5	7	9	9	30	90	
ENGAGED	26	25	23	21	21	0	360	

student may have been reading, writing, answering a teacher's question, watching a student answer a problem on the board, listening to a teacher's academic presentation, or doing anything else that would indicate that he or she was involved in academic tasks. *Unengaged* students, on the other hand, are *not involved in the assigned academic tasks*. The following five categories were used to code different types of unengaged behaviours so that teachers could make more precise analyses of their classrooms:

(1) management/transition – getting ready for instruction, waiting, listening to non-academic directions, or changing activities;

(2) socializing – interacting with other students or watching others do so;
(3) discipline – being reprimanded or punished by an adult or watching another student being disciplined or punished;
(4) unoccupied/observing – wandering about with no apparent purpose or goal, watching other people, or playing with materials; and
(5) out of room – being temporarily out of the classroom.

At the beginning of each scan the observer recorded the time and number of students assigned to the subject or topic of interest. A tally mark was made in one of the five unengaged categories each time an unengaged student was observed. At the end of each scan the number of engaged students was computed by subtracting the number of tallies from the number of assigned students (that is, 'Assigned' minus 'Unengaged' equal 'Engaged'). After all 15 scans had been completed, the observer added each row and found the engagement rate by dividing the total number of engaged students by the total number of assigned students. If, for example, there were 30 students in a class during 15 scans of the classroom, the total number of assigned students would be 450 (i.e. 30 x 15). If the total number of engaged students over all these observations was 360 students, the engagement rate would be computed by dividing 360 by 450, a rate of 80 per cent.

Since student engaged time is a better predictor of achievement than either allocated time or engagement rate alone, teachers need to use their collected classroom data to calculate student engaged time before comparing classroom data to the research evidence. In order to make valid comparisons, such data on student engaged time should be equivalent to those obtained from research studies. RBS conducted a small study to determine if practitioners could collect data that are essentially equivalent to those collected by a trained observer using the Stallings and Kaskowitz instrument in the same classroom.

Eleven teachers from three different schools were observed for two days in both reading/language arts and mathematics. Each day's estimate of student engaged time, as calculated by an observer using the Stallings and Kaskowitz instrument, was compared with the estimate of student engaged time obtained by teachers using the instruments and procedures developed by RBS. The Pearson Product-moment Correlation between these two estimates of student engaged time was 0.92. Thus, the data collected from the simplified observation system developed by RBS were comparable to those collected using the research-based instrument and procedures.

Teachers used a single form to record student engaged time data throughout the year. The amount of student engaged time was calculated for each day an observation took place. This amount was obtained by multiplying the total allocated time (see Figure 9.2) by the engagement rate computed on the observation form (see Figure 9.3). If data from several days were available, then an average student engaged time was also calculated. Data for three observations are shown in Figure 9.4. Student engaged times were calculated for each day (e.g. 70% x 100 minutes = 70 minutes), and an average student engaged time for the three days was computed.

Figure 9.4: Completed Summary Sheet

State Atlantic
District Eastern
School New Delgen
Teacher Demetrios

COMPLETED SUMMARY SHEET FOR TIME

State # 03 School # 08 Grade 3
District 47 Teacher X105 Year 1981-82

Date	Coder #	Part of Period	Engagement Rate	Allocated Time	Student Engaged Time	Average Student Engaged Time
10-2	M010	End	70%	100 min.	70 min.	
10-4	A294	Middle	80%	90 min.	72 min.	71 min.
10-5	K14	Beg.	80%	146 min.	117 min.	86 min.

Comparing Data to Research

In the comparison phase of the instructional improvement cycle, teachers compare their own classroom time data with the results of previous research in order to identify opportunities for improvement. The classroom observational data do not by themselves give teachers an adequate basis for making decisions about what changes might be made to increase student achievement. For example, these observations may reveal to the teacher that in his or her third-grade class the students spend 100 minutes of time engaged in reading. Such information does not tell the teacher whether increasing, decreasing or sustaining this level of student engaged time would be most beneficial to student achievement. Only when the classroom information is compared to research data relating student engaged time to student achievement can the teacher begin to make a data-based decision about the probable effect of a change in student engaged time upon student achievement.

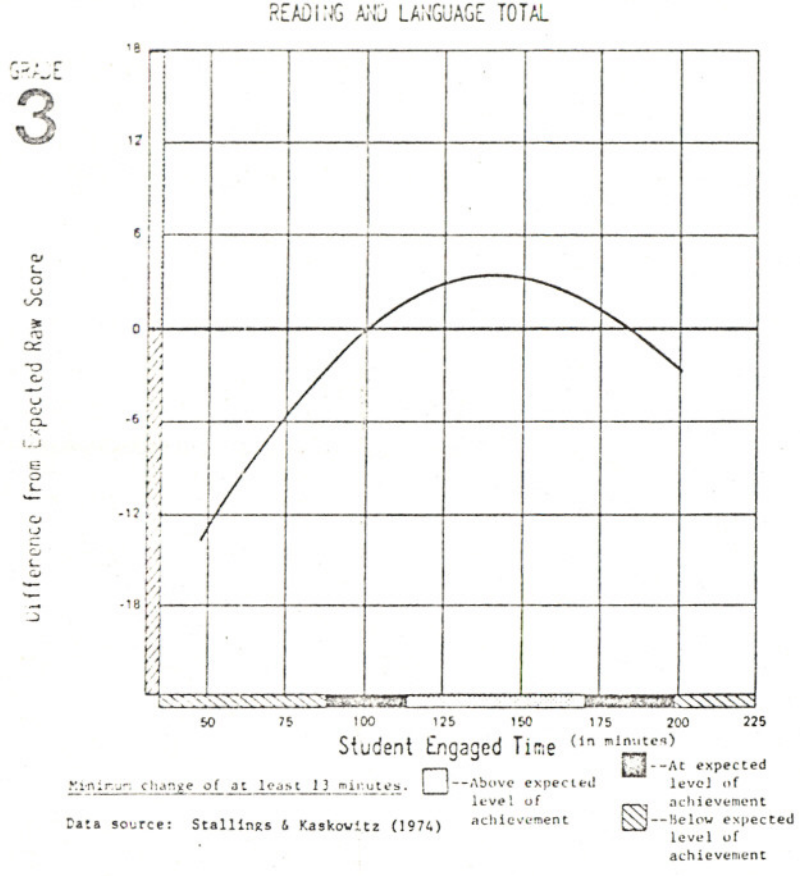
To assist teachers in making knowledge-based decisions regarding student engaged time, RBS prepared reference graphs from existing research data. Figure 9.5 presents an example of a reference graph. The information in this figure is based on a reanalysis of data from Stallings and Kaskowitz (1974) by Rim and Coller (1978) and shows the relationship between student engaged time in reading/language arts classes and student achievement gains in reading/language arts. The horizontal axis represents student engaged time in reading/language arts as the number of minutes per day; the vertical axis represents the difference between the actual end-of-year achievement-test scores, and the achievement-test scores predicted from the beginning-of-year achievement-test score.

On each graph, student engaged time (horizontal axis) is marked with three kinds of zones (bars) which correspond to the positive, zero and negative zones on the student achievement scale. These zones are determined by first examining the point(s) on the horizontal axis that correspond with no difference between actual and predicted (expected) achievement scores. A minimum-change unit based on the standard error of prediction is specified for each graph. This minimum-change unit is the smallest amount of change in student engaged time that is likely to produce a change in student achievement. In Figure 9.5, for example, the minimum-change unit is 13 minutes. Generally, if the student engaged time of a classroom in the research study fell within the range marked by a zone on the horizontal axis, then it is likely (at least two out of three times) that student achievement would fall in the corresponding range on the vertical axis. Next, zones around each of the two zero points in Figure 9.5 are determined by adding and subtracting the minimum-change unit at the appropriate points on the horizontal axis. These are termed zero zones. Finally, positive and negative zones are created by examining the nature of the curved line on either side of each zero zone.

The data from two research studies (Stallings and Kaskowitz, 1974; Fisher, Filby, Marliave, Cahen, Dishaw, Moore and Berliner, 1978) were reanalyzed to generate all these reference graphs. The graphs were then

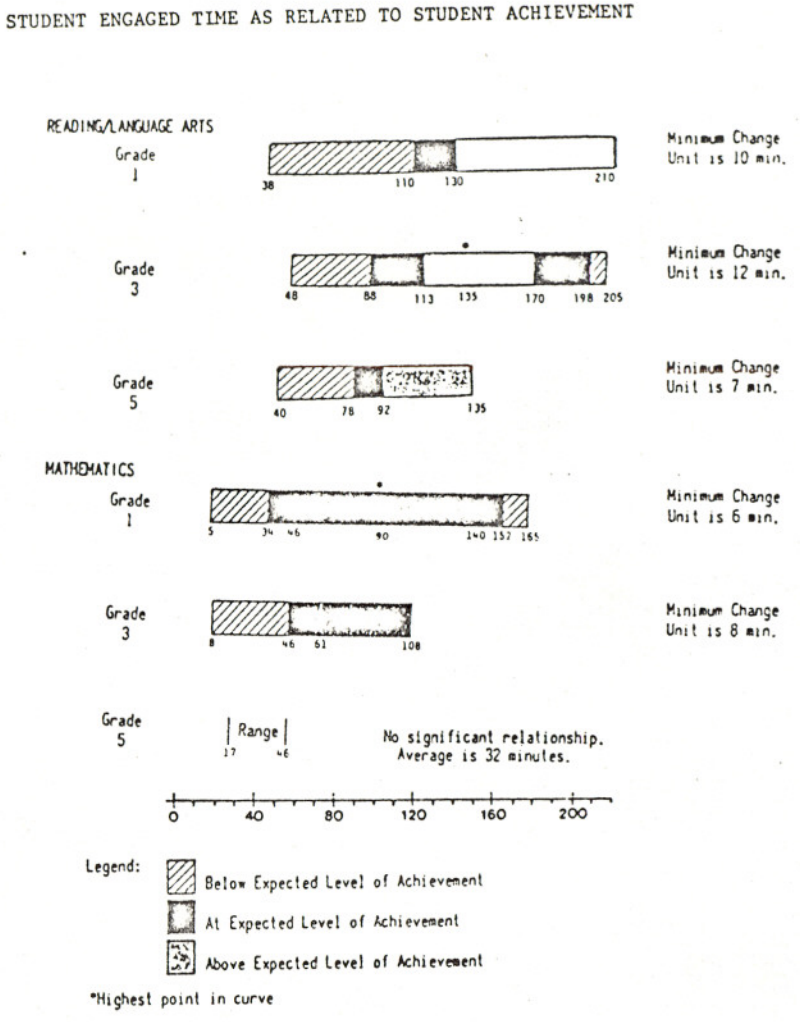
summarized (see Figure 9.6) by reporting information relating to the horizontal axes only.

Figure 9.5: Examples of Graph Relating Student Engaged Time to Student Achievement (Rim, Caldwell, Helms and Huitt, 1981)



Teachers who have collected data on student engaged times in their classrooms first select a graph appropriate for their subject and grade-level. They then recall the amount of student engaged time for their classroom, locate that amount on the appropriate graphs, and determine the corresponding predicted-achievement zone. The teachers then decide (1) whether to attempt to make changes in student engaged time; (2) in what direction any such change ought to be made; and (3) the extent of the change. For example, the average student engaged

Figure 9.6: Summary of Graphs for Student Engaged Time (Rim, et al., 1981)



time calculated on the illustrative summary sheet presented in Figure 9.4 is 86 minutes. Let us assume this is a reading class. According to the third-grade reading/language arts graph (Figure 9.6), this level of student engaged time would probably be associated with less-than-optimal student achievement. Based on this information the teacher might decide to try to increase student engaged time. The minimum-change unit for this graph indicates that a change of at least 12 minutes

should be made. Depending upon the particular circumstances, then, a reasonable goal for this teacher might be 100 minutes of student engaged time; this level of student engaged time falls near the middle of the zero zone. Quite obviously, a larger increase would be needed if the goal was to attain student-achievement scores which would fall in the positive zone.

After setting a goal for student engaged time for their classrooms, teachers need to decide whether to change allocated time or engagement rate. Research relating to each of these variables can help teachers in making their decisions.

Most teachers will probably want to increase allocated time to correspond with the average amount of time allocated for the subject at the particular grade-level. Average amounts of time allocated to elementary reading/language arts has been found to be from 120 to 130 minutes; for secondary, the average is 40 minutes. Average allocated time for elementary mathematics is from 40 to 45 minutes; for secondary the average ranges from 40 to 60 minutes. In general, if the engagement-rate for a class of students is average (60 per cent), then allocating an average amount of time for a subject is not sufficient to enable a class to reach a level of student engaged time associated with achievement at or above the expected level. For example, an average amount of allocated time for elementary reading/language arts coupled with an engagement rate of 60 per cent, yields student engaged time which is in the negative zone for all grades (120 minutes x 60% = 72 minutes). Some educators are recommending increases in allocated time beyond the current averages, The National Council of Teachers of Mathematics, for example, now recommends daily time allocations for mathematics of 60 minutes in the primary grades and 85 minutes in the intermediate grades.

In setting engagement-rate goals most teachers will probably want to set a tentative goal of at least the average engagement-rate for their situation; that is, 60 per cent for elementary classrooms and 65 to 70 per cent for secondary classrooms, when calculated using methods comparable to those developed by RBS. Most teachers probably will not want to set goals above the highest average engagement-rates found (90 per cent). In the 60 to 85 per cent range, teachers will usually want to try to increase the engagement-rate by at least 5 per cent (again based on the standard error of prediction), if possible.

In setting all time goals, teachers should use their own judgement as well as research evidence in considering the feasibility of tentative goals for their own particular situations. It is this combination of research evidence and professional judgement which forms the foundation of the problem-solving, decision-making process.

Identifying and Selecting Appropriate Improvement Strategies

Teachers who have decided that a change in student engaged time is desirable and have set specific goals to make such a change, next review existing research-based strategies. The focus of this review is on ways in which either allocated time or engagement-rate can be changed.

There are few research-based suggestions as to how allocated time might be increased since such suggestions are often school specific. Thus, most of the principles presented here are suggestions from teachers and administrators involved in developing the ADL programme. The strategies can be grouped into three general themes: (1) use all of the scheduled allocated time, (2) reduce the amount of non-academic time, and (3) reorganize the time scheduled for academic work. A sampling of these principles follows:

USE ALL OF SCHEDULED TIME

Adhere to the schedule more closely.

REDUCE AMOUNT OF NON-ACADEMIC TIME

Shorten opening exercises.

Reduce the time spent moving between classrooms by scheduling 'special' subjects for longer time periods on fewer days.

Instead of having a single ten or fifteen-minute break let students go to the bathroom or get a drink of water individually during instructional periods.

REORGANIZE ACADEMIC TIME

Add sustained silent reading, mathematics drill, or mathematics problem-solving activities during class periods other than those devoted to the teaching of reading/language arts and mathematics.

Integrate reading/language arts or mathematics activities with activities in other subject areas, such as science or social studies.

Assign homework as additional independent practice.

Quite often the application of these principles for improving allocated time results in increases of only 5 or 10 minutes. Over the course of the year, however, these small amounts of time add up to many additional hours of instruction. For example, a 5-minute increase when considered over 180 days results in a total increase of 15 hours of allocated time.

The number of specific teacher behaviours that research has shown

to be significantly related to high engagement-rates is quite large. In order to facilitate teachers' use of this research, the findings have been divided into two areas: *management behaviours*, which deal mainly with skills and techniques designed to control students' behaviour; and *instructional behaviours*, which deal with improving the quality of students' learning.

Three themes emerge from an examination of *management behaviours*: selecting and arranging activities, monitoring student behaviour, and dealing with misbehaviour. A review of those management strategies associated with high engagement-rates yields the following generalizations (see Caldwell, Huitt and French, 1981).

SELECTING AND ARRANGING ACTIVITIES

Use *routines* to reduce confusion.
Establish clear and consistent *rules*.
Plan for *transitions* between activities; have materials ready.
Foster good *student work habits*.
Structure the physical environment to facilitate learning.

MONITORING

Move around the room to *monitor* behaviour.
Pace activities appropriately.

STOPPING MISBEHAVIOUR

Anticipate consequences; head off misbehaviour before it occurs.
State *expectations* for behaviour clearly.
Hold students *accountable* for behaviour.
Give *feedback* on behaviour, perhaps privately.

To facilitate teachers' use of these generalizations, they are specified in terms of ways in which teachers can employ them in their classrooms. For example, the following suggestions can be given to teachers wishing to use the generalizations concerning selecting and arranging activities.

Have materials and supplies *ready in advance* of activities.
Use more *routines and procedures* to handle daily business such as turning in completed work, noting student progress and checking attendance.
Shorten *transition* times whenever possible. Specifically,
plan specifically how to change activities;
establish clear and consistent rules for transitions;
provide clear starts and stops for activities;
alert students to upcoming transitions;

economize movement. For example, have all of the students in a small group move at the same time rather than calling them individually.

Teach students classroom rules and procedures as they are needed, with special emphasis on this area in the first weeks of school. You may wish to rehearse procedures, use incentive systems to shape behaviour, or teach students to respond to specific signals such as the bell or the teacher's call for attention.

Teach students the skills needed to perform school work, skills such as following directions, copying assignments from the chalkboard, finding pages in the book, using programmed materials.

Even though research evidence on specific instructional behaviours reveals numerous and complex relationships with student engaged time (as well as with student achievement) a number of teacher behaviours seem to be consistently mentioned as facilitating student engagement (Anderson, 1981; Medley, 1977; Rosenshine and Furst, 1973). A synthesis of relevant research and theory (e.g. Bloom, 1976; Good and Grouws, 1979; Hunter and Russell, 1977; Medley, 1977; Rosenshine, 1976) has led to the development of a sequence of important instructional events. These events can be grouped into four major categories: presentation, practice, feedback and monitoring (see Figure 9.7).

Figure 9.7: Overview of Critical Instructional Events (from Helms, Graeber, Caldwell, and Huitt, 1982)

INSTRUCTIONAL EVENTS

PRESENTATION – Introduce, develop, or review concepts and skills.

- Review
- Overview – what, why
- Explanation
- Student demonstration of understanding

PRACTICE – Strengthen, apply, or give additional experience with concepts and skills.

- Guided or controlled practice
- Independent practice

FEEDBACK – Let students know whether their answers were right or wrong and why.

MONITORING – Assess and maintain student's knowledge and application of concepts and skills.

- Daily work (including new and review content)
- Unit or topic tests

As in the case of management generalizations, these instructional generalizations can be made more meaningful to teachers by associating specific teaching practices with each generalization.

Teachers must identify the specific behaviours they believe to be the most useful to them, and organize them into a cohesive approach or strategy. This strategy will be employed to achieve the specified goal of optimizing the amount of allocated time, engagement rate or both. After designing such a strategy for reading these goals, teachers must *plan* to implement the strategy. It also is important to *plan* how to monitor the use of the strategy so teachers and administrators are certain the planned change has taken place.

Implementation and Recycling

In the final phase of the improvement cycle, teachers implement their selected strategy and monitor that implementation to ensure that the strategy is in place before a second round of data collection begins. In the recycling phase teachers also generate data for formative evaluation of their use of the approach. This evaluation has two aspects which occur simultaneously: (1) a subjective judgement as to the degree of success, based on discussions with other teachers, supervisors or both; and (2) a data-based judgement as to the status and change of student engaged time.

Implementation procedures allow teachers to subjectively share their experiences with their colleagues and supervisors in a set of regularly scheduled meetings. During these meetings teachers provide their answers to questions such as:

(1) What was the strategy and to what extent was it implemented as planned?
(2) Was the strategy modified during its implementation, and, if so, how was it modified?
(3) What happened that was either expected or unexpected?
(4) What can you tell others who might wish to implement the strategy?

Implementation procedures also permitted teachers to examine observation data collected in their classroom. One such data-based procedure calls for teachers to plot collected data on specially prepared graphs (see Figure 9.8). The vertical axes for these graphs were produced from the graphs used for comparing collected data to research evidence as shown in Figure 9.6. Thus, there are separate graphs for maths and reading/language arts and for grades 1, 3 and 5. The horizontal axis on

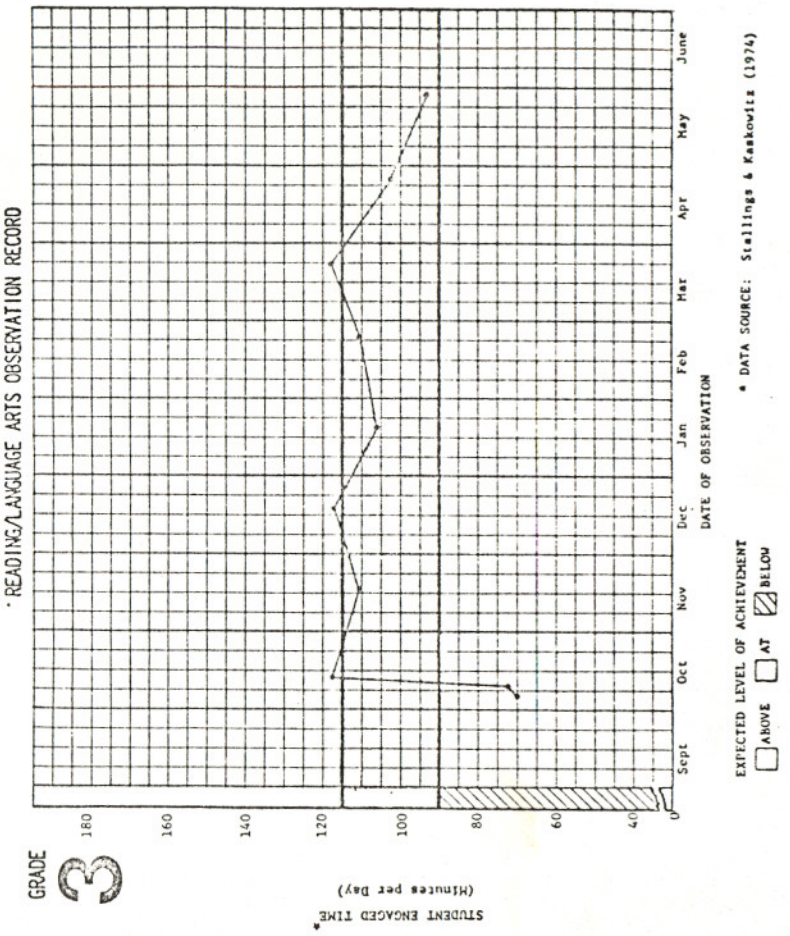


Figure 9.8: Example of Completed Observation Record

each graph is simply a time-line for the school year. Use of these graphs focuses attention on both the status of the class in terms of expected student achievement as well as changes in student engaged time over the entire school year (see Huitt, Segars and Caldwell, 1982).

For example, Figure 9.8 shows that the first two observations were in the 'below expected' level of achievement zone. The remainder were in either the 'at expected' or 'above expected' level of achievement zone. These data would indicate that the teacher had been relatively successful in increasing and maintaining an appropriate level of student engaged time.

Experiences and Implications

As of May 1982 more than 1,000 teachers and 500 administrators in sixty districts in ten states had been trained in the time component of the ADL programme. While the evaluation data presented here cannot appropriately be used as summative data for the ADL programme since they relate only to the time component, the data nevertheless provide encouragement as to the success of this portion of the programme. Some of RBS's experiences in developing and implementing the time component of the ADL programme as well as the programme's implications for teachers and administrators are reported in this section.

A basic skills instructional improvement programme may be considered successful for many reasons. Perhaps teachers and administrators like the programme and perceive it as helpful. Similarly, a programme may be considered successful if it actually changes teachers' behaviours or students' behaviours as intended. Or, a programme may be considered successful if student achievement improves. Experiences with the time component of the ADL programme indicate that success defined in each of these ways was attained. A brief description of each of these 'successes' is discussed below. More complete descriptions of the outcomes of the programme are available elsewhere (Graeber, Huitt, Helms and Segar, 1981).

Attitudes and Perceptions

Although systematically collected data on perceptions of programme benefits are not available in large quantity, the following generalizations are consistent with the anecdotal evidence.

Participation gives teachers a chance to use research findings in the classroom.

The programme brings consultants, administrators, specialists and teachers together with a common purpose and goals – to improve instruction.

The programme has provided individualized in-service training. It has let teachers look at the use of time in their classrooms and personalize the training they receive in order to meet classroom needs. But more than that, it has helped to identify school-wide and, in some cases, district-wide, opportunities for improvement.

One of the advantages of this programme is getting to work closely with other teachers in each other's classrooms.

Using the observation instrument has helped shift the focus during observations from looking at what the teacher is doing to concentrating on what the students are doing.

In addition to the above generalizations, a more structured questionnaire was administered to fifteen teachers in a single school. These teachers responded to the questionnaire which grew out of the school's special interest in using its work on student engaged time to improve staff relations. These teachers reported changes in their own behaviour and that of the principal. The principal was reported as becoming more willing to help teachers, more open to teachers' suggestions and ideas, more interested in working together with teachers in school improvement, and more interested in teachers' professional improvement. Eleven of the fifteen teachers also reported that they received adequate support to make the needed changes in their classrooms. Teachers developed an awareness of the activities of other teachers; a willingness to discuss educational problems with other teachers and the principal; a willingness to help, share, and work with other teachers, and increased feelings of importance as a professional.

Teacher Behaviour

Some data have been collected on changes teachers have reported making in their own teaching behaviours. Most teachers implementing the programme reported making changes in their own behaviours to improve students' use of time. Some of the implemented strategies were:

More whole-class instruction.

Increased feedback to students on written work.

Less time spent giving directions.

Keeping books in desks instead of distributing them and picking them up each class period.
Less independent seatwork.

Many teachers seemed to begin the improvement process by implementing management strategies and then considering instructional strategies. Furthermore, teachers have reported improvements in their knowledge of effective instructional practices, increased awareness of students' use of time, and increased sensitivity to classroom management and quality of instruction.

Some strategies have also been implemented at the school and district levels. Schedules have been changed, for example, so as to increase allocated time, and times for pullouts, and special subjects have been co-ordinated to minimize disruptions to classrooms.

Student Behaviours

Preliminary data from a complete implementation of the ADL programme inn three districts provides an indication that the programme is effective in helping educators attain and maintain appropriate levels of student engaged time. Of 343 classrooms involved in the study, 59 per cent had engaged times corresponding with achievement above the expected level, 26 per cent had engaged times corresponding with achievement at the expected level, and only 15 per cent had engaged times corresponding with achievement below the expected level.

In one school 7 teachers used a team-teaching approach with groups of third and fourth-grade students and worked on increasing student engaged time. Three measures of student engaged time were obtained at the beginning of the programme, and one measure was obtained two months later. When individual teacher data were plotted on the third-grade reference graphs, student engaged time in reading/language arts was initially in the 'below expected' (2 teachers) or 'at expected' (5 teachers) zones. Two months later student engaged time was in the 'above expected' zones in three classrooms and in the 'at expected' zones in four classrooms. For mathematics, the initial measures were in the 'below expected' (4 teachers) or 'at expected' (3 teachers) zones, and two months later all 7 teachers were in the 'at expected' zone.

The changes between the average of the three initial measures and the ending measure were calculated for all seven classes. On the average, student engaged time increased by 15 minutes per day in reading/language arts (from 98 to 113 minutes) and by 7 minutes per day in mathematics (from 45 to 52 minutes). This increase may seem small,

but if the increased number of minutes had been maintained over one-half off the school year, students would be engaged in learning an additional 22 hours in reading/language arts and an additional 10 hours in mathematics.

Student Achievement

Although RBS personnel believe that achievement gains are more likely to result from proper implementation of all components of the ADL programme rather than emphasizing the time component alone, some data are available which suggest that significant achievement gains may occur when implementation of only the time component is emphasized.

Third and fourth-grade students at one school were tested using the Stanford Achievement Tests (Primary II, Primary III and Intermediate I) in March 1979 and May 1980. A norm-referenced model (similar to Model A for Title I evaluation) was used to analyze reading and mathemtics test scores (Graeber *et al.*, 1981). The results show that these students made an average gain of 4 percentiles in reading (55th to 59th percentile) and 12 percentiles in mathematics (from 47th to 59th percentiles). The gain in mathematics is statistically significant ($t = 3.58$ with 136 degrees of freedom, $p < 0.01$) and approaches the level of educational significance (one-third of the standard deviation of the national norm group) as defined by the Rand Corporation for Title I evaluation.

Significant gains in achievement were also made by students in seven classes in grades 1-5 at another school where administrators and teachers were involved in the development of the entire ADL programme. Previously unreported test results from the California Achievement Tests indicate average gains of 10 percentiles in reading (from 55th to 65th percentile) and 12 pecentiles in mathematics (from 51st to 63rd percentile) from the spring of 1979 to the spring of 1980. These gains were statistically significant ($t = 2.61$ for reading, $t = 3.43$ for maths with 133 degrees of freedom, $p < 0.01$). Students in nine classes in the same school continued to gain the next year, although these gains were less substantial; average gains were 3 percentiles in reading (from the 59th to the 62nd percentile), 8 percentiles in language (from the 68th to the 76th percentile), and 6 percentiles in mathematics (from the 59th to the 65th percentile). Thus, achievement gains slowed, but continued as the programme was expanded and institutionalized.

Discussion

The ADL programme, developed by Research for Better Schools, provides teachers and supervisors with a feasible approach to the use of existing research on student engaged time in order to improve instruction. While conclusions about the effectiveness of the approach are forthcoming, early experiences are promising. Research evidence on student engaged time can be used by teachers and administrators as the basis for an instructional improvement programme. Both teachers and administrators tend to find the programme beneficial. Furthermore, teachers report changes in their own behaviours and teaching practices. Changes in student engaged time also seem to occur in classes taught by teachers who participate in the programme.

The use of a four-stage instructional improvement cycle offers an opportunity for schools to build in-service experiences around needs identified by the teachers themselves. Principals and central office staff, working with teachers, can design in-service sessions for small groups of teachers who have identical or similar needs. The basis for designing effective in-service programmes for these teachers rests in the proper understanding and use of a research-based, decision-making process to effect changes in the classroom, school and district that improve students' use of a valuable resource, time.

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